

Visualising a complex ritual landscape

Gaining a new perspective on the Late Period/Early Ptolemaic sacred landscape of North Saqqara through the application of digital technologies

Volume 1

Scott Andrew Williams

Thesis submitted to Cardiff University

School of History, Archaeology and Religion

in fulfilment of the degree of Doctor of Philosophy in Archaeology

May 2018

Corrigenda

Page viii—Alter figure listing to read “Figure 3.19. Probable RAF/EAF aerial photograph of North Saqqara, dated ca.1929.”

Page viii —Alter figure listing to read “Figure 3.20. Probable RAF/EAF aerial photograph of North Saqqara, dated ca.1929. Numbered 3044.”

Page viii —Alter figure listing to read “Figure 3.21. Probable RAF/EAF aerial photograph of North Saqqara, dated ca.1929. Numbered 3045.”

Page x—Insert Davey so “Figure 5.2. The Davey, Jeffreys and Smith (1988, Fig. 1) plan of the Bubastieion and Anubieion enclosures...”

Page xv—remove ‘of’ in sentence “Standing inside of the Bubastieion South Gate...”.

Page xviii— Alter “Figure 8.46. (22)—Standing to the top...” to read “Figure 8.46. (22)—Standing at the top...”

Page xix—Figure 8.49 caption, change raise to rise

Page xxiii—Add ‘of Cardiff University’ after “Both Professor Paul Nicholson and Dr Steve Mills”.

Page 1—Change “display very little semblance of their former appearances” to read “display very little resemblance to their former appearances”.

Page 7—Amend citation (see Lehner 2008: 82–83) to read (see Lehner 2008, 82–83).

Page 33—Alter “to achieve an objective outcome; Merleau-Ponty however...” to read “to achieve an objective outcome. Merleau-Ponty however...”

Page 35—Alter “phenomenology produces qualitative data and ‘science’...” to read “phenomenology produces qualitative and non-metrical data and ‘science’...”.

Page 45—Remove “and so forth” from sentence.

Page 50—Amend “the Saqqara area is described as the ‘Plaine des Momies’ (Plain of Mummies)” to read “the Saqqara area is described as the ‘Plaine des Momies’ (Plain of Mummies) or ‘Plaine des Oiseaux’ (Plain of Birds)”.

Page 62—Amend Dachour to Dahchour.

Page 71— Amend geolocated to georeferenced.

Page 78—Alter sentence to read “Figure 3.19. Probable RAF/EAF aerial photograph of North Saqqara, dated ca.1929.”

Page 79—Alter sentence to read “Figure 3.20. Probable RAF/EAF aerial photograph of North Saqqara, dated ca.1929. Numbered 3044.”

Page 80—Alter sentence to read “Figure 3.21. Probable RAF/EAF aerial photograph of North Saqqara, dated ca.1929. Numbered 3045.”

Page 98—Change Finnmap to EGSA.

Page 98—Amend “the British Library (who hold copies but copyright restrictions apply), and the Egypt Exploration Society.” to read “the British Library, who hold copies, but copyright restrictions apply, and the Egypt Exploration Society, who hold paper copies.”

Page 106—Amend tolerance to distance.

Page 109—Amend “... from aerial photographs...” to read “...from Kentings aerial photographs...”

Page 130—Amend are to were to read “...the completed 3D feature models (as described previously) were copied...”

Page 138—Remove hyphen from “five-hundred”.

Page 142—Add ‘s’ after mean to read “an absence of excavation and the inaccuracies of historical plans means that information...”

Page 143—Add of into sentence to read “It is known from the of work Jeffreys and Smith ...”

Page 148—Insert Davey so “Figure 5.2. The Davey, Jeffreys and Smith (1988, Fig. 1) plan of the Bubastieion and Anubieion enclosures...”

Page 155—Close space before footnote reference number 9

Page 158—Change encapsulated to read covered.

Page 160—Add space between paragraphs.

Page 163—Add of into sentence to read “through the inclusion of digital assets representing small trees.”

Page 170—Amend footnote 2 to read “...either through choice, obligation or necessity.”

Page 173—Amend Principle to Principal.

Page 175—Remove it from sentence to read “...the graffiti in Horemheb’s tomb is unclear...”

Page 190—Change ‘and’ to ‘an’ to read “The SAN is located towards the northern extent of the necropolis and covers an extensive area.

Page 191—Remove which from sentence to read “due to later overlying structures and a large deposit of archaeological spoil...”

Page 199—Close space between sentences to read “...located (Smith 1974, 69–70). This collection...”

Page 203—Change diverges to differs.

Page 212—Remove apostrophe from it’s to read “The Serapeum Enclosure, its north gate and pylons...”

Page 218—Amend spelling of Asklepieion to Asklepieion.

Page 218—Remove apostrophe from Athenian’s to read Athenians

Page 237—Alter “They describe their journey around the necropolis...” to read “S/he describes their journey around the necropolis...”

Page 238—Alter “like one might expect from a modern Baedeker.” to read “as one might expect from a modern Baedeker.”

Page 238—Change neither to nor

Page 277—Alter “Figure 8.46. (22)—Standing to the top of the slope to the dromos...” to read “Figure 8.46. (22)—Standing at the top of the slope to the dromos...”

Page 279—Figure 8.49 caption, change raise to rise.

Page 328—Remove duplicate paragraph.

Page 338—Add letter t to no, so sentence reads “did not permit construction.”

Page 343—Change function to consequence so “A consequence of its relationship...”

Page 359—Capital B and C for Baboon Catacombs.

Page 389—Alter “Brown, K.M. 2010. A pluralistic contextual approach for the interpretation of Egyptian archaeological sites. Unpublished thesis.” to read “Brown, K.M. 2010. A pluralistic contextual approach for the interpretation of Egyptian archaeological sites. Cardiff University: Unpublished PhD thesis.”

Page 393—Include reference: Jeffreys, D., and Tavares, A. 2000. An integrated mapping project for the Saqqara plateau and escarpment. In M. Bárta and J. Krejčí (Eds), *Abusir and Saqqara in the year 2000*. Prague: Academy of Sciences of the Czech Republic. 27–32.

Page 393—Include reference: Jeffreys, D. 2010a. *The Survey of Memphis. VII, The Hekekyan Papers and other sources for the Survey of Memphis*. London: Egypt Exploration Society.

Page 395—Include reference: Lauer, J. and Picard, C. 1955. *Les statues ptolémaïques du Sarapieion de Memphis*. Paris: Presses universitaires de France.

Page 395—Include reference: Jeffreys, D. 2010b. Regionality, Cultural and Cultic Landscapes. In W. Wendrich (ed), *Egyptian Archaeology*. Malden, MA: Wiley-Blackwell. 102–118.

Page 400—Include reference: Swelim, N. 1988. The Dry Moat of the Netjerykhet Complex. In J. Baines, T.G.H. James, A. Leahy, and A.F. Shore (eds), *Pyramid Studies and other essays presented to I.E.S Edwards*. London: Egypt Exploration Society. 12–22.

Page 400—Include reference: Swelim, N. 2006. The Dry Moat, the South Rock Wall of the Inner South Channel. In E. Czerny, I. Hein, H. Hunger, D. Melman, and A. Schwab (eds), *Timelines, Studies in Honour of Manfred Bietak Volume 1*, Orientalia Lovaniensia Analecta. 363–376.

Page 405—Alter “Situated on the desert escarpment west of the cultivation.” to read “Situated on the eastern edge of the desert escarpment, west of the cultivation.

SUMMARY

The Late Period (747–332 BC)/Early Ptolemaic (332–30 BC) monuments at the necropolis of North Saqqara have historically been investigated either in isolation or within small spatially close groups. The monuments have rarely been compared within their wider landscape setting, or their relationship with the topography upon which they are imposed considered. This study seeks to redress the situation for the monuments associated with the sacred animal cults through the investigation of topographic associations, monument interconnectedness, and affordances and entanglements within the sacred landscape.

To achieve this, a new and detailed GIS (Geographical Information System) of the North Saqqara and South Abusir archaeological areas was researched and compiled, as there was no other currently available. The GIS provided the foundation for the construction of an innovative multi-layered digital 3D representation of the ancient necropolis, which was used to examine the landscape from a terrestrial viewpoint. This was fundamental to developing an holistic understanding of a sacred landscape which is no longer wholly extant. By employing the creative power of digital reconstruction, the task of visualisation and the investigation of divergent viewpoints becomes achievable in ways that otherwise might not be possible.

The employment of archaeological theory, not previously applied widely within the field of Egyptological studies, has permitted a nuanced interpretation of the funerary landscape visualised through the digital representation. Investigation of the landscape in this manner has offered new perspectives into the place of the monuments, and their topographic and interconnected relationships: a correlation between the sacred animal monuments, networks of movement, and specific milieus of terrain has been recognised; a mechanism of visual performance employed by the monument builders has been identified; and a new mixed-media narrative account of the landscape has been constructed.

Table of Contents

Volume 1

TABLE OF CONTENTS.....	i
LIST OF FIGURES.....	vii
LIST OF TABLES.....	xxxi
ACKNOWLEDGEMENTS	xxxiii
CHAPTER 1	1
Introduction.....	1
Why is a new perspective required?.....	1
Purpose of the study.....	2
Aims	2
Primary research questions.....	3
Secondary research questions	4
Objectives.....	5
The location and importance of Saqqara	6
The geographical study area	8
Late Period/Early Ptolemaic	11
Theoretical approach.....	14
Archaeological Documentation.....	14
Methodology	15
Rationalising the landscape representation	15
A dynamic landscape	16
Landscape narratives	16
Discussion and conclusion.....	17

CHAPTER 2	19
Archaeological theory.....	19
Introduction	19
Theoretical approach	19
Summary	47
CHAPTER 3	49
Archaeological documentation	49
Introduction	49
General archaeological maps of Saqqara	49
Partial archaeological maps of Saqqara	71
Maps of non-archaeological designation	72
Aerial photogrammetries and satellite imagery	72
Data discordance	84
Attribute-data	85
CHAPTER 4	87
Constructing a digital representation of Saqqara.....	87
Introduction	87
Structured development process	87
1. Software license	89
2. Software packages.....	92
3. Software assessment.....	93
4. Constructing a terrain model.....	97
5. Researching the GIS.....	112
6. Drafting plans and constructing the structure models.....	118
7. Constructing the GIS.....	127
8. Compiling the landscape model	129
Summary	131

CHAPTER 5	133
The digital landscape representation.....	133
Introduction	133
Constraints of the study	133
Methodology for depicting the LP/EP sacred landscape	137
Summary	165
CHAPTER 6	167
The Memphite necropolis.....	167
Introduction	167
The ancient necropolis of Memphis	168
Life at the necropolis	169
Summary	199
CHAPTER 7	203
Challenging the narrative.....	203
Introduction	203
A brief review of the landscape narratives.....	204
Critiquing the narratives.....	210
Summary	234
CHAPTER 8	237
Developing a new narrative	237
Introduction	237
CHAPTER 9	321
Discussion.....	321
Introduction	321
Affordances and entanglement in a monumental landscape	322

CHAPTER 10.....	375
Conclusion	375
Purpose of the study.....	375
Contributions to knowledge.....	375
Practical considerations.....	376
Generating data.....	377
Topography, affordances, and the ‘conceal and reveal’ mechanism.....	378
Networks of movement and nodes of entanglement.....	380
Recommendations for future work.....	383
BIBLIOGRAPHY	387
Publications	387
Cartography	402
Online	402

Volume 2

APPENDIX 1.....	405
Glossary and Abbreviations.....	405
Egyptian place-names.....	410
APPENDIX 2.....	413
GIS map book and attribute data.....	413
Map book.....	414
APPENDIX 3.....	475
Gazetteer of impediments.....	475

APPENDIX 4.....	485
Map transformations.....	485
APPENDIX 5.....	491
Map contour amendments.....	491

List of Figures

Figure 1.1. General location of Saqqara within Egypt (after Shaw and Nicholson 2008, 6).	7
Figure 1.2. The general project study area within the Saqqara necropolis, defined by the dashed yellow line (source author).	10
Figure 2.1. A coordinatised map depicting the Serapeum Enclosure. Projected in the WGS 84 UTM Zone 36N coordinate system (source author).	26
Figure 2.2. A relative location map showing the New Kingdom tomb group containing Horemheb’s tomb. Although a north arrow is present, no reference scale has been included which can limit the scope of use, depending on the requirements (source author).....	27
Figure 3.1. Description de l’Egypte map, Vol. 5 Antiquities V. Memphis et environs. Plan général de l’emplacement de Memphis et des environs (Description 1809–1826, Antiquités V, Planche 1).	51
Figure 3.2. Description de l’Egypte map, Vol.6 Atlas Géographique. Carte Topographique, Memphis (Description 1809–1826, Atlas Géographique, Planche 21).....	52
Figure 3.3. Perring and Vyse—Pyramids of Saccara (Vyse 1842, 37).	54
Figure 3.4. Lepsius—Composition of South Saqqara, North Saqqara and Abusir (Lepsius 1849, Abth. I. Bl. 32, 33, 34).	55
Figure 3.5. Lepsius—Detail of Pyramiden und Todtenfeld von Saqara (Lepsius 1849, Abth. I. Bl. 33).....	56
Figure 3.6. Mariette—La Nécropole de Saqqarah (Mariette 1885).....	58
Figure 3.7. Mariette—Plan de la Nécropole de Memphis (Mariette 1856, PL.II).	59
Figure 3.8. Mariette—Sérapéum de Memphis (Mariette 1856).....	60
Figure 3.9. Rhoné—Sérapéum de Memphis (Rhoné 1877, 216).	61
Figure 3.10. de Morgan—Carte de la nécropole Memphite, Dachour, Sakkarah, Abou- sir—The Serapeum (de Morgan 1897, 11).....	63

Figure 3.11. de Morgan—Carte de la nécropole Memphite, Dachour, Sakkarah, Abou-sir—The North Saqqara necropolis (de Morgan 1897, 10).....	64
Figure 3.12. Smith—Map of the Saqqarah Cemetery (Smith 1936, Map ii).	66
Figure 3.13. Spencer—The Saqqara Necropolis (Spencer 1974, Tab.I).....	67
Figure 3.14. Lauer—Allgemeiner Lageplan von Saqqara (Lauer 1976, 8–9).....	69
Figure 3.15. Porter and Moss—Composite of all North Saqqara maps (Porter and Moss 1981).	70
Figure 3.16. Ministère de l'Habitat et de la Reconstruction (MHR) Topographic Series 1:5000 Scale (Cairo 1978) Sheet H:21—Abusir.	75
Figure 3.17. Ministère de l'Habitat et de la Reconstruction (MHR) Topographic Series 1:5000 Scale (Cairo 1978) Sheet H:22—North Saqqara.....	76
Figure 3.18. Ministère de l'Habitat et de la Reconstruction (MHR) Topographic Series 1:5000 Scale (Cairo 1978) Sheet H:23—South Saqqara.....	77
Figure 3.19. Aerial photograph of North Saqqara. Provenance unknown, dated ca.1929.	78
Figure 3.20. Aerial photograph of North Saqqara. Provenance unknown, dated ca.1929. Numbered 3044.	79
Figure 3.21. Aerial photograph of North Saqqara. Provenance unknown, dated ca.1929. Numbered 3045.	80
Figure 3.22. RAF aerial photograph of North Saqqara, dated August 3rd, 1947. Numbered 5063 V 13.....	81
Figure 3.23. RAF aerial photograph of North Saqqara including a partial of South Saqqara, dated August 3rd, 1947. Numbered 5107 V 13.....	82
Figure 3.24. Aerial photograph of North Saqqara. Provenance and date unknown.	83
Figure 4.1. 52m contour line displayed at 1:20 scale (source author).	103
Figure 4.2. 52m contour line displayed at 1:40 scale (source author).	103
Figure 4.3. The blue squares denote the vertices of the polyline, note the close spacing around the curve (source author).	104
Figure 4.4. The polyline created by closely spacing the vertices (source author).	104
Figure 4.5. MHR1978 base map showing contours, spot-height elevation values and breaklines (source author).....	105

Figure 4.6. Digitised contours and spot-height elevations—shown in yellow (source author).....	106
Figure 4.7. Digitised contours and breaklines—shown in blue (source author).....	107
Figure 4.8. GPS data capture locations described above (source author).	116
Figure 4.9. Plan of Tomb S3503 (Emery 1972, 67) attached to the CAD document and scaled to 1:1 (source author).....	120
Figure 4.10. Polyline drawing of Tomb S3503 overlaid on the plan (source author). ...	121
Figure 4.11. Detail of Tomb S3503 polylines (source author).....	121
Figure 4.12. Tomb superstructure extruded to 5m with a taper of 1d30'0" applied. Viewed from a south-west isometric angle and displayed using x-ray style (source author). ...	123
Figure 4.13. Compound niches and false door niches extruded to 5m. The tomb superstructure has been isolated and hidden for clarity (source author).	123
Figure 4.14. The tomb superstructure after implementing the SUBTRACT command (source author).	124
Figure 4.15. The enclosure wall and internal platform after the EXTRUSION command was applied (source author).....	124
Figure 4.16. The extruded grave superstructure and cylinder which will form the rounded top (source author).....	125
Figure 4.17. The shape formed by the intersection of the block and cylinder, creating the grave superstructure (source author).	125
Figure 4.18. The completed tomb, enclosure wall and subsidiary graves (source author).	126
Figure 4.19. The completed structure model rendered with shadows included (source author).....	126
Figure 4.20. Georeferenced structure models relative to the MHR1978 map (source author).....	127
Figure 4.21. Georeferenced structure models relative to the new cartography (Kotob <i>et al.</i> 2003, 317–341), note the 'new cartography' misalignments (source author).	128
Figure 4.22. Georeferenced structure models relative to the satellite imagery (source author).....	129
Figure 4.23. The structure model at 0 elevation, situated beneath the TIN surface (source author).....	130

Figure 4.24. The structure model elevated to the TIN surface (source author).....	131
Figure 5.1. The UCL Anubieion/Bubastieion VRML model (see footnote 7) viewed with the Windows 10 3D Builder application. The model is shown from an elevated view facing west-north-west.	144
Figure 5.2. The Jeffreys and Smith (1988, Fig. 1) plan of the Bubastieion and Anubieion enclosures (see Figure 5.5 for the location of the Serapeum Way).	148
Figure 5.3. Mariette's (1856) plan of the Bubastieion and Anubieion enclosures. The Anubieion is designated the Sérapéum Grec.....	149
Figure 5.4. de Morgan's (1897, 10) plan of the Bubastieion and Anubieion, also designated Serapeum Grec. This plan also includes the location and plans of the Dog Catacombs to the north of the Anubieion enclosure.....	149
Figure 5.5. The Anubieion ground plan, in red, central to the image. The discontinuous remains of the Serapeum Way path can be seen entering the area of the Anubieion from the north-north-east (see also Figure 5.2) (source author).	150
Figure 5.6. The possible southern wall of the Serapeum Way, perpendicular to the Anubieion western wall. The pyramid of Teti is visible in the background with various structures of the Teti north cemetery visible to the right of the image (photo author).	151
Figure 5.7. The MHR1978 map with the SGSP survey data (Mathieson and Dittmer 2007) overlaid. With thanks to Adel Okasha Khafagi of the Egyptian Antiquities Service for making this data available.....	154
Figure 5.8. Detail of the Serapeum Way as defined by the SGSP GPR data (Mathieson and Dittmer 2007).	155
Figure 5.9. Interpretation of the structures to the north of the Serapeum Precinct, based on SGSP GPR data (Mathieson and Dittmer 2007) (source author).	160
Figure 6.1. Locations of the ancient place-names of the Memphite necropolis at North Saqqara (source author).	169
Figure 6.2. The Wadi Valley Road at the northern end of the necropolis. Structure plans are overlaid on the MHR1978 map and SGSP survey data (Mathieson and Dittmer 2007) (source author).	172
Figure 6.3. The modern route up the escarpment, indicated by the blue arrow (source author).	174

Figure 6.4. Decaying mastaba tombs situated alongside the Serapeum Way, seen here protruding from the overburden of sand (to the left and right of the image) (photo author).....	178
Figure 6.5. The tomb of Bakenrenef set into the desert escarpment. The modern motor road can be seen to the right of the tomb (source author).	179
Figure 6.6. The temple enclosures of the Bubastieion and Anubieion. Potential settlement locations are marked in pale-yellow (source author).	182
Figure 6.7. The location of the Bes chambers within the Anubieion complex (source author).....	183
Figure 6.8. The Serapeum temple complex. Potential settlement locations are marked in yellow (source author).	186
Figure 6.9. Macramallah’s location plan (1940, PL.I), georeferenced and shown with the Serapeum complex overlaid (source author).....	188
Figure 6.10. Possible settlement archaeology shown as hatched lines on the Mariette plan (Mariette 1856, Pl.II).....	189
Figure 6.11. The SAN and Wadi Valley Road, potential settlement locations are marked (source author).	191
Figure 6.12. Location of the South House in relation to the SAN MTE (source author).	193
Figure 6.13. The SGSP geophysical survey data of the area of the Wadi Valley Road between the Abusir South tombs and the SAN (source author).	194
Figure 6.14. Interpretation (drawn in purple) of the potential structures depicted in the SGSP survey data of the Wadi Valley Road area (source author).	196
Figure 6.15. The postulated route of the ‘Wadi Valley Road’ leading into the necropolis and towards the SAN is indicated by the black arrows (source author).....	197
Figure 6.16. Two possible pathways in the Wadi Valley Road visible in the SGSP survey data (Mathieson and Dittmer 2007) (source author).....	198
Figure 7.1. The possible routes used within the necropolis by the protagonists in the Smith (1974) narrative account. The routes are marked as dashed lines due to their uncertain locations as described in the text. “?” indicates the uncertainty associated with access or distance taken along a route. Memphis is not included on this plan (source author). .	205

Figure 7.2. The routes used within the necropolis throughout the course of the Nicholson (2016) narrative account (source author)..... 208

Figure 7.3. View towards the Serapeum from the wadi valley, facing south-south-west. The South Ibis garden and catacombs are located some 60m to the left of the image. The north gate of the Serapeum Enclosure is approximately 530m away. It is possible that there may have been hostelries and other buildings in the foreground further obscuring the view (source author)..... 213

Figure 7.4. Standing outside of the entrance to the South Ibis garden, facing south-west, gives a clearer view of the Serapeum Precinct than when standing in the wadi valley (source author)..... 213

Figure 7.5. The probable southern approach towards the south gate of the Bubastieion, the tomb of Bakenrenef is to the left of the image. Facing north (source author). 214

Figure 7.6. Possible view of the Anubieion complex when approached from the lower terraces of the cultivation. Facing west (source author). 215

Figure 7.7. Possible view when travelling around the promontory of the plateau towards the Lake of Pharaoh and the wadi valley. Facing north-west (source author). 215

Figure 7.8. The congested wadi valley as it may have appeared during the LP/EP. Facing south-south-west (source author). 217

Figure 7.9. Approaching the Bubastieion South Gate from the route leading past the tomb of Bakenrenef. Facing north (source author)..... 219

Figure 7.10. The approach to the South Ibis garden taken by Smith’s protagonists. Facing south-east. Smith (1974, 70) suggests a “winding sacred way” leading from the valley to the catacomb, however, Martin (1981, 12) suggests that no such ceremonial approach existed and access was gained over a deposit of excavation chippings. (source author). 220

Figure 7.11. A conjectural view from the Serapeum Way towards the Abusir pyramids and the SAN. The denuded remnants of Old Kingdom mastaba tombs are visible in the middle-distance (source author)..... 221

Figure 7.12. This panorama towards the north allows a better view of the Old Kingdom mastaba ruins (the dark brown features), which are situated between 90m–460m distant from the Serapeum Way (source author)..... 221

Figure 7.13. Approaching the Serapeum Dromos, facing east (source author). 222

Figure 7.14. A closer view of the Serapeum Dromos, facing east (source author)..... 223

Figure 7.15. A reconstruction of the East Temple of Nectanebo II, as viewed upon arrival at the Serapeum Dromos. Facing south-east. The Philosopher’s Hemicycle has been represented as orthostatic blocks (source author). 223

Figure 7.16. The Barbot lithograph, looking east from the Serapeum (Ray 1976, Plate I). 224

Figure 7.17. A reconstruction of the Serapeum Dromos area, which recreates the perspective of the Barbot lithograph. Facing east (source author)..... 224

Figure 7.18. A view of the small temples to the south of the dromos from the same location as the Barbot drawing. Facing south-east (source author)..... 225

Figure 7.19. The gate of Nectanebo I illustrated by de Bar (1858, 144), after a drawing by Barbot..... 226

Figure 7.20. Facing west towards the Serapeum temple and the gate of Nectanebo I, viewed from a slightly oblique angle (source author). 226

Figure 7.21. A projection of the North-South Sacred Way from the SAN MTE towards the Serapeum Precinct (source author)..... 227

Figure 7.22. The south gate of the SAN MTE as it may have been seen from the North-South Sacred Way. To the right of the image is a reconstruction of the pillared-portico (see Smith *et al.* 2006, 97) situated to the south of the SAN MTE. To the left of the image is a reconstruction of Block 1 of the Southern Dependencies. Just out of the image, a reconstructed peripteral temple has been placed atop the platform of the block to represent the type of structure which may have been present there (see Martin 1981, 17–18 and Fig.31) (source author). 229

Figure 7.23. The western approach to the SAN MTE towards brick-built pylon of Nectanebo II, seen from the wadi road. The temple structure on the right of the image is the conjectural peripteral temple set atop Block 1 of the Southern Dependencies (source author)..... 229

Figure 7.24. A view towards the gate leading to the dromos of the baboon catacombs. Mastaba S3518 is visible on the crest of the escarpment above the temple-complex (source author). 230

Figure 7.25. View towards the Lake of Pharaoh from the entrance to the wadi valley, facing north. The pyramids of Abusir are visible to the north west—left of image. A small

number of earlier tombs are known to exist between this viewpoint and the pyramids. As denuded structures during the LP/EP they are not visible from here (source author). 231

Figure 7.26. View towards the Lake of Pharaoh from the garden of the North Ibis catacombs. The time-of-day has been altered—to early morning—to accentuate the elevation of the garden above the wadi valley. Without some form of shading a false representation is given (source author)..... 232

Figure 7.27. View towards the south from the North Ibis garden, facing the escarpment of the plateau. The vaulted entrance to the North Ibis catacombs is against the escarpment, between the walls to the right of the image (source author)..... 232

Figure 8.1. Map 1—General overview of the Memphite necropolis of North Saqqara. The route proposed by the narrative account is shown as a blue line. Detail maps used throughout the narrative depict view locations using numbered circles as described above (source author)..... 242

Figure 8.2. Map 2—The southern route to the necropolis, arriving from the direction of Memphis. The blue arrows indicate the direction of view (source author)..... 244

Figure 8.3. **(1)**—Looking west towards the Unas valley temple ruin located at the far edge of the lake. The pyramid of Unas is visible to the left of centre. The Step Pyramid of Djoser is located to the centre. The tomb forecourt of Bakenrenef, partway up the escarpment is just visible towards the right of the image. The ruined Teti pyramid and enclosure wall of the Bubastieion are visible to the right (source author)..... 245

Figure 8.4. **(1)**—Looking northwest from the same position. Part of the Unas valley temple is visible to the left of the image, along with the Step Pyramid. The top of the Teti pyramid is situated beyond the Bubastieion complex which is visible to the centre-right (source author). 245

Figure 8.5. **(2)**—Standing on the pathway at the edge of the escarpment, leading to the Bubastieion temple complex. Facing to the north, the pylon gateway and part of the forecourt of Bakenrenef’s tomb are visible on the left atop the sandy slope, set against the escarpment edge. Beyond the escarpment, the pylon of the Bubastieion south gate and its enclosure walls are clearly visible (source author)..... 246

Figure 8.6. **(3)**—Looking from the road towards the pylon-gated courtyard of Bakenrenef’s tomb. The south gate of the Bubastieion is just visible behind the terrain to the right of the image (source author)..... 247

Figure 8.7. Map 3—The Bubastieion area (source author).	248
Figure 8.8. (4) —Facing north, towards the Bubastieion south gate (source author).	249
Figure 8.9. (5) —Standing beside the Bubastieion south gate, facing west up towards the plateau. The top tier of the Step Pyramid is just visible (centre) at the top of the rise (source author).	249
Figure 8.10. (6) —Standing inside of the Bubastieion South Gate facing north-north-east offers a view of the densely packed settlement within the enclosure (source author).	250
Figure 8.11. (7) —A view from the base of the main stairway of the Bubastieion leading up to the Temple of the Peak (source author).	251
Figure 8.12. (8) —Standing at the top of the main stairway, facing east towards the pylon gated enclosure of the Temple of the Peak (source author).	251
Figure 8.13. (8) —A view looking south towards the north gate of the Bubastieion enclosure, from the same location as (Figure 8.12) (source author).	252
Figure 8.14. (9) —Standing in the Bubastieion north gateway, facing south towards the central temple enclosure(source author).	252
Figure 8.15. (9) —A view of the causeway joining the Bubastieion north gate with the Anubieion south gate. Facing north towards the Anubieion.	253
Figure 8.16. Map 4—The Anubieion area (source author).	254
Figure 8.17. (10) —A view towards the Bes Chambers (image centre), facing east. The south gate of the Anubieion is to the right of the image (source author).	255
Figure 8.18. (10) —Within the Anubieion enclosure, facing north. The central temple of the Anubieion is situated within the compound to the right of the image. To the west (left) of the temple are structures of the settlement, which also extend further north (source author).	256
Figure 8.19. (10) —Facing north-west towards the settlement situated west of the central temple (right of image). Behind the settlement buildings the western pylon gate of the Serapeum Way is visible (source author).	256
Figure 8.20. (11) —A view from the edge of the upper terrace of the Anubieion, facing north-north-east. The lower terraces are visible, and a small temple is situated in the foreground (source author).	257
Figure 8.21. (12) —Standing in the east gate of the Anubieion enclosure on the Serapeum Way. Facing east-south-east along the steps to the first terrace (source author).	258

Figure 8.22. **(13)**—Standing on the Serapeum Way at the edge of the first terrace, facing south towards the stairs to the central temple. At the top of the stairs—on the second terrace—the pylon gateway to the temple enclosure is visible. The small temple from (8.17) is visible to the east (left) of the steps (source author)..... 259

Figure 8.23. **(13)**—Standing in the same location as (8.18) facing westwards, along the Serapeum Way. The stairs lead up to the second terrace. The central temple pylon-gate and enclosure are visible to the left, to the right is a revetment wall, and situated behind and to its left is the western gateway of the Anubieion enclosure (source author). 259

Figure 8.24. **(13)**—Standing in the same location as (8.18) facing north, towards the gate which opens onto the pathway leading to the Dog Catacombs (source author). 260

Figure 8.25. **(14)**—Standing on the Serapeum Way within the Anubieion enclosure, facing west towards the pylon gateway that leads out into the necropolis. To the north (right) and south (left) are the buildings of the settlement (source author). 261

Figure 8.26. **(15)**—Standing before the west gate of the Anubieion facing west along the Serapeum Way (source author)..... 261

Figure 8.27. Map 5—The Serapeum Way (source author). 262

Figure 8.28. **(16)**—Standing just beyond the Anubieion west gate on the Serapeum Way facing west. The ruin of the Teti pyramid is visible to the left of the image, the ruin of the pyramid of Khuit II lies to the right of the image. Boundary walls are visible either side of the Serapeum Way (source author)..... 263

Figure 8.29. **(16)**—Facing south-west towards the pyramid of Teti. The southern boundary wall flanking the ceremonial way screens the view further south at this location (source author). 264

Figure 8.30. **(16)**—Facing north-west towards the ruined pyramids of Khuit II (left) and Iput (right). The pyramids at Abusir are just visible in the far distance (source author). 264

Figure 8.31. **(17)**—Standing on the Serapeum Way facing south-west. The pyramid of Userkaf is visible in the foreground, with the Step Pyramid of Djoser behind to the right. In the far distance to the left of the image the pyramids of South Saqqara are visible (source author). 265

Figure 8.32. **(17)**—The view westwards from a rise in the terrain along the ceremonial way. The Serapeum Precinct is just visible to the right of centre in the distance (A). To the

left, denuded mud-brick tombs and the Step Pyramid enclosure are just visible (B) (source author).....	266
Figure 8.33. (18) —Standing on the Serapeum Way facing north. Dark mud-brick ruins of tombs are visible beyond the flanking boundary wall. To the left of the image, in the distance, the south gate and enclosure walls of the main temple enclosure of the Sacred Animals are just visible (source author).	267
Figure 8.34. (18) —Standing on the Serapeum Way facing south-west. Low mounds are visible beyond the boundary wall revealing the dark mud-brick ruins of tombs (source author).....	267
Figure 8.35. (19) —Standing beside the tombs to the south of the Serapeum Way, facing west. The boundary wall to the south is discontinued here. The alignment of shrines and temples bordering the south of the Serapeum Precinct are visible in the distance to the left of the image (A), with the northern alignment to the right of the image (B). The pylon gates of the Serapeum temple enclosure are just visible in the centre of the image (C) (source author).	268
Figure 8.36. (20) —Farther along the Serapeum Way, nearing the dromos, facing west. To the south of the ceremonial way, the tombs increase in number closer to the Serapeum Precinct. The sacred mound and 3 rd Dynasty stepped feature are visible in the far distance, to the right of the image (A) (source author).....	268
Figure 8.37. Map 6—The Serapeum Way and precinct. The magenta arrows indicated the view when travelling east (source author).....	270
Figure 8.38. (21) —Approaching the dromos and Serapeum Precinct. The pylon gateways of the temple enclosure are visible between the sphinxes as the ceremonial way turns to the south. The East Temple of Nectanebo II is visible beyond the sphinxes towards the left of the image (A) (source author).	271
Figure 8.39. (22) —Facing north from the Serapeum Way by the slope to the dromos. In the far distance, the pyramids at Abusir are visible. The row of shrines and temples to the north of the Serapeum Precinct are visible in the near distance (A). The settlement within the wadi valley can just be seen before the Lake of Pharaoh to the centre of the image (B), and the main temple enclosure of the Sacred Animals and its Southern Dependencies are visible to the right of the image (C). The boundary wall to the north of the ceremonial way does not extend this far along the route (source author).	271

Figure 8.40. **(22)**—Approaching the slope down to the Serapeum dromos, facing south-west. The East Temple of Nectanebo II is to the left of the image, and the Greek Temple and Egyptian Sanctuary are visible in front of the pylon gate into the Serapeum Enclosure to the centre-right of the image (source author). 272

Figure 8.41. **(23)**—Standing by the Serapeum dromos, facing south-east towards the East Temple of Nectanebo II. The hemicycle of philosopher statues (represented by blocks) is to the right of the image (source author). 273

Figure 8.42. **(23)**—Looking at the Serapeum dromos, facing south-west towards the *pastophoria* at the rear-centre of the image (source author). 274

Figure 8.43. **(24)**—Standing beside the Philosopher's Hemicycle facing west towards the Gate of Nectanebo I (centre) and the entrance to the Serapeum Enclosure. The *pastophoria* are situated towards the left of the image. Against the boundary wall to the right of the image are the Egyptian Sanctuary and the Greek Temple. The position of statuary set atop the walls are represented by blocks in the digital model (source author). 275

Figure 8.44. **(25)**—Standing before the Gate of Nectanebo I. The *pastophoria* are situated towards the left of the image and this position provides a closer view of the Egyptian Sanctuary (right foreground) and the Greek Temple (right, behind the sanctuary) (source author). 275

Figure 8.45. **(25)**—Facing east along the Serapeum dromos towards the East Temple of Nectanebo II. The sphinx flanked Serapeum Way leads south from the dromos then turns to the east (left of image) (source author). 276

Figure 8.46. **(22)**—Standing to the top of the slope to the dromos facing east along the Serapeum Way. The tombs to the south of the route are visible to the right of the image, behind which is the ruined pyramid of Teti. In the far distance, the Anubieion enclosure and pylon gateway are barely visible (centre of image) (source author)..... 277

Figure 8.47. **(20)**—Standing beside the tombs to the south of the ceremonial route. The Anubieion enclosure has become screened from view in the far distance (centre of image) (source author). 278

Figure 8.48. **(19)**—Facing east, past the tombs to the south of the Serapeum Way, the Anubieion enclosure is once again visible in the distance (source author). 278

Figure 8.49. (18) —Facing east along the Serapeum Way. The raise in the terrain screens the Anubieion and Bubastieion enclosures from view. The ruined pyramid of Teti is visible at the top of the ridge (source author).	279
Figure 8.50. (17) —Moving further towards the east along the ceremonial way the Anubieion is brought into view (source author).	279
Figure 8.51. Map 7—North of the Anubieion, towards the Dog Catacombs (source author).	280
Figure 8.52. (26) —Standing outside of the Anubieion north gate, facing north towards the dog catacombs which are screened from view at this location by the terrain. The Lake of Pharaoh is just visible in the far distance (source author).	281
Figure 8.53. (26) —Standing outside of the Anubieion north gate, facing west up towards the plateau (source author).	281
Figure 8.54. (27) —Standing on the pathway at the bottom of the escarpment facing west up towards the steps which lead to the courtyards of the Dog Catacombs (source author).	282
Figure 8.55. (28) —Standing before the courtyard and entrance of the larger Dog Catacomb, facing west (source author).	283
Figure 8.56. (28) —Facing south towards the courtyard and entrance of the smaller Dog Catacomb (source author).	283
Figure 8.57. Map 8—The northern end of the desert escarpment and area of Lake of Pharaoh (source author).	285
Figure 8.58. (29) —Looking up the escarpment towards the plateau, facing west. The decaying mud-brick of a denuded tomb is visible near the edge of the escarpment (source author).	286
Figure 8.59. (30) —Standing at the northern end of the desert escarpment, facing northwest, looking towards the Lake of Pharaoh. The pyramids of <i>Pr Wsir</i> (Abusir) are to the left of the image (source author).	286
Figure 8.60. (31) —Standing near the Lake of Pharaoh facing south-west towards the entrance to the Wadi Valley Road. The buildings of the small settlement are visible across the wadi (A). Behind the settlement, on the western escarpment, denuded mud-brick tombs are visible (B). The sacred mound with its Old Kingdom stepped structure is visible in the far distance (C) (source author).	287

Figure 8.61. **(31)**—Standing near the Lake of Pharaoh, facing south-south-east. From this distance, the North Ibis garden is barely visible (A). The top two tiers of the Step Pyramid are just visible in the distance (B), the rest of the structure being obscured by the sand ridge in the terrain. The pylon gate and enclosure wall of the main temple enclosure of the Sacred Animals are just visible (C) (source author)..... 288

Figure 8.62. Map 9—The North ibis catacombs and the area of the main temple enclosure of the Sacred Animals (source author)..... 289

Figure 8.63. **(32)**—Standing in the garden courtyard of the North Ibis catacombs facing north-north-west towards the Lake of Pharaoh. The pyramids of Abusir are visible in the distance (source author)..... 290

Figure 8.64. **(32)**—Standing in the garden courtyard of the North Ibis catacombs facing south towards the vaulted entrance to the subterranean tunnels. Denuded mud-brick tombs are visible at the top of the escarpment (source author). 290

Figure 8.65. **(33)**—Standing in the Wadi Valley Road after descending the slope from the North Ibis Catacombs, facing south-south-west. The buildings of the small settlement stretch across the wadi valley. The Southern Dependencies are just visible (A), as is the Step Pyramid in the distance (B) (source author)..... 291

Figure 8.66. **(33)**—The view of the temple terrace of *H_p-nb.s* from the wadi valley when looking towards the south-east. The pylon gateway and enclosure walls are clearly visible atop the sandy rise (A). To the south of the enclosure is a temple structure of the Southern Dependencies (B), and the Step Pyramid is visible in the distance (source author). 292

Figure 8.67. **(34)**—Standing in the Wadi Valley Road, facing east towards the temple terrace of *H_p-nb.s*. To the right of the entrance ramp, the small gatekeepers hut is just visible. A denuded mud-brick tomb can be seen emerging from the sand at the front-right of the image. Two small structures are in front of the main temple enclosure of the Sacred Animals, to the right of the image. The North-South Sacred Way and the beginning of the Southern Dependencies are behind the structures. The pylon gate to the right of the image belongs to Block 1 of the Southern Dependencies (source author). 293

Figure 8.68. **(35)**—Standing within the western gateway of the main temple enclosure of the Sacred Animals, facing east towards Courtyard A. The North-South Sacred Way can be seen running from left to right across the terrace. To the left of the courtyard pylons

is the entrance to Precinct D. To the right the entrance to Gate C and the Baboon Precinct is visible (source author).	294
Figure 8.69. (35) —Standing within the western gateway of the main temple enclosure of the Sacred Animals, facing east-north-east towards the Northern Enclosure where the Mother of Apis catacombs are located (source author).	295
Figure 8.70. (35) —Standing on the pathway leading to Courtyard A, facing east into the courtyard towards the Sanctuary (source author).	296
Figure 8.71. (35) —Standing within the western gateway of the main temple enclosure of the Sacred Animals, facing south-south-east towards the entrance to the Baboon Precinct (A) and the Falcon Precinct (B). The north-south partition wall divides the Falcon Precinct from the rest of the terrace and the entrance to the catacombs is within the sanctuary. The South Gate to the main temple enclosure of the Sacred Animals is towards the right of the image where the North-South Sacred Way exits the compound (source author).	297
Figure 8.72. (36) —Standing on the North-South Sacred Way facing east towards the Baboon vaults and precinct. The gateway to the left leads to a sanctuary which stands before the earliest baboon vaults. The gateway to the right accesses the Baboon Precinct and dromos which leads to the Baboon Catacombs. The doorway in the wall between the two gates is the chapel of the ‘Hearing Ear’. On top of the escarpment above the catacomb vault entrances, the denuded remains of a large Old Kingdom tomb is visible (source author).	298
Figure 8.73. (37) —Beside the South Gate of the main temple enclosure of the Sacred Animals, facing west. A peripteral temple is situated atop a platform within the Southern Dependencies to the left of the image. In the distance is the wadi valley settlement (A). On the western slope of the wadi valley a large ruined Old Kingdom tomb is visible (B). In the far distance, the sacred mound and its stepped structure is visible (C) (source author).	299
Figure 8.74. (37) —Standing beside the South Gate of the main temple enclosure of the Sacred Animals, facing south. The Southern Dependencies of the SAN are situated to the right of the image, which are partially screening the pylons of the Serapeum Precinct in the distance beyond. The pyramids of Djoser and Unas are visible towards the left of the image (source author).	300

Figure 8.75. **(37)**—Standing beside the South Gate of the main temple enclosure of the Sacred Animals, facing south-east towards the pillared wall. The Step Pyramid is visible in the distance and the pyramid of Unas is visible to the right of the image (source author).
..... 301

Figure 8.76. **(38)**—Standing on the denuded mud-brick tomb facing south-east. The Anubieion enclosure is clearly visible (A), and the Bubastieion enclosure walls partially visible (B) behind the ruined pyramid of Teti (C). The ruined pyramids of Userkaf (D) and Djoser (E) are easily distinguished. The Serapeum Way (F) passes in front of the Step Pyramid, with denuded mud-brick tombs visible in the foreground (source author)... 302

Figure 8.77. **(38)**—Standing on the denuded mud-brick tomb facing south-west. The pyramid of Unas is visible (A). The tombs that flank the south of the Serapeum Way are aligned east to west along its route (B). The Serapeum Precinct stands within the wadi valley (C) with the alignment of shrines and temples situated to its north (D). The courtyard garden of the South Ibis Catacombs (E) and the buildings of the Southern Dependencies (F) are to the right of the image (source author)..... 303

Figure 8.78. **(38)**—Standing on the denuded mud-brick tomb facing west. The alignment of shrines and temples situated to the north of the Serapeum Precinct are visible (A). The courtyard garden of the South Ibis Catacombs (B) and the Southern Dependencies (C) are visible. The main temple enclosure of the Sacred Animals dominates the view (D). In the distance, the wadi valley settlement is visible (E). The sacred mound and Old Kingdom stepped structure are visible in the far distance (F) (source author)..... 303

Figure 8.79. **(38)**—Standing on the denuded mud-brick tomb facing north-west. The SAN Northern Enclosure of the Mother of Apis is visible (A). The pyramids of Abusir are visible in the far distance and the Lake of Pharaoh can be seen beyond the wadi valley (B). Denuded mud-brick tombs are visible on the escarpment (C) (source author). 304

Figure 8.80. **(38)**—Standing on the denuded mud-brick tomb facing west towards the large denuded mud-brick tomb on the opposite escarpment of the wadi valley (A) (source author). 305

Figure 8.81. **(39)**—Standing before the courtyard garden of the South Ibis catacombs, facing east. The ruined pyramid of Teti is visible in the distance. The entrance to the catacombs are located to the left of the small structure visible at the back of the courtyard (source author)..... 306

Figure 8.82. **(40)**—Standing on the North-South Sacred Way facing south-west towards the Southern Dependencies. The foreign temple is visible behind the steps of the temple platform (A). Administrative buildings are located to the left of the image (B), beyond which, in the distance, the courtyard garden of the South Ibis Catacombs (C) and the alignment of shrines and temples to the north of the Serapeum Precinct (D) are visible (source author). 307

Figure 8.83. **(40)**—Standing on the North-South Sacred Way facing west. The sunken Courtyard of the Ibis and Falcon is just visible in the lower distance (A) (source author). 307

Figure 8.84. **(41)**—Standing in the Wadi Valley Road, facing west. The large denuded mud-brick tomb is visible against the western escarpment (A) (source author). 308

Figure 8.85. **(42)**—Standing on the large denuded mud-brick tomb on the wadi valley western escarpment, facing north. The pyramids of Abusir are visible in the distance, to the left of the image. The Lake of Pharaoh is visible (A), and the buildings of the wadi valley settlement are situated to the right of the image (source author). 309

Figure 8.86. **(42)**—Standing on the large denuded mud-brick tomb on the wadi valley western escarpment, facing north-east. The courtyard garden of the North Ibis Catacombs is barely visible on the escarpment shelf (A). The wadi valley settlement stretches across this view. Set against the escarpment is the main temple enclosure of the Sacred Animals (B) (source author). 310

Figure 8.87. **(42)**—Standing on the large denuded mud-brick tomb on the wadi valley western escarpment, facing east. The main temple enclosure of the Sacred Animals is set against the escarpment (A), with its Southern Dependencies situated to the south (B). In the distance, the Anubieion enclosure is visible against the skyline (C), to the east of the Teti pyramid (D) (source author). 310

Figure 8.88. **(42)**—Standing on the large denuded mud-brick tomb on the wadi valley western escarpment, facing south. The ruined pyramid of Userkaf (A) is visible to the left of the Step Pyramid (B), with the reconstructed pyramid of Unas (C) visible to its right. The wadi road continues towards the Serapeum Precinct (D) which is partially screened from view by the alignment of shrines and temples to its north (E) (source author). ... 311

Figure 8.89. **(42)**—Standing on the large denuded mud-brick tomb on the wadi valley western escarpment, facing west. The Sacred Mound and Old Kingdom stepped feature are visible in the far distance (A) (source author). 311

Figure 8.90. **(43)**—Standing in the wadi valley beside the large mud-brick tomb, facing south. In the distance, the east gate of the Serapeum enclosure is just visible (A) with the rest of the Serapeum enclosure hidden behind the northern alignment of shrines and temples (B) (source author). 312

Figure 8.91. **(44)**—Standing in the Wadi Valley Road beside the alignment of shrines to the north of the Serapeum Precinct (left of image), facing west. The land to the west is hilly and barren (source author). 313

Figure 8.92. **(44)**—Standing in the Wadi Valley Road beside the alignment of shrines to the north of the Serapeum Precinct, facing east. The Anubieion enclosure is just visible over the rise in the terrain (A) (source author). 313

Figure 8.93. Map 10—The route to the Serapeum Precinct (source author). 314

Figure 8.94. **(45)**—Standing in the Wadi Valley Road facing south towards the north gate of the Serapeum enclosure (source author). 315

Figure 8.95. **(45)**—Standing in the Wadi Valley Road facing south-east. The Anubieion enclosure is just visible over the rise in the terrain (A). The ruined pyramids of Teti (B) and Userkaf (C) and the Step Pyramid of Djoser (D) are clearly visible against the skyline. The East Temple of Nectanebo II (E) and Serapeum Precinct are visible (F) (source author). 315

Figure 8.96. **(46)**—Standing beside the north gate of the Serapeum, facing north. The northern alignment of shrines and temples are visible on the rise in the terrain. The pyramids of Abusir are visible in the far distance. The main temple enclosure of the Sacred Animals is set against the wadi valley escarpment (A) (source author). 316

Figure 8.97. **(46)**—Facing south towards the north gate of the Serapeum enclosure (source author). 317

Figure 8.98. **(47)**—Standing to the south of the north gate, facing east. The sprawling settlement can be seen against the large enclosure walls. The pylon gate of leading from the dromos is visible to the right of the image (source author). 317

Figure 8.99. **(47)**—Standing before the northern entrance to the main Serapeum temple enclosure (source author). 318

Figure 8.100. (48) —Standing before the Serapeum enclosure east gate, facing east towards the dromos and gate of Nectanebo I (source author).	319
Figure 9.1. Approaching the tomb of Bakenrenef along the southern route into the necropolis, facing north. The Bubastieion is visible in the distance (source author). ...	324
Figure 9.2. The southern road leading to the Bubastieion south gate. Facing east (source author).....	326
Figure 9.3. Standing next to the tomb of Bakenrenef on the path leading north towards the Bubastieion, facing north. The pylon gateway of the tomb casts its shadow across the path and the south pylon gate and enclosure wall of the Bubastieion are visible in the background. The Bubastieion gate is partially screened by the escarpment projection (source author).	327
Figure 9.4. After passing the tomb of Bakenrenef, ascending the rise in the terrain and negotiating the escarpment protrusion, the south gate of the Bubastieion is revealed (source author).	328
Figure 9.5. The Bubastieion south gate as viewed from the pathway leading up to it. A human figure has been inserted next to the gate for scale reference. The figure is 1.76m tall (source author).	329
Figure 9.6. The top tier of the Step Pyramid is indicated at the top of the escarpment ridge. This view is towards the west from the south gate of the Bubastieion (source author).....	329
Figure 9.7. The view from the temple platform at the top of the main Bubastieion stairway. Buildings of the village are visible to the right of the image. The human figure at the base of the stairs is included for scale (source author).	331
Figure 9.8. Location of the main temple within the Bubastieion enclosure (source author).	333
Figure 9.9. Location of the main temple within the Anubieion enclosure (source author).	334
Figure 9.10. Standing on the causeway between the Bubastieion and Anubieion, facing south towards the Bubastieion north gate. The figure is included for scale (1.76m). In the background, the enclosure of the Bubastieion central temple is visible (source author).	335

Figure 9.11. The possible route to the Dog Catacombs—exiting the Anubieion enclosure through the north wall—following the lower terrace at the base of the escarpment (source author)..... 337

Figure 9.12. The route of the Serapeum Way and the modern path up the escarpment (source author)..... 339

Figure 9.13. The sand covered tombs close to the route of the Serapeum Way, facing east. The remnants of Mastaba tombs can be seen jutting out from the sand. The mound in the bottom right of the image is stained dark brown from the decaying mud-brick. A modern motor road is visible in the top right of the image (photo author)..... 341

Figure 9.14. Standing on the location of the Serapeum Way, facing west. The escarpment that marks the western extent of the Serapeum Enclosure is visible as a ridge at the centre-back of the image. Decaying mud-brick mounds are visible to the left of the image (photo author). 342

Figure 9.15. Standing on the location of the Serapeum Way, facing east. The Teti pyramid is visible to the right of the telecommunications mast. Mounds of decaying mud-brick are visible to the right of the image (photo author)..... 342

Figure 9.16. View towards the Anubieion from the Serapeum Way. The ruin of the Teti pyramid is visible to the right of the image, the pylon of the Anubieion west gateway is visible at the end of the Serapeum Way (source author)..... 344

Figure 9.17. View towards the Serapeum Precinct from the same position on the Serapeum Way as the above figure. The Serapeum Precinct is just visible at the far end of the pathway. The northern group of shrines and temple structures indicated by the SGSP data are also visible (source author)..... 344

Figure 9.18. View along the Serapeum Way towards the Anubieion, facing east. The tombs which screen the south of the way have just been passed to the right of the image (out of view) (source author)..... 346

Figure 9.19. The approach to the low mound of sand which screens the Anubieion enclosure from view. Facing east (source author). 346

Figure 9.20. The view towards the SAN MTE from the Serapeum Way as its western extent is approached, facing north-west. The terrain has sloped away, and the SAN MTE is beginning to be revealed (source author). 347

Figure 9.21. The view towards the SAN MTE approaching the western end of the route, facing north-north-west. The SAN MTE is less hidden and the small workman's village across the wadi valley is visible (source author).	347
Figure 9.22. The view towards the SAN MTE and the Wadi Valley Road, facing north-north-west. This viewpoint is towards the western end of the Serapeum Way, just before the route turns south to enter the dromos. The boundary wall to the north of the ceremonial way does not extend this far along the route (source author).	348
Figure 9.23. The northern end of the escarpment promontory, facing south (source author).....	349
Figure 9.24. The bedrock promontory screens everything to the north-west until it has been passed. Facing north (source author).	349
Figure 9.25. After rounding the escarpment promontory, the Lake of Pharaoh comes into view. Facing north-west. The Abusir pyramids are to the left of the image (source author).	350
Figure 9.26. The beginning of the Wadi Valley Road (marked by an arrow) leading south from the Lake of Pharaoh into the necropolis. Facing west (source author).....	350
Figure 9.27. Overhead view of the necropolis with the Wadi Valley Road marked. The Lake of Pharaoh is clearly visible at right (north) with the Serapeum Enclosure at top (west) (source author).	351
Figure 9.28. A view from the entrance to the South Ibis garden courtyard, facing north towards the wadi valley settlement and Lake of Pharaoh. The South Ibis garden wall is visible right of image (source author).....	352
Figure 9.29. Standing in the wadi valley at the periphery of the village after rounding the escarpment promontory. The SAN MTE is partially revealed, and the reveal continues as the routeway is traversed. Facing south-south-east (source author).	353
Figure 9.30. In the Wadi Valley Road facing the SAN MTE which has been revealed by passing the bedrock promontory. Facing east-south-east (source author).....	353
Figure 9.31. Looking towards the SAN from the worker's village spanning the Wadi Valley Road, facing east (source author).....	355
Figure 9.32. Overhead view of the Wadi Valley Road with the route against the escarpment highlighted (source author).....	356

Figure 9.33. Looking east towards the SAN MTE which stands above the wadi road. The top of the escarpment is barely visible (source author). 356

Figure 9.34. Looking south from the Wadi Valley Road towards the Serapeum Precinct. Denuded mud-brick of an unnumbered mastaba tomb is visible to the left of the image (source author). 357

Figure 9.35. View towards the east-north-east of the SAN MTE, facing the Northern Enclosure of the Mother of Apis (source author). 358

Figure 9.36. View into the interior of the MTE from the western gateway. Facing east (source author). 358

Figure 9.37. View towards the east-south-east of the SAN MTE, facing the Baboon Precinct and the Falcon Precinct (source author). 359

Figure 9.38. View towards the west from the SAN MTE western gateway. Looking across the wadi valley (source author). 360

Figure 9.39. View towards the east with the tomb S3518 visible on the plateau above the temple enclosure. The figure is included for scale (source author). 360

Figure 9.40. The SGSP survey data (within the grey areas) for the Wadi Valley Road. The corridor of empty space is indicated by the parallel blue lines. Probable structures highlighted by the SGSP data are shown as white polygons (source author). 362

Figure 9.41. View towards AS33 from the east-west corridor. Facing west (source author). 363

Figure 9.42. View south from the MTE south gate, along the North-South Sacred Way (source author). 366

Figure 9.43. View from the SAN MTE south gate towards a reconstruction of the pillared wall by the wadi valley's eastern escarpment. Facing south-east (source author). 366

Figure 9.44. The wide 'U' shape created by the terrain surrounding the SAN indicated in blue. The locations of the North and South Ibis catacombs are indicated. The orange arrow indicates the intervisibility between mastabas S3518 and AS33 (source author). 368

Figure 9.45. Another possible bedrock surround located to the south of the central SAN, indicated by the blue line. The projected route of the North-South Sacred Way is indicated by the black arrow. The grey oval represents the area where Smith considers a possible location for the Rams catacombs (Smith 2017 pers. comm.) (source author). 368

Figure 9.46. Aerial view of the Serapeum Precinct and the northern and southern temple alignments (source author).....	369
Figure 9.47. The SGSP data plot of the northern alignment of temples and shrines. The space that represents the probable pathway between the structures is indicated. The width of the gap is displayed in metres (source author).....	370
Figure 9.48. Aerial view of the northern alignment of structures. The probable pathway between the second and third structures is indicated by the black arrow (source author).	371
Figure 9.49. The Serapeum North Gate. Facing south (source author).....	372
Figure 10.1. Basic structure of the entanglement relationship (source author).....	382
Figure A2.1. Map book sheet A1 (source author).....	414
Figure A2.2. Map book sheet A2 (source author).....	415
Figure A2.3. Map book sheet A3 (source author).....	416
Figure A2.4. Map book sheet B1 (source author).....	417
Figure A2.5. Map book sheet B2 (source author).....	418
Figure A2.6. Map book sheet B3 (source author).....	419
Figure A2.7. Map book sheet C1 (source author).....	420
Figure A2.8. Map book sheet C2 (source author).....	421
Figure A2.9. Map book sheet C3 (source author).....	422
Figure A2.10. Map book sheet D1 (source author).	423
Figure A2.11. Map book sheet D2 (source author).	424
Figure A2.12. Map book sheet D3 (source author).	425
Figure A3.1. Non-contour lines digitized as contours on the UoP map sheets (source author).....	477
Figure A3.2. Areas on the MHR1978 map sheets 21 and 22 where issues with contours were encountered (source author).	478
Figure A5.1. MHR1978 map contour amendments. The yellow lines within the amendment areas represent the unmodified map contours digitised from the MHR1978 map sheets, whilst the grey lines represent the amended contours (source author). .	494
Figure A5.2. MHR1978 map contour amendments. The yellow lines within the amendment areas represent the unmodified map contours digitised from the MHR1978 map sheets, whilst the grey lines represent the amended contours (source author). .	495

Figure A5.3. MHR1978 map contour amendments. The yellow lines within the amendment areas represent the unmodified map contours digitised from the MHR1978 map sheets, whilst the grey lines represent the amended contours (source author). . 496

List of Tables

Table 4.1. Software assessment criteria.....	93
Table 4.2. Software assessment matrix.....	95
Table 4.3. Geodetic projections relevant to the study area.....	110
Table 4.4. List of data points recorded during the January 2017 field season.....	117
Table A2.1. General archaeological features attribute table, type abbreviations.	426
Table A2.2. Other structures and the Sacred Animal Necropolis attribute tables, prefix abbreviations.	426
Table A2.3. Subsurface features attribute table, prefix abbreviations.....	427
Table A2.4. General archaeological features attribute data.	429
Table A2.5. Other structures attribute data.....	469
Table A2.6. Sacred Animal Necropolis attribute data.....	470
Table A2.7. Subsurface structures attribute data.....	473
Table A4.1. MHR1978 map sheet H:21 transformation data.....	485
Table A4.2. MHR1978 map sheet H:22 transformation data.....	486
Table A4.3. MHR1978 map sheet H:23 transformation data.....	488
Table A5.1. GIS attribute data for the map contour amendment areas.....	491

ACKNOWLEDGEMENTS

This thesis is the conclusion of doctoral research commenced in September 2014 in the School of History, Archaeology and Religion (SHARE) at Cardiff University. Whilst the work has been an individual endeavour, it could not have been achieved without the help and support of several individuals and institutions.

The undertaking of this research was assisted through a tuition fee bursary, generously awarded by SHARE. The financial benefit that this award provided enabled the commencement and completion of this research. Additional financial contributions were made by the school which have enabled attendance and presentations at several conferences and germane events that have been beneficial to this thesis research in general.

Over the years of research, several individuals have made themselves and their knowledge available, and were kind enough to answer questions, and provide feedback and encouragement for this project. To them I would like to extend my sincerest gratitude and thanks. Both Professor Paul Nicholson and Dr Steve Mills have been instrumental in my continuation within academia. Paul helped me realise my ambition to work in Egypt by offering me a place on his Dog Catacombs research project at Saqqara, and through his trust in my abilities to undertake the work fostered my interest in the sacred animal cults and monuments at the necropolis. Steve has provided me with an immense amount of support in archaeological theory and digital applications in archaeology. He also taught me the skill of archaeological surveying with a total station in the most unlikely of places for such a task—beneath the desert of Saqqara. Both Paul and Steve have provided continual assistance, advice and critique, for which I am indebted.

This work has benefitted from in-depth conversations with Professor Harry Smith, Sue Davies, Professor Dorothy Thompson and Dr Aidan Dodson to whom the author owes a

debt of gratitude. These individuals have given freely of their time and knowledge and have offered critique and encouragement in equal measure. I would like to extend additional thanks to Harry and Sue who provided hospitality in their own home to enable our meetings.

Additional assistance was gratefully received from several other individuals: Professor Miroslav Bárta kindly provided me with GIS data from the Czech Institute archaeological work at Saqqara; Associate Professor Nozomu Kawai provided several articles and maps relating to the Waseda University concession at Saqqara; Professor Naguib Kanawati provided comment and assistance regarding his extensive work at the Teti North Cemetery at Saqqara; Dr Adel Okasha Khafagy kindly provided mapping of the necropolis; Dr Mohammad Youssef provided articles, plans and discussion relating to early dynasty mastaba excavations at the site; Professor Stephen Quirke and Narushige Shioda provided comment and discussion on the University College London 3D model of the Anubieion and Bubastieion at Saqqara. Their assistance was invaluable in constructing a credible representation of the monuments; Dr Salima Ikram and Dr Nicholas Warner kindly critiqued the digital representation and offered advice during the 2017 Dog Catacombs field season; several years before starting my thesis I was fortunate enough to meet Dr David Jeffreys at Saqqara, where we discussed issues surrounding historical maps and survey at the necropolis; Dr Campbell Price provided assistance and offered data from the Scottish Geophysical Survey project. Brian Garvan of the Medmenham collection who offered advice and discussion on RAF aerial photogrammetries; the Egypt Exploration Society and Dr Chris Naunton who made plans and publications available to the author; Drs Hendrike Nouwens, for making time spent underground more fun.

Although he has had no input into this thesis, I would like to extend my appreciation to Dr Peter Guest in recognition of his support, encouragement, and assistance, which led me to become a professional archaeologist.

Finally, and most importantly, I would like to thank my wife, Lisa Williams. Lisa has supported me throughout this endeavour, both financially and emotionally. She has made every effort to listen when I needed to talk about archaeological data, even though

she had limited interest in the subject matter. During my time researching this project, Lisa was made redundant more than once from her work, but has always kept on going to ensure that we had an income, and that I was able to continue and complete my doctorate. I am forever in her debt for such unconditional support.

CHAPTER 1

Introduction

Why is a new perspective required?

The sacred landscape of Saqqara, as experienced now, is very much different from the landscape of the ancient past (Nicholson 2016, 19–20). Many of the monuments have long since decayed, and those that remain extant generally display very little semblance of their former appearances. Their relationships and interconnectedness, both with one another and the topography, have been masked by millennia of human and environmental action. Understanding this complex funerary landscape is complicated by this situation.

The Late Period/Early Ptolemaic¹ (hereafter abbreviated LP/EP²) sacred monuments of North Saqqara have historically been investigated and published either in isolation (c.f. Davies 2006; Davies and Smith 2005; Smith 1974; Smith *et al.* 2006) or within small groups of spatially related features (c.f. Jeffreys and Smith 1988; Giddy 1992; Martin 1981). The monuments have rarely been compared within their wider landscape setting or their relationship with the topography, upon which they are imposed, considered. Connective networks of movement both leading to, and between, monuments have similarly received little consideration. Finally, no previous analysis of the sacred monuments has been conducted which included the application of the archaeological theories of affordances and entanglement. The absence of these types of analyses disfavours the sacred landscape of North Saqqara by excluding potential new interpretations that may be achieved through this method of research. This study seeks to redress the situation.

¹ All chronology used follows Shaw and Nicholson (2008: 350–352). The Late Period dates to 747–332 BC and comprises the 25th to 31st Dynasties. This period is preceded by the Third Intermediate Period (1069–747 BC) and followed by the Ptolemaic Period (332–30 BC).

² See Appendix 1.

Purpose of the study

This study sets out to examine and re-evaluate the LP/EP sacred monuments of North Saqqara within their landscape setting. Whilst the creation and positioning of the monuments is undoubtedly influenced by ritual considerations, it is not the purpose of this thesis to investigate ancient Egyptian religious practice and belief. Rather, the landscape is experienced through the eyes of a visitor to Saqqara, who may have only limited or rudimentary religious knowledge (Kemp 1995). This perspective might also be appropriate for the visitor to Saqqara today, removed as she/he is from the period in question by several millennia. It is hoped that such a perspective will allow visitors to engage with and understand the interconnectedness of monuments within the landscape. Investigation of the landscape in this manner has raised new questions and offered new insights into the setting of the monuments and their topographic and interconnected relationships.

The study aims to achieve this goal through the construction, investigation and assessment of an innovative digital representation of the archaeological site. The digital representation will be assessed as an epistemological tool through its application in the creation of a new landscape narrative account of the necropolis. The aim is to establish the digital representation as a useful method of research for a site that is no longer wholly extant. The employment of archaeological theory, not previously applied widely within the field of Egyptological studies, permits a nuanced interpretation of the funerary landscape.

Aims

This study aims to make the following original contributions to the body of knowledge of LP/EP Saqqara:

- Determine whether dictated visual perspectives may have been employed by the builders of the sacred monuments to create a scripted visual performance when moving through the landscape.

- Examine the relationship of affordances with specific locations and how they might engage with entanglement and place.
- Suggest how the potential of specific geological landforms and networks of movement might make certain places desirable for the installation of sacred monuments.
- Assess the existing landscape narratives against the new digital representation and determine whether they require revision.
- Gain a better understanding of the networks of movement, specifically the Serapeum Way, and how it might relate to the positioning of the Anubieion.

In addition to the above aims, it is hoped that the study will benefit Egyptology at Saqqara in the following ways:

- The construction of a new and detailed GIS (Geographical Information System) of the North Saqqara and South Abusir archaeological areas.
- An innovative 3D landscape representation of North Saqqara (including South Saqqara and Abusir in less detail).
- A structured development process for the application of this type of work on future projects.

Primary research questions

1. Can investigation of the digital representation establish whether the location of LP/EP sacred monuments within the landscape is related to topographical affordances, or whether their position relates to the locations of other (related) LP/EP monuments (intervisibility or interconnectedness), earlier monuments (or their absence i.e. if they were obscured by sand) or existing routes of movement? Is a combination of each of the above a possibility?

2. Are networks of movement determined by the location of monuments, or do pathways determine the location of monuments? Do the pathways exist before the monuments, are they already embedded in the landscape?
3. How might networks of movement effect experience when approaching the sacred monuments? Do topographic conditions play a part in the potential experience making?

Secondary research questions

4. Is it possible, through detailed analysis of the location of LP/EP monuments and their distribution upon and relationship to the topography, to suggest the prospective location of yet to be discovered LP/EP features (such as the Catacomb of the Rams)?
5. Are there more-advantageous locations that LP/EP sacred animal monuments could have occupied but did not? Could this suggest a specific reason for their location?

To begin to address the research questions, the study seeks to investigate the relationship of the main sacred monuments³ with the topography upon which they are imposed; with networks of movement that may have enabled access to the monuments, and their relationship to other features, both earlier and contemporary, within the necropolis. The application of modern archaeological theoretical approaches to the field of Egyptology will permit a more nuanced understanding of the ancient features. The arrangement of the necropolis will be examined both from a terrestrial perspective through the 3D digital representation, with the additional support of a traditional GIS.

³ The major monuments of the LP/EP at Saqqara relate to the sacred animal cults, being the Sacred Animal Necropolis and Southern Dependencies; the Anubieion/Bubastieion; the Serapeum Precinct.

Objectives

To achieve these aims the creation of a new GIS was required to provide a detailed plan of the archaeological site. To enable investigation from a terrestrial perspective, progression beyond the traditional GIS was necessary and realised through the implementation of 3D modelling. This approach, employing the construction of an innovative multi-layered 3D representation, was fundamental to developing an holistic understanding of the complex funerary landscape of the ancient necropolis. The georeferenced⁴ landscape model provides a digital research heuristic which has been used to investigate the site throughout its diverse phases of use.

The 3D representation can be manipulated to realize the potential for virtual corporeal perspectives and to investigate how they may relate to, and be influenced by, landscape and material affordances (see Gillings 2012). This has permitted detailed examination of environments and funerary structures that are no longer wholly extant or accessible.

This method does not attempt to provide an embodied experience within the landscape, rather it prioritises visual over and above other sensory modalities.⁵ That is not to say, that when investigating the digital model, the other senses are not engaged, but they are not the focus of this study. It is possible that this marginalisation could be addressed in future projects through the application of mixed reality (see Eve 2014).

⁴ Georeferenced is a term that describes data that have been situated in geographic space with reference to a specific coordinate system (Wheatley and Gillings 2002: 26) which describes their position.

⁵ This decision was made at an early stage as a practicable solution to understanding the actual and virtual North Saqqara landscape without “being there” (Tilly 2010, 26), given the time-constraints and difficulties of working in Egypt.

The location and importance of Saqqara

The archaeological remains at North Saqqara represent the principal necropolis of Memphis, once the capital of ancient Egypt (Ray 1978, 157). Situated approximately 20km south of modern Cairo on a plateau at the edge of the western desert (Figure 1.1), the necropolis has a history of use dating back over 5000 years. Large decorated *mastaba* tombs of the ancient kingdom's First Dynasty (ca.3100–2890BC) elite once stood in a line atop the edge of the plateau (Seidlmayer 1998, 33; Emery 1972), contesting the relationship between land and sky, and presenting an impressive panorama when viewed from the flood-plain below. The necropolis is approximately 6km in length with a maximum width of 1.5km (Shaw and Nicholson 2008, 281) and forms part of a larger funerary landscape of pyramids and tombs stretching from Abu Rawash to the north, to Dashur in the south.

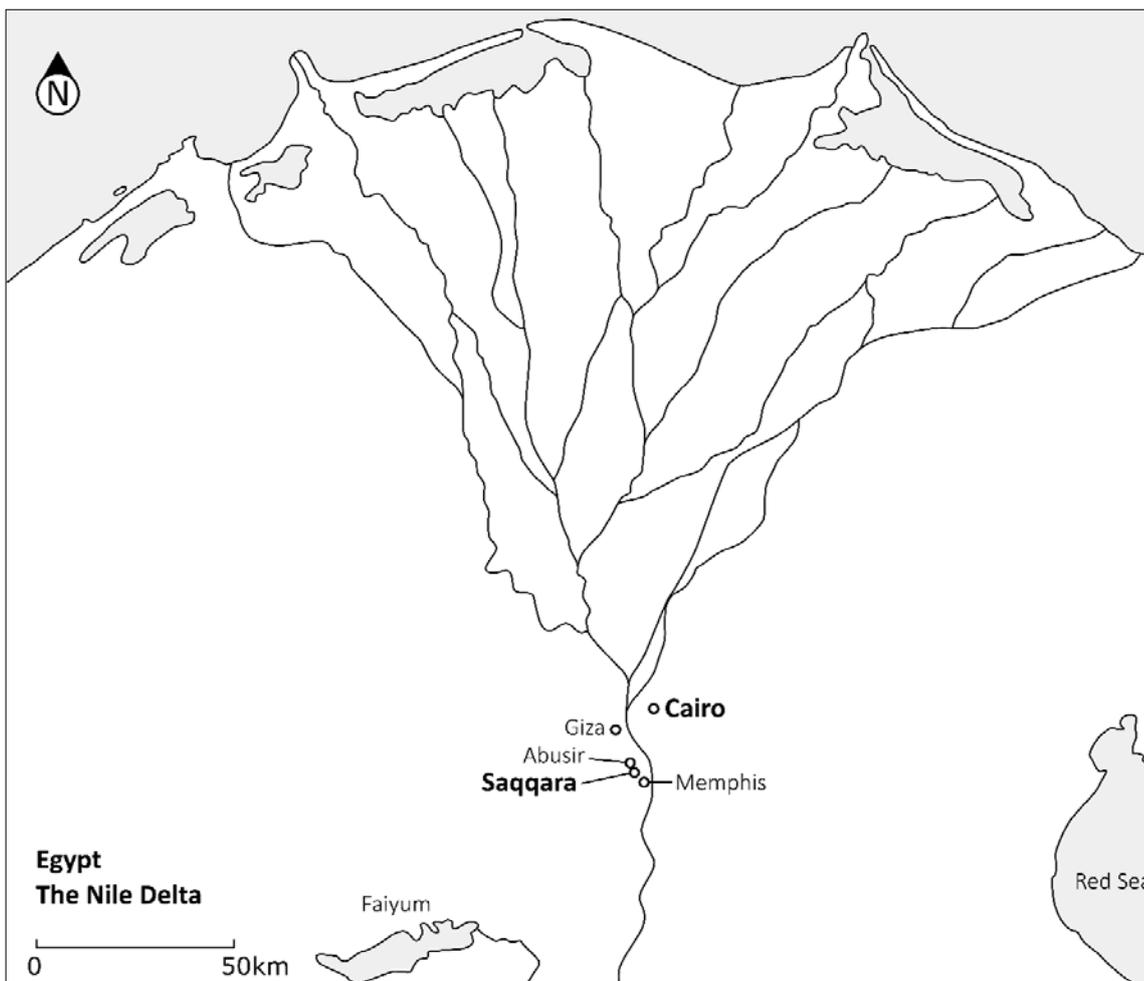


Figure 1.1. General location of Saqqara within Egypt (after Shaw and Nicholson 2008, 6).

The extreme congestion of tombs and burials throughout the necropolis, many of which have experienced multiple phases of use (Shaw and Nicholson 2008, 281), demonstrate that Saqqara was a site of great importance. The plateau comprising both North and South Saqqara hosted twelve main pyramids with multiple royal subsidiary pyramids (see Lehner 2008: 82–83), more than any other site in Egypt (Lehner 2008, 82). Beneath the surface the plateau is honeycombed with catacombs, galleries and tombs, many of which are not visible at surface level (Martin 1991, 17 and 27).

A defining moment in Egyptian architecture is ascribed to the construction at Saqqara of the Old Kingdom (2686–2181 BC) step pyramid complex of the 3rd Dynasty (2686–2613 BC) pharaoh Djoser (2667–2648 BC) whose design is attributed to Imhotep, the pharaoh's vizier and architect. Consequently, Imhotep is credited with constructing the first monumental building entirely from stone (Ray 1978, 149) which continued to follow earlier building forms connected with the use of organic materials (Martin 1991, 24) and so displays a transition between the two forms. During the 5th Dynasty (2494–2345 BC) the smallest of all known Old Kingdom pyramids was constructed (Lehner 2008, 154) for the pharaoh Unas (2375–2345 BC) to the south-west of the Djoser complex. This pyramid contains the earliest known examples of the 'Pyramid Texts' (Lehner 2008, 31–33) which comprise the earliest body of religious literature in the world's history (Martin 1991, 25). In addition to royal burials, the Memphite elite had *mastaba* tombs constructed here during the Old Kingdom, many of which were focussed close to the locations of the pyramids of the kings (Shaw & Nicholson 2008, 282).

The custom of elite burials at Saqqara continued in the New Kingdom (1550–1069 BC) when many tomb chapels were constructed by nobles, which were often surrounded by the smaller private tombs of their families and servants. During this period, and significantly for the focus of the later animal cults, the Serapeum, the hypogea of the sacred Apis bull, was constructed in the north-western area of the necropolis. This impressive subterranean funerary complex remained in use until at least the Roman Period (30 BC–AD 395) (Dodson 2005, 90–91 Table 1; Thompson 2012, 283).

Late in Egypt's ancient history, during the Late (747–332 BC) and Ptolemaic (332–30 BC) Periods, the necropolis served not only for human burials, but the northern area of the site became a nexus for the burials of millions of sacred animals, such as falcons, baboons, cows and ibis. These were being mummified and deposited in large subterranean funerary complexes on an industrial scale. Farther to the south-east mummified cats and dogs were being interred into their own subterranean galleries associated with the large temple complexes of the Bubastieion and Anubieion respectively. Many of these catacombs remained improperly explored and recorded until relatively recent times and have provided a wealth of information regarding the animal cults of the period.

Additionally, many highly decorated private tombs from the 26th Dynasty (Saite Period 664–525 BC), 27th Dynasty (First Persian Period 525–404 BC), 30th Dynasty (380–343 BC) and the Greco-Roman Period (332 BC–AD 395) are distributed across the site (Shaw & Nicholson 2008, 283).

The geographical study area

The geographical area with which this study is concerned follows the plateau edge of the western desert, from the south of the pyramids of Abusir to the southern extent of North Saqqara—just beyond the Sekhemkhet enclosure. To the west the study area extends out to the furthest known archaeological remains (those of the Khaemwaset temple) and to the east it extends just beyond the Western Desert's escarpment, where the Anubieion and Bubastieion temples run down onto the lower lying flood-plain (Figure 1.2).

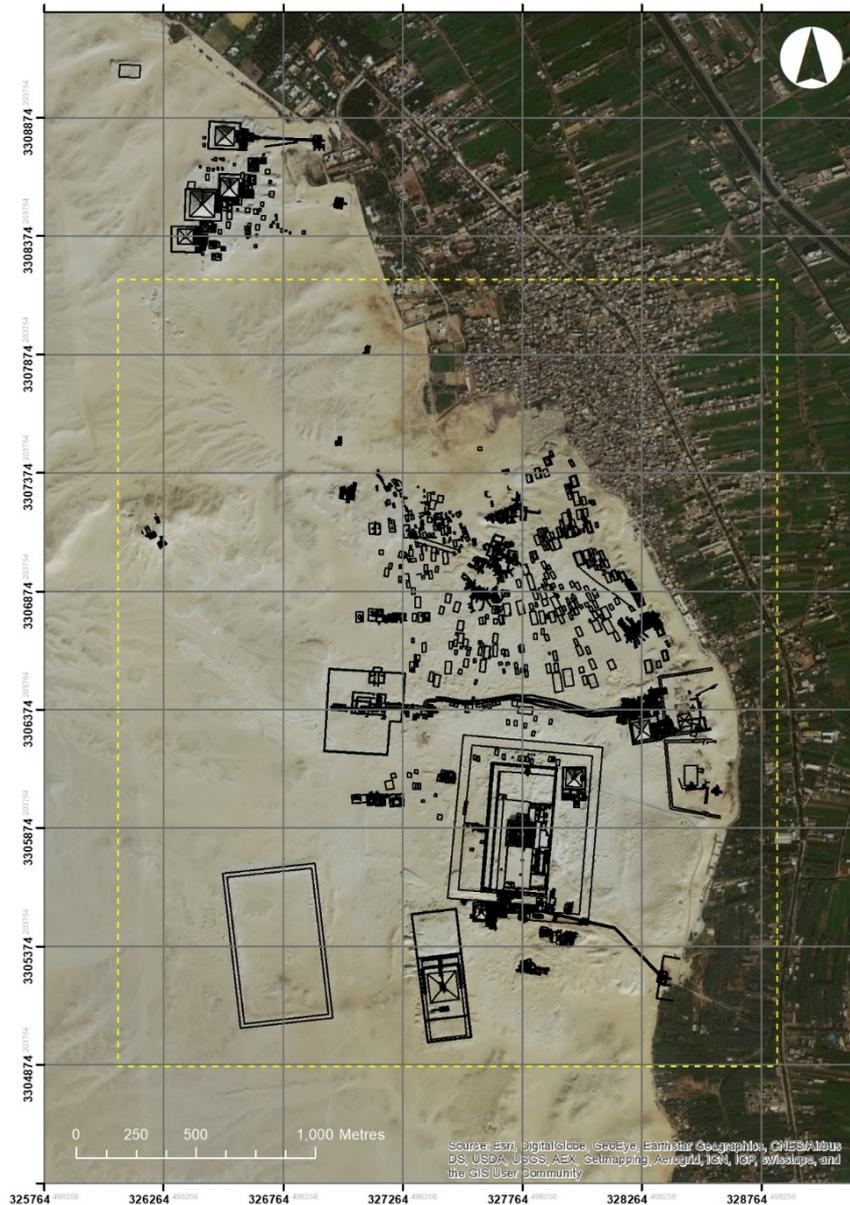


Figure 1.2. The general project study area within the Saqqara necropolis, defined by the dashed yellow line (source author).

These areas are demarcated in general by the modern topographical maps of the *Ministère de l'Habitat et de la Reconstruction* (MHR) sheets H:21 (Abusir) and H:22 (North Saqqara). The distinction between Abusir and North Saqqara as defined by the maps is arbitrary and most likely a modern convenience for land and mapping purposes. The clarity of the modern division between Abusir and North Saqqara can be problematic for archaeologists, as it is unclear where the archaeological area of North Saqqara ends and Abusir begins. As an example, the North Ibis catacombs are considered by archaeologists

to be situated in North Saqqara, but they are located further north than tombs AS20, AS33 and those of Ka'aper and Ity which are situated further west and are deemed to be in South Abusir. For this study, the current location terminology employed by archaeologists who undertake work in the area will be adopted for convenience. However, the use of modern land apportionments will not impede the investigation of the landscape from an historical perspective when these modern divisions probably did not exist.

It was not sufficient to limit the extent of the GIS and digital model to only the areas of North Saqqara and South Abusir. Doing so would remove those areas from their context and place them in isolation. The funerary installations of these areas form part of a larger landscape and require examination within such a setting. To comply with this necessity, features that are beyond the remit of the study have been included in the GIS and digital representation. The terrain and pyramids of South Saqqara have been modelled, but in less detail; the pyramids and surrounding structures in north Abusir have also been included. To understand the potential implications of using reduced levels of detail within the terrain model, Karolina Wruszczak, a Cardiff University archaeology undergraduate, undertook a profile analysis study of the digital terrain (Wruszczak 2016). The results of her study informed the decision to include the terrain of South Saqqara at a slightly reduced detail from that of North Saqqara (see Chapter 4).

The foremost concentration of LP/EP sacred monuments, which represent the focus of this study, are situated towards the central and northern extent of North Saqqara, overlapping into South Abusir⁶ and relate to the sacred animal cults. The mortuary installations under investigation will be examined with reference to their location within the landscape and their situation in respect to other tombs and structures both preceding and contemporary with their use. It follows then that the central and northern landscape areas of North Saqqara will receive greater consideration than more remote outlying areas. This is simply because of the distribution of the mortuary installations within the landscape.

⁶ A group of Late Period shaft tombs is located to the south of the Abusir pyramids which is beyond the area of study.

Late Period/Early Ptolemaic

The chronological epoch examined by this study commences during the Late Period, with the 26th Dynasty (664–525 BC), and ends in Early Ptolemaic times, defined for this project by the end of the rule of Ptolemy III Euergetes I (246–221 BC). The 26th Dynasty is when the sacred animal cults gained importance (Bard 2015, 302; Kessler 1989, 223–229), and Ptolemy III was the last Ptolemy in power prior to a long and gradual decline of Greek governance and increase in Egyptian unrest, which began with Ptolemy IV Philopater (221–205 BC) (Thompson 2012, 110).

The Late Period of Pharaonic Egypt was one of complexity, transformation, archaism, creativity and decline. For a detailed discussion of the LP/EP periods see Lloyd (1983) and Lloyd (2000a and 2000b). There is generally some debate regarding the chronological beginning of the Late Period in Egyptian history. Stammers (2009, 3) remarks that certain writers consider the 21st Dynasty (1069–945 BC) as the beginning of the Late Period, when the New Kingdom disintegrated. These dynasties are generally accepted as being part of the Third Intermediate Period (1069–747 BC) by most Egyptological scholars. Others, such as Lloyd (1983) place the start of the period with the 26th Dynasty (664–525 BC), dominated by the Saite kings. This study, however, follows the chronology of Shaw and Nicholson (2008, 350–352) which sets the beginning of the Late Period at the start of the 25th Dynasty of the Kushite rulers (747–656 BC).

The Egyptian Late Period exemplifies a fascinating era in the history of Pharaonic Egypt. It was during this period that Egypt would function as an autonomous administrative unit for the last time and would find its cultural identity under extreme pressure from outside influences in the form of the main civilizations of the Near East and Eastern Mediterranean. Egypt was forced to adapt its establishments and beliefs to respond to these persistent challenges (Lloyd 1983, 279). The Kushite rulers of the 25th Dynasty, Nubian outsiders who controlled Egypt through military power (Taylor 2000, 354) showed a deep respect for the religious traditions and ideologies of Egypt. They furthered a national sense of archaism, looking to the past and drawing upon the Old Kingdom for inspiration (Taylor 2000, 356) in both art and religious practise. Additionally, the country's

administrative centre was transferred from Thebes back to Memphis (Lloyd 1983, 332). The 26th Dynasty saw the Saite reunification of Egypt after the turmoil and decentralisation of the Third Intermediate Period and overthrew the recent trend of foreign domination. Trade links were established and encouraged with the Greeks and Phoenicians during the early stages of this dynasty, economic reconstruction was an important focus, and Assyrian oversight was deposed. Foreign mercenaries such as Greeks, Carians, Jews and Phoenicians, were employed to maintain the balance of power. This had the additional effect of countering the underlying threat of the influence of the native Egyptian warrior class (Lloyd 2000a, 372).

This period of Saite rule saw its end with the Persian invasion of Egypt in 525 BC which instigated the beginning of the First Persian Period (525–404 BC). Whilst this period of Persian control was at times tense and unsettled, the trend of reconstruction and renewal continued with the building and restoration of temples throughout the land (including the Serapeum at Saqqara) (Lloyd 2000a, 383–384) and the completion of projects that had begun under the Saite rulers (Kessler 1998, 274; Lloyd 2000a, 383).

The last period of independence was gained through insurrection in c.404 BC. Persian might was overthrown and indigenous pharaohs once again ruled the country. This was a tumultuous period outlined by national volatility and the pervasive threat of Persian power. Regnal years were short and conflict between contenders for authority was commonplace (Lloyd 2000a, 385). Despite the turmoil and strife that dominated this period there was an endeavour by pharaohs of the 29th Dynasty (399–380 BC) to bring legitimacy to their rule through archaic association with the last great rulers, those of the 26th Dynasty (Lloyd 2000a, 386). This continuity with older traditions continued into the 30th Dynasty (380–343 BC) combined with significant creation and originality (Lloyd 2000a, 390–391), and the building and reconstruction of religious temples and iconography persisted. The cults of the sacred animals became especially significant during this time and their attendant industries and priesthoods may have performed an important economic function, whilst royal support encouraged a sense of national identity (Lloyd 1983, 294–295).

Independence was finally terminated by Persian dominance when Nectanebo II (360–343 BC) the last innate pharaoh of Egypt, was defeated by Artaxerxes III Ochus (343–338 BC). This heralded the start of the Second Persian Period (343–332 BC), a short and often violent phase of Persian control. This unwanted regime was considered incompetent and destructive in their efforts to reinstate the arrangements of the previous Persian occupation (Lloyd 2000a, 390). So despised were the new Persian rulers that the conquering armies of Alexander the Great (332–323 BC) faced little opposition (Lloyd 1983, 287).

During the early years of Greek rule (the Macedonian Dynasties, 332–305 BC) Alexander founded the city of Alexandria as a base from which to govern the country. He was afforded royal titles by the Egyptians and showed great respect for their religious predispositions (Lloyd 2000b, 395–396). After Alexander's death, his half-brother Philip Arrhidaeus (323–317 BC) governed the country, followed by his son Alexander IV (317–310 BC), after which the Macedonian Dynasty was superseded by the Ptolemaic Dynasties, commencing with the rule of Ptolemy I Soter I (305–385 BC), one of Alexander's generals (Wilkinson 2008, 192–193). Although he moved the country's religious and administrative centre to Alexandria, he respected and honoured Egyptian religion and was keen to accommodate and continue the traditions established during the Late Period (Lloyd 2000b, 414). He established the cult of Serapis from the prevailing cult of Osiris-Apis and many temples were rebuilt or extended (Wilkinson 2008, 193). The Egyptians recognised the Ptolemies as Pharaohs, which was the highest form of political power that they knew (Lloyd 2000b, 410) and the Ptolemies ran a highly effective infrastructure during the early years (Lloyd 2000b, 407), with fiscal matters being of great concern (Lloyd 2000b, 410).

By the time of Ptolemy IV Philopater (221–205 BC) the popularity of Ptolemaic rule had begun a long decline, marked by Egyptian revolts and internal conflict (Lloyd 2000b, 419). Later Ptolemaic rule was characterised by internecine strife and murder (Lloyd 2000b, 418) and a rapid deterioration of the political situation (Lloyd 2000b, 419). Egyptian disaffection became commonplace, characterised by desecration of temples, desertion of villages, workers strikes, and a greater frequency of the usage of temple's rights of

asylum, whilst the administrative system was slowly being eroded by corrupt officials (Lloyd 2000b, 419–420). This destructive situation of local violence and uprising, coupled with ineffective governmental control, was exploited through frequent intervention by Rome, which became mediator in dynastic disputes. A brief resurgence of past glories was achieved by Cleopatra VII Philopater (51–30 BC) (Lloyd 2000b, 421), but her actions ensured a decisive role for Rome and Ptolemaic control eventually ceded to Roman rule of Egypt (Lloyd 2000b, 421).

Theoretical approach

Egyptological research has greatly benefitted from a substantial breadth of written evidence from the ancient periods but as a result there has been limited theoretical interpretive work within the discipline (Brown 2010, 91). A small number of Egyptological scholars have engaged with theoretical approaches to varying degrees (see Kemp 2006; Meskell 1999, 2003, 2004, 2005; Nicholson 2016; Ucko 2003) with Meskell being one of the few researchers to embrace phenomenological approaches, and Nicholson to engage with a narrative approach to landscape investigation (Nicholson 2016). Whilst a potential reluctance to engage with theoretical approaches has not excessively disadvantaged the discipline, certain aspects of Egyptological research, particularly landscape studies, may benefit from more explicit application of archaeological theory. To situate this study within wider archaeological discourse (beyond the confines of Egyptology), theoretical concepts have been considered and adopted (see Chapter 2).

Archaeological Documentation

A chapter has been set aside to examine the archaeological documentation that has been used throughout this study (see Chapter 3). This documentation takes the form of archive publications, historical cartographies, and excavation plans. This chapter explains the use of this documentation within the context of the study, provides a brief history of mapping at Saqqara, and discuss discordances within the published data that presented issues of consistency and accuracy during use.

Methodology

The methodological approach employed by this study is discussed in detail in Chapter 4 and therefore is briefly summarised here. To ensure that the digital landscape representation provided a solid platform for robust research, a structured development process was devised and adhered to throughout the project. Comprising a sequence of eight steps designed to direct progression of the project, the application of this process ensured a well-documented and, therefore, verifiable and replicable result. The steps directed the decision-making for software license types and software packages to be used; the method of constructing the terrain model; the research and compilation of the GIS; the process of digitally reconstructing the archaeological structures of the necropolis; and the compilation of the landscape representation, comprising the terrain and structure models.

Rationalising the landscape representation

The digital landscape model comprises multiple data files that are brought together to create an interpretive representation of the ancient landscape. It offers a data-rich, complex construction, composed of hundreds of spatial components, which can be manipulated to depict different periods of Egypt's history, from the 1st Dynasty through to the LP/EP era. Whilst Chapter 4 discussed the construction methodology of the digital representation, Chapter 5 details the decision-making for representing the LP/EP landscape of North Saqqara. A brief discussion of the constraints faced by the study is included and examines archaeological documentation, plans and location data, historical maps and data interpretation.

How to best depict the sacred landscape of LP/EP North Saqqara proved a challenging prospect. The necropolis is littered with thousands of monuments spanning many different periods of ancient Egyptian history. Serious consideration was given to understanding the potentialities of monument visibility in the LP/EP, yet there was no simple answer. Choices regarding visibility were made based on assumptions relating to topographic location, a characteristic common to each structure (see Chapter 5). Whilst

this allowed the construction of the digital representation to progress, the degree of visibility of earlier structures remains open to debate.

The chronological period of concern to this study represents a duration in time of just over 500 years, when monuments may have been built and destroyed, fallen out of use and sanded over, or just neglected and forgotten leading to general decay. It was decided that to best depict the LP/EP sacred monuments an archetype of the period would be constructed. Though this archetype may represent a conflation of monuments that may not have been concurrent in the conditions depicted, it does allow research at a macro-level of the monuments and their relationships.

A dynamic landscape

The ancient necropolis of Memphis, far from being a quiet place of the dead, would have been busy with activity, much like it is today. Chapter 6 examines life at the necropolis and investigates who might have been living and working at, or visiting the site. Settlement locations and potential networks of movement are given consideration, in addition to the performance of procession, and how this may have brought visitors to the funerary site. The question of when visitors may have been permitted into the necropolis and where they may have been authorised to go are also addressed.

Landscape narratives

Chapter 7 briefly reviews the two landscape narratives for the North Saqqara necropolis, being those of Nicholson (2016) and Smith (1974). Both narratives are diverse in character and approach, and both seek to offer the reader an experience of the LP/EP era landscape that may have been observable during that time. A critique of the narratives is provided and comparison made against the digital representation. This has allowed the digital representation to be tested against accounts written by experts in the period, and has provided a new response to their work.

Based on the narrative reviews and critiques, a new mixed-media narrative account has been developed which afforded the opportunity to use the digital representation as an

epistemological tool. Chapter 8 presents the new landscape narrative for the LP/EP sacred landscape at Saqqara in the format of a travel-guide which attempts to recount potential experiences to a casual visitor to the site, contemporary with the period. The narrative examines the necropolis through a journey around the sacred landscape undertaken by a casual tourist (the reader), and explains what can be seen and experienced at various locations, like one might expect from a modern *Baedeker*. It was considered that this approach offered the best opportunity to represent the necropolis landscape and its monuments through the literary approach of a 'second-person pronoun' narration.

Discussion and conclusion

A detailed discussion is presented in Chapter 9, which applies the overarching research questions of this project in a meaningful way, appropriate to the medium of the digital landscape model. The discussion is guided and informed by the narrative account. Chapter 10 provides a conclusion to the study and suggests recommendations for future work.

CHAPTER 2

Archaeological theory

Introduction

The limitations of the digital representation must be recognised. It cannot and does not present a historical ‘truth’, only a possible representation of the historical landscape as it may have been. To adopt a Baudrillardian approach, it is a simulation—an unreal version of a real reality. Therefore, a framework should be applied to underpin and guide the investigation of such a representation—a framework provided by the theoretical approaches adopted by this study. To situate this project within the wider academic debate, several different theoretical concepts will be examined. These concepts include landscape, space, place, space in GIS, perception of the world, recreating the past, affordance, entanglement, hyper-reality and the use of theory in Egyptology.

Theoretical approach

Recreating the past

Any attempt to recreate aspects of the past in the present will likely, albeit unintentionally, express characteristics that relate to the ‘now’, rather than the actuality of the past. A digital model of an ancient temple constructed through computer software, for example, may visually represent the structure and its architecture down to the finest detail, and could be located within a representation of the landscape in which the real-world structure is integral. Manipulation of the digital model may allow an observer to experience the structure in ways that were never possible, or even considered, during the ancient past. Thus, the model, whilst representing the past, is a modern construct, imbued with modern capabilities and responds to our contemporary ‘world view’. It is therefore necessary to question whether a contemporary representation is truly capable of expressing aspects of the past, and if it is not, what implications arise from this? Are

there still insightful data to be gained from such an object, and what dangers does this problem pose for interpretation?

A consideration of which data are appropriate from the representation and difficulties that may be inherent within those data is germane to the question. A traditionally GIS based view of a landscape is from an abstracted top-down point of observation (the so called 'god trick'), which was unlikely to have ever been experienced during the past in the real world—but may have been imagined. Therefore, observations made through visibility studies using this perspective may have unwanted complications attached. When considering, for example, line of sight analysis, a more plausible approach would be to create a virtual corporeal perspective (i.e. from a terrestrial point-of-view through human eyes) to attempt to replicate a possible view that may have been experienced in the past.

The opinion of Thomas (2004, 200), that representations are removed from the context of human participation, and Tilley (2004, 118–119), that *in situ* field experience is paramount as the principle source of knowledge, are not without merit. However, these approaches should not detract from the adoption of representations in archaeological landscape studies to increase insight and aide interpretation of the archaeological past when implemented within controlled frameworks. If, as Tilley (2010, 26) advocates, that only through “being there” is an archaeologist able obtain knowledge and that the inclusion of representations is flawed, expressing a futile attempt to communicate significance (Llobera 2012, 501), it becomes difficult to reconcile the number of phenomenologically orientated archaeological publications, Tilley’s included, against an interpretation that suggests they represent a secondary means of knowledge that he so denigrates. Phenomenological approaches have received much criticism and critique (see Barrett and Ko 2009; Brück 1998; 2005; Fleming 1999; 2005) and Tilley (2010, 25) has softened his approach, suggesting that providing rich description creates a “metaphorical textual mediation” through which others can experience and comprehend the myriad facets of landscapes.

What is landscape?

The often-used term 'landscape' represents a concept devised for the western early modern and modern worlds (Baines 2013, 21), coming into use in the latter years of the 16th century (David and Thomas 2008, 27). The term originally signified a unit of human occupation (Schama 1995, 10) but has evolved to encompass much more. For this study, the term landscape is used to signify the surroundings which relate to human engagement and experience. This encompasses terrain, constructions, pathways and other features of the specified geographical area, natural or otherwise. A tension exists between landscape as an aesthetic entity, to be viewed at a distance, or landscape as a context of activity (David and Thomas 2008, 27). Cosgrove (1984, 9) remarks on the merging of two western notions of landscape. The first, where landscape denotes the scenery of the visible world as viewed by a spectator, and the second, where landscape represents the investigative interests of academic geography (Feld 1996, 94). This landscape, a "delimited portion of the earth's surface", can be analysed by methods of scientific enquiry (Cosgrove 1984, 9). Feld (1996, 94) notes that both these notions of landscape display a "pervasive visualism" where sonic apprehension and other sensory modalities are absent.

The term 'landscape' is conceptually encumbered and many diverse theories exist which seek to address landscape issues (Baines 2013, 21). Landscapes are created by people, either consciously or unconsciously, through engagement and experience (Bender 1993, 1). Landscapes are challenged and claimed, they are modified and they endure, the landscape is never lifeless (Bender 1993, 3). Landscape locates human existence, not just the physical environment on which lives are lived, but also the locations, spaces and places, within which lives are lived. Objects within the landscape are not just abstract features but meaningful things which take part in experiential and social praxis (David and Thomas 2008, 38) and emplacement.

Temporality of landscape

Tuan (2007, 191) remarks that "history has depth, and time bestows value", commenting that the European landscape is historical, "a museum of architectural relics"; like that of the Egyptian landscape. In opposition to this the Chinese landscape offers a limited

number of structures of prodigious antiquity, despite the vast age of the Chinese civilisation (Tuan 2007, 190). Europeans built structures from stone, imbuing them with longevity and a sense of permanence. Chinese ideology is one of renewal and form over substance. Structures are generally constructed of wood, which does not last as long. The substance is corruptible, but form can be resurrected (Tuan 2007, 190-191). The scarcity of ancient monuments within Chinese landscape makes it no less empowered through engagement and experience than any other landscape which displays objects of antiquity. The landscape reflects the lives lived on and within it, through dwelling and practice (Lazzari 2005, 128), and is ultimately bound together with those lives in a continual collaboration through time. Landscape is culturally constructed and provides a lasting testimony of those who have dwelt within it (Ingold 1993, 152).

Landscape to placescape

Landscape is intrinsically enmeshed with space and place. All events, at whatever scale, occur in place (Casey 1996, 44). Casey (1996, 44) remarks that each event has its own appropriate and unique place which constitute a landscape of places. Landscape is place constructed through human (and other) activity, and place is “lived space” (Kahn 1996, 193). Landscape cannot exist without place and by extension, space (Casey 1996, 49). Casey defines landscape as “an instance of a *placescape*” (Casey 1996, 49; italics in original) which comprises part of the place-world, which he (1996, 49) defines as “an historic or prehistoric world that is anchored in a given unique place”.

Describing the concept of space

Spatial investigation of any variety must be conducted within a concept of ‘space’ (Conolly and Lake 2007, 3), which is a difficult term to define (Worboys and Duckham 2004, 83). We each experience space through our bodies, and would likely provide a different definition of space based on personal experience. Tim Ingold (2011, 145) argues against the notion of space which he defines as abstract, empty and detached from life and experience. He reflects on the use of alternative terms such as environments, land and landscape, fields and pastures, air and ground. For Ingold (2011, 145.), “space is nothing, and because it is nothing it cannot truly be inhabited at all”.

What is space?

Harvey (1979, 195) provides two concepts of the nature of space, which Conolly and Lake (2007, 3) suggest are the two main philosophical ideas of space that have dominated Western thought; *absolute* and *relative* space.

Absolute space: this concept describes space as a container that encompasses all objects and events, and exists independently of those objects within (Conolly and Lake 2007, 3). It follows then that for material objects to exist space is required; however, space can exist without material objects, as if awaiting the insertion of these objects. Immanuel Kant believed that space and time were nothing but representations, that they were not things in themselves, and therefore could not exist “out of and apart from the mind” (Kant 1855, 307). He resolved that ideas of space (and time) are inapplicable to the universe, although they can be applied to ordinary things and events where he understood them as a framework or a filing system for observations. He saw space as a frame of reference that was not founded upon experience, but instinctively used in experience, and formed part of the human mechanism for understanding the world (Popper 1972, 179). Conolly and Lake (2007, 4) remark that many processes, in which archaeologists are concerned, can only be understood if distance is determined through the language of social contact, time and cost, for which Kant’s filing system approach to absolute space cannot account.

Relative space: divergent to the concept of absolute space, the relative concept describes space as a quality that defines the position of material objects or events within the world. Therefore, in opposition to the absolute concept, relative space cannot exist in the absence of things (Conolly and Lake 2007, 3), where space and material objects within are inextricably linked.

Harvey (1979, 197) goes on to remark that “different concepts of space may be appropriate for different theoretical purposes”, commenting that the concept of space can be “multi-dimensional”, in that it can have alternate meanings depending on cultural background, perception, and scientific purpose.

The understanding of space can also be characterised or described. Freundschuh and Egenhofer (1997) discuss the experience of space in terms of small- or large-scale. Where small-scale space is that in which all places within the space can be experienced from a single vantage point, for example a room. In opposition to small-scale space, large-scale space is not perceivable from a single vantage point, requiring movement through the space to gain a perception of it. This type of space is learned, or understood through movement over time. Examples include building interiors or city-sized spaces. This suggests that perception of space, spatial cognition and behaviour are scale-dependent and experience-based, which contrasts with the space presented in GIS—a coordinatised Euclidean geometry¹. The properties of space in GIS are often presented as scale-independent (Freundschuh and Egenhofer 1997). In practice, this means that a GIS allows the interaction with, and observation of space in a manner that would be impossible through embodiment in the landscape—for example, viewed from above.

Tilley (1994, 15) suggests that space is an abstract concept which provides “a situational context for places, but derives its meanings from particular places. Without places there can be no spaces”, a view which conforms to the relative concept of space, whereby space cannot exist in the absence of contents within. Indeed, Tilley remarks (1994, 17) that “space can only exist as a set of relations between things or places. In this sense there is no space that is not relational”. For Tilley, place is inextricably linked with space, and he uses the term ‘platial’ to describe landscape from a phenomenological perspective (Hicks and Beaudry 2010, 72). The areas between places may be referred to as space (Chapman 2006, 130). Tilley also notes the role of pathways, which facilitate movement through space between places. He divides space into five forms; Somatic, Perceptual, Existential, Architectural, and Cognitive (Tilley 1994). These descriptive forms of space conform to the concept of small- and large-scale spaces that are experienced through the senses and movement of the body which leads to understanding.

¹ This is absolute space, where geospatial phenomena are embedded in a Euclidean plane, generally comprising an origin point and axes of orthogonal lines intersecting the origin (Worboys and Duckham 2004, 84).

Whether studying small- or large-scale spaces, within either the absolute or relative concepts of space, it is desirable to be able to describe positions of geographical phenomena. Burrough *et al.* (2015, 22–23) suggest two descriptors to represent geographical phenomena in the real world; “*What is present*” and “*Where it is*”. The description of what is present relates to features, such as hills, streams, structures, whilst the referencing in space of the phenomena can be defined in terms of geometrically exact or relative locations. The depiction of exact locations require the use of local or world coordinate systems comprising standardised systems such as UTM WGS 1984 datum or the OSGB 1936 / British National Grid (Figure 2.1); whereas a relative spatial geometry would describe locations in reference to other features within the same space (Figure 2.2) (Burrough *et al.* 2015, 23).

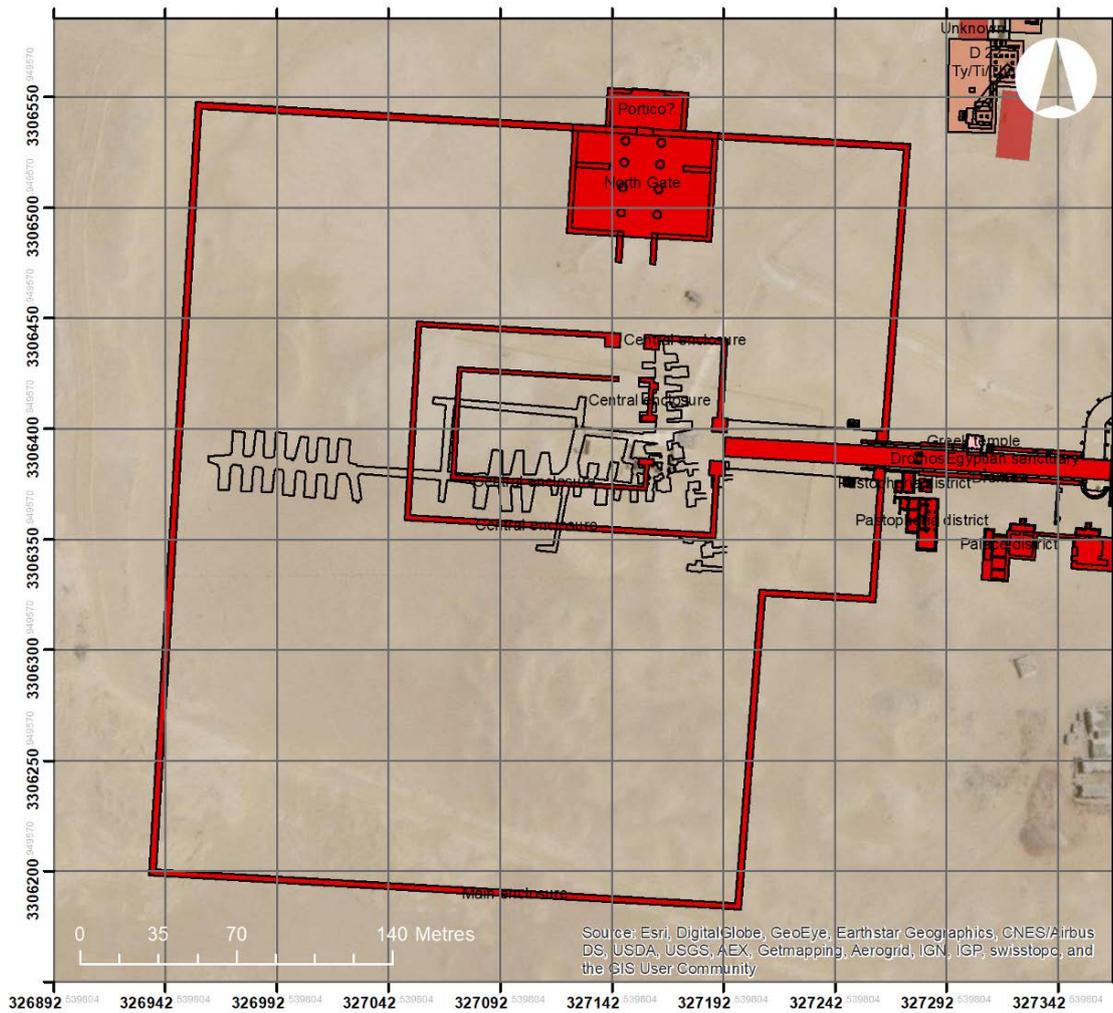


Figure 2.1. A coordinatised map depicting the Serapeum Enclosure. Projected in the WGS 84 UTM Zone 36N coordinate system (source author).

dimensions, over which an attribute varies, usually smoothly and continuously (Burrough *et al.* 1998, 30; Couclelis 1992). In contrast to the entity approach, attributes and their spatial variations are initially described, and when collections of similar attribute values are established, only then do they become features.

Is space neutral?

It has been suggested that a presumption that space is a neutral container should be regarded as incorrect, rather it should be considered a medium for human action embodied with meaning (Wheatley and Gillings 2002, 8). The construction of space through social action is reflected in the construction of social action through space, it is rooted and connected in those acts (Wheatley and Gillings 2002, 8). In practice, this requires space to be dynamic, active and constantly changing dependent on the actions occurring within, which makes space distinct across time, as human action is distinct across time. The space of 'now' is not the same as the space of 'then'.

Space in a GIS

Space in terms of its use within a GIS is related to the depiction of a subset of the earth's surface, and there are several fundamentally different ways to portray this space. Space can be presented as highly organised, through coordinate systems of Euclidean geometry, or as a primitive space, through collections of objects with no other structure (Worboys and Duckham 2004, 84). Conolly and Lake (2007, 4) remark that the two principle data models used in GIS that describe how attributes and locations should be linked, reflect the two theoretical concepts of space. The entity data model mainly conforms to the concept of relative space, where information is organised by entity as opposed to fixed location. Most often in a GIS this data model is represented by vector² based information (such as a topological³ map).

² A vector representation is a straight-line section of finite length defined by its end points, whose locations are specified in relation to "a coordinatization of the plane or higher-dimensional space" (Worboys and Duckham 2004, 17).

³ Topology is the science and mathematics of geometric relationships which are "nonmetric (qualitative) properties of geographic objects that remain constant when the geographic space of objects is distorted" (Longley *et al.* 2011, 215).

However, Burrough *et al.* (2015, 23) note that within a GIS, the locations of entities are commonly described within a fixed coordinate system which defines a space independent of those entities. The continuous field data model arranges information through fixed locations in space, and therefore aligns with the concept of absolute space. An example of a representation of a continuous field is a raster⁴ based Digital Elevation Model (DEM) where, theoretically, each location (represented by a single pixel) has an attribute value. Although these types of data structures, vector and raster respectively, have been used as examples for the *entity data model/relative space* and the *continuous field data model/absolute space* concepts, they are not exclusive to either respective concept. Where raster data structures can be used to define an assemblage of entities and vector data structures to define continuous fields (Conolly and Lake 2007, 4).

The use of GIS to present alternate versions of space has been previously noted. Chapman (2006, 130) critiques Tilley's (1994) division of landscape into places and spaces as simplistic, but comments that it can be extremely useful in the GIS environment; where places can be modelled within their landscape environments and, through the regression of the contemporary landscape, alternate possible pasts can be explored. He remarks that GIS enables the potential to examine qualitative experience from embodying the landscape in a quantitative environment. Constructed representations of landscape spaces, through digital terrain modelling, and places, through 3D reconstructive modelling, permit the addition or removal of features which may no longer be extant or present a modern intrusion on a past environment. Through this method multiple possible landscape models can be constructed and investigated.

Modelling conceptual space in a GIS

Modelling qualitative concepts in GIS is a difficult though not insurmountable problem (Chapman 2006, 18). With respect to landscape studies, conceptual topics relating to neighbourhood, areas that are considered desirable or less so, areas of special spiritual or physical significance, and so forth, may influence cultural decisions that are not

⁴ A raster representation is defined as an ordered array of cells aligned as a grid, known as pixels. Each cell within the array has an address, which is identified by its position defined through row and column numbers (Worboys and Duckham 2004, 17). An example of raster data used in GIS would be satellite imagery.

understandable through deterministic environmental modelling or even through examination of the archaeological record. Interpretive data layers can be used to produce theoretical models which generate possibilities rather than realities (Chapman 2006, 18), and through manipulation, alternative scenarios can be examined and diverse approaches considered. For example, a pathway along a hill-side may not traverse the easiest route to its destination, but may have been diverted along a more arduous course to afford those passing along it a specific view of the landscape. If examination of the route considered only time and cost implications, then its divergence from the easiest course would make little sense. However, with an holistic approach which examines multiple possibilities that are afforded by the landscape, then it is probable that an inference to the deviation of the path's course and its relationship with the specific view of the landscape it afforded would be made.

From space to place

Tuan (2007, 73) suggests that to learn space it must be experienced; to acquire spatial ability through the repetition of daily tasks. Human beings attain familiarity with their world, which comprises a collection of diverse objects in space, through purposive kinaesthesia and perceptual experience. It is through this movement and perception that space acquires value (Tuan 2007, 12), and "when space feels thoroughly familiar to us it has become place" (Tuan 2007, 73).

Place is more than a concept of straightforward physical location (Malpas 1999, 157). Tilley (1994, 18) associates place with "situatedness in relation to identity and action". Here he sees place as context, from where the relevance of space is viewed and understood (Tilley 1994, 18). Place is an integral part of human experience; places can overlap depending on the scale of interaction (Tilley 1994, 17); places can have multiple meanings and multiple uses depending on the values attributed to them by different people at different times. People live in place, they are part of it and have a sense of it and it contributes to identity, both individual and social; it is comprehended and formed through experience, meaning and symbology (Tilley 1994, 18). Place is landscape formed through lived space, culturally constructed and realised through human action (Kahn

1996, 193) and interaction, where place can entangle and disentangle (Feld and Basso 1996, 10).

Place is never static. Indeed, Casey (1996, 22) suggests that place can have its own “operative intentionality” which interacts with the “corporeal intentionality” of a perceiving subject in a mutual integration of body, place and motion. Whilst a specific place may be enduring it should not be assumed to be inactive or immobile. Place has dynamic power and it actively solicits kinesis in the experiencer through bodily motion. Casey (1996, 23) identifies three types of bodily motion concerning place: “staying in place” where movement is limited but not stationary; “moving within a place” where the body moves within a defined and bounded space; and “moving between places” where a transition occurs from one place to another. In this way, human action collaborates with place to generate biographies and histories (Wheatley 2004) according value and meaning and, through meaning, places define the human world.

For Ingold (2011, 149) place is described through movement, and movement between place facilitates the acquisition of knowledge. He describes movement between place using the term *meshwork*⁵, and knowledge is acquired through *wayfaring*⁶ which integrates places and provides a “practical understanding of the lifeworld” (Ingold 2011, 154). He contends that life is not “place-bound” but “place-binding” and is lived out not within place, but around and between place, either here or elsewhere, along the paths that connect through the meshwork (Ingold 2011, 148–149). He contrasts place as acting on many levels, where place contains lower-level places, exists alongside other places at the same level that are all contained within place at a higher level, with the notion of places that exists through enjoining pathways of lineal movement rather than via a system of vertical transition (Ingold 2011, 146–149). He presents an objection to the location of place within space (Ingold 2011, 146), which, as mentioned previously he does

⁵ Ingold (2011, 148–149) presents the concept of meshwork as an interlinked assemblage of trails, or lifelines, laid down through the wayfaring of inhabitants. Where inhabitants meet and their lifelines interact their trails become entwined, creating a knot, binding the life of each inhabitant with one another. The complexity and concentration of the knot is defined by the number of lifelines entwined, and places are akin to knots. Lifelines trail beyond the knots to become entwined with other trails thus generating other knots and places.

⁶ Ingold’s (2011, 148) term for the experience of embodied movement.

not find to be a useful term or notion. For Ingold, the groundedness of place situated within the abstraction of space is anathema. Place is where life's actions occur, space is not.

Perception of the world

Eve (2014, 8) remarks that the question of human perception of the world is fundamental to the theories of the Philosophy of Mind. Whilst Young (1998, 72) observes that “the goal of perception is to create representations of external events in ways that permit effective actions in the world that an organism inhabits”. Merleau-Ponty declared that “the body is our general medium for having a world” (Merleau-Ponty 1962, 146). Each human being comprehends the ‘world’ through action and interaction through the ‘immediate’ that surrounds them in their everyday undertakings, to the distant, which is beyond their peripheries, conveyed to their perception through various mediums. Ingold (2011, 45–46) describes how knowledge of the environment is accumulated through multiple observations from continual locations of rest along paths of perambulatory movement. Perception is not achieved from a fixed point, but from different angles gained through continuous locomotion, which affects what is perceived, and the method by which locomotion is undertaken will affect perception. For example, walking slowly through a landscape will afford a perception of the surroundings that is different from running through the same landscape. The level of detail that may or may not be perceived must surely alter the interpretation of the perceiver.

Human comprehension of the ‘world’ in the present is likely to be fundamentally different to that held by past people (see Phenomenology in archaeology below). This difference would have to be critically challenged and understood to begin to work towards an interpretation of past processes of thought. Indeed, as an example, the world view of the modern Arabic people who now populate Egypt differs with that of their ancient Egyptian predecessors, who held widely divergent religious beliefs and knowledge of the world. European researchers attempting to recreate some aspect of ancient Egypt will likely hold a different world view again. These contested perspectives are not specifically a past or present phenomena, but rather an aspect of the human condition.

Phenomenology

Phenomenology claims to be a “*radical way of doing philosophy, a practice rather than a system*” (Moran 2000, 4, italics in original). It is “the study of conscious experience as lived, as experienced from the first-person point of view” (Smith and Thomasson 2005, 1), emphasising the attempt to describe phenomena “as it manifests itself to consciousness, to the experiencer” (Moran 2000, 4). Phenomenological approach requires that no *a priori* explanations are enforced prior to understanding the phenomena, and this requires a freedom from the prejudice of embedded traditions (Moran 2000, 5). To correctly describe experience, the phenomenologist must recognise that they contend with the experience of direct engagement with the world and the nature of consciousness as actually experienced, not as implied through philosophy or “common sense” (Moran 2000, 6). The concept of ‘bracketing’ was proposed by Husserl to remove presupposition and bias from the experiencer to achieve an objective outcome; Merleau-Ponty however, condemned bracketing as a “repudiation of science” (Moran 2000, 14).

Phenomenological study, through association with introspectionist psychology (Smith and Thomasson 2005, 4), has been accused of being unverifiable by external means (Eve 2014, 11). Through this justification phenomenology has been ignored and kept apart from the study of the philosophy of mind (Smith and Thomasson 2005, 4). However, phenomenology has a basis in the analytic tradition. Indeed, phenomenology actively pursued a philosophical direction that avoided the methods of introspectionist psychology (Smith and Thomasson 2005, 4). Phenomenology is often accused of being subjective. Merleau-Ponty stated that phenomenology described rather than explained (Moran 2000, 14) and the approach continues to rigorously defend “the fundamental and inextricable role of subjectivity and consciousness in all knowledge and descriptions of the world” (Moran 2000, 15).

There is not, however, a single unified phenomenological approach. Rather there are differing traditions, the leading protagonists of which are generally considered to be Heidegger, Husserl and Merleau-Ponty, amongst whose work is a great diversity and conflict (Moran 2000, 22). For Husserl, phenomenology centres on ‘intentionality’, a

theory in which “all conscious experiences ... are characterised by ‘aboutness’” (Moran 2000, 16). In simple terms, experience is always about *something*, whereby we are unable to experience empty consciousness without content, such as ‘seeing’ or ‘feeling’ for example, we can only be aware of seeing something, of feeling something and so forth (Ferguson 2001, 235). Therefore, experience always involves an object which is viewed from a perspective (Eve 2014, 11). It did not matter to Husserl whether the object of the experience existed, but that it was a “meaningful correlate of the conscious act” and that would allow one to explore “the intentional structures of acts and their correlative objects” (Moran 2000, 16). Lived experience provided the means with which to understand consciousness, through acts rather than as removable contents of the mind (Ferguson 2000, 236).

Objects which are observed present indeterminate features, for example a closed door offers the view of a single side, but the observer is aware that there is another side to the door that exists beyond their current perspective. The knowledge of what is sensed suggests that experience transcends the indeterminate nature of the object. Merleau-Ponty (1962, 169–170) rejected this transcendentalism, instead he argued that phenomena could not be studied in abstraction. He maintained that consciousness, which he equated with *subjectivity*, is bound to the body and to the world (Merleau-Ponty 1962, 408) and that the world is experienced from within a perspective (Merleau-Ponty 1962, 406).

Philosopher of contemporary cognitive science, Daniel Dennett, distinguishes two types of phenomenological investigation in the Husserlian tradition: autophenomenology and heterophenomenology. Dennett vehemently accuses autophenomenology as being “The Fantasy of First Person Science”, with charges of scientific unreliability and introspective investigation of cognitive processes (Roy 2007, 10). Dennett’s heterophenomenology, which has received wide criticism (see Dreyfus and Kelly 2007; Drummond 2007; Zahavi 2007), claims to be conducted objectively in the third-person by a subject that is not the experiencer, and therefore could be termed scientific and externally verifiable (Roy 2007, 10). Roy (2007, 17) disagrees with this division, claiming that heterophenomenology does not qualify as phenomenological study, but is rather a “theory of phenomenological

properties” and chooses to correlate autophenomenology with actual phenomenological investigation. Can then phenomenological investigation be scientific?

The discipline of the Husserlian concept of phenomenology is concerned with exploring the essences of experience and their relationships and connections that they offer (Smith and Thomasson 2005, 6) rather than the actual corporeal experience itself (Eve 2014, 11). The “essences of experience types are understood through our *concepts* of experiences of different types” (Smith and Thomasson 2005, 6). The basis of an experience can be understood through questioning the components of a concept. This connects the outcome of phenomenological study to the “conceptual analysis of mental state types” related to the scientific approaches of the analytical philosophy of mind (Smith and Thomasson 2005, 6).

Phenomenology in archaeology

The concerns of a phenomenological approach to archaeology are with experience and understanding of the world through human sensory modalities and the way these occur. Phenomenology attempts to gain comprehension and provide an account of experience as lived by a subject (Tilley 1994; 2010; Brück 2005, 46). However, it is through an apparent subjective approach that the discipline has routinely been devalued through pejorative criticism as being inaccessible to objective assessment through scientific method (Hamilton and Whitehouse 2006), because frequently phenomenology produces qualitative data and ‘science’ processes quantitative data.

When attempting to experience a representation of some aspect of the past, engagement with the theoretical approaches that inform and direct research within *the historical* cannot be avoided (Lyotard 1991). The reconstruction of the historical in the present brings with it an existential ambiguity, whereby the agent performing the reconstruction through historical science is also an historical being, an object within history. Lyotard (1991, 111) suggests that this situation leads to the question of how historical science is possible. If the historical being operates within history, there must be a realisation for that being to go beyond its historicity to understand historical reality as an entity of science. He further suggests a history for consciousness, that consciousness

is itself history and that “we have a consciousness of our identity through time”. Object history presents itself to the observer through monuments, remains, records, signs and materials, and that these proffer an opening to the past, though not necessarily explicit knowledge of their meaning, and “that scientific thematisation adds nothing to our understanding, only that this thematisation, this construction of the past, is, as it were, a reconstruction” (Lyotard 1991, 117). The signs are obtainable to the observer who is invested with a sense of the past, but their meanings require “conceptual elaboration” (Lyotard 1991, 118). This conceptual elaboration can manifest through the application of phenomenology.

For Tilley (1994, 12), phenomenology is about the connection between Being and Being-in-the-world, and the objectification of the world through the action of setting oneself apart from it which allows for the distance created between the self and the world to be connected. Spanning this distance occurs through perception, movement and other means, and it is through the recreation of these means to understand human experience that the focus of phenomenology resides. Embodiment is key to the phenomenological approach (Tilley 2004, 2; 2006, 22; 2010, 25) as humans are always in their bodies and cannot leave them and experience of landscape occurs through the medium of the body (Tilley 2010). However, as Brück (2005, 56) remarks, past experience is historically constituted and simply attempting to recreate that experience in the present is unlikely to provide an authentic understanding. How a human agent experiences an event may be prescribed by a number of factors including physical aspects associated with the body: stature (influencing a view perspective), vision impairment (red-green colour blindness for example); psychological aspects of the mind: depression presenting an immediate example of a psychological state that can alter perception; psychoactive drugs that induce hallucination; or even physical conditions of the environment in which the experiencer is participating: weather, topography, time. Each of these aspects differ between events, experiencers and locales, and through time. This was cogently summed up by Bender (2006, 303):

“The same place at the same moment will be experienced differently by different people; the same place, at different moments, will be experienced differently by the same person; the same person may even, at a given moment, hold conflicting feelings about a place.”

If theoretically it was possible to erase all personality and modern knowledge from the brain of an observer to create an empty vessel in which to implant a constructed mind-set to imitate that of a human agent from the past, then the experiencer, when placed in a situation that replicated a past-construct or historic landscape for example, could experience a scripted/constructed past-reality as if it were actual. This almost ‘science fiction’ approach would still suffer from serious complications. The ethics of erasing a human brain notwithstanding, the implanted past-mind would only be a construction of what modern science believes a past-mind should comprise. In addition, past-landscapes, by their very temporality, now exist within contemporary time and space, and therefore are no longer located in the past, which is unattainable.

Phenomenology and GIS

Llobera (2012, 498) provides a cogent critique of Thomas’ (2004 and 2008) opinion on the association of GIS and virtual reality modelling (VRM) as “the reproduction of modernist thinking about the world, and their role in reproducing a Cartesian dualism that prevents us from understanding more experiential aspects of the world”. Llobera remarks that Thomas does not appear to provide any solutions as to how best to achieve the phenomenological understanding of the past that he claims is possible. Indeed, it can be argued that it is not possible within our current technological and psychological boundaries to ever recreate an observable past-experience in the present. There are several reasons why this is so. The most pertinent being that the observer will always know that they are in the present viewing a modern construct, which relates back to Lyotard’s views of the ‘historical being’ discussed previously. Furthermore, no two experiential events will be appreciated in the same way by different people, echoing Benders remarks quoted earlier. This is the same today as it would have been in the past.

The general aversion expressed by archaeological protagonists of experiential theory over the employment of GIS in landscape studies is well known, and the hotly contested debate continues (Brück 2005; Llobera 2012, Gillings 2012). Brück (2005, 54) remarks that “the detached and analytical character of GIS runs counter to the spirit of phenomenological approaches” but does go on to affirm that GIS provides an ability to demonstrate relationships between places which can aid in inferential observations, and as such should not be dismissed without careful consideration. A digital approach through GIS does not actually present realities, only possibilities (Chapman 2006, 138). Brück’s initial remark appears to treat GIS as a replacement for the more traditional phenomenological approach to landscape archaeology, which is not without its own attendant issues, whereas it could be used to complement such an approach where appropriate. If there was a synthesis between the ‘out in the landscape’ approach and the ‘digital landscape’ approach a greater diversity of data may be realised leading to the ability to make well-informed inferences. When recreating a past landscape that is no longer extant, significantly altered, or inaccessible, then a variation of the phenomenological approach within GIS may represent the best or only option.

Another criticism that has been levelled against the use of GIS in landscape studies is that of environmental determinism (Gaffney and van Leusen 1995; Llobera 1996). This contention depreciated the value of GIS through the general consideration that it was a tool for location modelling, site prediction, and little else. This view led to an assumption that any study using environmental information, such as topography, imposed determinism upon the results (Llobera 2012, 496). However, to discount environmental opportunity as a mechanism for the location of sites or monuments would be to preclude any study from achieving the best possible outcome through access to all available data. It is possible that along with human choice it may form part of the process which results in their location (Llobera 2012, 496).

Perceived affordances

In response to the debate over landscape theory and GIS, Gillings (2012) proposed a departure from the use of spatial technologies to model sensory modalities where “there is little to be gained from developing approaches that are locked into the Landscape

Phenomenology of 1994” (Gillings 2012, 604). Instead he encouraged the use of such technologies to explore experiential affordances that features being studied may offer. An affordance determines a range of possibilities that an object (or feature) may offer in a relationship between the properties of that object and the capabilities of an interacting agent (Norman 2013⁷). This approach follows the work of J.J. Gibson (1979) in the field of visual perception. His theory of *invariants* and *affordances* through direct perception proposes that the environment contains invariant information—affordances. These are meanings which the environment offers an animal (human or otherwise) which are perceived directly without prior mediation (i.e. not augmented by the animal’s mind) through sensory engagement. The affordances, through their meanings, offer a guide to behaviour, suggesting possibilities to an observer, the numerous responses to which he termed *effectivities* (Gordon 2004, 155). Through affordances “the relationship between perceiver and environment assumes great importance” (Gordon 2004, 154).

Gibson’s theory of invariants and affordances emphasises that understanding perception requires the study of both the animal and its environment together, as this relationship is essential (Lombardo 1987, 193). One must understand whether a perceiver can use potential invariant information. This, Gibson terms ‘*attunement*’—the perceiver must be attuned to affordances before they can act on them. The theory also emphasises that affordances offered by invariants differ across species (Gordon 2004, 155), presumably including social and cultural variations within the human species. The properties that invariants afford are situationally determined and must be learned by the perceiver to understand which outcomes they will satisfy (Gordon 2004, 155). Norman emphasises the memory, knowledge and experience of the interacting agent (animal) in realising affordances (Norman 2013), and the cultural conventions that determine use (Norman 1999, 40). He makes a distinction between actual affordances, which may not have a visible presence, and perceived affordances whose visible presence suggest possibilities, some of which may not be achievable (Norman 1999, 40).

⁷ Viewed online, page numbers absent.

Ingold (1992, 44) emphasises that direct perception of the environment provides a manner of engagement with the world, but does not constitute a manner of its construction. A human's perception of the environment relates to the action currently being undertaken and the affordances available in pursuit of that action. Perception and action gains practical knowledge of what an object or environment affords, and the type of affordance offered will relate to the type of activity being pursued (Ingold 1992, 46). Not all affordances offered by an object or environment are available to all perceivers. An agent's effectivities (action capabilities) will determine what they are practically equipped to achieve, therefore affordances are restricted by effectivities (Ingold 1992, 46).

Gillings (2012, 605) observes that as a concept, affordance is not static and debate continues within the field of Psychology to develop a coherent theory. A key question for a GIS based application of the concept relates to the qualities shared between animals and environments and how they constitute affordances, and importantly, whether affordances exist independently of animals (see Gillings 2012).

Affordance as relational theory

To overcome certain contradictions within the theoretical definitions of affordances, a *relational* theory was proposed by Chemero (2003) which stressed that affordances should not be thought of as properties of either animals or environments, as previously considered, rather they should be viewed as *relations* between both. Here affordances are perceived through "feature placing", whereby the animal can perceive that a situation provides a feature, which in turn necessitates the animal to provide specific abilities (Gillings 2012, 606). Within this theoretical concept affordances are not properties of environments but are connected to "features of whole situations" encompassing animals as an essential component, where the affordance is the relation between the situational feature and the animal's abilities. Changes in affordance can occur through change in the environmental situation or the animal's abilities (Gillings 2012, 606).

The following example is used to clarify the relational theoretical concept. A human on a journey approaches a vertical cliff face which must be negotiated to continue, the relation

between the cliff face (the feature) and the human (the animal) presents a route to allow the continuation of the journey (an affordance), or an obstacle denying the route onwards (an anti-affordance (Norman 2013)). The human does not know how to climb, therefore the affordance (relation) between the cliff and the human is presented as an obstacle. To progress, the human learns to climb. Upon returning to the cliff the affordance provided is that of a continuation of the route. A change in the abilities of the human facilitates a change in the relation to the cliff face.

Gillings' (2012, 608) recommendation for the use of the relational theory of affordances in GIS is to begin with the relational situation that is to be analysed and, through the development of a 'framing heuristic', explore and investigate relational potentials. He suggests that attempting only to map affordances opens research up to the prospect of reductive objectification and the cessation of relational possibilities. The generation of relational heuristic models and framing devices within GIS offers a space for deliberation, to examine, analyse and interpret possibilities, to create scenarios and generate new questions (Chapman 2006, 128).

In practice, this would begin with the investigation of a relational situation (Gillings 2012, 608) identified through research aims. Using GIS to create multiple data layers (such as viewshed products or lines of sight) that can overlay one another would permit the construction of a new data layer that provides a cumulative result of the other layers. This can be used to investigate the relational possibilities (such as visual affordances) that it may imply. For example, a GIS layer constructed that detailed an observer's lines of sight to structures from a specified location within the landscape could be used to investigate the visual relationship between the observer and the structures, where distance, angle, elevation would change dependent on movement, direction, and topography. The height of the observer would alter the visual affordances which could be used to generate new possibilities.

Entanglement

A relational theory of affordances describes a dynamic interchange between situation and animal, where situation (environment or object) provides the animal with

possibilities which in turn requires the abilities of the animal to realise those possibilities. This approach appears analogous in principle to Hodder's (2011; 2012) theories of entanglement, where people depend on things and things on people. Hodder (2011, 155) generally refers to things as "human-made objects"⁸. If applied to landscapes, this could include monuments, funerary structures, temples, all of which are made through human endeavour. For example, people who engage with temples (craftsmen, worshippers, priesthood) depend on them to provide an employment industry; to nourish their spiritual or other such needs; to convey meaning and significance; and the temples depend on the people to provide maintenance, activity through attendance, and meaning and significance. Through this entrapment (Mills 2014, 92) the people depend on the temples which depend on the people, and so a cyclical relationship is entered. Entanglements can transpire through situational circumstance when appropriate conditions prevail, though these entanglements may persist they may also be disposed to "instability and unruliness requiring solutions that lead to change" (Mills 2014, 92). Thus, the entangled relation between person and temple (thing) is susceptible to change, just as the relation of affordance can transform dependent on the abilities of the perceiver.

To explain the concept of change in relation or entanglement, a generic temple to a deity is presented as an example. The temple is constructed for veneration and is occupied and attended by the priesthood. It is visited by daily worshippers who through their presence have a specific relationship with the monument, which differs from the relationship held by the priesthood. Should a worshipper strive to become a priest then the relation afforded by the temple will change, as would the aspect of entanglement through the alteration of the dependency.

Can entanglement theory be applied to landscape?

Landscapes comprise things. To a lesser or greater degree people depend on the landscape in which they act. Surroundings—space and place, provide situation and create dependence. Is that dependence reciprocal? A landscape unaltered by human interaction

⁸ Plants and animals are also included within the description (Hodder 2011, 162).

would not depend on the presence of people, but most landscapes in which the human population interact are no longer unaltered, after millennia of habitation, change and modification by humans, the landscape depends on people to retain its present form (Hodder 2012, 92). This approach is, of course, reducing landscape down to a simplistic unit, which it is not, being formed of innumerable parts. Howsoever one chooses to investigate a landscape altered by people—as a simplistic unit with little more than an inference of its summary parts or as a comprehensive assemblage of things—entanglement still appears to occur. People are entrapped by things comprising the landscape and the landscape is entrapped by its dependency on people to retain its present form.

Mills (2014, 92) expresses that the boundaries of entanglement may be “open or difficult to define or know”, and that entanglements themselves are messy. This would certainly correlate with the entangled entrapment of people and landscape, which may occur over multiple scales. People have dependence on a defined area such as the urban environment in which they live and the urban environment’s dependency on the people to function (small-scale). The same people may have dependence on the wider rural landscape for agricultural or pastoral land and the rural landscape’s dependency on the people to farm and maintain it (large-scale).

Hyper-reality

Hyper-reality is when the conscious mind is unable to distinguish between reality and a simulation of reality, where the unreal becomes the real. Baudrillard (1993, 73. Italics in original) contends that “the very definition of the real is *that of which it is possible to provide an equivalent reproduction*” and “through reproduction from one medium into another the real becomes volatile” (Baudrillard 1993, 71). The implication being that at the concluding stage of the process of reproduction the only reality is the hyper-reality that has been constructed, and Baudrillard (1993, 74. Italics in original) contends that “*today reality itself is hyperrealist*”. He considers hyper-reality to be beyond representation, because it exists within simulation (Baudrillard 1993, 73) and comments that “It is no longer a question of imitation, nor of reduplication, nor even of parody. It is

rather a question of substituting signs of the real for the real itself..." (Baudrillard 1983, 4).

An enmeshing of the real-reality and simulated-reality through digital technologies can facilitate the construction of a powerful hyper-real experience of place, where vision is the pre-eminent sense and all other senses become subordinate. The simplification of the interrelationship between the senses can lead to a detached and passive experience (Tringham *et al.* 2007), where vision is directed and constrained by the limitations of the digital model. Eve (2014) attempts to reconcile the experiential and computational approach to landscape studies through spatial analysis and phenomenological fieldwork and merges these approaches to create an embodied GIS using mixed reality techniques. The use of mixed- and augmented-reality offers an environment where computer simulation and dynamic analysis can be experienced within the physical landscape (Eve 2014, 1–2). Using a bridging medium (such as a tablet computer) a representation of a past landscape can be explored whilst moving through the physical environment where that landscape once existed, rather than statically from a remote location. Eve (2014, 124) takes this augmented-reality approach a step further into mixed-reality by including the olfactory and auditory senses to create an embodied GIS. Through an embodied GIS the phenomenological approach is bestowed with the ability of *in situ* experimentation by taking the underlying data into the landscape for analysis.

A digital representation of the past does not present a past-actuality—however tangible it may appear—rather it presents a past-possibility. Chapman (2006, 171) proposes that “often the more visually impressive a computer model is, the more likely it is to be accepted as ‘correct’”. Whilst every effort should be made to achieve accuracy and precision within a digital representation to reach the best possible data output with which to construct inferences, the representation should not constitute a concrete (hyper-)reality. Digital models that are not draped with realistic textures and rendered as ray-traced hyper-real visualisations, are equally as productive as those that are—in some cases, more so. The usefulness of a digital construction depends on its applicability to the research focus.

Whilst hyper-reality may be desirable to achieve specific outcomes, the type of digital representation that this project has produced is not an attempt at the presentation of a reality, where the digital becomes more real than the real. In recreating a landscape that is no longer wholly extant as represented, an issue can occur where the simulation becomes more significant than the real landscape (Chapman 2006, 37). The representation is not intended to be a replacement for the real, rather, it provides a supplement. It facilitates modes of study that may otherwise be impossible; the recreation of monuments no longer extant to determine relationships between interactive agents and the landscape; the removal of volumes of drift sand to change visual perspectives and so forth. Without the use of digital technologies this type of effort becomes cumbersome, if not impossible.

Theoretical approaches in Egyptology

There is a general lack of theoretical interpretive work within Egyptological research (Brown 2010, 91), which has benefitted greatly from the enormous breadth of written evidence from the ancient periods that has often negated the requirement to develop a theoretical method to understand the historical past. Brown (2010, 92) suggests that interpretive theory is a prerequisite tool of non-Egyptological prehistorians to aide interpretation in the absence of written records. He goes on to imply that a reluctance to engage with interpretive theoretical approaches may have arisen from concerns over access to sites within Egypt because of social and political pressures expressed through the refusal to grant excavation permits (Brown 2010, 94) leading to a *dig now—interpret from text later* culture within the discipline. He identifies the need to develop and implement analytical and interpretive theory and apply this to current and future work in Egyptology.

A limited number of Egyptological researchers (see Kemp 2006; Meskell 1999; 2003; 2004; 2005; Ucko 2003) have engaged with theoretical approaches to varying degrees. Lynn Meskell (2004) for example, examines the phenomenology of materiality in ancient Egypt, and she is one of the few authors to engage with a phenomenological approach. An Egyptological researcher who is not known for his theoretical approach is Harry Smith. The following passage is taken from Smith's *A Visit to Ancient Egypt* (1974, 64), and

represents his endeavour to envision the Late Period of North Saqqara in written form and, as such, could be considered a phenomenological approach to recreating the experiential aspects of a living landscape.

“I, Aristodamus, Athenian of the deme Acharnae, merchant, relate what befell me and my travelling companion, Peitho, Athenian of the same deme, merchant, when we visited Memphis in Egypt, not things that we heard by common hearsay, but what we saw with our own eyes and heard with our own ears from those skilled in their professions”.

Whilst Smith’s approach predates the adoption within archaeology of the phenomenological method, it accords with that method. He provides a detailed narrative that allows the reader to experience a funerary festival in the Late Period in Memphis through the perspective of interacting agents who are present at the event. It should be noted that Smith now believes that details within his narrative are incorrect (Smith 2016 pers. comm.), however, this does not detract from the experiential focus that the account attempts to provide.

Baines (2013, Chapter 2) approaches the ancient Egyptian experience of the landscape through a sense of space and place depicted in visual form through mortuary display. These pictorial representations offer the possibility to explore experience of landscape, of the desert or urban setting, but Baines remarks that a “materially or ideologically neutral landscape” is unobtainable, having been, he maintains, long removed through millennia of human activity. Egyptian representations were not organised by, or depicted from, a specific viewpoint, as is common within the western notion of landscape. Within the western tradition a scene is always viewed from somewhere (a location), from a particular perspective. Baines observes that these western notions are of “limited value for ancient Egypt”, where representations made use of motifs or captions to indicate where a depicted event was occurring, but not a specific viewpoint (Baines 2013, 43). Natural formations within the environment generally served to provide backdrops to the figures who were the focus of the representation, and as such were often rendered in abstract principles. They did not always communicate information about a particular

space or place. The environment provided a canvas upon which human activity was set. Often locations were depicted for what they afforded, or produced, and the activities they supported (Baines 2013, 44–45). This may suggest that the natural landscape was not an object of interest in and of itself to the ancient Egyptians, but more for what it could afford those who would manipulate it.

Summary

To provide an understanding of theoretical concepts germane to the investigation of GIS and spatial technologies (including digital representations), several are outlined and discussed above. Through doing so, it became apparent that investigation of the digital landscape representation would benefit from the application of the theory of affordances and entanglement, which were suitable approaches to addressing the study's research questions (see Chapter 1). These theoretical concepts would be used to understand the potentialities that affordances offered interacting agents in the landscape; how the landscape, the agents, monuments, and networks of movement become, and remain, entangled. There is an interconnectedness between affordance and entanglement, whereby they require scrutiny comparative to one another. When perceived affordances are exploited, it appears that entanglements often develop. Through this methodological approach a more nuanced understanding of the LP/EP sacred landscape of the necropolis is sought. Additionally, the project seeks to establish a theoretical approach in Egyptological landscape studies where currently there is very little.

CHAPTER 3

Archaeological documentation

Introduction

Archaeological documentation from archival sources has provided the foundation upon which this study and its digital models are based. In many cases, the information provided by historical cartographies affords researchers the only known locations and details (albeit often sparse) of features now lost to time and the desert sands. It is for this reason that these cartographies are of high importance to Egyptologists. An archaeological site such as Saqqara can comprise hundreds, if not thousands, of structures, and there are probably as many maps, plans, and publications detailing these features. Compiling a detailed GIS required the synthesis of many of the available archaeological maps and plans, and no small amount of interpretation was required to fit together disparate site plans from multiple missions and archaeologists. This task has been a most interesting undertaking and has highlighted the need for such a GIS as this study has produced. The University of Pisa new cartography notwithstanding (see below for a discussion of the issues encountered with this work) a detailed and—as far as is practicable—comprehensive singular landscape plan of the Saqqara necropolis has not been available to Egyptologists. Existing maps and site plans will continue to provide primary source data for research, but just as the Porter and Moss (hereafter abbreviated P&M) topographical bibliographies have become a reference source, it is hoped that this projects' GIS and 3D model may do the same for the Saqqara environment.

General archaeological maps of Saqqara

The *Description de l'Égypte* (*Description 1809–1826*), created and compiled by the savants who accompanied Napoleon Bonaparte's army into Egypt, offers the earliest

known maps that identify the ancient necropolis of Saqqara. Two maps that concern the Saqqara/Memphis area are included within the publication, and both are presented at such a small scale that there are few details of the archaeological features. Larger features such as the pyramids are defined and labelled. Their relative positions in relation to the edge of the desert and the Nile floodplain are discernible. The larger scale map (Figure 3.1) also defines the general position of the Tombeau de Momies d'Oiseaux (Tomb of the Bird Mummies), presumably one of the Ibis catacombs, and Tombeau de Momies humaines (Tomb of human mummies). It is unclear to which tomb the latter description refers. On the smaller scale map (Figure 3.2) the Saqqara area is described as the 'Plaine des Momies' (Plain of Mummies). This map defines more sites of archaeological interest, and was presumably drawn later than the larger-scale Memphis map, which displays less feature information.



Figure 3.1. Description de l'Egypte map, Vol. 5 Antiquities V. Memphis et environs. Plan général de l'emplacement de Memphis et des environs (Description 1809–1826, Antiquités V, Planche 1).



Figure 3.2. Description de l'Egypte map, Vol.6 Atlas Géographique. Carte Topographique, Memphis (Description 1809–1826, Atlas Géographique, Planche 21).

Saqqara was a site of interest prior to the commencement of early modern archaeological investigations (see Baber 2016). During the formative years of the 1800s, the site was subjected to an escalation of archaeological exploration and focus. Baron Von Minutoli (1772–1846) and Girolamo Segato (1792–1836) began their exploration of the Step Pyramid of Djoser in 1821 (Bard 1999, 860). It was from these explorations that Von Minutoli published the first known cross-section elevation plan of the step pyramid but unfortunately did not include a map of the Saqqara area (Minutoli 1824). Further exploration of the necropolis continued in 1837 through the endeavours of John-Shae Perring (1813–1869) and Colonel Howard Vyse (1784–1853) (Vyse 1840a; 1840b; 1842). Vyse (1842, 37) published a map (Figure 3.3), drawn by Perring, detailing the known monuments that were visible at that time. The map defined the terrain of North Saqqara and the locations and relative sizes of the pyramids. Also identified are general areas of archaeological features presented without further detail and described in such a manner as ‘Ibis Mummies’, ‘Ancient Tombs’, and ‘Mummy Pits’. The plan by Perring represents the earliest known archaeological map of the necropolis.

During the mid-1800s Karl Richard Lepsius (1810–1884) discovered and documented approximately thirty tombs in the area surrounding the step pyramid. Additionally, and significantly, he created and published a more detailed archaeological map of the necropolis (Figures 3.4 and 3.5). It has been noted, that until the map by W.S. Smith published in 1936 (Reisner 1936, Maps ii), the Lepsius map remained the most accurate for the necropolis as a whole (Buongarzone 2003a, 108). The Lepsius map, like the Perring map before it, defined the terrain of the Saqqara necropolis and the locations and relative sizes of the pyramids. Additionally, many other large archaeological features were included, such as those that are now known as the Bubastieion, Gisir el Mudir and Serapeum. Other archaeological discoveries are identified on the map by numbers which relate to relevant passages of text within the publication.

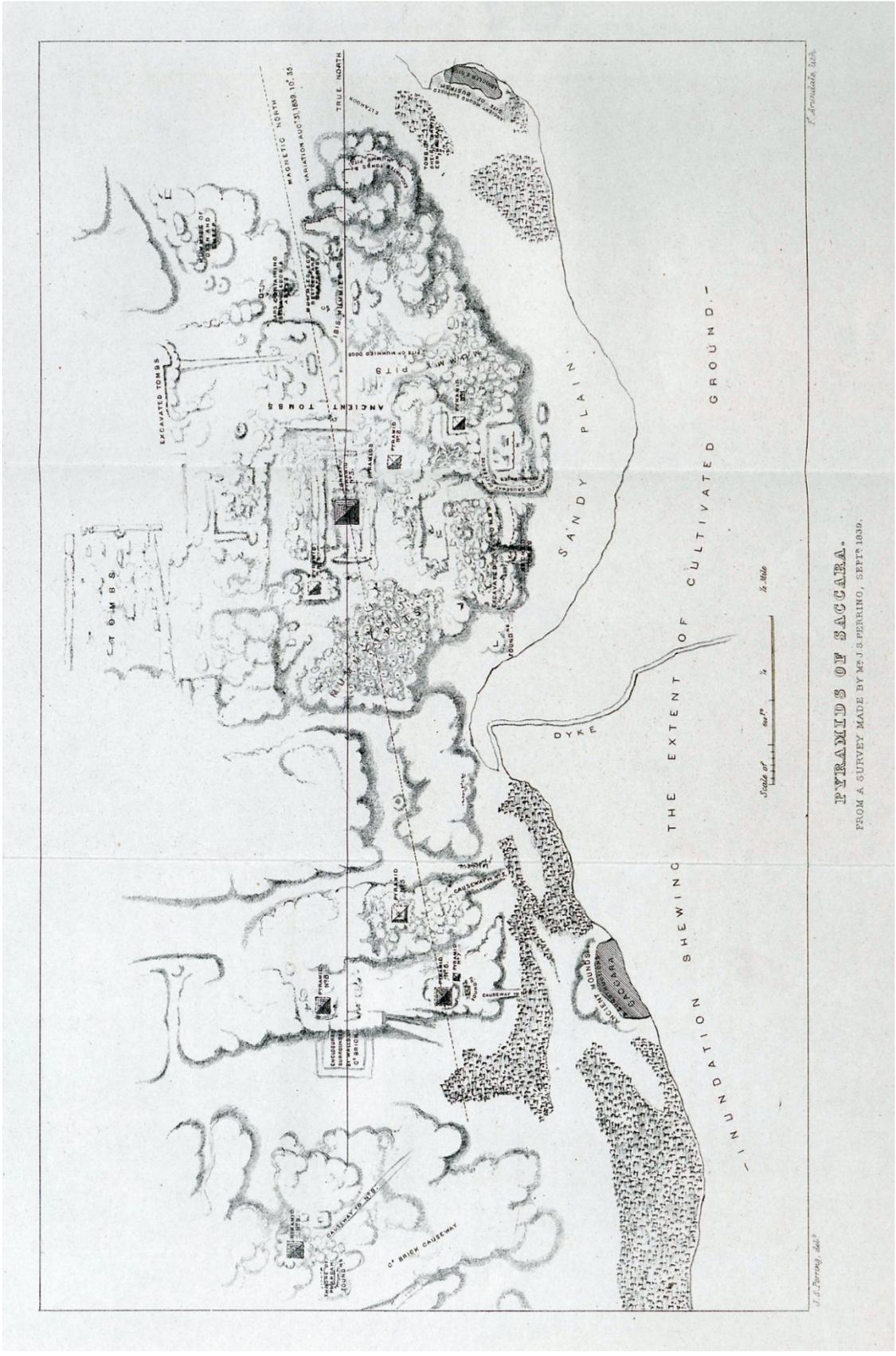


Figure 3.3. Perring and Vyse—Pyramids of Saccara (Vyse 1842, 37).

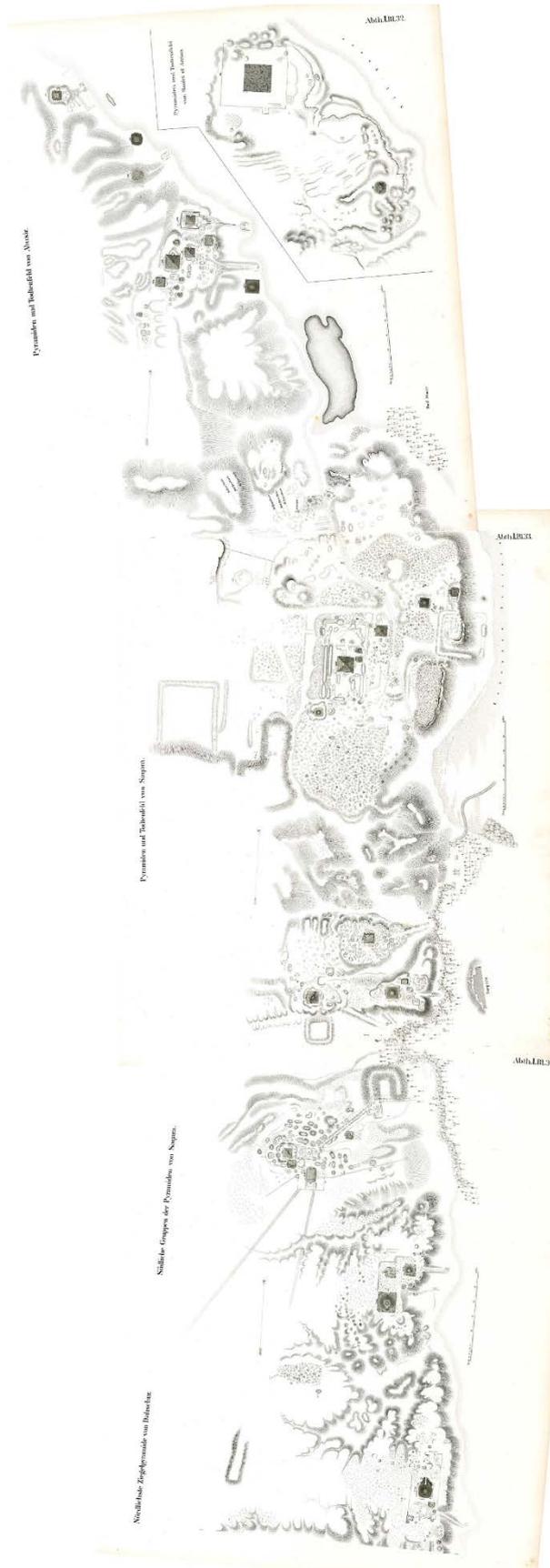


Figure 3.4. Lepsius—Composition of South Saqqara, North Saqqara and Abusir (Lepsius 1849, Abth. I. Bl. 32, 33, 34).

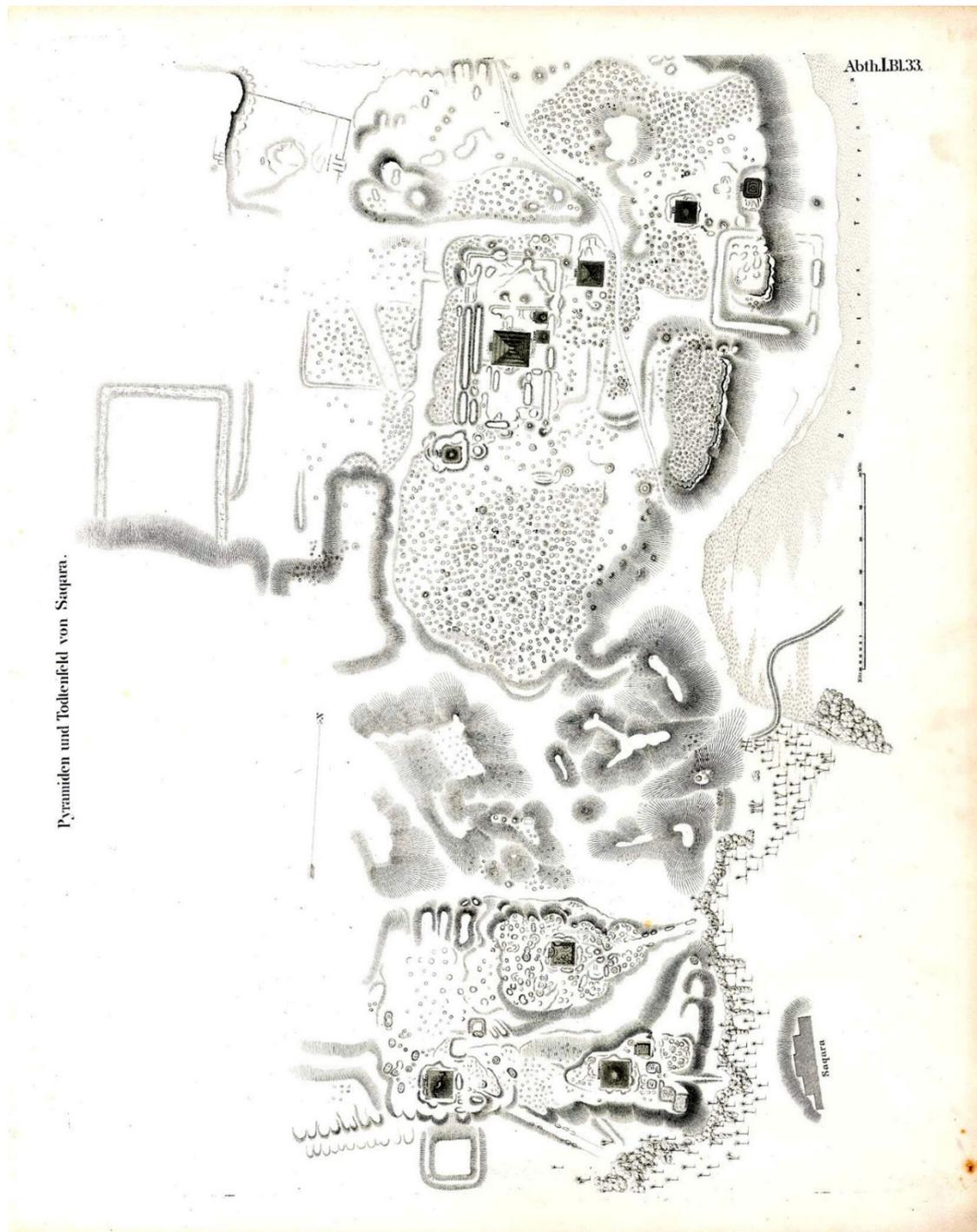


Figure 3.5. Lepsius—Detail of Pyramiden und Todtenfeld von Saqqara (Lepsius 1849, Abth. I. Bl. 33).

The posthumous publication of August Mariette's (1821–1881) *Les Mastabas de l'Ancien Empire* (Mariette 1885) included a map of North Saqqara which is clearly based upon the earlier work of Lepsius although, in comparison, the Mariette map appears somewhat rudimentary (Figure 3.6). Due to Mariette's alterations to the numbering conventions that were employed for tombs, identifying features can be onerous. Curiously this map omits the surface plan and location of the Serapeum—which is well defined in Lepsius' work—but does depict the general orientation of the Serapeum way. Two earlier maps by Mariette (Figures 3.7 and 3.8) do however include details of the Serapeum enclosure (Mariette 1856) and Arthur Rhoné (1836–1910) published a separate plan of the Serapeum area in *L'Égypte à petites journées* (Rhoné 1877, 216). The plan (Figure 3.9) depicts a detailed layout and location of the funerary feature and its *dromos* and is based on the Mariette map which was published later. It remains uncertain why the Mariette map was not adjusted to include these known features as detailed by Rhoné.

Planche II
La Nécropole de Saqqarah

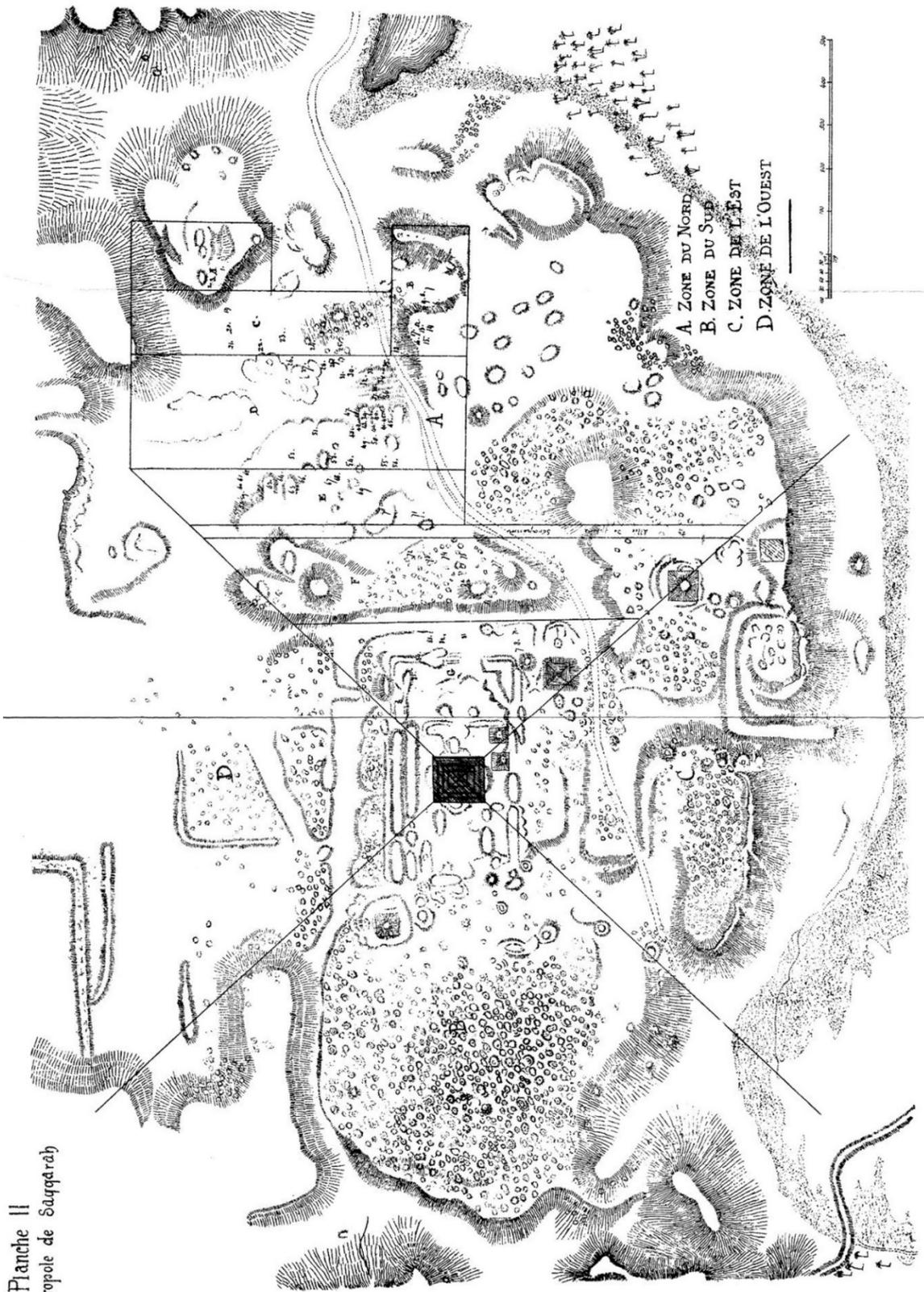


Figure 3.6. Mariette—La Nécropole de Saqqarah (Mariette 1885).

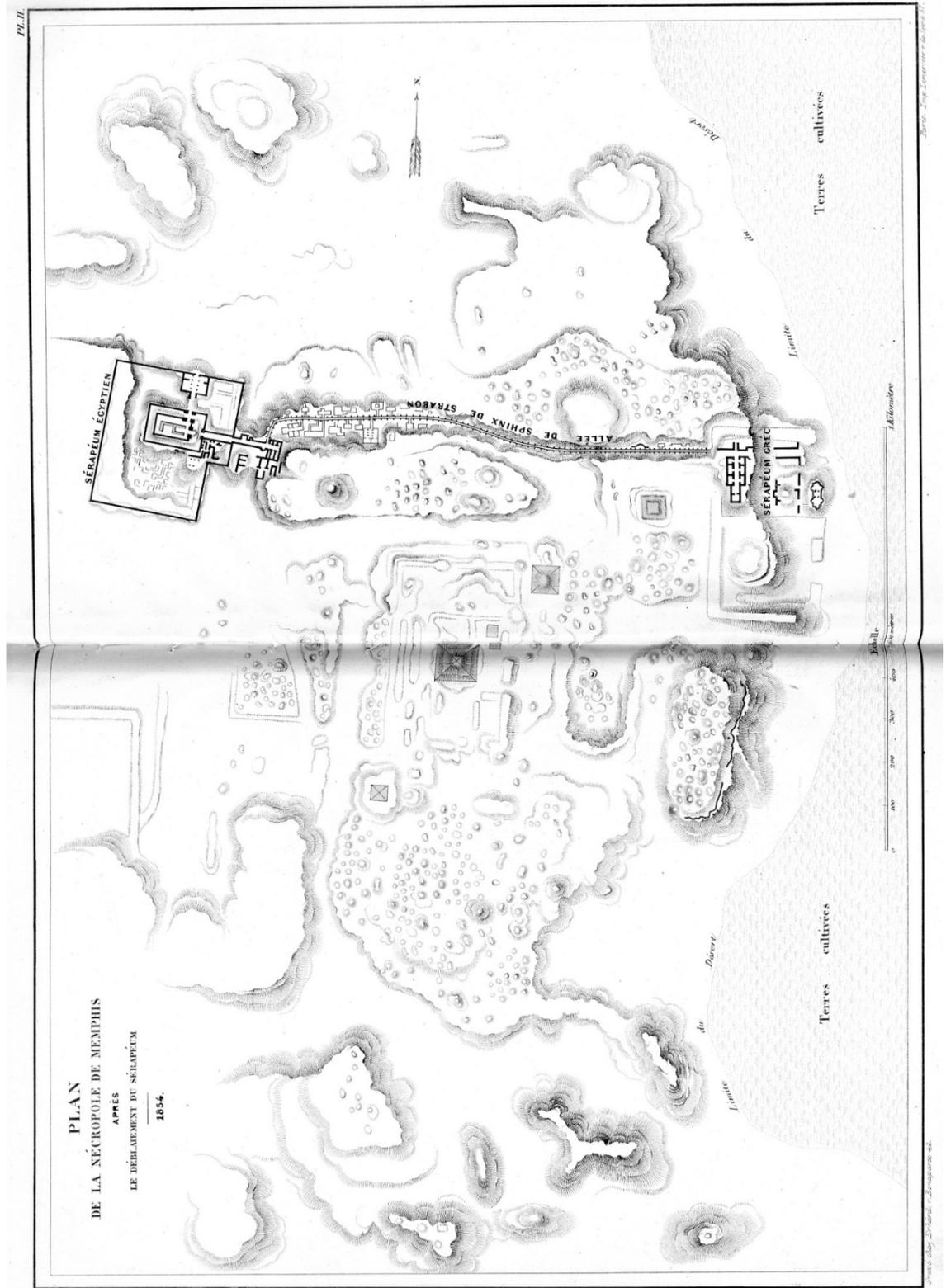


Figure 3.7. Mariette—Plan de la Nécropole de Memphis (Mariette 1856, PL.II).



Figure 3.8. Mariette—Sérapéum de Memphis (Mariette 1856).

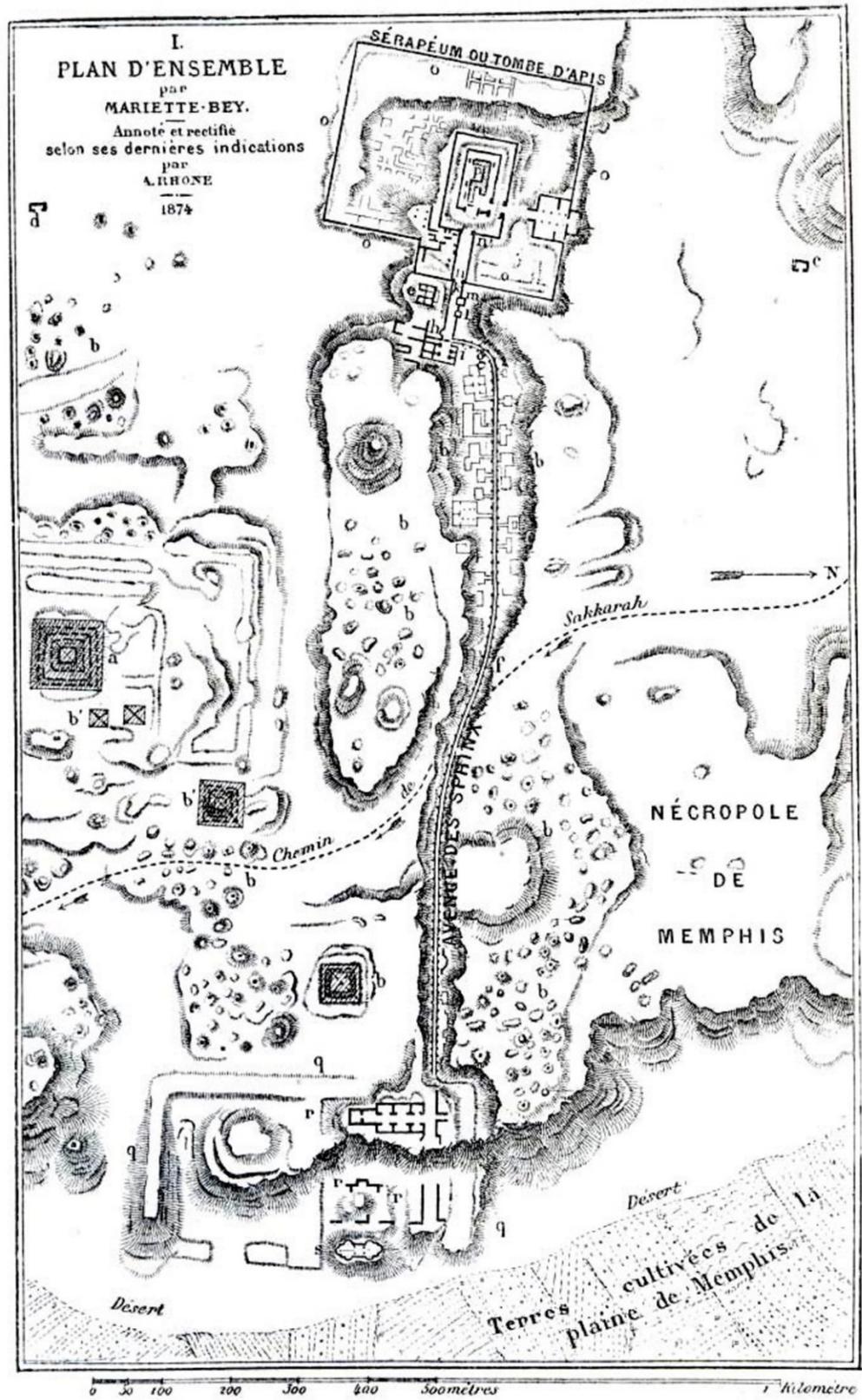


Figure 3.9. Rhoné—Sérapéum de Memphis (Rhoné 1877, 216).

During the latter years of the 1800s the most comprehensive plan of Saqqara available was that published by Jacques de Morgan (1857–1924) in his detailed *Carte de la nécropole Memphite, Dachour, Sakkarah, Abou-sir* (de Morgan 1897). There are difficulties with the de Morgan map of North Saqqara (Figures 3.10 and 3.11), where depicted monuments are incorrectly located, but the map records all monuments that were explored up to its creation, many of which have since been lost (Buongarzone 2003a, 108). The de Morgan maps provide an invaluable resource for archaeological investigation.

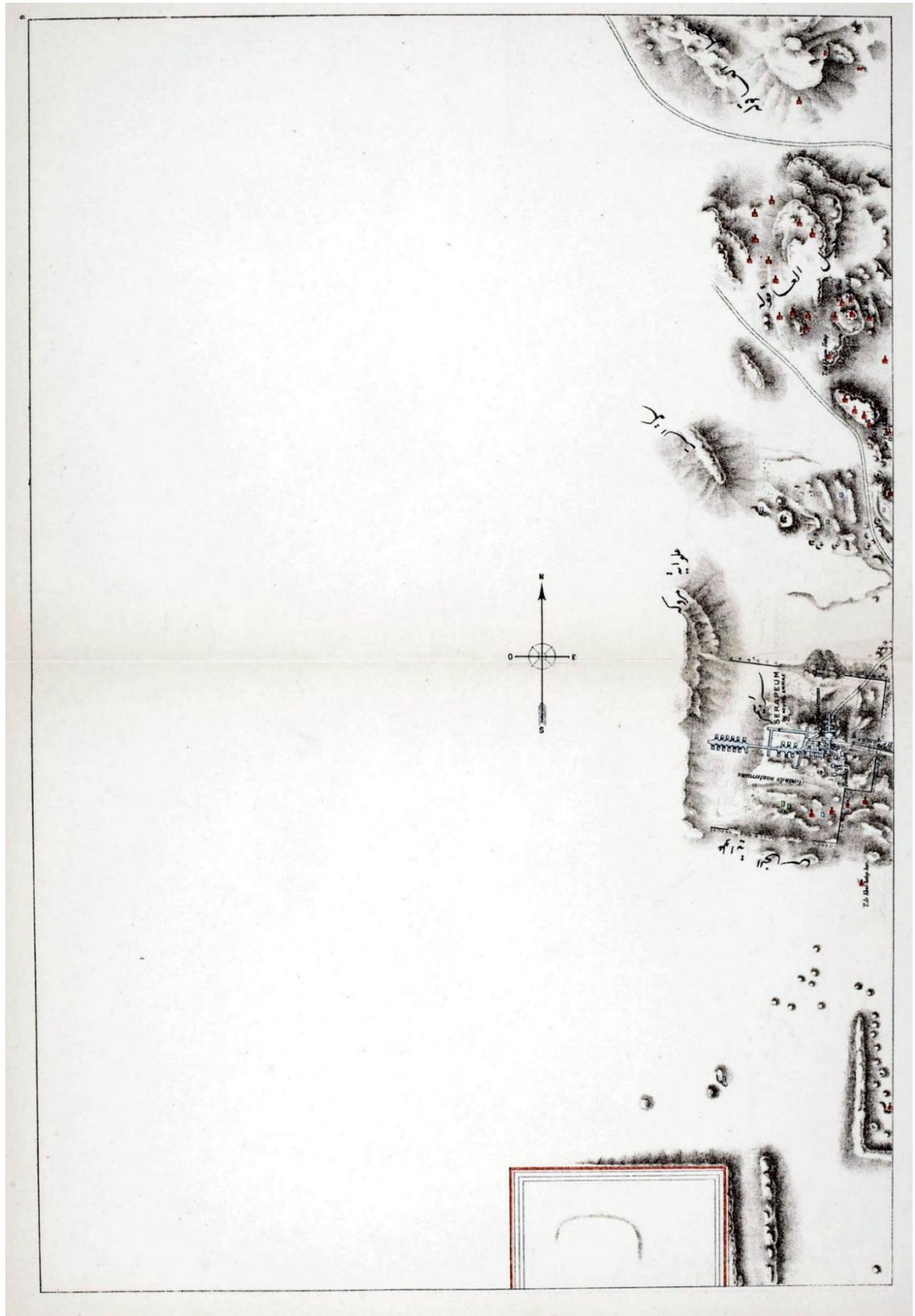


Figure 3.10. de Morgan—Carte de la nécropole Memphite, Dachour, Sakkarah, Abou-sir—The Serapeum (de Morgan 1897, 11).



Figure 3.11. de Morgan—Carte de la nécropole Memphite, Dachour, Sakkarah, Abou-sir—The North Saqqara necropolis (de Morgan 1897, 10).

George Reisner's (1867–1942) (1936) comprehensive publication *The development of the Egyptian tomb down to the accession of Cheops* contained the first map of North Saqqara to be drafted to modern standards (Smith 1936, Map ii). Composed by William Stevenson Smith (1907–1969), it used a topographical map produced by the Survey of Egypt in 1932 as its base, and documented monuments that were visible at that time (Buongarzone 2003b, 122). Smith incorporated features from the maps of Mariette, de Morgan and Lepsius, and drew upon the work of Murray and Quibell to construct a comprehensive map of the area (Figure 3.12), he attempted to reconcile many of the tomb numbering issues that had developed over time. He re-excavated several tombs which were discovered by Mariette and these allowed him to establish fixed survey points for them (Spencer 1974, 1). His detailed discussion on the source material and his identification of the tombs remains an invaluable resource (Smith 1936, 390–411).

Jeffrey Spencer identified a requirement for a revised map of the North Saqqara necropolis that combined and related the discoveries of various excavators (Spencer 1974, 1). To this end, he drew upon the work of Mariette, Lepsius, de Morgan, Firth, Quibell, Smith and Emery. Using the Smith map as the base, he published a revised plan in 1974 (Spencer 1974, TAB I) (Figure 3.13). He also drew upon P&M's *Topographical Bibliography* (see below) when compiling his list of tombs and reconciling the tomb numbering systems of Lepsius, Mariette, de Morgan, Quibell, Firth and Emery (Spencer 1974, 1). He identified several errors in earlier publications which he sought to correct, whilst also providing new notation on other poorly recorded archaeological features of North Saqqara (Spencer 1974, 2–4).

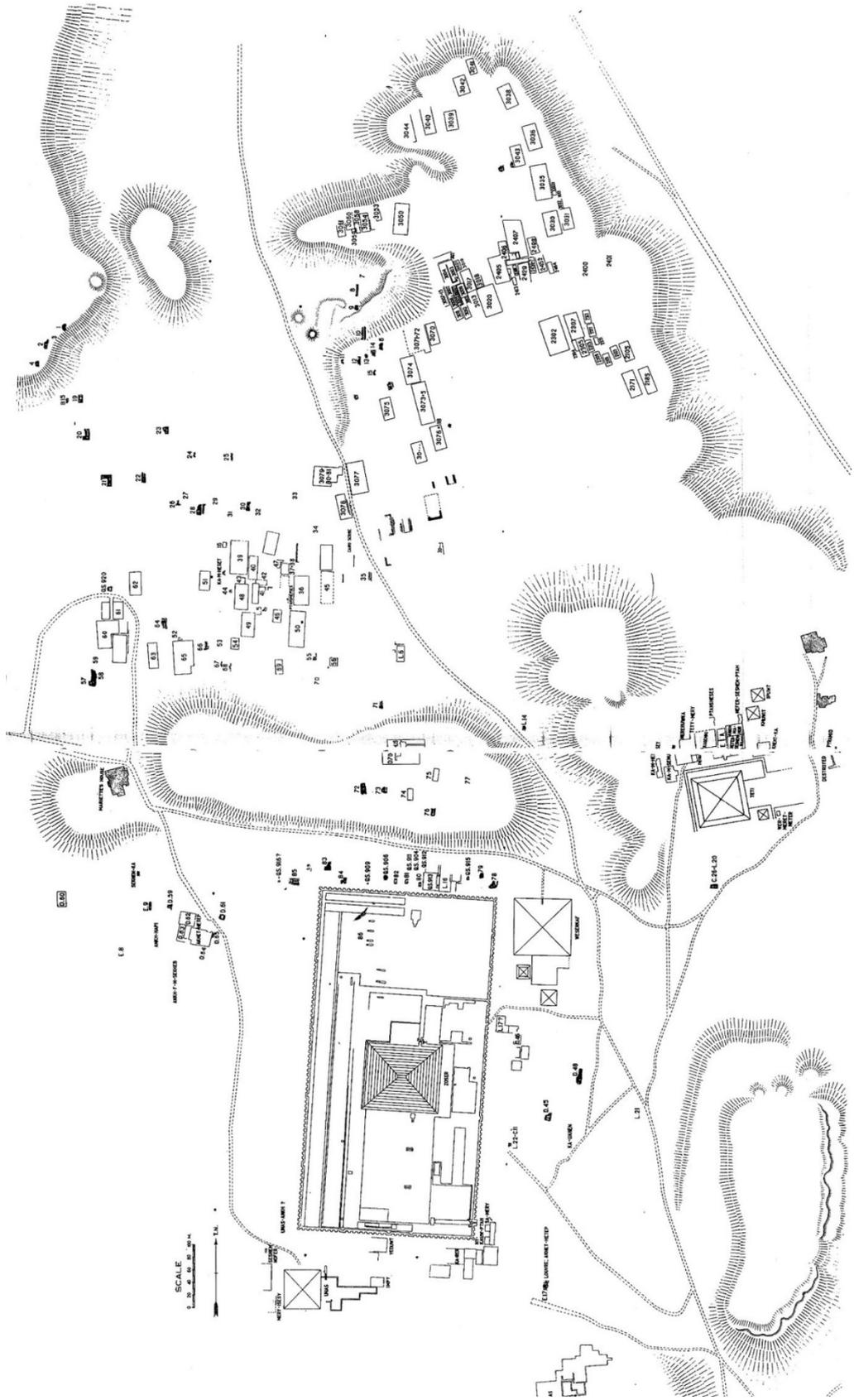


Figure 3.12. Smith—Map of the Saqqarah Cemetery (Smith 1936, Map ii).

Two years after the Spencer publication, Jean-Phillipe Lauer (1902–2001) published his popular account *Saqqara: the Royal Cemetery of Memphis, Excavations and Discoveries since 1850*, which contained a map of the North Saqqara archaeological site (Lauer 1976, 8–9). The map is presented without comment or notation, so it is unknown from which source materials it was derived (Figure 3.14). However, Lauer was likely to have relied on his own excavation notes in addition to other source materials. The map was drafted using contours rather than hachures to display topographic information and, therefore, appears to be more topographically accurate than the Smith/Spencer map. It does not contain the same degree of detail as the earlier Spencer map, and numerous tombs are absent.

In 1981, the *Topographical Bibliography of Ancient Egyptian Hieroglyphic Texts, Reliefs, and Paintings III²: Memphis. Part 2. Saqqara to Dahshur*, was published (Porter and Moss, 1981). The extensive volume contained many maps and plans of the North Saqqara area, detailing the positions of many tombs and structures (Figure 3.15). Unfortunately, the maps are topographically inaccurate and not all the locatable tombs are incorporated.¹ The maps are not presented with any reference scale or coordinate system and, therefore, positions of structures can be useful when compared relative to one another, but less so for terrestrial location. In addition to the maps, the volume provides a large amount of notation. Even with the deficiencies present in the maps, this resource is still of immense value to Egyptologists.

¹ Only inscribed tombs (and therefore attributable to individuals) are included in the publication, thereby omitting a great many unidentified (and non-inscribed) tombs.



Figure 3.15. Porter and Moss—Composite of all North Saqqara maps (Porter and Moss 1981).

In the late 1990s an environmental study was commissioned by the Supreme Council of Antiquities to assess the risk potential to the monuments of Saqqara, which face increasing visitor numbers each year, and threat from urban and agricultural development. The University of Pisa conducted detailed work at the necropolis, and consulted historical maps to compile a comprehensive topographical macro-archaeological map (Bresciani 2003, 61) of the Saqqara site. Whilst there are problems with this cartography (see Chapter 4) it offers the most comprehensive map of the necropolis to-date, compiled using modern GIS software, and GPS technologies.

Partial archaeological maps of Saqqara

During this study, many archaeological plans of single features and excavation areas comprising multiple features were consulted, scanned, drawn in AutoCAD Map and geolocated in the GIS. To obtain the maps and plans, numerous publications were accessed through archival research at several libraries. As expected with archaeological plans spanning from the early 19th century to the modern day, their quality and accuracy were variable. It was often the case that maps of the same area by different archaeologists were discordant or even inaccurate and difficult to reconcile with one another (see below). In other cases, different maps of the same area by the same archaeologist would omit details presented in earlier plans. It became a complicated and often difficult task to match disparate archaeological data to create a homogeneous feature plan that correctly and accurately represented the archaeological remains. Fortunately, the employment of satellite imagery greatly aided in this process, whereby feature plans could be positioned correctly based on their real-world location. Additionally, the University of Pisa cartography was helpful in locating the position of features that are no longer visible on the ground and therefore absent from the satellite imagery. This method is not without its potential inaccuracies, but was the best available means by which to locate many of the archaeological features.

It soon became apparent whilst researching publications for plans of the study area that some Egyptologists often did not excavate and record an entire monument. Rather, they excavated and planned areas that they (or, in the case of the early explorers, their

guides) felt to be important.² These omissions are quite evident in the work of Mariette (1889) and Murray (1905; 1937) for example, where they would often record the floor plan of a mastaba tomb chapel, but exclude the outer dimensions and plan of the entire feature. This does not mean that their work is any less valuable because of these omissions, far from it. However, this makes attempting to draft a feature plan problematic, when the only available details represent a partial area of the monument.

Maps of non-archaeological designation

The *Ministère de l'Habitat et de la Reconstruction* (MHR1978) topographic series sheets H:21 (Abusir), H:22 (North Saqqara) and H:23 (South Saqqara), produced at a scale of 1:5000 by the Consortium SFS/IGN (France) based on 1977 aerial survey data, formed the topographical base upon which the archaeological data was geolocated (Figures 3.16–3.18). These maps provided the most up-to-date cartographical data available for the study area.³

Aerial photogrammetries and satellite imagery

Throughout the 20th century various aerial photogrammetries (Mathieson *et al.* 1999, 25) were produced. Determined efforts were made to obtain the earlier aerial photogrammetries, but without any measure of success. The sortie references (Mathieson *et al.* 1999, 25) for the photographs from 1920 through to 1949 suggest that they were flown by the RAF for the Survey of Egypt, perhaps specifically to cover the monuments rather than as part of a wider survey. The RAF no longer hold them in their collection and if they still exist they may possibly be held by the Egyptian authorities (Brian Garvan pers. comm. December 2014⁴) and thus are at present inaccessible.

² Often, in the case of the early explorers, this meant inscribed tombs (see Murray 1905, 2).

³ The maps were obtained from the Egypt Exploration Society (hereafter abbreviated EES) through David Jeffreys and from Adel Okasha Khafagy of the Ministry of Antiquities/SCA at Saqqara, to all of whom I am indebted.

⁴ Brian Garvan is connected to the RAF's Medmenham Collection and was contacted via email through their website in the hope of obtaining information regarding the sought-after aerial photogrammetries.

A limited number of aerial photogrammetries were discovered in a Catacombs of Anubis digital project folder (see Figures 3.19–3.24). Neither the author nor Paul Nicholson were sure where they were obtained from, and their source remains uncertain. Three of the aerial photos are dated to 1929,⁵ two are dated to 1947⁶, and one remains undated. The image of the undated photo (which has a modern plastic rule laid on top of it to provide a scale) is likely to be similar in date to the 1929 photogrammetries and covers the north-western area of the necropolis.

Aerial photographs can provide important historical information when constructing a digital terrain model. Most useful for this project is the depiction of areas of topography prior to modern archaeological intervention, much of which is evident at Saqqara. Whilst they mainly present the ground surface covered by wind-blown sand, as expected, they allow a view of areas which are now hidden underneath large mounds of archaeological spoil. Analysis of these early aerial photographs will aid in the removal of these spoil dumps from the digital terrain model by providing a reference image prior to excavation which can be translated into the terrain surface through adjusted contour data.

Modern spatial technology software, such as ArcGIS, AutoCAD Map 3D and Google Earth, facilitate easy access to satellite imagery. Whilst extremely useful for providing a diachronic view of the landscape, the resolution is often too low to use for detailed topographical analysis. It is possible to purchase high resolution satellite imagery directly from geospatial companies, but it is too often cost prohibitive. Aerial photogrammetries offer a better source of historical landscape data—the earliest useful satellite image for the North Saqqara necropolis available through Google Earth dates to 2003—but for the latest topographical information, satellite imagery provides the preeminent solution. The online maps in AutoCAD Map 3D and those of Google Earth

⁵ Two of the photos have a sequence number in the bottom left corner, being 3044 and 3045, the other photo is missing this number due to the cropping that has been applied. Some indistinct writing is present in the bottom right corners of the photos to the left of the date.

⁶ These aerial photogrammetries can be attributed to the RAF due to the information provided along the base of the images.

will be consulted and utilised to address general queries about the terrain of the necropolis.

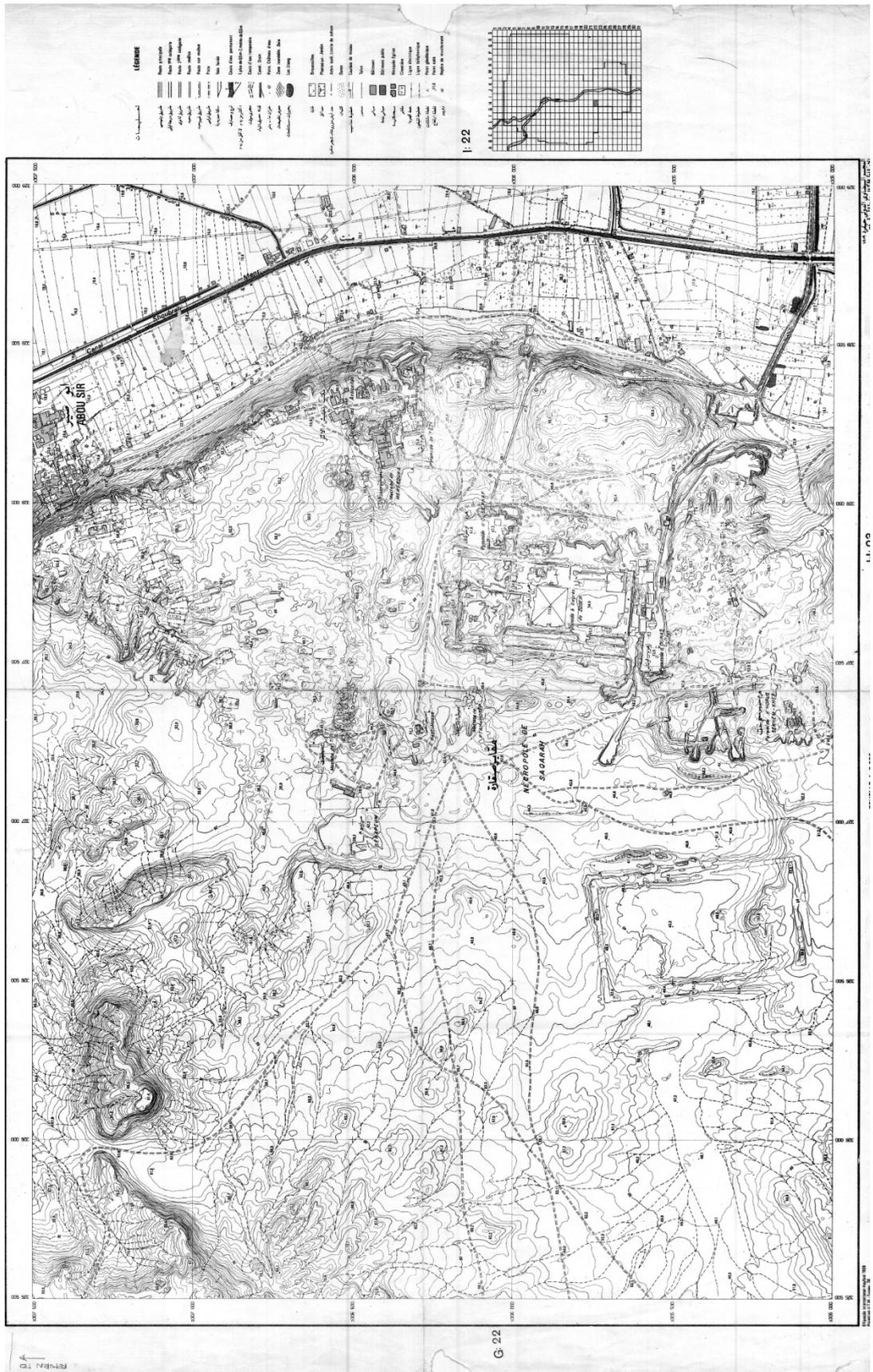


Figure 3.17. Ministère de l'Habitat et de la Reconstruction (MHR) Topographic Series 1:5000 Scale (Cairo 1978) Sheet H:22—North Saqqara.



Figure 3.19. Aerial photograph of North Saqqara. Provenance unknown, dated ca.1929.



Figure 3.20. Aerial photograph of North Saqqara. Provenance unknown, dated ca.1929. Numbered 3044.



Figure 3.21. Aerial photograph of North Saqqara. Provenance unknown, dated ca.1929. Numbered 3045.

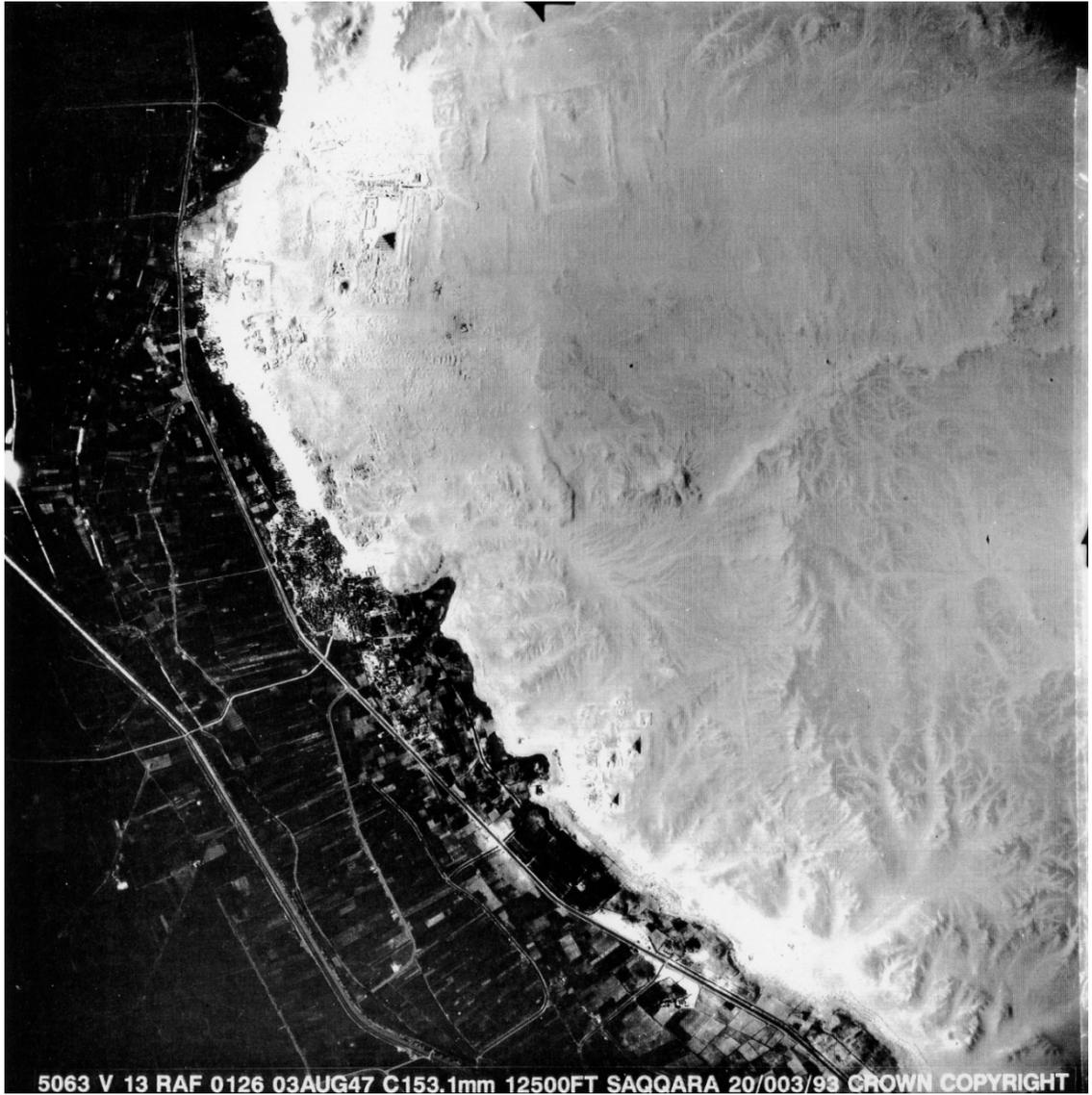


Figure 3.22. RAF aerial photograph of North Saqqara, dated August 3rd, 1947. Numbered 5063 V 13.

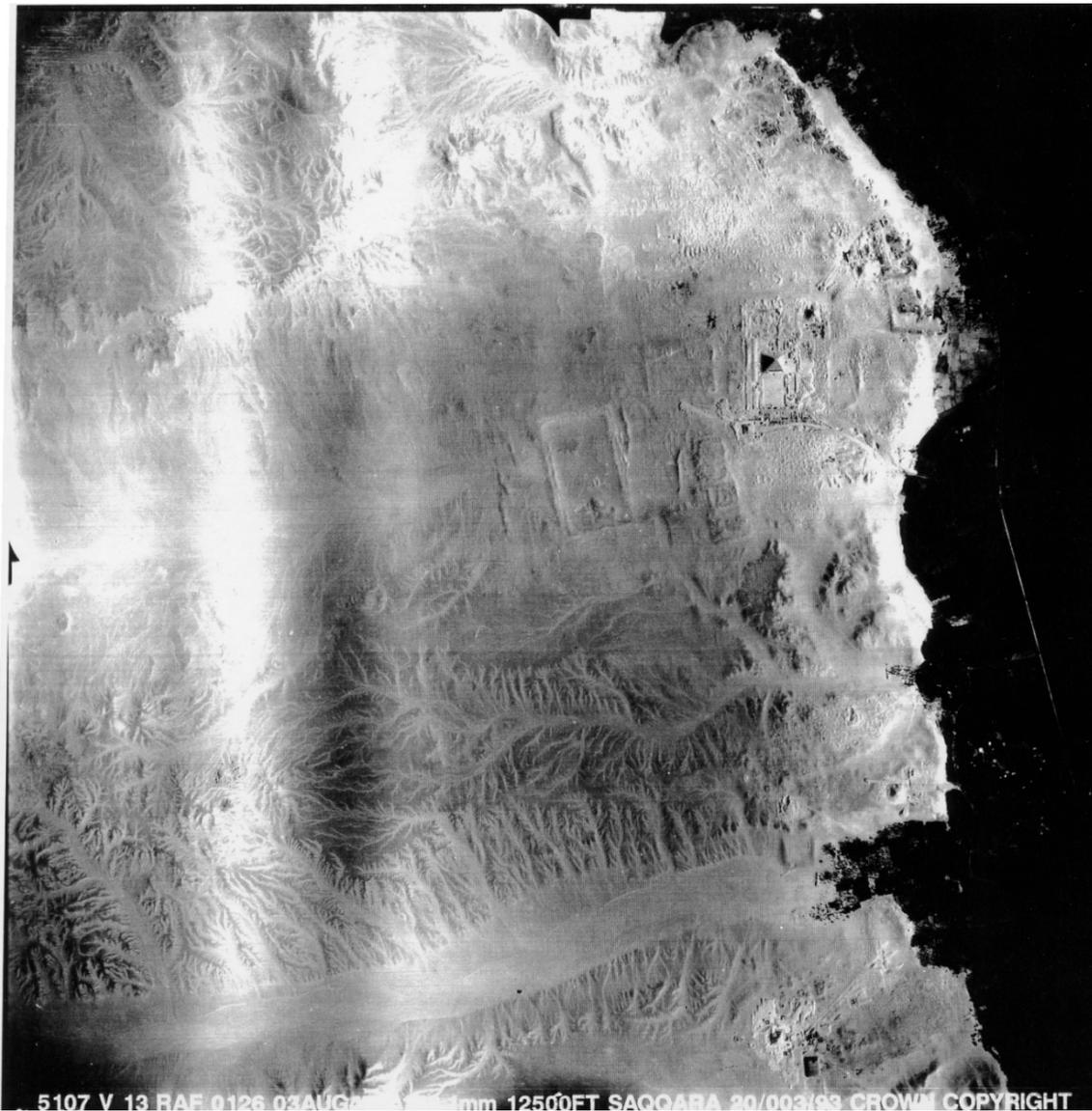


Figure 3.23. RAF aerial photograph of North Saqqara including a partial of South Saqqara, dated August 3rd, 1947. Numbered 5107 V 13.

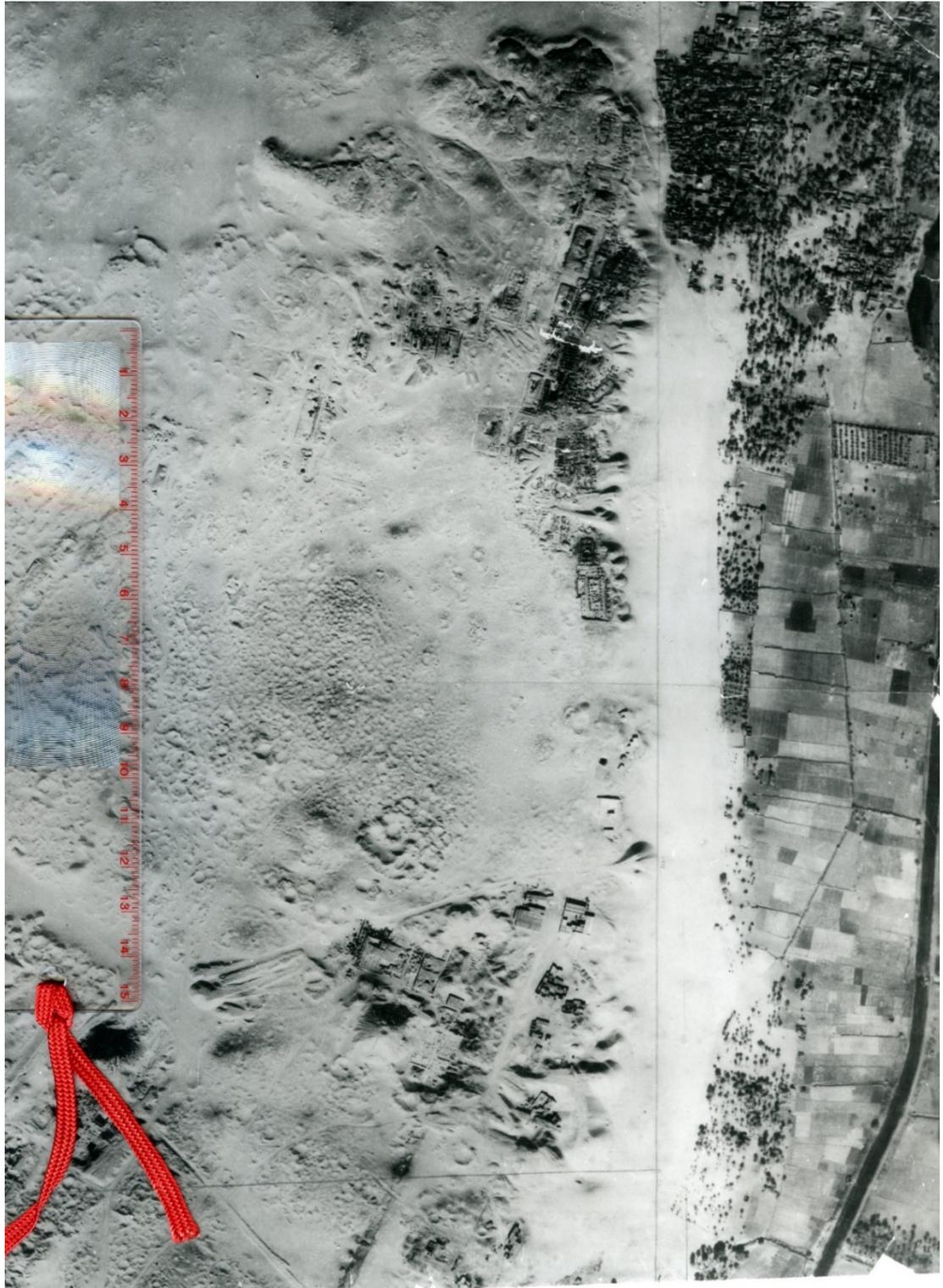


Figure 3.24. Aerial photograph of North Saqqara. Provenance and date unknown.

Data discordance

During the task of integrating the cartographical and plan data from various archaeological sources, a number of issues of consistency and accuracy became apparent. Often, maps that cover the same areas do not present the same features at a comparable size or, even more problematic, at the same location. Often the orientation of a feature will be slightly different between plans. Additionally, it is not uncommon to discover the ground plan of a feature to have changed, having different structural attributes. This latter point may be explained by further archaeological investigation and recording.

Several plans (see El-Khouli and Kanawati (1988), Firth and Gunn (1926), Kanawati and Abder-Raziq (1998; 1999; 2000; 2001; 2004a; 2004b; 2008), Kanawati and Hassan (1996; 1997), Kanawati (2006; 2010), Kanawati *et al.* (1984; 2010; 2011), Loret (1899), Maragioglio and Rinaldi (1962), Quibell and Hayter (1927), and Sowada *et al.* (2000)) exist for the complicated multi-phase area of the Teti North Cemetery, and provide an example of data discordance for a single area. The Firth and Gunn plan covers a large area of the cemetery, including the large mastabas of Kagemni, Mereruka and Ankhmahor/Nefersheshemre, and offered a good base upon which to situate the plans of surrounding areas. Additionally, when drawn in AutoCAD Map, the plan aligned closely with the positions of the monuments on the satellite imagery, and so was considered to be of a very good level of accuracy. The plans of Quibell and Hayter, where they overlapped that of Firth and Gunn, were a close comparison. The earlier Loret plan, covering the area of the Iput pyramid, matched the size and positions of the Ankhmahor/Nefersheshemre tombs from Firth and Gunn, but did not agree with the later Maragioglio and Rinaldi plan of the same area. The Loret plan presented the Iput pyramid at a smaller measurement, and the orientation and size of the Khuit pyramid enclosure appeared also to be incorrect. However, the Maragioglio and Rinaldi plan fit better with the features visible on the satellite imagery, and so was likely therefore the more accurate of the two. Additionally, Roberto Buongarzone (2003b, 123) noted that the more recent Kanawati excavation plans did not match well with the earlier plans of Firth and Gunn or Quibell and Hayter.

A similar challenge was encountered in the Czech Institute Abusir publication data, specifically relating to that of the Saite/Persian Period shaft tombs. The general plan of the shaft tombs in relation to one another fit well with what could be discerned on the satellite imagery. However, the single feature plans in their respective publications (Bareš 1999; 2008; 2011; Coppens 2009) were presented with incorrectly sized reference-scales. In practice, this meant that when these feature plans were drawn in AutoCAD Map and overlaid on the general site plan, only one was the correct size (R3), three were larger in size (Udjahorresnet, Iufaa and Padihor), and one was smaller (Menekhibnekau). This resulted in a necessity to correct the sizes of the drawn plans.⁷ Additionally, accurate geographical location data was often absent in the publications which added an additional layer of complexity when attempting to geolocate the drawn feature plans into the GIS.⁸

These examples show that not only do archaeologists encounter these types of issues with historical data, where a greater expectation of this might be expected, but also with contemporary site and feature plans. Therefore, it is necessary to be cognisant of the potential for error and attempt to mitigate those errors to produce as accurate a result as is possible.

Attribute-data

To compile a record of the archaeological documentation applied during this study, attribute data was recorded within the GIS for each of the monument feature plans (see Appendix 2). This meta-data has provided reference documentation that links the feature plan with the publication from where it came, the figure or plan reference within that publication, and any salient notation regarding the feature. This reference meta-data will prove invaluable for both current and future research. The original published documents can be assessed alongside the digital map, providing a clear and transparent link between the source material and the modern compilation. It is hoped

⁷ The feature sizes were also checked against the dimensions given in the publication texts.

⁸ Georeferenced data was very kindly provided by Miroslav Bárta and his team specifically for this project.

that through this referencing to the source data the GIS will become a useful resource for future research.

CHAPTER 4

Constructing a digital representation of Saqqara

Introduction

Box and Draper (1987, 424) contend that “Essentially, all models are wrong, but some are useful”. Therefore, it is essential that the digital landscape representation provides a solid platform upon which to conduct robust research. Towards achieving this aim, a structured development process has been devised. Comprising a sequence of eight steps designed to direct progression of the project, the application of this process would ensure a well-documented, accountable and replicable result. The steps, composed of several subsections, are detailed below. It is through this structured approach that a credible digital representation of the Saqqara necropolis has been constructed, which has permitted investigation of an otherwise difficult landscape.

Structured development process

A structured development process was followed to ensure a rigorous and robust result for the creation of the digital representation. However, it should be noted that the quality of a digital representation depends on the quality of the source data. Materials such as excavation reports, historical cartographies and other archival sources are not always as reliable as would be hoped for. For example, several Egyptological publications contain site plans and maps relevant to this study which are not georeferenced¹ (De Morgan 1897; Lauer 1976; Lepsius 1850; Mariette 1882; Porter and Moss 1978a; 1978b; 1978c;

¹ Georeferenced is a term that describes data (in this case plans and maps) that have been situated in geographic space with reference to a specific coordinate system (Wheatley and Gillings 2002, 26) which describes their position. The earlier maps and plans would make use of a geographical coordinate system, which is based on latitude and longitude (Wheatley and Gillings 2002, 27) and “constitutes the most comprehensive system of georeferencing” (Longley *et al.* 2011, 135). Whereas more modern plans may utilise a Cartesian coordinate system, which “assigns two coordinates to every point on a flat surface by measuring distances from an origin parallel to two axes drawn at right angles” (Longley *et al.* 2011, 135).

Rhoné 1877; Spencer 1974; Smith 1936) and a certain amount of topographic corroboration is required to geolocate the site plan to real-world coordinates to facilitate use. This is often a case of a 'best-fit' scenario, where the user must try to match points of recognisable reference on the plans to the same points on a correctly georeferenced map or satellite image, whilst attempting to mitigate the generation of errors.

The following eight steps classify the development process:

1—*Software license designation*: includes the identification of the types of software licenses available and the implications for their use.

2—*Software packages*: the specific software programs that are considered for use with the project.

3—*Software assessment*: utilises a defined set of questions to query the available software packages and applies an assessment matrix to determine the most applicable program(s) to use.

4—*Constructing a terrain model*: implements the chosen software package(s) in the construction of a digital terrain model.

5—*Researching the GIS*: data-mining archive reports and publications for plans and information regarding the features of the necropolis.

6—*Drafting plans and constructing the structure models*: describes the process of digitally reconstructing the structures that comprise the North Saqqara necropolis.

7—*Constructing the GIS*: the process of georeferencing the structure plans to construct the GIS.

8—*Compiling the landscape model*: details the process of georeferencing the completed structure models onto the terrain model.

Each step comprises several subsections which are described in detail below.

1. Software license

Preliminary decisions regarding the software that will be used to construct and display the digital representation are required. Several relevant programs could be applied to the task and each has its own advantages and disadvantages. Therefore, careful consideration is necessary to determine the most appropriate application.

Within archaeology generally, CAD (Computer Aided Design) software is regularly used to draw site plans from survey data and field drawings, and GIS (Geographical Information Systems) software is used to collate and interpret spatial and geospatial datasets. Additionally, it is necessary to consider the use of 3D modelling software, which may permit the creation of better structure and terrain models. This type of specialist application is often impenetrable to the untrained user and costly to purchase.

Software licensing considerations often dictates the choice of program, as much as applicability to the task being undertaken. This choice can often depend on many factors, including but not limited to: budget/cost implications, output and ease of use. There are two different licensing categories available: open-source software (OSS), and closed-source software, more commonly known as proprietary.

Open-source software

The term open-source software is generally used to refer to software that is frequently free of charge and developed by authors who make the code publicly available, allowing community users to view and alter the code, to add to or modify the software application². These software packages are commonly produced as community-driven projects and typically have a license agreement, but these agreements are very different legally to those of proprietary software³. Software such as GNU Image Manipulation

² See <http://opensource.com/resources/what-open-source>

³ See <http://opensource.org/licenses/alphabetical>

Program, LibreCAD, QGIS, and OpenOffice are all included within the open-source category.

Proprietary software

Proprietary software refers to non-free software whose code is not freely available and under the terms of a license agreement may not be modified, adapted, copied or shared (www.gnu.org/philosophy/categories.html). This software is often, but not exclusively, produced by for-profit companies and therefore comes with a cost implication in monetary terms. Software applications such as Adobe Photoshop, AutoDesk CAD, ArcGIS, and Microsoft Office are included in this category.

Open-source or proprietary: for and against

At present there appears to be an extensive adoption of open-source software within the archaeological discipline, in some cases apparently for no more reason than the nature of its open-source licensing, which is often assumed to be a better alternative to proprietary licenses. To future-proof project data it is important to consider the output format for the data, as this will determine its potential preservation and accessibility, ease of use and potential for dissemination of components which can be rebuilt in open-standard applications should proprietary software be no longer available. Open-source software will export as open-data formats, as will most proprietary software. For example, Microsoft Word will output files in the OpenDocument Text (.odt) format, which is used by such open-source software as LibreOffice.

Open-source software generally has large user-communities which provide assistance and support through the medium of online-forums and, most often, through the creation of add-ons and modifications to the software-applications. However, this can come with an unwanted downside. Many open-source software applications are not consistently stable, depending on the version released, and do not always have a comprehensive toolset—though this can also be said of some proprietary software. Installation of open-source software can often be problematic, sometimes requiring knowledge of command-line prompts, and there is no guarantee that the application will run correctly. Support for this type of software is often provided through user-community websites. Proprietary

software tends to be more stable and well-appointed with features and tools. There is often a wide availability to tutorials and advice through user-base videos posted to sites such as YouTube⁴. Service packs are released, albeit infrequently, which update the proprietary software applications. It is more usual, however, that new features are included in new releases which require the purchase of a new or upgrade license. Subscription licensing appears to be gaining popularity amongst some of the larger software development houses, such as Adobe and Autodesk. The subscription model requires payment of a monthly or yearly fee for a software license, which includes new updates within the cost.

A noted difficulty with proprietary software is that operations within the applications often appear to be analogous to a 'black box' into which a user inputs data and a result is yielded with little knowledge of the mechanics in-between that created the output. This is often seen as an obstacle because the user cannot always affect the variables that create the output result, and without access to the source code (or at the least, detailed and honest help files) it is often difficult to determine what process the software is using. An example germane to this project would be the creation of a TIN (Triangular Irregular Network⁵) surface within *AutoCAD Civil* using digitised contours. The user is required to create an empty surface definition (a place-holder or container for the surface), then add data definitions, which are the components which comprise the surface build, for example the contours. The software can then build the TIN surface⁶ which becomes available to the user. However, without knowledge of the computational algorithms that are employed in the task of generating the TIN, it is generally unclear how the final output is achieved. In the case of *AutoCAD Civil*, the computational geometry used is Delaunay triangulation (see Davenport and Voiculescu 2014, 156).

⁴ www.youtube.com

⁵ A Triangular Irregular Network, sometimes referred to as a Polyhedral Irregular Network (Chapman 2011, 50), is a topological data structure, comprised of vector polygons, that is constructed by joining points of known value into a series of triangles using Delaunay triangulation (Burrough *et al.* 2015, 57; Longley *et al.* 2011, 220). It is used to represent a surface "as contiguous non-overlapping triangular elements" (Longley *et al.* 2011, 220).

⁶ This is a much-simplified account of the incremental process; there are several steps to go through, with various options available to the user to affect the result.

2. Software packages

Autodesk, the authors of industry standard CAD software AutoCAD and its vertical products, generously make their software available to students free of charge on a three-year educational licence⁷. ESRI (Environmental Systems Research Institute) ArcGIS is also available to students at a substantially reduced cost⁸, as is 3D modelling software Google Sketchup Pro⁹. AutoDesk, ESRI and Google software run under proprietary licenses and, therefore, certain open-source and freeware (a sub-set of proprietary) applications were also considered for comparison. *Dassault Systems'* DraftSight, a 2D/3D freeware CAD application, and QGIS, an open-source GIS application, were also included for consideration.

CAD software: AutoCAD Civil, DraftSight

GIS software: AutoCAD Map 3D, ArcGIS, QGIS

3D modelling software: 3ds Max, Maya, Google Sketchup

Other: Infracore 360

Disregarded software packages

CAD software: LibreCAD, DoubleCAD XT, TurboCAD

GIS software: GvSIG, GRASS

3D modelling software: Blender, Meshlab

LibreCAD¹⁰ is a 2D open-source CAD application which did not respond well, during extensive testing, to large data-sets, suffering from extensive processing lag. In addition, it cannot create or manipulate 3D data. DoubleCAD XT¹¹ is a 2D freeware CAD application that is overly complicated to use and does not include any 3D modelling capabilities. TurboCAD¹², whilst having 3D capabilities cannot import or export shape files (.shp) which makes cross-compatibility with GIS very difficult. The author has previously attempted to

⁷ <http://www.autodesk.com/education/free-software/students-university/all-products>. Accessed on 14/05/15.

⁸ <http://www.esri.com/industries/apps/education/offers/promo/index.cfm>. Accessed on 14/05/15.

⁹ <http://www.sketchup.com/buy/student-licenses>. Accessed on 14/05/15.

¹⁰ <http://librecad.org/cms/home.html>. Accessed on 14/05/15.

¹¹ <http://www.doublecad.com/DoubleCAD/DoubleCAD-XT-v5>. Accessed on 14/05/15.

¹² <http://www.turbocad.co.uk/windows-range/turbocad-deluxe-2d-3d>. Accessed on 14/05/15.

work within the GRASS¹³ environment with little benefit, having not had the extensive time required to become familiar with the software. A modified version of the open-source GvSIG Desktop has been released by Oxford Archaeology¹⁴ (OA) which includes GRASS GIS modules, restructured program menus and a stand-alone installer file. Whilst this version is far more useable than the earlier releases of GvSIG Desktop¹⁵, it still does not compare to ArcGIS and QGIS which are feature rich, with more comprehensive tool-sets and capabilities. In addition, both ArcGIS and QGIS are regularly updated with new functionality, which is not the case for the OA version of GvSIG which is static, provided 'as-is'¹⁶. Whilst Blender provides superb functionality for 3D modelling and rendering, the scope of the software far exceeds the requirements of the project at hand. AutoCAD and its verticals provide the ability to produce complex 3D models within a geographic coordinate system, and have the benefit of including tools specifically for the analysis of surface and spatial data, which Blender does not. Similarly, Meshlab which provides complex 3D mesh processing systems, was not the correct tool for achieving the desired project outcome.

3. Software assessment

The author has several years commercial experience in the use of both CAD and GIS software of the open-source, proprietary and freeware licensing varieties. This working-knowledge was used to inform the creation of a set of assessment criteria (Table 4.1) with which to test the software programs to determine applicability.

Table 4.1. Software assessment criteria.

Ease of use (Accessibility/Usability)	Are online tutorials available? How steep is the learning curve? Will the use of this software require additional training?
--	---

¹³ <http://grass.osgeo.org/>. Accessed on 14/05/15.

¹⁴ <http://oadigital.net/software/gvsgoade>. Based on GvSIG v1.10. Accessed on 14/05/15.

¹⁵ <http://www.gvsig.com/en/products/gvsig-desktop/previous-versions>. Accessed on 14/05/15.

¹⁶ For the latest versions of GvSIG visit: <http://www.gvsig.com/products/gvsig-desktop/downloads>. Accessed on 15/05/15.

What types of data does the software use?	Does it only use proprietary formats that are not cross application compatible?
What types of data can be imported?	DEM/DTM TIN/Raster surface Shape files (.shp) Object files (.obj) Drawing files (.dwg) Drawing Exchange Format (.dxf)
What data types can be exported?	DEM/DTM TIN/Raster surface Shape files (.shp) Object files (.obj) Drawing files (.dwg) Drawing Exchange Format (.dxf) PDF JPEG
Metadata	Is it possible to include metadata within the data files?
Functionality	Can the program create a TIN/Surface? Does the program have modelling tools; a geographical coordinate system; spatial analysis tools? What functions are available for publishing?
Financial	How much does the software cost to use/purchase?
License type	Open-source Proprietary Freeware Shareware

To allow determination of the software capabilities in relation to the previously set-out requirements, a test file was compiled comprising contours, a DTM (Digital Terrain

Model¹⁷) of both TIN and Raster surfaces, and structures constructed from 3D solids, all of which combined to represent a 500m² area of the Saqqara landscape. The test file was reused data from a previous project (Williams 2010) constructed in ArcGIS. This data was designed to function within the CAD, GIS and 3D environments, and hopefully provide answers to the questions asked through the Software Assessment Criteria.

Assessment matrix

An assessment matrix was created (Table 4.2).

Table 4.2. Software assessment matrix.

	AutoCAD Map 3D	AutoCAD Civil 3D	Draft- Sight	Infra- works 360	Maya	3ds Max	3ds Max Design	Arc- GIS	QGIS	Sketchup Pro
<i>Input</i>										
Import DEM	Yes	Yes	?	Yes	No	Yes	Yes	Yes	Yes	Yes
OBJ	No	Yes*	No	Yes	Yes	Yes	Yes	Yes	No	Yes
<i>Export</i>										
DEM/TIN	No	Yes	?	Yes	No	?	?	Yes	?	?
PDF	Yes	Yes	Yes	No	?	?	?	Yes	Yes	?
JPEG	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OBJ	No	No	No	No	Yes	Yes	Yes	?	No	Yes
<i>Publishing</i>										
Stand- alone model	Yes	Yes	No	No	No	?	?	Yes	?	?

¹⁷ A DTM, an example of a Digital Elevation Model (DEM), explicitly classifies the data as a representation of topographic elevation (Wheatley and Gillings 2002, 107).

	AutoCAD Map 3D	AutoCAD Civil 3D	Draft- Sight	Infra- works 360	Maya	3ds Max	3ds Max Design	Arc- GIS	QGIS	Sketchup Pro
Functionality										
3D modelling tools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*	Yes
Geodetic Coordinat e system	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
Spatial analysis tools	Yes	Yes	No	Yes	No	No	No	Yes	Yes	No
General usability										
Tutorials	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?
Training required?	Self- train	Self- train	No	Self- train	Yes	Yes	Self- train	No	No	Self- train
Steep learning curve?	Medium	Medium	Low	Medium	High	High	High	Low	Medium	Low - medium
Use?										
Use this software	Yes	Yes	No	Yes	No	No	Possibly	Yes	No	Possibly
* denotes the need for third party plugins to enable capability										

After considering the merits of open-source or proprietary software, the authors' own commercial experience with AutoCAD and ArcGIS, and the results of the assessment matrix, a decision was made to focus on AutoCAD Civil 3D for terrain surface construction,

and AutoCAD Map 3D for GIS and CAD modelling, with ESRI ArcGIS as an alternative if required.

Infracore

To complement the use of AutoCAD Map 3D and Civil 3D, Autodesk Infracore was also employed by the project to visualise and assess the landscape model. Infracore is an infrastructure design and visualisation software package which assists in the manipulation and analysis of complex landscape models. The ability to import native CAD drawing files directly into Infracore without the need for any conversion made this software an appealing choice. Infracore proved capable of handling the large terrain surface when compiled with all the structure models.¹⁸ The software provides the capability to script and record camera arrangements which allows the investigator to visualise the data from a corporeal perspective at the terrestrial level.

4. Constructing a terrain model

The construction of a terrain model for the Saqqara necropolis is predicated on the use of the *Ministère de l'Habitat et de la Reconstruction* (MHR) Topographic Series 1:5000 Scale (Cairo 1978) H:21 and H:22 map sheets, which, at the time of writing are the latest known available ground maps of the area. Although satellite imagery is available for the region under study, there are issues associated with the projection of the satellite images and archaeological surveys that have been conducted at the necropolis. LIDAR data or similar was not available for the region at the time of research and detailed satellite imagery proved to be cost prohibitive. Shuttle Radar Topographic Mission (STRM) digital elevation data was available, but at a resolution of 90m was too low for detailed topographical analysis.¹⁹ The absence of alternative practical ground surface data

¹⁸ To ensure a useable performance when investigating the digital landscape model, the recommended hardware requirements are as follows:

System Processor – Intel i7 running at 3GHz or above recommended.

System RAM – 16Gb or above recommended.

Graphics hardware – Medium to high-end CAD certified graphics hardware such as the Nvidia Quadro M4000 8Gb or above (as a cheaper alternative, a mid-range graphics card for gaming, such as an NVIDIA GeForce GTX 10 Series, would suffice).

¹⁹ STRM digital elevation data provides DEMs at a resolution of 90m which are available in several useful formats. See <http://www.cgiar-csi.org/data/srtm-90m-digital-elevation-database-v4-1> (accessed 6/6/17).

prompted the conclusion that digitisation of the MHR1978 map contours would offer access to the most accurate ground surface model.

The provenance of the MHR1978 maps (digital version) provided to Paul Nicholson by David Jeffreys of University College London²⁰ for the *Catacombs of Anubis* project (Nicholson *et al.* 2013; 2015) have been somewhat difficult to determine. David Jeffreys (2015 pers. comm.) was unable to recall from where that version of the map originated and where it was digitised²¹. Several attempts have been made to obtain an original print of the map without success²².

The scanned map had certainly not been printed onto a stable medium, such as Mylar, and as a result had suffered from slight distortion in the form of probable paper shrinkage, in addition to folding, tearing and possible abrasion. A lack of information on the type/make of scanner used to digitise the map makes it very difficult to account for any errors that may have occurred during this process. However, there is a certain amount of metadata that can be learned from the scanned copy²³ and it is not to say that distortions within the scanned map image could not be corrected.

Potential impediments

An initial visual appraisal of the map identified several potential impediments for the digitising process (see Appendix 3). The map sheets were attached to the CAD working environment and a global coordinate system (GCS) was assigned—UTM WGS 1984 datum Zone 36 north. The maps sheets were georeferenced to the correct position within the

²⁰ Dr Jeffreys was a field director for the Egypt Exploration Society (EES) during this time.

²¹ He was also not able to provide information on where the original version of the map sheet held by the EES was located because they had recently moved their data repository in 2014 prior to the author's researches.

²² At the time of writing the Egyptian authorities were no longer permitting non-Egyptians access to purchase detailed maps of the country. Prior to this it was a simple task to purchase a map from Finnmap in Cairo. The author has pursued an original copy through communication with Dr David Jeffreys, Professor Salima Ikram, the GIS centre of the Egyptian government, the British Library (who hold copies but copyright restrictions apply), and the Egypt Exploration Society.

²³ Investigation of the MHR1978 digital map file through GIMP (GNU Image Manipulation Program) image editing software has revealed the following metadata: Size in pixels: 10189 × 6378 pixels; Print size: 862.67 × 540.00 millimetres; Resolution: 300 × 300 ppi; Colourspace: Greyscale; Size in memory: 309.2 MB, Number of pixels: 64985442.

coordinate system²⁴, and certain distortions were immediately evident. When measured, each of the grid squares that represent 500m on the ground did not conform to those dimensions in the GCS, many being undersized by a few metres. To counter this distortion and correct the aspect of the digital map as best as possible, a geometric rectification technique known as *Rubber sheeting* was used.

Rubber Sheeting

The Rubber sheeting tool forms a part of the *Correlate* functions within the *AutoDesk Raster Design* software suite that plugs-in to CAD, comprising raster editing and raster-to-vector conversion tools which work in combination with the CAD toolsets. As defined by the *AutoCAD Map 3D* help files, rubber sheeting is “a nonuniform adjustment of a data set based on the movement of known control points to new locations” (AutoCAD Map 3D online help²⁵). In simple terms, the command is used to align a dataset using several known points.

Rubber sheeting (see ESRI GIS Dictionary²⁶) is performed mathematically. This is achieved using first or higher order polynomial transformations (Kimerling 1996, 59). First order (affine) equations modify differences in scale, rotation, skew and coordinate range between the new and old coordinate systems and take the following form:

$$X_{\text{new}} = a + bX_{\text{old}} + cY_{\text{old}}$$

$$Y_{\text{new}} = d + eX_{\text{old}} + fY_{\text{old}}$$

The a, b, c and d, e, f coefficients are resolved by the concurrent solution of three equations for X_{new} and Y_{new} . This requires that three control point coordinates are precisely known in the old and new system. However, it is advantageous to include more control points, through which a root mean square (RMS) error (estimate of transformation accuracy) is determined through their inclusion. When transforming coordinate systems where non-

²⁴ This was achieved using the *IMATCH* command to geolocate two known points on the map to their real-world coordinates.

²⁵ <http://help.autodesk.com/view/MAP/2015/ENU>. Search term ‘rubber sheeting’. Accessed on 20/05/15

²⁶ [http://support.esri.com/en/knowledgebase/GISDictionary/term/rubber sheeting](http://support.esri.com/en/knowledgebase/GISDictionary/term/rubber%20sheeting). Accessed on 20/05/15

linear rectifications are required (which particularly pertains to *rubber sheeting*) higher order polynomial equations are often engaged, requiring more control points for the simultaneous solution of the equations (Kimerling 1996, 59).

AutoCAD Map 3D presents the user two options when setting out the rectification points; *Grid points*, or *Add points* (which allows the users to select and position the required points anywhere, which, for example, would be useful for an irregular shaped plan that required rectification). To rectify the distortion of the MHR1978 map the *Grid point* layout was considered the most applicable option.

This process allows the definition of grid squares in rows and columns at a specified measurement. A 5 x 7 grid was established at the correct geolocation which matched the coordinate graticules on the map, with each square representing 500m x 500m of real-world ground measurement. Each of the control points on the map (being the corners of the 500m x 500m squares) were selected in turn and their new rectified position located (based on the drawn grid) until all coordinate points were accounted for. A total RMS error of 0.309 was achieved for the H:22 sheet which translated to an average distance of 1.01m Easting and -3.85m Northing; and 0.184 for the H:21 sheet which translated to an average distance of 1.56m Easting and -3.05m Northing, using 5th degree polynomial calculations (see Appendix 4). These errors represented a minor distortion across the distance of the map and, once the rectification process was completed, the most accurate rescale and skew that was possible was achieved and the distortion removed from the map scan.

Digitising contours

To construct an accurate surface model of the North Saqqara plateau, contours of the MHR1978 map sheets were digitised. Contours (or isolines) are lines that describe the structure of the ground surface through joining points of equal elevation (Howard 2007, 126). The contours on the MHR1978 map are displayed at 1m intervals and depict a high level of terrain detail. By their very nature, contours do not describe a surface completely, leaving intermediate spaces between the bands of contour lines where the position of the surface is uncertain, unless a straight-line slope gradient is assumed (Imhof 2007, 23).

This area of uncertainty is calculated through computational geometry when constructing a TIN.

Mitigating possible errors in accuracy

It has been previously noted that the MHR1978 map is not without errors (Williams 2010, 11), and the use of contours digitised from map sheets to construct a DTM are not without issue. It is often unclear how the contour data was initially transcribed; this could be from spot height information or derived from photogrammetric analysis of aerial photographs, with the latter being the more accurate method (Conolly and Lake 2007, 103). Jeffreys (1985, 1) remarks that photogrammetric analysis was the method used by IGN France International to produce the MHR1978 maps. He has also suggested (2015 pers. comm.) that the maps were produced from Kentings aerial photographs. This suggests a probable high level of accuracy in their transcription. However, a DTM constructed from digitised contours can be several steps removed from the original data; for example: spot height – interpolated contour – digitised contour – DTM. Errors in accuracy can occur at any or all point in this process, and errors can be compounded.

Accuracy of the model

The general condition of the map sheets in use were variable, and this meant that the visual quality of the contours varied across the sheets. Issues with the scanned maps have the potential to affect the final accuracy of the digital surface model and accuracy will ultimately depend on the decision-making process employed throughout the digitisation (i.e. where a vertex should be placed on a contour, how to project a segment of contour that is missing or unclear) in addition to the length of time allowed to construct the model. Less time availability when digitising and constructing will result in a model that is produced more rapidly but exhibits less detail and therefore accuracy. The issue of time and accuracy in digitisation pertains to the placement of vertices along the line of the contour to create a digital representation, where less time generally equates to less vertices at a greater distance apart resulting in less detail. A less detailed model has the moderate benefit of a smaller file size; however, when using a landscape surface model to make archaeological inferences greater detail and superior accuracy is a desirable property. Modern high-specification computers and data-storage devices are

considerably more capable of processing and storing large file-size data than computers were several years ago, therefore file-size is not an immediate concern.

Digitisation

To aid in the digitisation process, a graphics mouse²⁷ (pointing device) was purchased which allowed a greater level of control over the sensitivity of the mouse pointer on screen and could be fully configured for use within the CAD working environment²⁸. This meant that during digitisation the drawn lines could be placed with greater efficiency and precision resulting in a more confident result.

Each contour is represented by a line with a continuous elevation value. Prior to drawing each contour, the correct elevation value was set and a polyline was created to represent the contour. Initially 3D Polylines were used to define the contours, but it was discovered that this variety of polyline does not transfer its elevation values across to ArcGIS, therefore drawing the contours continued with 2D polylines, which has an ELEVATION attribute that records the Z value. The remaining 3D polylines were converted to 2D using a LISP²⁹ routine script (www.lee-mack.com³⁰). The contours were drawn using an appropriate view-scale between 1:40 and 1:250 at maximum. The view-scale of digitisation was limited by the quality of the scan, which becomes very pixelated when viewed up-close (Figures 4.1 and 4.2).

²⁷ Logitech mX Performance Mouse

²⁸ A pen and tablet setup was considered and discounted due to CAD's useful keybinding of the scroll wheel for the zoom facility. This facility is much more difficult to use with a pen and tablet.

²⁹ LISP (Locator/Identifier Separation Protocol) is a computer programming language

³⁰ The LISP routine, programmed by Lee Mack (<http://www.lee-mac.com/>), was in a thread on the CADTutor forum: <http://www.cadtutor.net/forum/showthread.php?70491-3D-polyline-Vector-Z-value-to-2D-polyline-elevation%E2%80%A6>. Accessed on 21/05/15

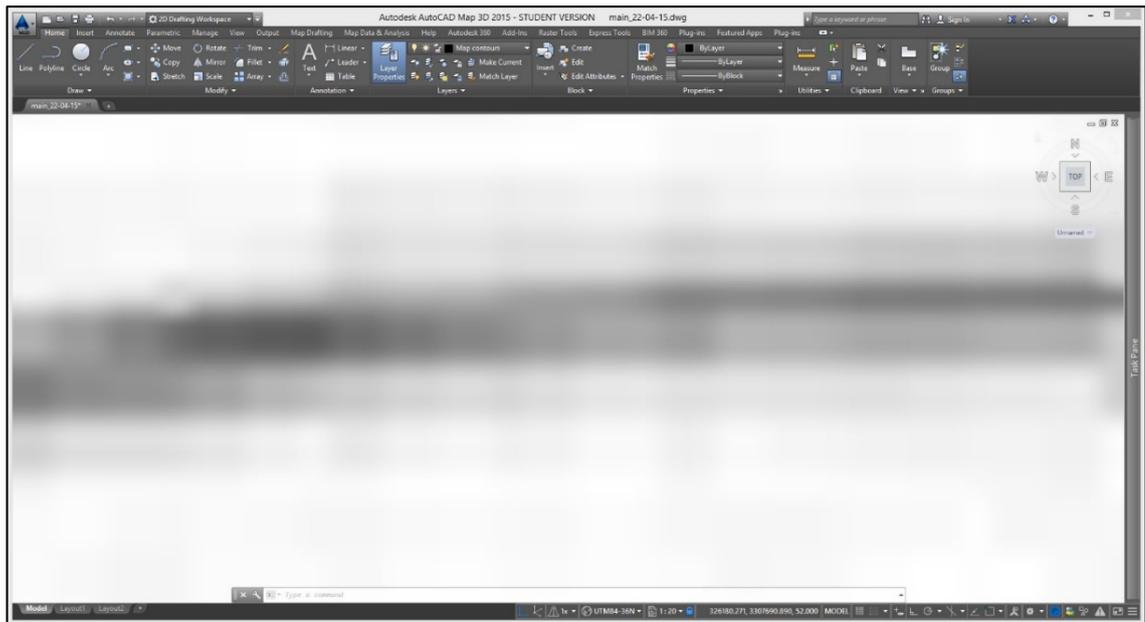


Figure 4.1. 52m contour line displayed at 1:20 scale (source author).

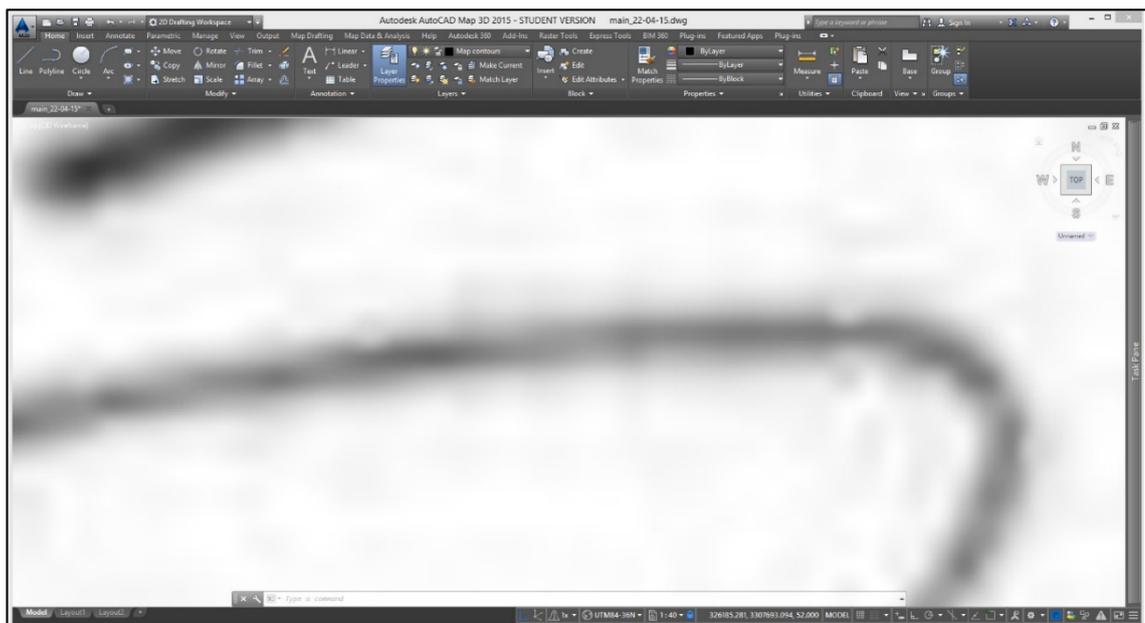


Figure 4.2. 52m contour line displayed at 1:40 scale (source author).

Where the contours were more tightly curved, an increased number of vertices were created and the scale at which digitisation was undertaken was smaller (i.e. 1:40 for a very tight curve), straighter lines required less vertices (Figures 4.3 and 4.4). The centre-line of the contour was taken as being the best representation of the contours actual position, and this is where the drawn line was created, as best as could be achieved.

This process was adopted for every contour without exception to minimise the error potential.

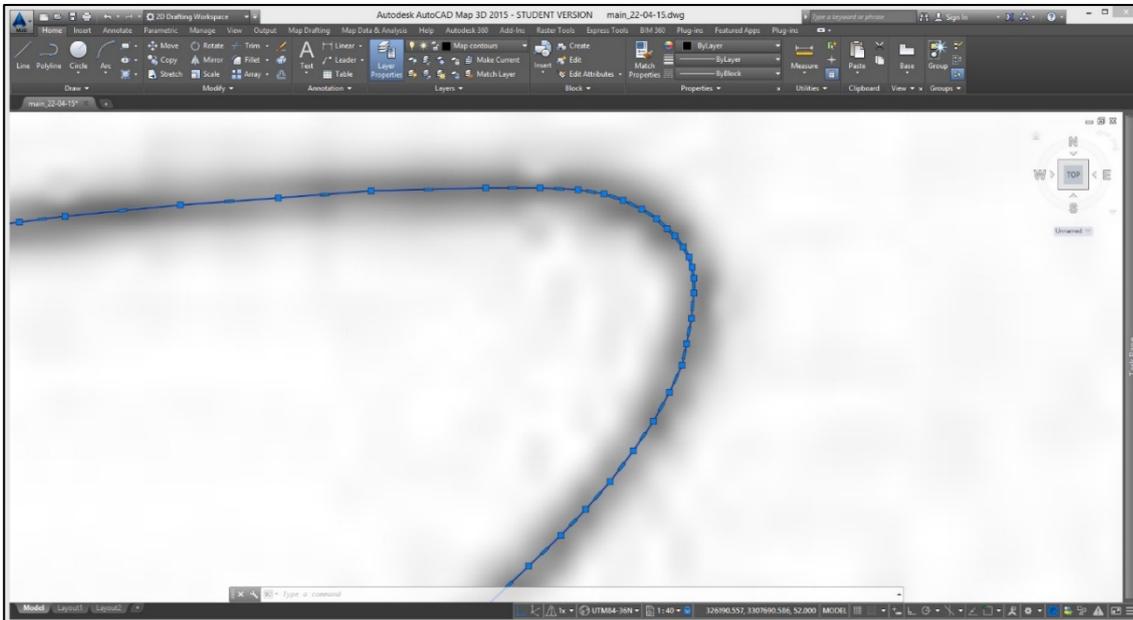


Figure 4.3. The blue squares denote the vertices of the polyline, note the close spacing around the curve (source author).

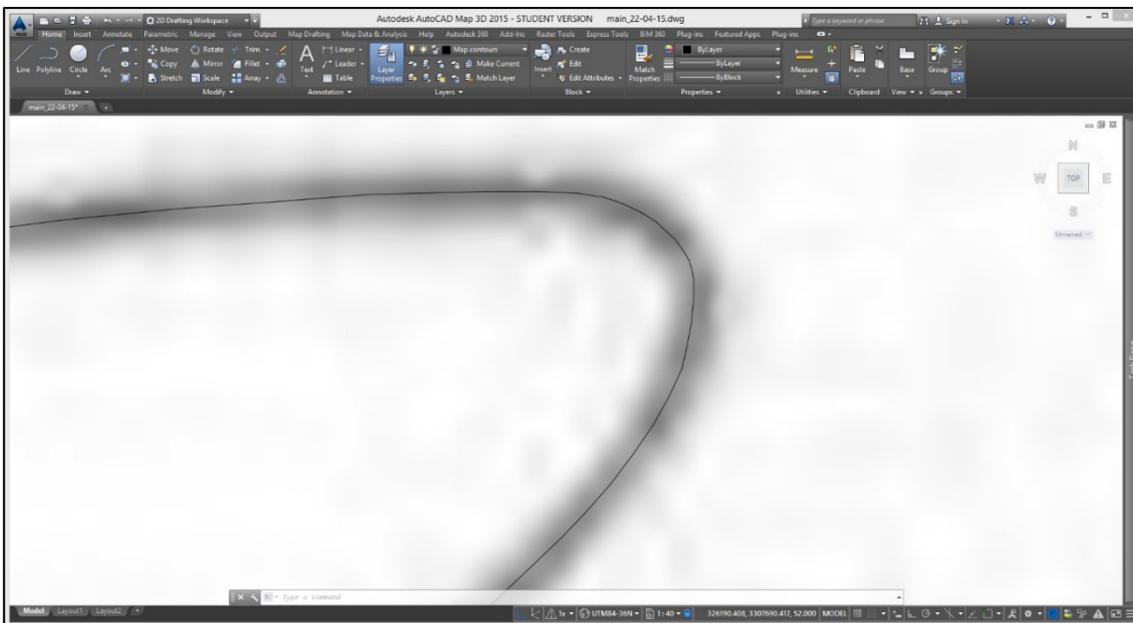


Figure 4.4. The polyline created by closely spacing the vertices (source author).

Digitisation of the contours requires curved lines on the map to be represented by short segments of straight polyline, and a certain amount of loss of detail is inevitable during

transcription. Specific to the North Saqqara necropolis, archaeological intervention has resulted in the accumulation of sand and debris mounds of excavation spoil which are depicted on the map through the contours. The process for their removal requires consideration (see Chapter 5: *Map contour amendments*). A total of 1725 contours were digitised and used to generate the surface model.

Spot-height elevations and breaklines

To further refine the accuracy of the terrain model both spot-height elevations and forced surface breaklines (Figure 4.5) were digitised from the MHR1978 map sheets and appended to the TIN surface. The addition of the forced surface breaklines and spot-height elevations has produced a more nuanced model of the ground surface, which is as accurate as can be attained using this method of construction.

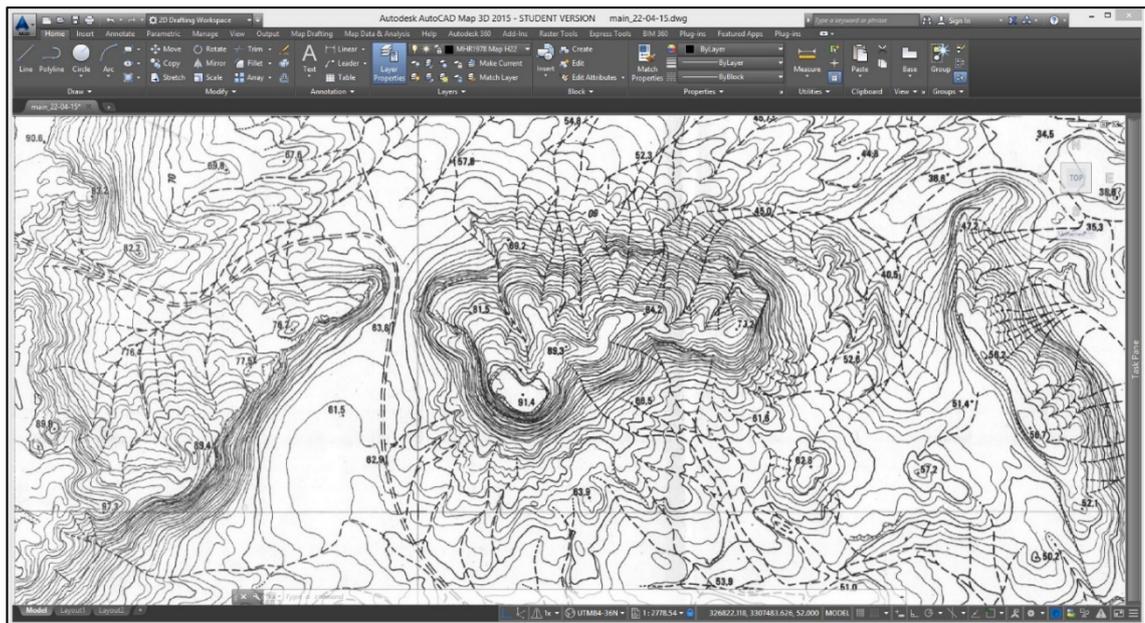


Figure 4.5. MHR1978 base map showing contours, spot-height elevation values and breaklines (source author).

Spot-height elevations

Spot height elevations (Figure 4.6) are cartographically significant points that have a recorded elevation, usually a height above a given datum. These points are often used to contribute in establishing the elevation values of adjacent contours and advance the

understanding of information about locations on the map (Imhof 2007). A total of 511 spot height elevations were included across the H:21 and H22 map sheets.

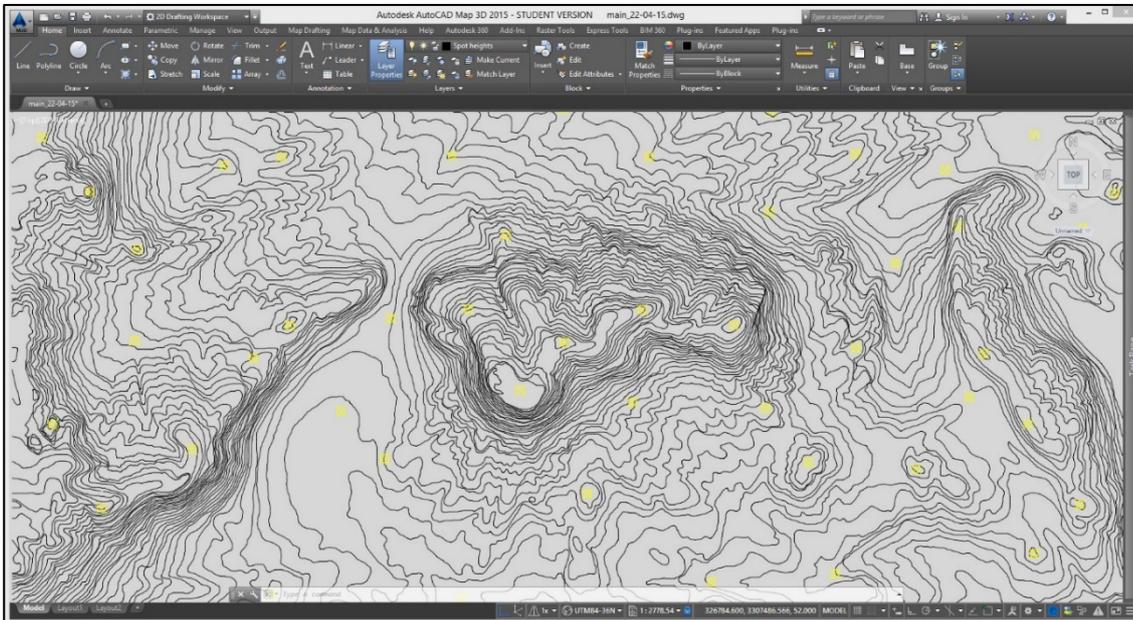


Figure 4.6. Digitised contours and spot-height elevations—shown in yellow (source author).

Omitted spot heights

In the south-eastern and eastern area of the map, representing the low-lying Nile plain, spot-height elevations that represent the embanked and raised roads and canals have been omitted. When dealing with this area during digitisation two options were considered. Either, exclude all spot heights from embanked and raised modern roads; or, include only spot heights that are within an acceptable tolerance of the surrounding land. The second option poses a problem, whereby a decision is required as to what represents an acceptable tolerance in height difference from the elevation of the surrounding land. Indeed, another decision may be required to determine acceptable distance from the modern road if the spot height is within the acceptable tolerance. If the increase in height was in the region of 0.2m would this adversely affect the landscape model? Probably not, but an increase of a meter is quite substantial and may well create an unwanted distortion of the land-surface.

Pyramid spot heights

Spot heights that represented the extant height of pyramid structures were plotted on a separate CAD layer so as not to distort the land-surface model.

Breaklines

Breaklines are a critical element in the construction of an accurate surface model as these affect the interpolation of the data which determines the shape of the model (Figure 4.7.). Breaklines can be used to define such features as ridges, pathways, streams, and they force surface triangulation along the breakline, preventing triangulation across it (AutoCAD Civil 3D online help). There are a few available breakline types, each with different functions. The non-destructive type, which maintains the integrity of the original surface, was used during construction of the TIN surface model for which 490 breaklines were digitised.

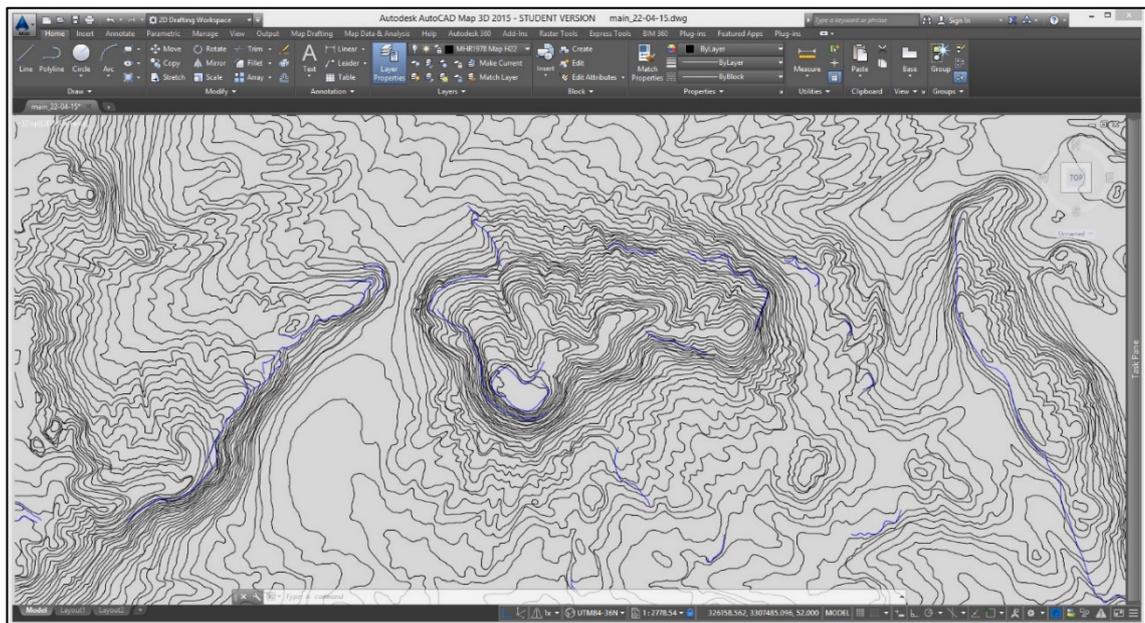


Figure 4.7. Digitised contours and breaklines—shown in blue (source author).

Several instances on the UoP maps (see Appendix 3) were noted where breaklines have mistakenly been digitised as contours. Great care was taken to avoid this during the creation of the digital terrain due to the distorted representation of the land surface that would have occurred. It is likely that this was not a serious consideration for the UoP risk assessment project as it would not have been detrimental to their results.

Levels of detail

Where included, the wider landscape beyond the immediate study area has primarily been digitised using larger contour intervals. The main study area was digitised at 1m contour intervals as presented on the MHR1978 mapping. This offered the best available level of detail for investigating the terrain at this location. The digitisation of the wider surroundings did not represent the terrain with such a high level of contour detail. This raised the question of the impact that a reduced level of terrain detail may have on the outcome of the research questions. To understand the potential implications of using divergent levels of detail within the terrain model, Karolina Wruszczak, a Cardiff University archaeology undergraduate, undertook a profile analysis study of the digital terrain (Wruszczak 2016). The results of her study informed the decision to include the terrain of South Saqqara at a slightly reduced detail from that of North Saqqara. Her study showed that a reduction of contour detail from 1m to 5m, whilst not the most desirable resolution, would not present a detriment towards interpretation in locations beyond the immediate study area. Reducing the level of detail for these locations was beneficial in adding more terrain where time was limited.

Cartographic metadata

The following cartographic information is displayed on the MHR1978 map at the bottom of sheets H:21 and H:22 in both the French (left side) and Arabic (right side) languages:

Ellipsoïde international-Hayford 1909
Projection U.T.M. – Fuseau 36
Quadrillage semi-kilométrique
Equidistance des courbes: 1 mètre
Dressé par CONSORTIUM S.F.S./I.G.N.-FRANCE en 1978
Photographies aériennes 1:15000 de Avril 1977
Echelle 1:5000

The metadata provided shows that the map location is defined through the Universal Transverse Mercator Zone 36 (north) projection using the International Hayford 1909

ellipsoid (also known as the International 1924 ellipsoid)³¹. The maps were prepared by Consortium S.F.S/I.G.N (France 1978) from aerial photographs from April 1977 at 1:15000 scale, in collaboration with the Egyptian Ministry of Housing and Reconstruction. The maps are printed at a scale of 1:5000.

Map projection

It is not entirely clear which geodetic reference system (GRS) (datum) was used by the French team when producing the maps. There are two GRS's associated with the Hayford 1909 ellipsoid for Egypt, specifically the New Egyptian Datum 1930 and the European Datum (ED) 1950. I.G.N. France are unsure which datum was applied, but believe it to be the ED50 datum. This information was located on a German GIS and geography forum thread from 2008³². A user had posted an email received from I.G.N. France³³ after requesting information relating to the GRS used for the map and the transformation data required to perform a geodetic transformation between the map datum and the more modern WGS84 datum. Applying such a transformation would facilitate the ability to overlay (or underlay) satellite imagery at the correct coordinates of the map. A transformation from GRS ED50 to WGS84 was provided having been calculated in 1991 by the USGS National Imagery and Mapping Agency (NIMA) using 14 Doppler points which produced the following parameters:

$T_x = -130 \text{ m (+- 6 m)}$

$T_y = -117 \text{ m (+- 8 m)}$

$T_z = -151 \text{ m (+- 8 m)}$

I.G.N. France declared that the accuracy of the transformation was unknown to them (see footnote 33).

³¹ For more information on projection systems and ellipsoids see Burrough and McDonnell (2015, 23–28).

³² <http://www.geographen.info/phpBB3/viewtopic.php?f=12&t=2223>. Accessed 23/10/2014.

³³ The author contacted I.G.N.France International via email with the very same query, but never received a response.

To overcome the problems of transformation between the two geodetic systems, the UoP team (Ago *et al.* 2003) made use of ‘on the ground’ georeferencing using GPS. This allowed them to identify stable points on the map which were extant on the ground at Saqqara that they could obtain GPS coordinates for. This data could then be used to understand the shift required for the coordinates of the points on the map (in ED50) to match up with the coordinates obtained through GPS (in WGS84). The UoP team identified the base vertices of the Djoser pyramid as being reliable points (Carlucci 2003, 256). GPS data was obtained and the team concluded that a shift of -60m east and -40m north was required to provide a geodetic transformation from ED50 to WGS84.

There appears to be a significant issue with the transformation applied by the UoP team. Both Steve Mills and the author have attempted to replicate the transformation based on the data supplied in the UoP publication (Ago *et al.* 2003, 256) and neither were able to achieve the alignment of the MHR1978 map with the WGS84 GRS as presented. Further investigation into the projection of the MHR1978 map has shown that it simply does not project correctly with any form of the ED50 GRS. To determine the closest matching projection, several geodetic projections were tested (Table 4.3).

Table 4.3. Geodetic projections relevant to the study area.

Referenced to International Hayford 1924/Egyptian Datum 1930				
Code	Description	Definition type	Datum	EPSG Code
EG-TM1	Egypt Transverse Mercator Zone 1, west of 27 deg East	Projected Coordinate System	INTNL (International - 1924)	-
EG-TM2	Egypt Transverse Mercator Zone 2, 27 to 30 deg East	Projected Coordinate System	INTNL (International - 1924)	-
EG-TM3	Egypt Transverse Mercator Zone 3, 30 to 33 deg East	Projected Coordinate System	INTNL (International - 1924)	-

EG-TM4	Egypt Transverse Mercator Zone 4, 33 to 36 deg East	Projected Coordinate System	INTNL (International - 1924)	-
EG-TM5	Egypt Transverse Mercator Zone 5, east of 36 deg East	Projected Coordinate System	INTNL (International - 1924)	-
Old-Egyp.LL	Egypt 1907	Geographic Coordinate System	OLD_EGYP (Egypt 1907, Egypt)	4229
Old-Egyp.Blue	Egypt 1907/Blue belt	Projected Coordinate System	OLD_EGYP (Egypt 1907, Egypt)	22991
Old- Egyp.ExPurple	Egypt 1907/Extended Purple Belt	Projected Coordinate System	OLD_EGYP (Egypt 1907, Egypt)	22994
Old-Egyp.Purple	Egypt 1907/Purple Belt	Projected Coordinate System	OLD_EGYP (Egypt 1907, Egypt)	22993
Old-Egyp.Red	Egypt 1907/Red Belt	Projected Coordinate System	OLD_EGYP (Egypt 1907, Egypt)	22992
Referenced to European Datum 1950				
ED50-UTM36	European 1950 Based UTM, Zone 36 North, Meter	Projected Coordinate System	ERP50-W (European 1950, Western Europe)	23036
Referenced to WGS84				
UTM84-36N	UTM-WGS 1984 datum, Zone 36 North, Meter; Cent. Meridian 33d E	Projected Coordinate System	WGS84 (World Geodetic System of 1984)	32636

The ED50-UTM36 provided the closest geodetic match for an ED50 projection, having an offset error of approximately 139.32 N by -107.51 E within a few metres of tolerance.

The UTM84-36N provided the closest geodetic match for a WGS84 projection, having an offset error of approximately -29.04 N by -76.25 E within a few metres of tolerance.

The UTM84-36N projection was selected. This projection offered the best solution for using satellite imagery without the need to apply complicated transformations. Additionally, when georeferencing digital structure models, their locations could be assessed against the satellite imagery, where archaeological features remain visible, to ensure that they were as accurately placed as possible. To adjust the MHR1978 map projection to align correctly with the UTM84-36N projection, the following adjustments were required: a shift east of 76.484m, and south of 29.490m. These adjustments were determined through GPS data readings gathered during a field season at Saqqara in 2010. Their locations were compared against the satellite imagery and an adjustment determined.

5. Researching the GIS

The GIS would provide the framework for the construction of the digital landscape model. Therefore, it was important that the plans and maps which comprised the GIS were accurately reproduced and georeferenced. Many publications were consulted throughout the research process to compile a GIS that was as comprehensive as possible. It was accepted at an early stage that there would always be new additional data that could be incorporated. This situation shows that the project has ongoing value and presents numerous possibilities for future research. The decision was made to focus on the use of archival data to construct the GIS, and should any new data become available, consider its merits for inclusion during the progression of the project.

Archival data

Archival data were obtained from several sources,³⁴ depending on availability. The P&M Topographical Bibliography (Porter and Moss, 1981) provided a useful reference for details of the archaeological features at Saqqara. However, the bibliography has certain limitations (See Chapter 3), but its overall usefulness cannot be overstated. Consultation of both the P&M and the University of Pisa (Ago *et al.* 2003) publications provided considerable information on the location and identification of monuments at North Saqqara. For a list of the archival publications consulted, please refer to the bibliography and Appendix 2.

Ground survey

To achieve the best possible accuracy for the GIS it was desirable to conduct some form of ground survey to compare the position of the digital data to their real-world location. An opportunity to undertake a field survey became available during January 2017. A visit was made to the Saqqara Necropolis as part of the Cardiff University Catacombs of Anubis Project. During this season of work, several locations within the archaeological site were visited and GPS location data was obtained.

A handheld Garmin eTrex 10 was employed to record location data. Whilst the eTrex 10 is a basic GPS unit, it provided a portable solution that was easy and quick to implement on site. Ground survey using a DGPS unit or a totalstation would have been preferable, but the current situation within Egypt, including the difficulties in obtaining permissions to work and transporting the equipment into the country, prohibited this. A degree of suspicion from the site authorities was encountered when using the handheld GPS. Local guards are often apprehensive regarding the activities of researchers at the site, which can generate a tension that is desirable to avoid. Explaining the work to the guards and *gafirs* prior to recording data often helped to mitigate their concerns. Time considerations, with the working season being shorter than anticipated, also dictated that a simple, time efficient solution, was implemented.

³⁴ Cardiff University Arts and Social Sciences library, Oxford University Sackler Library, Bristol University Arts and Social Sciences library, and several online sources.

Locations suitable for GPS data capture were selected prior to visiting the site. Any additional positions that were practicable to record whilst walking around the necropolis were also included. The location of the monuments within the necropolis determined their potential use for data capture. The issue of obtaining permission to work on the plateau is one that often presents difficulties when working at Saqqara, indeed this applies to most places in Egypt. Therefore, it was desirable to choose locations that were away from the main tourist areas, and therefore the direct oversight of the local *gafirs* and guards. This cautious approach allowed the author to obtain several advantageous GPS points which may not have otherwise been possible.

The following locations were selected for data capture (Figure 4.8. and Table 4.4):

- A. Within the area of the Anubieion (specifically the large Old Kingdom mastaba tomb, and the east-west aligned wall or pathway)
- B. The Mereruka/Kagemni complex within the Teti cemeteries, and a location to the south to record the difference in terrain height
- C. The south gate of the Sacred Animal Necropolis Main Temple Enclosure (hereafter abbreviated SAN and MTE respectively)
- D. The western gate structure of the SAN MTE
- E. The modern reconstructed cover of the Unas causeway
- F. The modern ramped entrance to the tomb of Ti
- G. The Catacombs of Anubis project control point number 4, on the garden wall of the Architects house.

Additional locations where GPS data was recorded:

- H. By a deposit of dispersed masonry blocks to the north of the Serapeum complex, which may relate to the northern extent of the complex, or perhaps the northern gate.
- I. An existing control point to the east of the Userkaf pyramid complex (presumably installed by David Jeffreys)

- J. Beside a mudbrick structure (possible remnant of wall or gateway) by the western wall of the Anubieion
- K. Another possible gateway in probable Late Period mud brick to the west of the Anubieion, near the satellite pyramid of the Teti complex
- L. Near the north-east corner of the Teti satellite pyramid

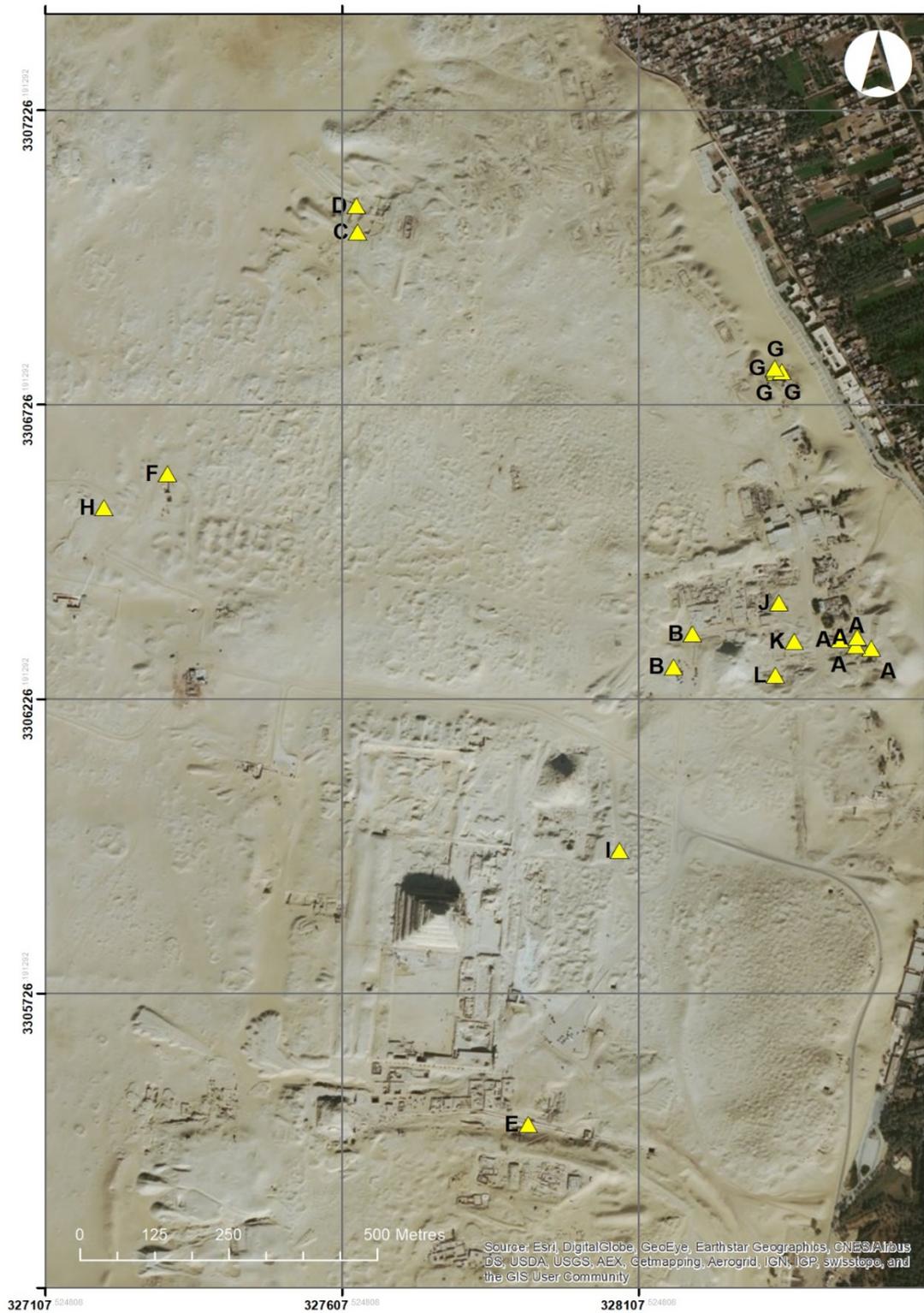


Figure 4.8. GPS data capture locations described above (source author).

Table 4.4. List of data points recorded during the January 2017 field season.

Point ID	Comment	Date/Time	Elevation
1	Architects garden wall @07.10	2017-01-18 T05:45:19Z	58.419254
2	Architects garden wall @12.30 Northern Point	2017-01-18 T10:55:30Z	56.953556
3	Architects garden wall @12.55 Southern Point	2017-01-18 T11:26:24Z	56.33189
4	SW point on SAN south gate	2017-01-18 T13:47:16Z	34.421814
5	NW corner of SAN main gate	2017-01-18 T13:58:04Z	33.347874
6	NE corner of Teti satellite pyramid	2017-01-20 T08:03:49Z	59.958591
7	SW corner of Mereruka extension with false door	2017-01-20 T08:14:50Z	61.541649
8	Area near Mereruka - to get an idea of surface level above tombs	2017-01-20 T09:28:22Z	59.943264
9	NW corner of modern ramp leading down to the tomb of Ti	2017-01-20 T10:00:06Z	37.775398
10	Possible north gate or north wall of Serapeum	2017-01-20 T10:07:56Z	37.45805
11	David Jeffreys control point: 328000E 3306000N	2017-01-20 T10:28:58Z	55.592968
12	Reconstructed cover on Unas Causeway	2017-01-20 T10:42:31Z	54.175426
12	Garden wall of Architects house	2017-01-17 T05:16:44Z	48.931141
13	NE corner of large OK mastaba	2017-01-17 T13:56:04Z	47.694588
14	NE corner of large OK mastaba	2017-01-17 T14:00:50Z	45.561977

15	NW corner of OK mastaba	2017-01-17 T14:06:07Z	44.71516
16	Centre line of pathway/wall foundation in Anubieion - west end	2017-01-17 T14:14:41Z	53.787651
17	Centre line of pathway/wall foundation in Anubieion - east end	2017-01-17 T14:17:43Z	55.72427
18	Possible gate in Anubieion wall west	2017-01-17 T14:25:14Z	59.374054
19	Possible large gate structure in Anubieion west wall, may be on Serapeum alignment?	2017-01-17 T14:31:43Z	63.108391

6. Drafting plans and constructing the structure models

The archaeological site of Saqqara presents a palimpsest of built features which required construction and georeferencing within the digital representation.

Geometric modelling system

Both AutoCAD Map and Civil 3D provide rich modelling environments. However, AutoCAD Civil 3D is better suited to three-dimensional object modelling, and it was this software package that was used to create the three-dimensional models of the monuments that comprise the Saqqara landscape. The software enables complex object modelling through its numerous in-built tools, each provided for specific tasks. Objects can be modelled as solids or surfaces or a combination of both. Solid object models have the benefit of being able to provide mass and volume data, which may be desirable when investigating tomb features. It is possible to construct both surfaces and 3D solid objects from 2D geometry through commands within the software.

Beginning with 2D geometry

The approach taken by this project to modelling the monuments of Saqqara began with the drafting of a 2D line drawing of the archaeological feature. This required a digitised plan (that includes a scale bar) which could be imported into the CAD environment. If plans were not already available digitally (i.e. as image format files) they were located

within their respective archaeological publications and scanned at 200 DPI³⁵. Each plan was saved as a high-quality PNG file using the following naming convention: [author][publication][feature]. As one would expect, the archaeological plans available were of varying quality, both with respect to presentation (i.e. print quality, size reproduced) and standard of recording. In many cases, only poorer quality plans were available, and in some cases there were no plans available of known archaeological features.³⁶

Setting up the CAD document

A blank CAD document was created for each feature with the following document units defined:

- Length type = Decimal; Precision = 0.000
- Angle type = Deg/Min/Sec; Precision = 0d00'00"
- Scale = Metres
- Lighting = International

This ensured that each feature document was set to the same unitary measurements. A new layer was created and given a global name of 'Plan image'. This was the layer onto which the scanned feature-plan would be attached. Another layer was created with a global name depending on the feature type: 'Mastaba', 'Tomb', 'Pyramid'. If additional layers were required then these were created as necessary.

The digitised plan was brought into the CAD working environment by attaching it to the 'Plan image' layer. The plan was then resized, based on its reference-scale, to a 1:1 scale, ensuring that the feature was drawn at its real-world size. Correct sizing matters for georeferencing the model later.

³⁵ Images were scanned using GIMP via a Brother MFC-J6510DW A3 printer/scanner.

³⁶ In these instances, it was decided that an object would be placed at a known location to represent the feature. If the rough dimensions or type of the feature were known then an approximate object solid could be constructed. If, for example, the feature was a First Dynasty mastaba measuring approximately 30m x 18m, a representation could be built using the knowledge that the mastaba was likely to have had palace façade decoration on its four sides and a taper towards its upper limit. This model when geolocated to the correct position would provide the best scenario in lieu of an actual feature plan to work from.

Drawing a 2D structure plan

With the attached image scaled to the correct size (Figure 4.9), its holding layer was locked to ensure no accidental alterations were made whilst drawing over the plan. The structure plan was then drawn using 2D polylines over the plan image, effectively creating a digital 'floor-plan'.

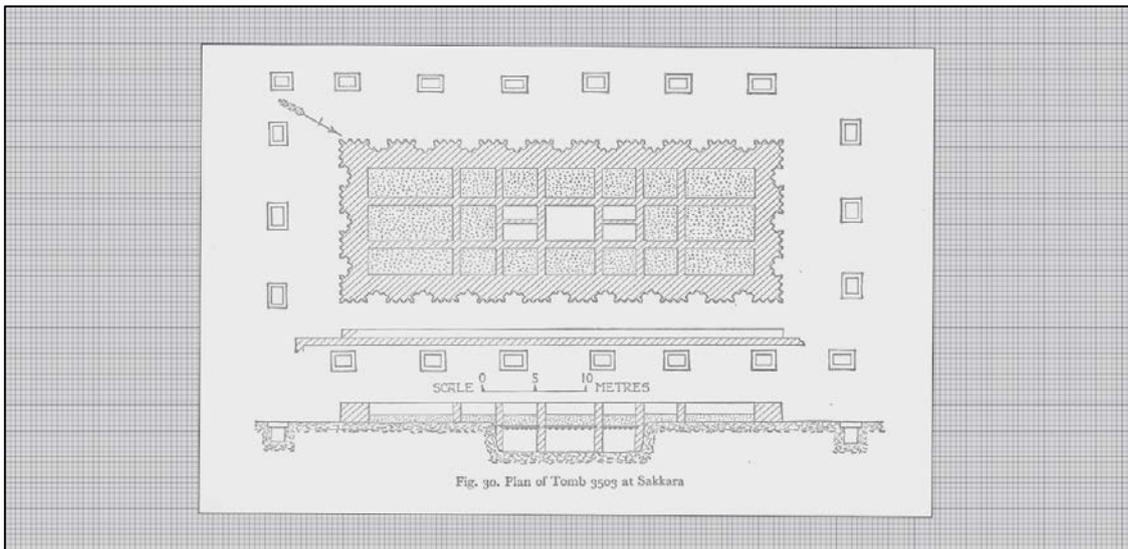


Figure 4.9. Plan of Tomb S3503 (Emery 1972, 67) attached to the CAD document and scaled to 1:1 (source author).

Each element of the plan required to construct the 3D model was drawn (Figure 4.10), including internal features where necessary. The First Dynasty mastaba tombs (of the type shown here) often have detailed external wall recessing, known as Palace Façade decoration. It was decided to simplify the number of recesses drawn during constructing of the models. This would reduce the geometry count, which reduces the computational power required to display the models, but would still allow for a recognisable visual representation of the feature. Reduced model geometry gains greater consideration as the digital model becomes more complex, so it is good practice to allow for this from the beginning of a project.

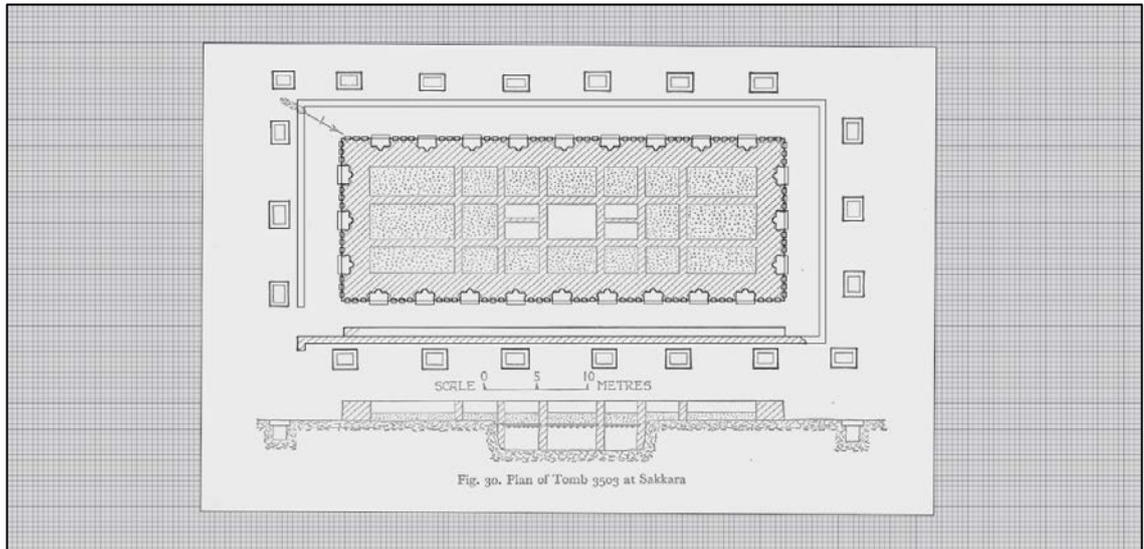


Figure 4.10. Polyline drawing of Tomb S3503 overlaid on the plan (source author).

The blocks that represent the external decoration are extended beyond the outline of the feature to assist when converting the 2D plan into a 3D model (Figure 4.11).

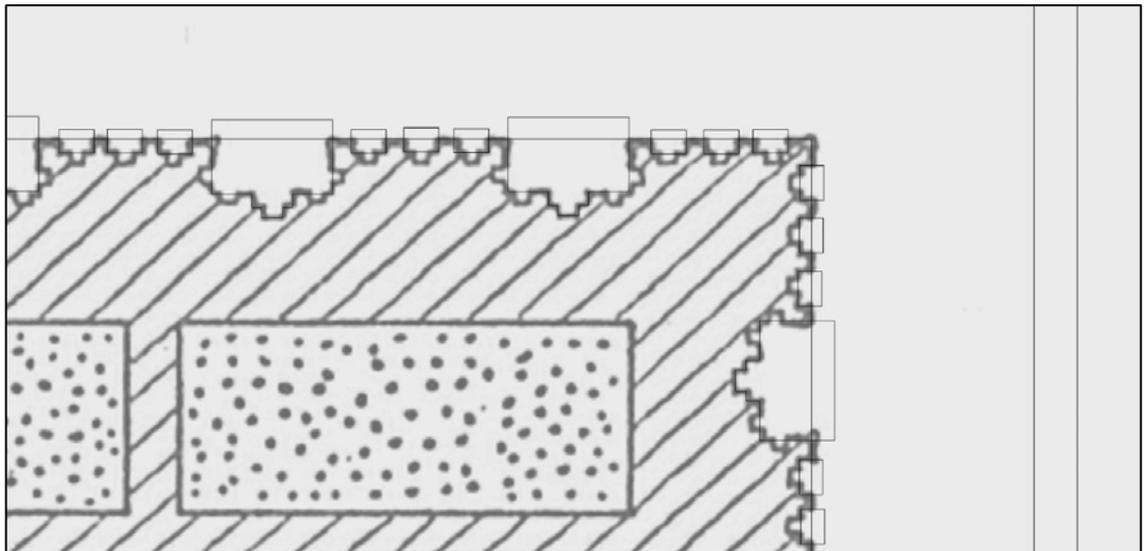


Figure 4.11. Detail of Tomb S3503 polylines (source author).

The completed digital plan is copied from the drawing file into the GIS (see below) and georeferenced into the correct position. The geolocated plan is then copied and pasted into a blank document, with units set as previously described, to its correct position within the coordinate system. This process not only ensures that a correctly

georeferenced version of the feature plan is being used, but that a separate document file also exists for the three-dimensional feature model.

Defining complex solid objects

Many of the structure models comprise multiple parts that are assembled to define the final object model and several CAD commands are used during the modelling process. Construction of the previously presented Tomb S3503 will be used as a case study to highlight the modelling methods used.

The EXTRUDE command provides the ability to create a solid three-dimensional block from a two-dimensional item. The user inputs an extrusion value or extrusion can be achieved manually by dragging the cursor to achieve the desired value. The latter method is not helpful when accurate heights are required.

Beginning with the rectangle that represents the superstructure of the tomb, the EXTRUDE command is applied and a height value of 5m is entered. This is a conservative value based on Emery's reconstruction drawing of the brick superstructure of a mastaba tomb, without the additional height of the conjectured roof structure (Emery 1972, Fig.79). It is possible that the tombs may have been constructed to a greater height than this, or as Emery suggested, may have been finished with a decorated roof to represent coffins constructed to look like houses (Emery 1972, 131). To ensure that all modifications undertaken on the solid object are editable, object history is recorded. This option retains a record of the unmodified solid object.

The mastaba tomb superstructures generally have a gradual inward batter leading to a narrowing towards the top of the structure, so a taper angle was introduced to replicate this attribute. If the archaeological plan does not define the slope of the wall, an angle of 1d30'0" was used. This figure was chosen as being enough to visually represent that a batter was present, but without being overly sloped which may have affected the visual impression of the structure (Figure 4.12).

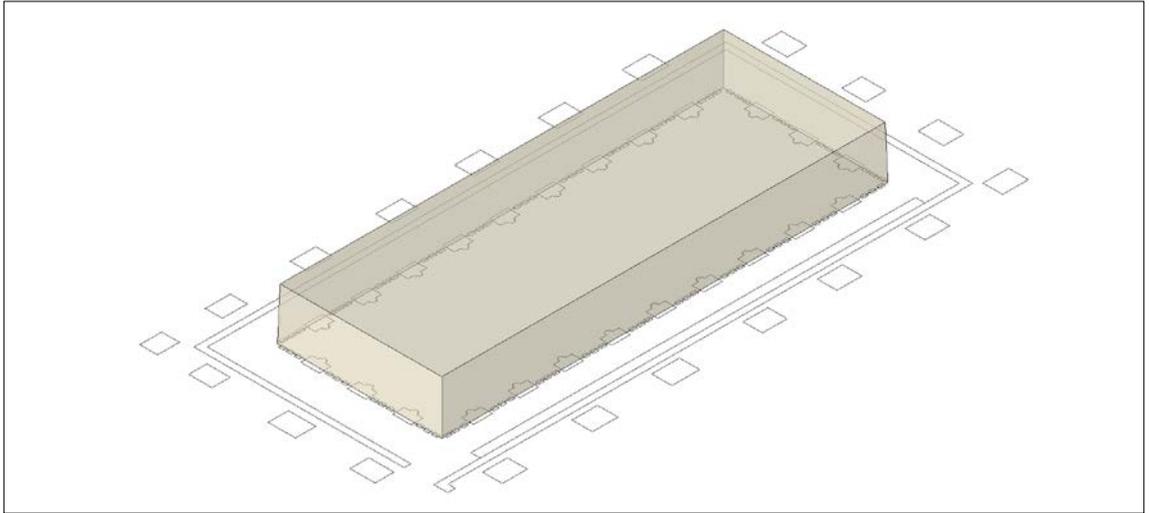


Figure 4.12. Tomb superstructure extruded to 5m with a taper of 1d30'0" applied. Viewed from a south-west isometric angle and displayed using x-ray style (source author).

To reproduce the external palace façade panelling, each of the compound niches and false door niches were extruded and then subtracted (SUBTRACT) from the tomb structure solid object (Figures 4.13 and 4.14).

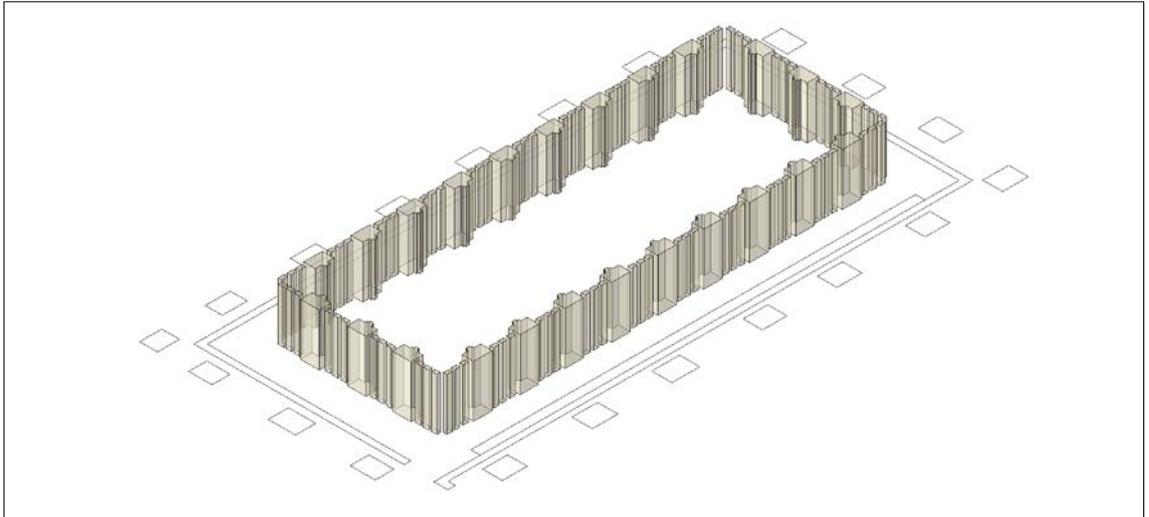


Figure 4.13. Compound niches and false door niches extruded to 5m. The tomb superstructure has been isolated and hidden for clarity (source author).

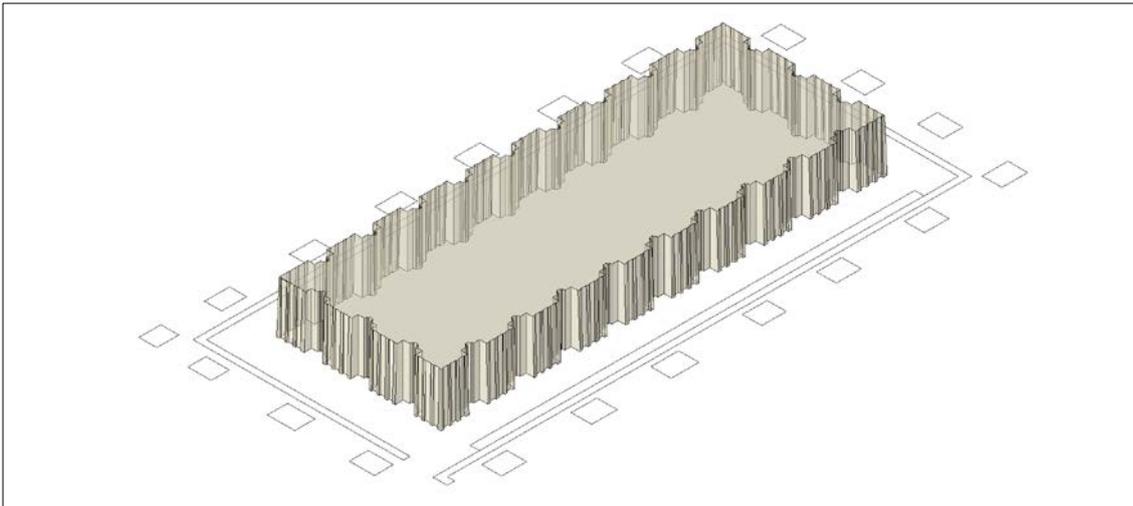


Figure 4.14. The tomb superstructure after implementing the SUBTRACT command (source author).

The same process of extrusion was applied to the enclosure wall using a height of 1.5m (Figure 4.15). Emery (1958, 6) observed certain enclosure walls surviving up to a height of 1.6m. If no maximum height was given in the archaeological report a cautious approach was taken and a value of 1.5m adopted, being less than the maximum recorded height of these features. The platform that adjoins the enclosure was extruded to its extant surviving height of 0.40m.

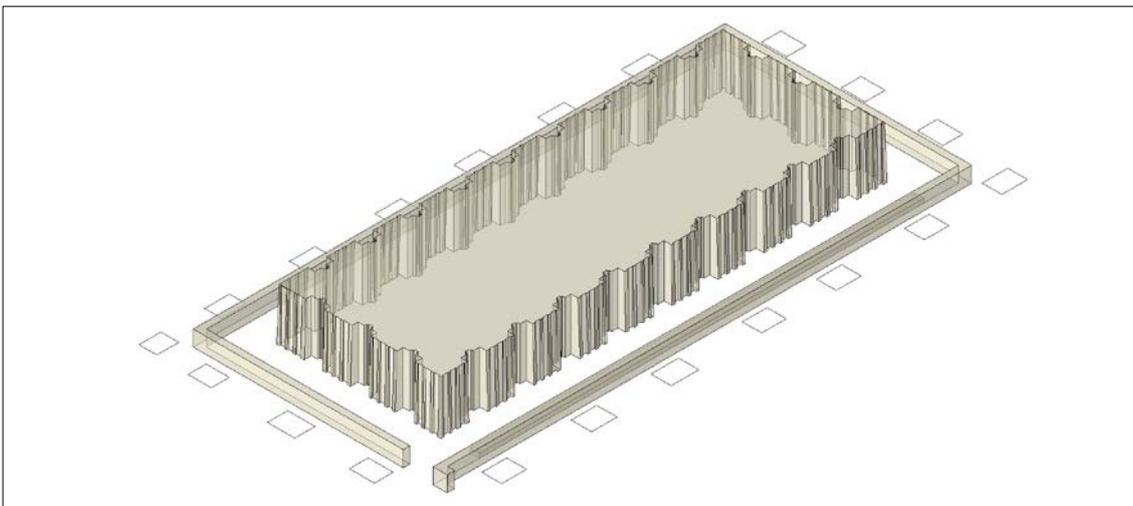


Figure 4.15. The enclosure wall and internal platform after the EXTRUSION command was applied (source author).

The extrusion command is implemented to begin the construction of the superstructures of the subsidiary grave models. In the case of tomb S3503 only one subsidiary

superstructure was partially extant upon excavation, and so the grave superstructures are based on the subsidiary graves of tomb S3504. The grave block is extruded to the required height of 0.50m and a cylinder is drawn to represent the rounded top of the superstructure (Figure 4.16).

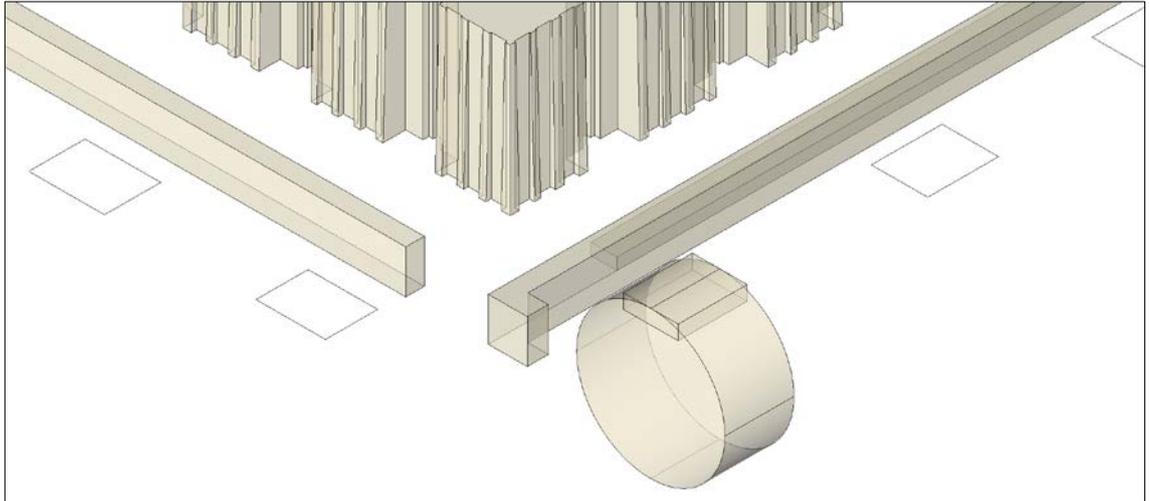


Figure 4.16. The extruded grave superstructure and cylinder which will form the rounded top (source author).

The INTERSECT command is applied to the block and cylinder to create a 3D solid shape from the intersection of the two objects (Figure 4.17). This process is then completed for each of the subsidiary grave structures.

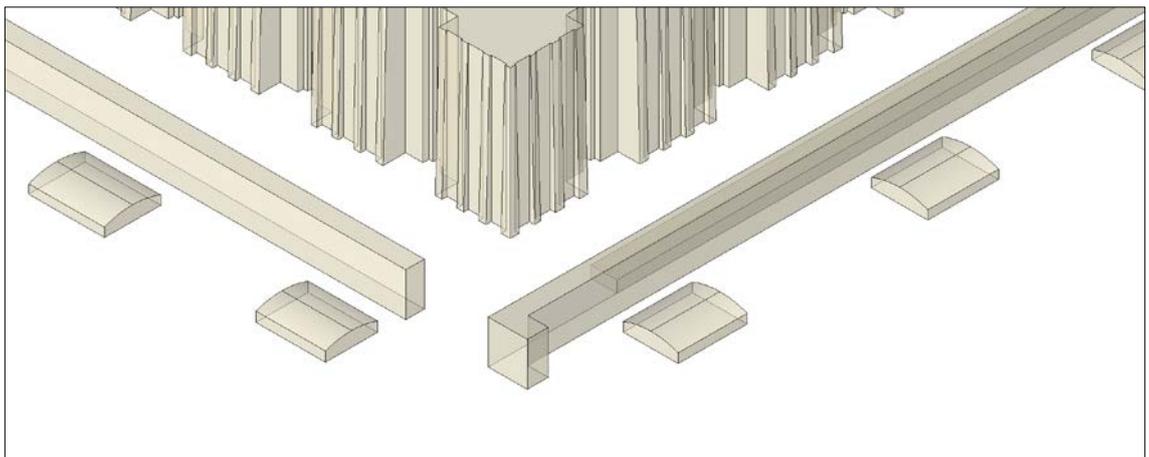


Figure 4.17. The shape formed by the intersection of the block and cylinder, creating the grave superstructure (source author).

No materials or textures were applied to the model during this stage of the process (Figure 4.18). The exclusion of both can help reduce the time it takes to render a view of the model. The model can be presented in a conceptual style (Figure 4.19) which is faster to both manipulate and render. The structure models can be dynamically re-oriented in real time through three-dimensions, which affords detailed inspection of the model from multiple perspectives, and is invaluable when modelling complex structures which have multiple components.

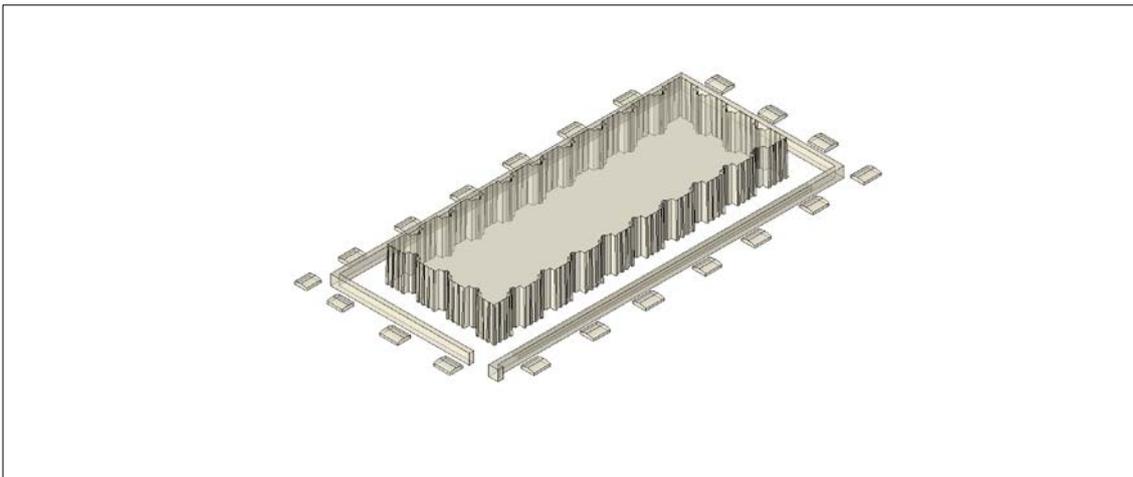


Figure 4.18. The completed tomb, enclosure wall and subsidiary graves (source author).

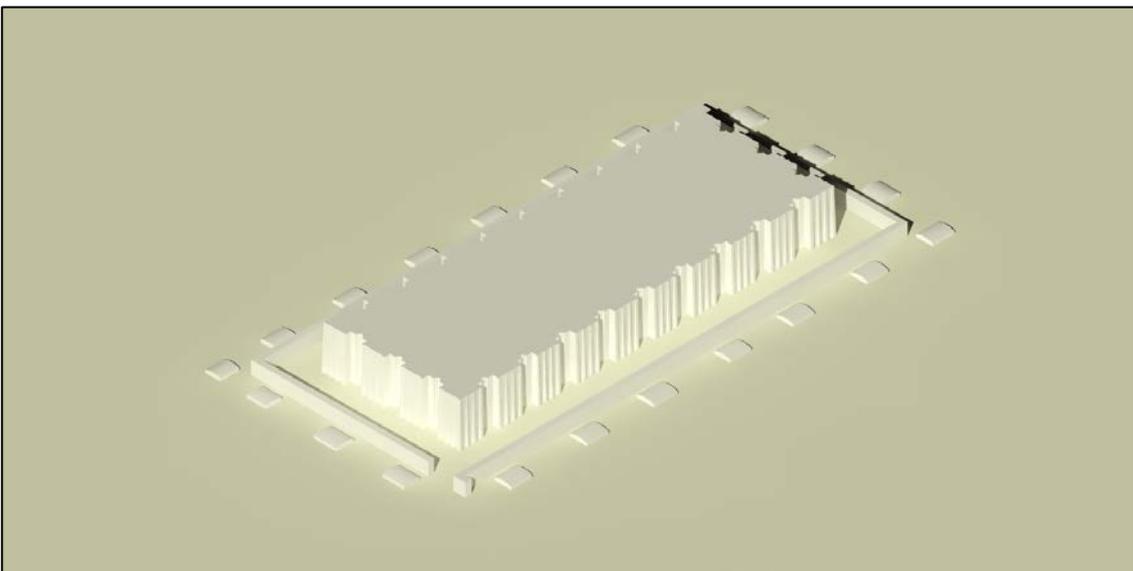


Figure 4.19. The completed structure model rendered with shadows included (source author).

7. Constructing the GIS

Construction of the GIS was predicated on the use of the MHR1978 base mapping, the University of Pisa new cartography, and satellite imagery³⁷ which, when combined, afforded the best available opportunity for determining the locations of the Saqqara monuments in lieu of the ability to undertake ground-based survey. In addition, numerous archive publications were consulted (see Step 5). With both the MHR1978 maps and University of Pisa new cartography maps georeferenced and adjusted for the offset between ED50 and WGS84 (as discussed previously) the 2D digitally drafted structure plans were geolocated to their known positions (Figure 4.20). No elevation data was attributed to the structure plans, all were placed at elevation 0m.

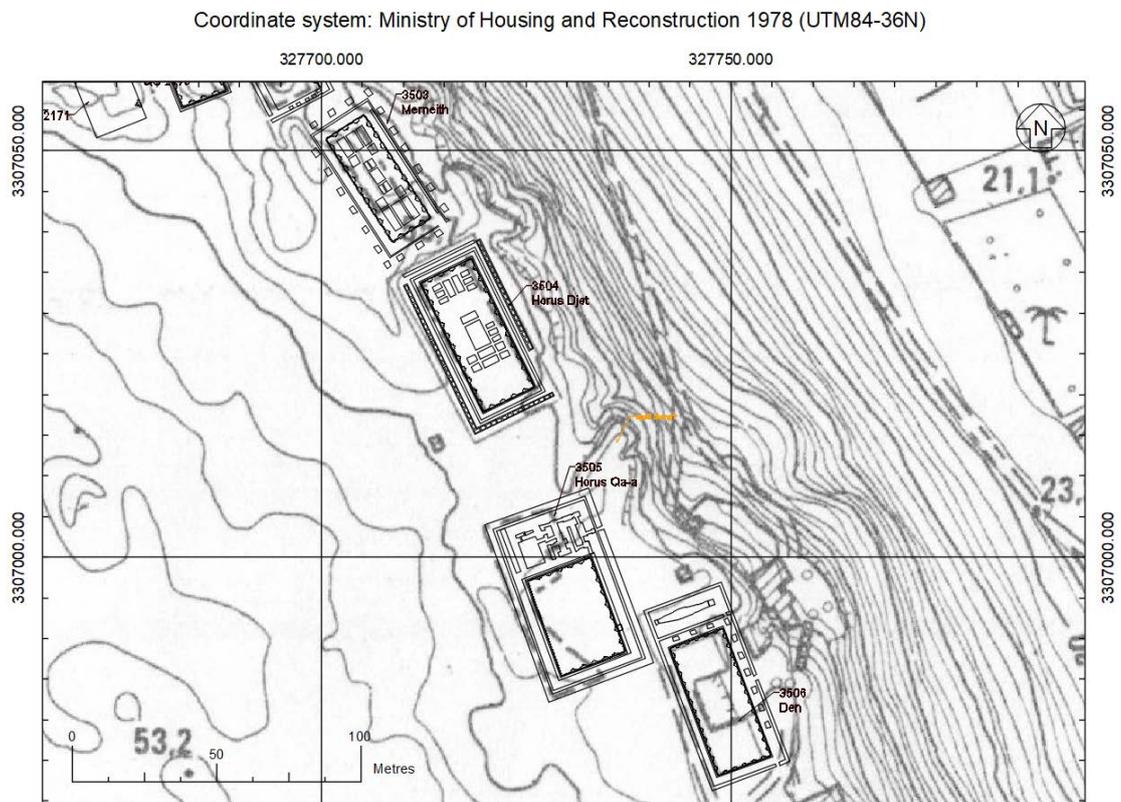


Figure 4.20. Georeferenced structure models relative to the MHR1978 map (source author).

³⁷ Bing™ map layers are provisioned as part of the Autodesk software and the aerial data is provided by NAVTEQ®. For more information see: <https://knowledge.autodesk.com/support/autocad-map-3d/learn-explore/caas/sfdarticles/sfdarticles/Live-Maps-information.html>. Accessed 23/02/2018. Google Earth was also used.

There was often a misalignment of structures on the University of Pisa plans when compared against the satellite imagery (Figure 4.21). In these instances, the satellite imagery was used for a more accurate location (Figure 4.22).

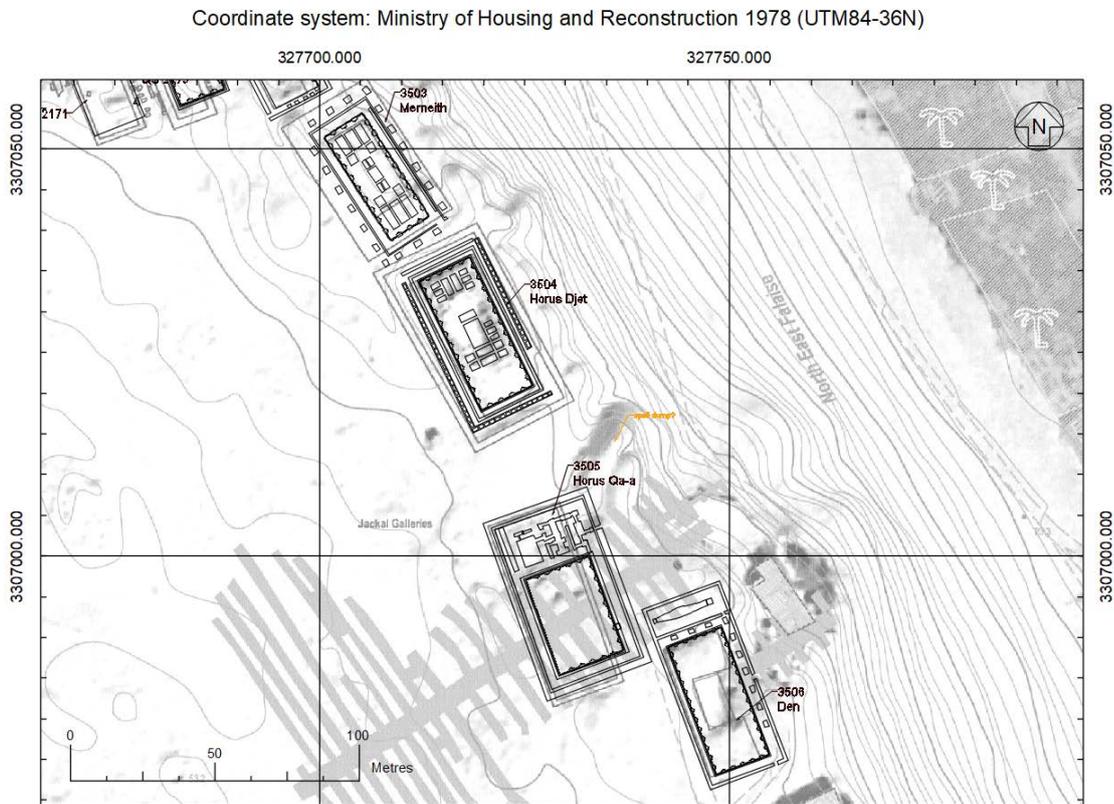


Figure 4.21. Georeferenced structure models relative to the new cartography (Kotob *et al.* 2003, 317–341), note the ‘new cartography’ misalignments (source author).

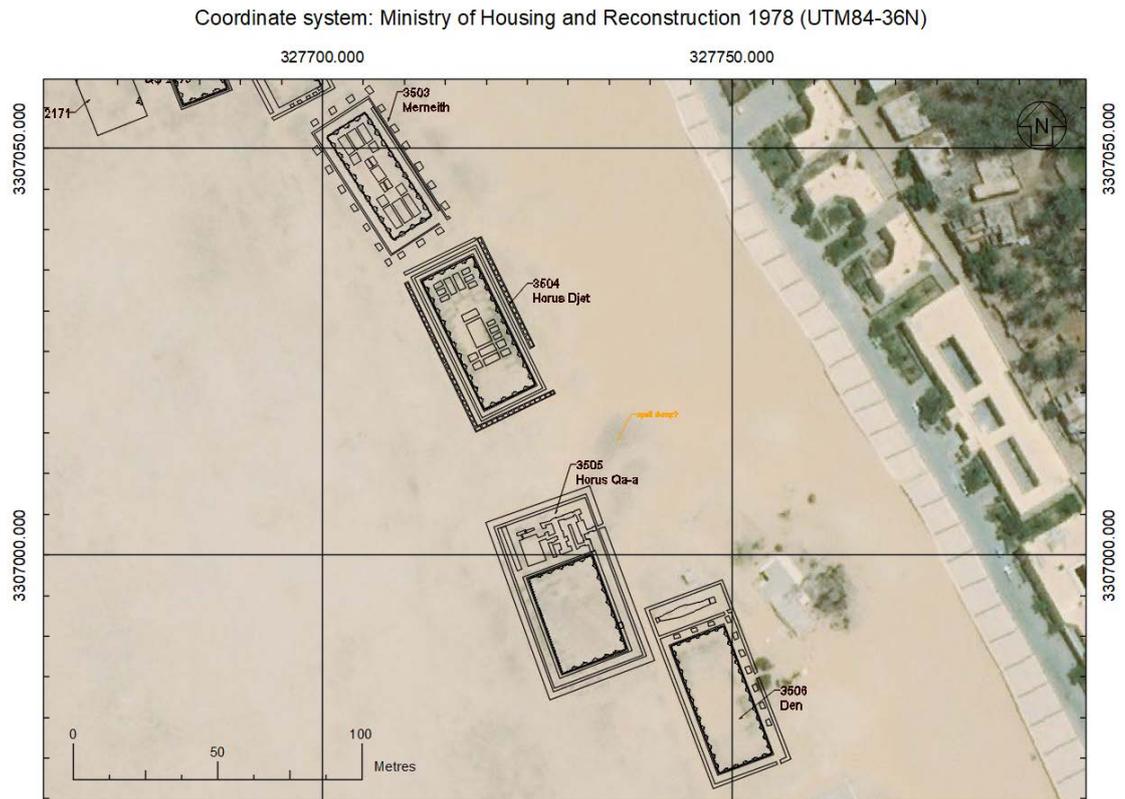


Figure 4.22. Georeferenced structure models relative to the satellite imagery (source author).

Through the repetition of this process a comprehensive GIS was constructed. Annotative metadata was included for each of the structures, which contained the structure number, tomb owner if known, and any other notes pertinent to the feature. These associated attributes are searchable through the GIS. The structures were grouped into layers chronologically by period; i.e. First Dynasty, Second Dynasty. This allowed easy access to specific periods which could be displayed in isolation or together with other periods if so desired by using query definitions to filter the data.

8. Compiling the landscape model

The landscape model comprises several elements, including the DTM, structure models, pathways of movement, areas of water and vegetation cover (where applicable), and the GIS was used to inform the correct placement of these features within the digital representation.

Digital landscape representation

The digital landscape representation comprises the TIN surface—the topography of the landscape—and various other assets set in their correct geographical location within the GRS. Each of the structure models requires an elevation value to allow them to appear at surface level. To achieve this the completed 3D feature models (as described previously) are copied from their document files and pasted into the file that contains the landscape surface data, using the PASTEORIG command, which locates them to their correct geographical position. With the surface layer visible, the view of the model is manipulated so that the feature model can be seen relative to the surface (Figure 4.23), and the elevation is adjusted to allow the feature model to rest on the TIN surface (Figure 4.24). In practice, this often means that parts of the structure models intersect and remain beneath the TIN surface, often due to the representation of sand overburden. This process was repeated for all structure models.

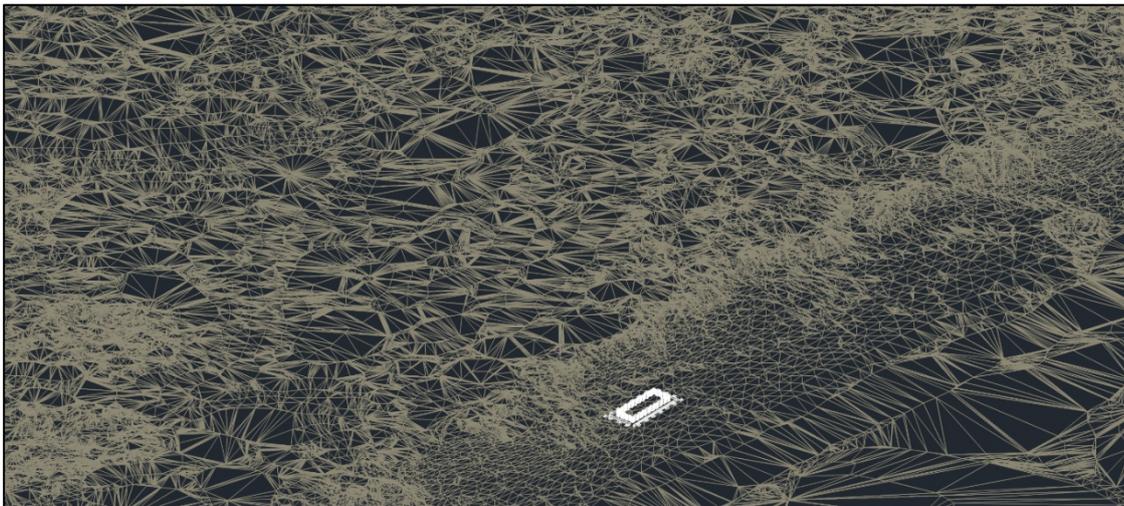


Figure 4.23. The structure model at 0 elevation, situated beneath the TIN surface (source author).



Figure 4.24. The structure model elevated to the TIN surface (source author).

Mitigation of asset loss in large documents

Several file errors occurred during the construction of the 3D landscape model which caused a nominal amount of disruption and the requirement to revert to previous uncorrupted file-saves. Additionally, it became apparent that the digital document was becoming too large and unmanageable. The document contained multiple layers which in turn held multiple assets, all internal to the main file. This meant that if the main file corrupted, all the data would be affected. Therefore, to reduce the document file-size, streamline the workflow, and protect the numerous assets that comprised the digital landscape model, a master document was created that would act as a placeholder. New documents created for each of the chronological periods were attached to the master document as external references, meaning that they function within the master document, but exist separate to that document and are initialised when the document is opened. Whilst this means the management of multiple documents, document file sizes are now generally much reduced, documents are less cluttered, and should a file corruption occur, not everything will be lost.

Summary

This chapter has proposed a structured development process to create the digital representation to ensure a solid platform for research. The process comprises a sequence of eight steps which have directed decision-making—from the types of software to use, through to the construction of the digital terrain and models. The next chapter reviews

the methodology for depicting the LP/EP landscape and considers the potential constraints of the study.

CHAPTER 5

The digital landscape representation

Introduction

The digital landscape model provides an interpretive representation of the Saqqara necropolis. The model comprises separate data files and can be manipulated to depict different periods of Egypt's ancient history from the 1st Dynasty through to the LP/EP era. The rich spatial complexity of the model, combined with the ability to diachronically investigate the landscape, enables the researcher to examine the palimpsest of North Saqqara's archaeological features together within their landscape setting, thus the model becomes a powerful research tool. The digital model facilitates the conception of ancient visual perspectives no longer wholly extant, and herein lies its strength. Without harnessing the creative power of digital reconstruction, the task of visualisation becomes arduous and cumbersome, the investigation of divergent viewpoints simultaneously is almost inconceivable, and attempting to visualise change over time is an improbable task. Research becomes empowered through interaction with the digital environment, where data generates possibilities through the medium of the model, and visual prompts during the investigative process lead to new questions and avenues of investigation.

Constraints of the study

The constraints of this study must be addressed, and their potential impediments understood, that they may form part of the process of investigation leading to the outcome of this project. A few significant challenges presented themselves which require discussion. Principally, the documentation of excavations has not been and, in some cases, is still not the best that it could be. In the case of historical excavations of the 19th century, when large areas of archaeological features at Saqqara were investigated (Stammers 2009, 6), they were too often poorly recorded, where only a

limited amount of information that the excavator deemed necessary was retained. This often related to inscriptional evidence that might attest to the tomb owner, the excavation and recording of a tomb chapel rather than the entire feature, or the retention of material culture, but often little else. It follows then that poor recording techniques have led to publications that are often inadequate regarding the information that they provide which impacts their general usefulness. When using data from these publications in a landscape study such as this, it should be remembered that many were not written for, or in anticipation of, such use, which can prove challenging.

For example, to compile the GIS, archaeological plans which are georeferencable to their correct terrestrial location are desirable. However, many archaeological publications offer insufficient information regarding excavated features, such as external or internal dimensions, or accurate location data. All too often there are inadequate feature plans or, at worst, no feature plans at all. Further complications occur with published plans that have been incorrectly scaled, where dimensions on the plan are found not to match those given in the accompanying text. The reference scale on the plan (if indeed one is included) might be found to be incorrect when compared, for example, to a general location plan of the same feature. This can often be resolved if more than one publication presents data of the same archaeological site. Additionally, this type of error can sometimes be corrected through a comparison of the scaled plan with satellite or aerial photography, if available.

Precise location data with which to situate archaeological plans within their surroundings is most desirable but often lacking, and it can be anywhere from difficult to impossible to georeference this data correctly. This is particularly problematic for archaeological features planned in isolation, or where no location coordinates or coordinate system have been identified. It is, however, explicable why this situation occurs. The need to conceal the whereabouts of ongoing excavations to guard from potential looting is not only desirable, but appropriate. The same applies to completed excavations where finite and irreplaceable archaeological remains are reburied. The need for site protection, whilst certainly necessary, often hampers the requirements for an accurate location map for research purposes. It is necessary to remain cognisant that

the incorrect placement of a feature will impact the effectiveness of any GIS and/or digital representation used in research.

The P&M topographical bibliography, specifically the Saqqara volume (1981), is presented here as an example of a superlative resource for information relating to monuments, including dating and relative location to other monuments,¹ but one that provides no accurate location data. The maps and plans presented within the volumes are generally reference sketches and no reference scale for the drawings are provided.² These volumes would benefit immensely from accurate site plans providing detailed location data, as this would expand their potential scope of use.

The preceding concerns are often mitigated in modern archaeological publications where sufficient care is taken over the excavation and recording of data, but it is a situation that persists. Emery's sizeable excavations of the 1960s employed hundreds of workers and often only had three supervisors on site, and not all at the same time (Smith *et al.* 2006, 5). Understandably, this resulted in numerous omissions during the recording process which sadly has led to questions that are now difficult to address. Archaeological investigation can be a destructive process, and the excavated monuments were either partially removed or reburied under tonnes of sand which would now be cost prohibitive to re-excavate. It is now, however, generally accepted in the process of archaeological recording that everything is, or will be, in some way important. Whilst all data that is recorded might not be immediately salient to the excavation project, it may hold relevance in the future.

Data interpretation can also become a concern when attempting to conflate disparate plans of monuments that are often difficult to reconcile with one another. Areas at Saqqara that are congested with tombs and structures have not always been excavated and recorded by a single archaeological mission. The Teti cemetery provides a good example. Situated to the north of the Teti pyramid complex, the area is choked with

¹ This only applies to monuments where inscriptional evidence or other material culture was extant upon excavation.

² This is generally understood by Egyptologists who make use of these volumes.

multiple phases of structures and tomb shafts in addition to other types of burial, all excavated and recorded over a period of many years by several different archaeologists, often with differing agendas and levels of ability (see Chapter 3). This has led to a situation where multiple plans of the archaeological features exist, many which overlap, but do not easily fit together. Features presented on the plans and yet not discussed within the text of the publication is not uncommon. These undocumented features require interpretation as best possible. This does not present such a complication for the GIS, but can become rather problematic when attempting to construct a 3D representation of the structure, which may lead to an inaccurate visual representation.

Historical maps can be exceptionally beneficial in a GIS when georeferenced and investigated as part of a map regression/progression analysis. They can help define and locate hitherto unidentified features, or those that may have been lost subsequent to the production of the map. However, there are potential drawbacks with this process. Georeferencing historical maps, which are rarely drawn in a projected coordinate system, often requires a degree of interpretation to make them compatible with existing datasets. This usually involves the determination of markers present on both the map for georeferencing and the dataset to which it will be georeferenced. These markers are then matched between the two datasets to create a transformation of the historical map. This procedure, however, is open to error (see Williams 2012).

The process of georeferencing may, and usually does, result in an amount of distortion in parts of the map which are distant from the markers. The markers should not be clustered together else potential distortion will be amplified. Ideally, they should be well-spaced across the map. Often, however, markers that are common to both datasets are limited. If the technique of *rubber sheeting* is employed to refine the transformation (see Chapter 4) then distortion errors can become severe away from the section of the map that has had the transformation applied. Using a map after such transformations requires that a degree of caution is exercised when making inferences based on correlations between datasets. It is important to record the errors generated when applying transformations, along with the point data used during the process.

With these concerns observed, map progression/regression analysis is an extremely valuable tool available to the archaeological investigator, and one that should, where practicable, be utilised in such a study as this. To potentially enable the identification of tombs that on modern maps remain unidentified is an extremely beneficial outcome. Certainly, future research may benefit from such documentation that is currently not extant.

Methodology for depicting the LP/EP sacred landscape

As discussed previously, construction of the 3D landscape model was informed by the GIS, which served as the principal map for the Saqqara necropolis. It was expected that the GIS and digital model would be used together, where the use of the overhead perspective of the GIS in conjunction with the terrestrial view of the landscape model may offer a more nuanced understanding of the terrain and its monuments through different perspectives. The GIS affords an overview of the surrounding landscape which can then be viewed from a terrestrial perspective through the digital representation. In this way, visual data that is investigated from a terrestrial elevation can be examined in the context of a wider area, which may (or may not) provide further data towards investigation.

Chronological considerations

The chronological duration of concern to this project begins with the 26th Dynasty (664–525 BC) when the sacred animal cults gained importance (Kessler 1989, 223–229), and ends with the rule of Ptolemy III Euergetes I (246–221 BC), who was the last Ptolemy in power prior to a long and gradual decline of Greek governance and increase in Egyptian unrest, which began with Ptolemy IV Philopater (221–205 BC) (Thompson 2012, 110). This specific duration was the focus of the study because of the dominance of sacred animal monuments at Saqqara dating to within this timeframe.

How to best characterise the LP/EP landscape of North Saqqara in the digital representation required careful consideration. Which monuments endured and which were no longer visible? In what state of preservation did they appear? After extensive

deliberation, it appears that there is no simple answer. It remains extremely difficult to know what to include and what to omit with regards to structures, and in what state of preservation many of those structures may have appeared. However, the study required a starting point (see below), and once begun, the opportunity to adapt the representation over time becomes a possibility. This approach allows for reassessment and revision of interpretations based on new proposals or evidence that may be available in the future.

A duration of just over five-hundred years represents the LP/EP as defined for this study, and it is very likely that monuments were constructed, destroyed and/or buried throughout this period. For example, those monuments which stood at the beginning of the period may have been buried by the sands towards the end. For this study, it was decided that an archetype of the LP/EP would be adopted—a single moment in time which may be used to represent the known monuments. To depict the landscape in a credible manner, a representation of the sacred monuments as they may have appeared during the reign of Ptolemy I Soter I was constructed. The following examples provide context for this decision: construction of the Anubieion and Bubastieion may have begun during the reign of Ahmose II (570–526 BC) (Arnold 1999, 111); the avenue of sphinxes flanking the Serapeum Way were installed under Nectanebo I (380–362 BC) (Arnold 2003, 218); areas of the Main Temple Enclosure of the Sacred Animal Necropolis were enlarged substantially during the reign of Nectanebo II (360–343 BC) (Arnold 1999, 108); by the time of Ptolemy I a hemicycle of Greek philosophers had been installed at the end of the Serapeum Way, adjacent to the East Temple of Nectanebo II (Smith 1975, 421). Each of these monuments, whilst in use, would have remained concurrent with one another and functioning within the sacred landscape, despite a probable duration of over 250 years.

The wider area of the necropolis

Earlier monuments of the necropolis, those predating the LP/EP time, were also included in the digital representation. Large structures, such as the pyramids, which today are often little more than mounds of rubble, would have appeared to be in a ruined condition during the LP/EP. This is evidenced through the decay suffered by the

Pyramid of Unas by the time of the New Kingdom, when the pyramid was partially restored by Khaemwaset (Lehner 2008, 155). It is likely that the Unas valley temple and causeway were in a ruined condition during the LP/EP, whilst the pyramid may have been in better repair, due to the restoration work. This is reflected in the digital representation, where the valley temple and causeway are depicted in a state of disrepair, whereas the pyramid is presented with mainly sharp lines and minor deterioration. The large unfinished pyramid and enclosure of Sekhemkhet (see Goneim 1957) was most likely buried beneath the sand and represented by little more than a sandy mound at surface level. A similar condition could be assumed for the large rectilinear enclosure, the Gisr-el Mudir. The external enclosure surrounding the pyramid of Djoser may have been more visibly upstanding, due to the height and general robustness of the walls, but it is likely that much of the internal spaces would have succumbed to drift sand, with sand clinging to the steps of the pyramid, giving them a sloping appearance. It should be assumed that the dry moat surrounding the Djoser pyramid enclosure was mainly filled during the latter years of the Old Kingdom, which permitted the construction of the large mastaba tombs that are built over it to the south. The pyramids of Userkaf and Teti, and their satellite pyramids are also assumed to have been in a ruined condition during this period. The pyramids at Abusir and those of South Saqqara have been included due to their spatial proximity to the necropolis of North Saqqara.

The digital models for these structures have been presented in a distressed condition to represent the general decay and destruction that they are assumed to have suffered by the LP/EP. They have been coloured a uniform sandstone beige/brown, identifying them as stone, rather than mud-brick, and showing that they are no longer plastered white and in pristine condition, having fallen out of use.

The Old Kingdom mastaba tombs proved a challenge with regards to potential visibility. Many of these large, and smaller, mud-brick structures are visible at surface level today through the intervention of archaeological excavation. It is not clear how similar the situation would have been during the ancient past. Wind-blown sand drifts across the plateau, covering and uncovering monuments over time. It could reasonably be

assumed that early Old Kingdom tombs, such as the 1st and 2nd Dynasty Mastabas, lining the escarpment edge at the east of the plateau, may have been partially visible at certain times. This suggestion is supported by the lack of overbuilding of the monuments during later periods, even when vacant space was limited. In view of this consideration, the Old Kingdom mastaba tomb models have been reduced in height to simulate their denudation, and as a result many are only just visible, protruding from the terrain surface. The Old Kingdom structure models have either been coloured a uniform dark brown, to represent mud-brick, or a sandstone beige/brown, where it is likely that they were either built or cased in sandstone.³ Where it is known that a specific tomb was used in the LP/EP, for example the large mastaba S3518, the structures are given greater visual prominence above the terrain surface. It follows that if a structure was in use during the LP/EP then its location was known and therefore it was visible within the landscape. Visibility would have been retained through its use and the clearance of drift sand would have been necessary to maintain access. The choices regarding levels of visibility were made based on the following assumptions:

1. Structures located within a lower lying aspect of the terrain were considered more likely to have succumbed to drift sand, as they are now.
2. Structures situated atop the edge of the escarpment, or on ridges of bedrock, were considered more likely to retain a level of visibility. These areas were considered less likely to retain drift sand, being slightly elevated and allowing the sand to move more freely, as happens now.

In either of the above assumptions the degree of visibility is open to debate.

Representation of the New Kingdom tomb groups of Horemheb (see Raven 2011) and Nefer Renpet (see Tawfik 1990), to the south of the Unas causeway, was approached using the same treatment applied to the other monuments of the necropolis. It remains uncertain how much of the distinctive tomb structures would have been visible above the sand, if anything at all. The Nefer Renpet cemetery group is situated atop a rise in

³ The beige colour generally represents the 5th and 6th Dynasty mastaba tombs.

the terrain close to an escarpment edge, and so, in theory, should have endured less accumulation of drift sand. The Horemheb cemetery group is located further to the south on the rise and appears to be constructed on a lower lying area of terrain, possibly being more prone to sand overburden. This situation is reflected in the digital representation, whereby more of the Nefer Renpet group tombs are visible above the sand, than those of the Horemheb group. Whilst these cemeteries are situated a significant distance from the main LP/EP sacred monuments,⁴ the area they occupy is visible from the Serapeum Way, making their inclusion worthwhile. Additionally, Late Period shaft tombs of the 26th/27th Dynasties are situated nearby to the west of the cemeteries.

Situated to the north-west of the main Saqqara necropolis is a low hillside that is within the concession of Waseda University. Various archaeological remains have been excavated, including a layered stone structure protruding from the edge of the escarpment. This structure was recreated based on a hypothetical plan and reconstruction (Yoshimura *et al.* 2005, 366) to test its visibility whilst conducting the study. The structure, which is believed to date to the Old Kingdom, was given a distressed appearance (as discussed above). A large rectilinear mud-brick enclosure was discovered on the hilltop. Dating to around the middle of the New Kingdom, this structure appears to have been reused during the LP/EP periods, and was once plastered white/grey (Yoshimura and Takamiya 2000, 163) which has been reflected in the reconstruction. A fragmentary limestone pavement whose use dated from the end of the Third Intermediate Period (1069–747 BC) through to the Early Ptolemaic era presented an intensity of activity during the Late Period. It appears that this was a sacred area where votive offerings were made (Yoshimura and Takamiya 2000, 167).

The Bubastieion, Anubieion and Dog Catacombs

The Bubastieion structure remains woefully under-excavated and as a result is inadequately understood archaeologically. Alan Zivie (1983; 2009; 2013) is undertaking research in the New Kingdom tombs that line the escarpment within the confines of the

⁴ Over 900m to the south.

Bubastieion. However, his investigations do not extend to the wider area beyond the tombs, leaving the greater expanse of the Bubastieion mainly unexcavated. Jeffreys and Smith (1988, Appendix A) provide a summary of the surface survey of the Bubastieion, undertaken by the EES, in their Anubieion volume. Their plan (1988, Fig.1) of the Anubieion includes the Bubastieion enclosure. However, the plans for these structures provide limited detail when considered against the size of the features, and the extant remains visible on the ground do little to elucidate their once complex constructions. For example, the eastern extents of the Anubieion and Bubastieion enclosures, along the edge of the cultivation, remain unknown on modern plans, an absence of excavation and the inaccuracies of historical plans mean that information regarding these areas of the structures remains tenuous. Indeed, few details are known of extant subsurface archaeology at the level of the lower terraces, yet it follows that there was human activity taking place there.

Mariette's maps offer varied levels of detail for the Anubieion, but display little more than a partial outline of the Bubastieion. The map published in *Les Mastabas de l'Ancien Empire* (Mariette 1882) is extremely scant on details. The Bubastieion outer wall is partially plotted but no other detail of the structure is shown. The location of the unfinished pyramid of Menkauhor is displayed within the area of the Anubieion. Two plans presented in *Choix de monuments et de dessins découverts ou exécutés pendant le déblaiement du Sérapeum de Memphis* (Mariette 1856) display more detail of the Anubieion enclosure (labelled as Serapéum Grec), showing internal features and the route of the Serapeum Way through the enclosure, but the Bubastieion remains represented by partial enclosure walls. Although conspicuous mounds shown to the east of the structure may attest to the location of an eastern wall. There is no indication of the southern gate into the enclosure on the Mariette maps, and it is likely that during the drawing of the maps the remains of the upstanding walls visible at surface level were little more than mounds of sand and mud-brick debris.

Like the Mariette maps, that of de Morgan (1897, 10) shows limited detail of the Bubastieion except for plotting and projecting the position of the external wall.⁵ The Anubieion is shown in more detail and, like that of Mariette's plan, depicts internal structures and walls. Neither of these maps are entirely correct in their layout of the external enclosure walls, where they appear to show a single wall separating the Bubastieion and Anubieion (the southern Anubieion wall and northern Bubastieion wall). It is known from the work Jeffreys and Smith (1988) that both enclosures did not adjoin one another but were connected by a causeway.

Construction of the digital model of the Bubastieion was reliant upon the work of Jeffreys and Smith (1988), whose ground plan of the structure is the most comprehensive available to date. A 3D VRML (Virtual Reality Mark-up Language) model of the Bubastieion and Anubieion ⁶ was constructed in 2002–2003 by Narushige Shiode as part of a UCL (University College London) project entitled Digital Egypt for Universities.⁷ The UCL reconstruction (Figure 5.1) of both enclosures are predicated on Jeffreys and Smith (1988, Fig.1) but much remains conjectural (Stephen Quirke 2017 pers. comm.). Construction of the new Bubastieion digital representation drew upon the UCL model, the plan of Jeffreys and Smith, the New Kingdom tomb excavation reports of Zivie (1983; 2009; 2013) and satellite imagery. Parts of the external enclosure walls are visible on satellite photos and so the finished model was evaluated against this for accuracy. Amalgamating these data aided in the creation of a credible representation of these significant structures.

⁵ The de Morgan map does include the locations of the rock-cut tombs that Alan Zivie and team are excavating.

⁶ http://www.ucl.ac.uk/museums-static/digitalegypt/3d/impact_saqqara.html. Accessed on 10/05/2015.

⁷ <http://www.ucl.ac.uk/museums-static/digitalegypt/Welcome.html>. Accessed on 10/05/2015.

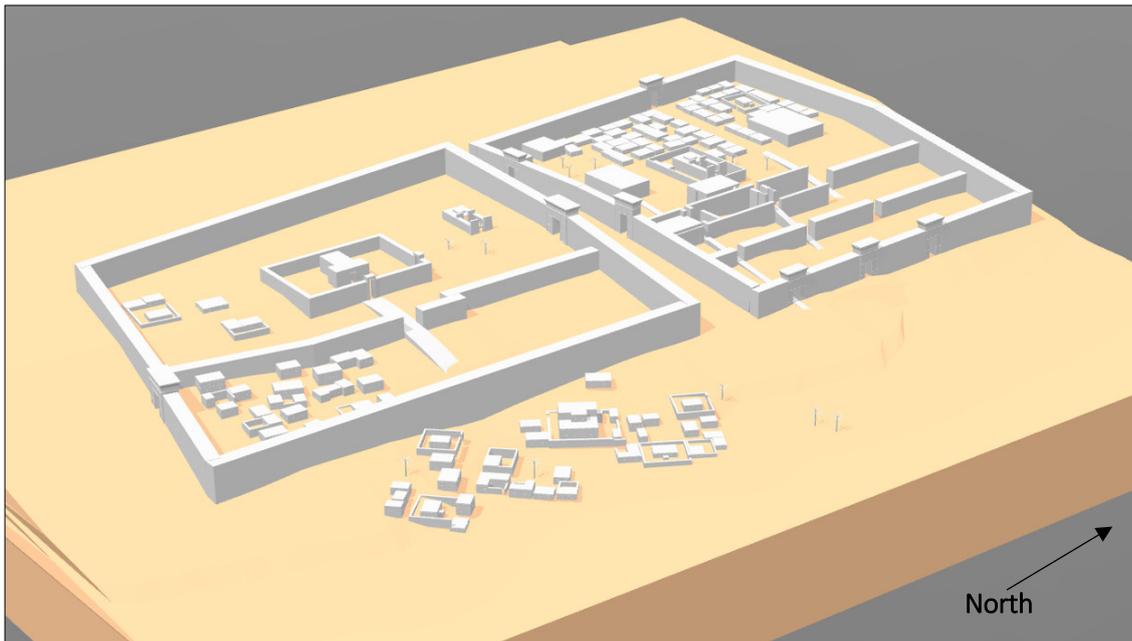


Figure 5.1. The UCL Anubieion/Bubastieion VRML model (see footnote 7) viewed with the Windows 10 3D Builder application. The model is shown from an elevated view facing west-north-west.

Within the area of the temple enclosure there is limited evidence for a village settlement and the denuded foundations of the mud-brick structures are visible along the lower terraces from the modern road which travels northwards past the Imhotep Museum towards the guard station and antiquities offices. It is difficult to extrapolate from this limited number of poorly conserved structures the final complexity of the village. Jeffreys and Smith (1988, 78) suggest that the entire lower terrace of the enclosure may have been filled with similar brick-built structures. This would make an extensive area of settlement, which has been partially reconstructed for the digital model. The foundation plans of the extant structures were used and duplicated to create a dense area of buildings in the south-eastern corner of the enclosure. Some smaller buildings of a basic rectilinear plan were included to fill in gaps and create a range of building sizes.

Situated within the Bubastieion enclosure is the (presumed) Temple of the Peak (Thompson 2012, 19). The direction from which this structure was accessed is somewhat unclear. Whilst Jeffreys and Smith (1988, 78) contend that a road rose from the cultivation westward up to the temple platform, Smith (2017 pers. comm.) has also suggested that access may have been gained up a stairway originating from a southerly

orientation, entering the enclosure via the south gate and presumably passing close by the New Kingdom rock-cut tombs. It seems more likely that an approach to the temple platform was gained from the east leading up and over the escarpment. Therefore, the temple stairway was constructed adopting the direct approach up and over the escarpment as suggested by Jeffreys and Smith (1988, 78) with the location based upon the Quirke/UCL model. If the Bubastieion enclosure had an eastern wall, which remains to be determined archaeologically, then it is likely that such an approach from the east would necessitate a gateway in the wall. The plan by de Morgan (1897, 10) indicates that such a wall may have existed, and for this reason a wall and gateway has been assumed for the digital model.

The Anubieion enclosure is located north of the Bubastieion. The distance between the two measures between 16m at the western end to over 35m towards the east. A short causeway provided a thoroughfare which connected the two structures (Jeffreys and Smith 1988, 78). David Jeffreys, Harry Smith and Lisa Giddy have undertaken intensive research on areas of the Anubieion (Jeffreys and Smith 1988; Giddy 1992), but even these detailed excavation works leave much of the feature unknown. The enclosure walls are recorded on the Jeffreys and Smith (1988, Fig.1) plan although many areas are shown with dashed lines, indicating a presumed projection of the wall rather than evidence from excavation. The lack of evidence for an eastern wall of the enclosure makes interpretation of the lower terraces and approaches to the structure challenging. As with the Bubastieion, the Anubieion digital model is based on the Quirke/UCL VRML model, with amendments which bring the ground plan closer to the plan of Jeffreys and Smith (1988, Fig.1). The model assumes an eastern wall along with three pylon gateways (see below) which provide access to the interior. No archaeological evidence for the wall or gateways has yet been recorded, and both their existence and locations remain conjectural. Like the Bubastieion enclosure, the de Morgan (1897, 10) plan reveals linear mounds along the eastern side of the Anubieion which he attributes as walls. The pathways emerging from these gates and up the escarpment were reconstructed using stairs rather than ramps. This decision was based on Smith (1981, 337), after excavation undertaken by the EES on segments of the Serapeum Way observed steps in its later construction. The maximum dimensions of the pylon

gateways were constructed using the First Pylon at Karnak as a guide (Arnold 2003, 183) with added consideration of the thickness of the Bubastieion and Anubieion enclosure walls (Quibell 1907, II).

The placement of the south-eastern most gate is based upon the southern compound area where the Bes chambers are located. This area has a clearly defined entrance in its eastern wall. The orientation of this entrance was projected towards the east and this was used to determine the position of the gateway. Placement of the central eastern gate was based upon the position of the central temple and its presumed access. Again, the compound wall of the temple area has an opening facing east. Projecting the orientation of the opening directly east was once again used to determine the placement of the gateway in the eastern wall. The north-eastern gateway, which represents the entrance of the Serapeum Way into the enclosure, was positioned using the Jeffreys and Smith plan, which shows remnants of a pathway in this location. The archaeological remains of the pathway are not aligned perpendicular to the presumed eastern wall, as the path is presented in the Quirke/UCL model, rather the path is set obliquely along a north-north-easterly direction.

The discontinuous sections of pathway recorded on the Jeffreys and Smith plan (Figure 5.2), shown as being up to 6.5m in width (Smith 1981, 332) and representing a substantial path, approaches the escarpment obliquely from the north-north-east at an approximate angle of 71° from the general orientation of the escarpment. The Mariette plan shows the passage of the ceremonial way as a straight route from the east to west up the steep escarpment through the enclosure (Mariette 1856, *Serapeum de Memphis* 1850–1854; see Figure 5.3), and this is how the Quirke/UCL model has represented its route. The de Morgan plan (1897, 10; see Figure 5.4) diverges from this in that it shows the pathway, arriving from the east, deviates slightly south as it progresses west. There is an orientation change back towards east-west once the pathway exits the enclosure through the Anubieion west wall. The orientation of the Serapeum Way in the de Morgan plan appears to correlate more closely to the plan of Jeffreys and Smith. The

digital representation of the Serapeum Way route has been constructed based on the excavation plan of Jeffreys and Smith (1998, Fig.1; see Figure 5.5).⁸

⁸ For a discussion of the Egypt Exploration Society's excavation of areas of the Serapeum Way see Smith (1981).



Figure 5.2. The Jeffreys and Smith (1988, Fig. 1) plan of the Bubastieion and Anubieion enclosures (see Figure 5.5 for the location of the Serapeum Way). Courtesy of the Egypt Exploration Society.

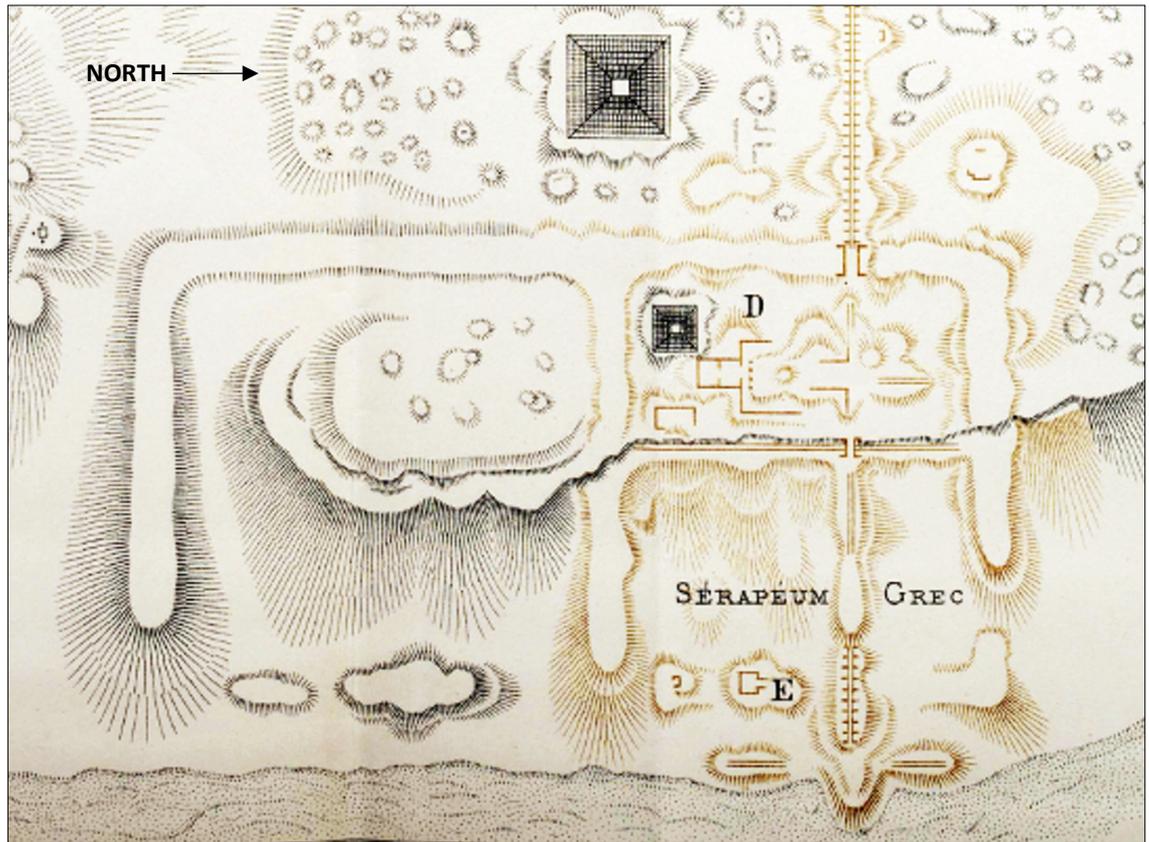


Figure 5.3. Mariette's (1856) plan of the Bubastieion and Anubieion enclosures. The Anubieion is designated the Sérapéum Grec.

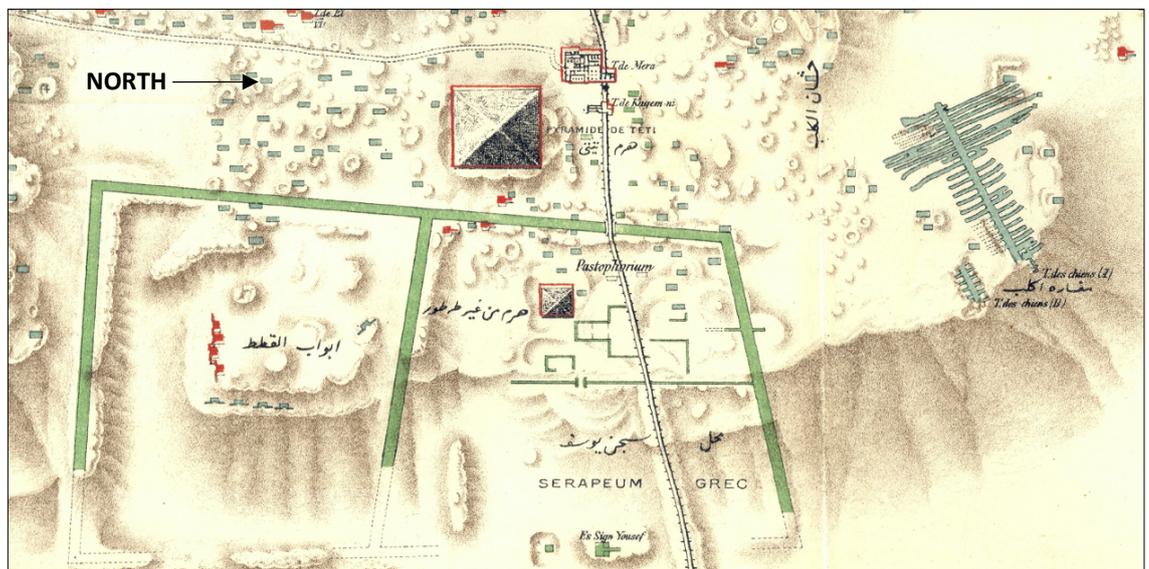


Figure 5.4. de Morgan's (1897, 10) plan of the Bubastieion and Anubieion, also designated Serapeum Grec. This plan also includes the location and plans of the Dog Catcombs to the north of the Anubieion enclosure.

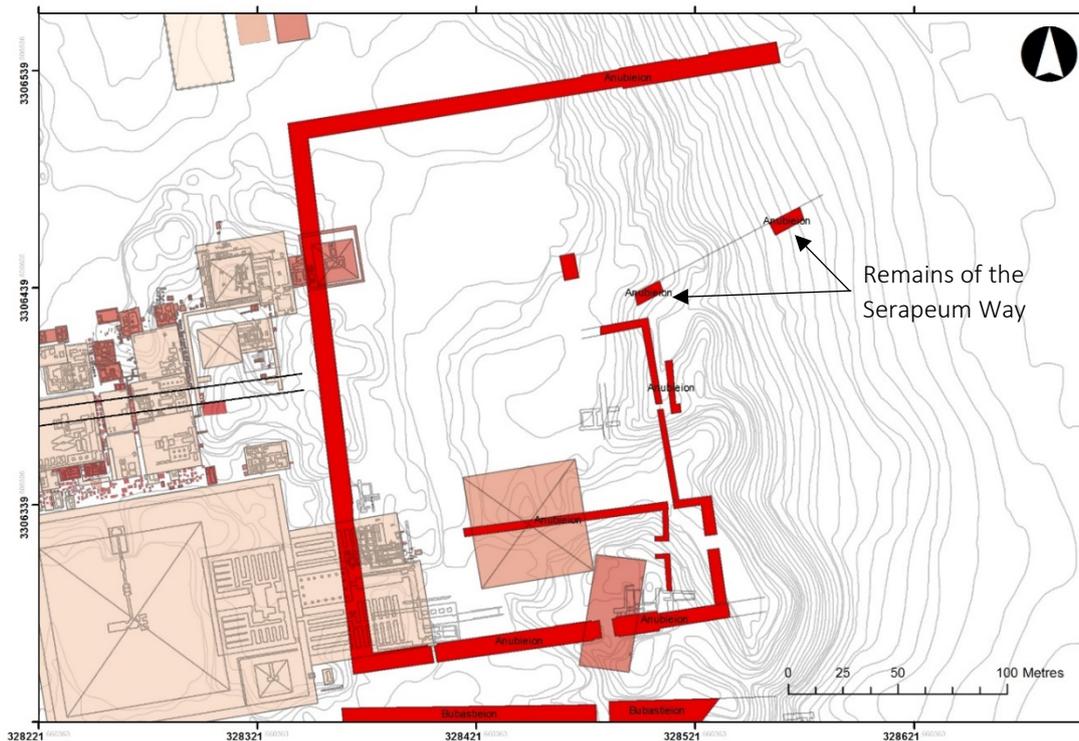


Figure 5.5. The Anubieion ground plan, in red, central to the image. The discontinuous remains of the Serapeum Way path can be seen entering the area of the Anubieion from the north-north-east (see also Figure 5.2) (source author).

The Jeffreys and Smith plan does not indicate where the Serapeum Way exited the Anubieion enclosure through the western wall, presumably because they did not observe any archaeological evidence to enable such a suggestion. However, extant Late Period mud-brick foundations by the western wall of the Anubieion may attest to the location of the gateway through which the Serapeum Way passed. The author visited the area during a working season at Saqqara in January 2017 and examined the mud-brick construction (Figure 5.6) and obtained GPS readings at the location. This enabled reconciliation of the position of these remains against satellite photography and the GIS plan of the necropolis to determine their spatial relationship with the alignment of the Anubieion plan. The visible mud-brick structure is spatially close to the western wall of the Anubieion enclosure, and set perpendicular to it. It is situated in a location where the western gateway was most likely to be. After aligning the ground penetrating radar (hereafter abbreviated GPR) data of the Scottish Geophysical Survey Project (hereafter abbreviated SGSP) ground survey, the route of the Serapeum Way was projected towards the east, beyond the survey limit. Where it crossed the Anubieion western wall

was the likely location for an entrance. The mud-brick feature observed on the ground aligns well with this postulated location and may represent part of the southern wall that flanked the Serapeum Way, and supports the location of the walls and gateway in the digital model.



Figure 5.6. The possible southern wall of the Serapeum Way, perpendicular to the Anubieion western wall. The pyramid of Teti is visible in the background with various structures of the Teti north cemetery visible to the right of the image (photo author).

The settlement area in the west of the enclosure has been partially recreated in the digital model based on the work of Jeffreys and Smith (1988, 25–30 and 38–39) and with reference to the Quirke/UCL VRML model. The layout and extent of the settlement remains conjectural due to the significant destruction of the temple terraces, the location of a modern village (Jeffreys and Smith 1988, 25) and the small areas sampled by modern excavation. The character of the settlement buildings would likely have been far more densely arranged than represented in the digital model, where a more circumspect approach was taken towards layout density. It was considered better to underestimate structure density, but to allow enough to promote the character of a village.

Whilst the position of the central temple of the Anubieion has been identified from scattered foundation deposits, its visual character remains unknown. A scarcity of remains preclude a reconstruction of the appearance of the temple. To provide a credible representation, a generic temple structure constructed in a Late Period style has been used to depict the main Anubieion temple.

It is possible that a gateway would have existed in the northern wall of the enclosure, specifically to provide access to the two dog catacombs situated some 250m to the north. Whilst such a gateway was not recorded on the Jeffreys and Smith plan, access to the catacomb entrances would have required travel beyond the north of the Anubieion enclosure and it seems plausible that a gateway would have made easier access in this direction and should be considered as very likely. In the most likely location for the gateway, a vestige of a pathway appears discernible towards the lower extent of the escarpment. The sandy ledge which leads towards the north, appears to turn in towards the larger dog catacomb entrance suggesting that this may have been how that area was accessed.

The Dog Catacombs were explored and surveyed by de Morgan or his colleagues and presented in his 1897 plan, but no other known work of an archaeological nature had taken place at the catacombs until recently, when a small team undertook the survey and recording of the interior of the larger of the two known structures (Nicholson *et al.* 2015). Examination of the exterior of the catacomb was limited to visual observation, and the smaller catacomb remains, for the time being, inaccessible. Whether a forecourt or garden was located outside of the catacomb entrances is unknown, though this possibility is credible. The catacombs of the other animal cults at Saqqara each have a garden area or forecourt, and so it can be reasonably assumed that the same was true for the dog catacombs. A simple flat area surrounded by low walls has been constructed for the model, to represent a forecourt directly in front of the catacomb entrances. Previous investigation has shown where the axial corridor of the larger catacombs is likely to have been accessed from the escarpment (Williams 2010) and this data has been applied in the location of the forecourts. It remains unclear how access up the escarpment to the entrances of the catacombs was affected. A credible suggestion

would be a stairway leading up from the causeway below, or a hard-packed sandy incline may have sufficed.

The Serapeum Way

The historical maps of Mariette (1885), Rhoné (1877, 216) and de Morgan (1897, 10) depict the route of the east-west processional way leading from the Anubieion to the Serapeum Precinct. However, none of these plans describe the correct route of the pathway. The orientation and location of the ceremonial route as depicted in the historical maps was compared against the modern survey data of the SGSP (Mathieson and Dittmer 2007; see Figure 5.7).

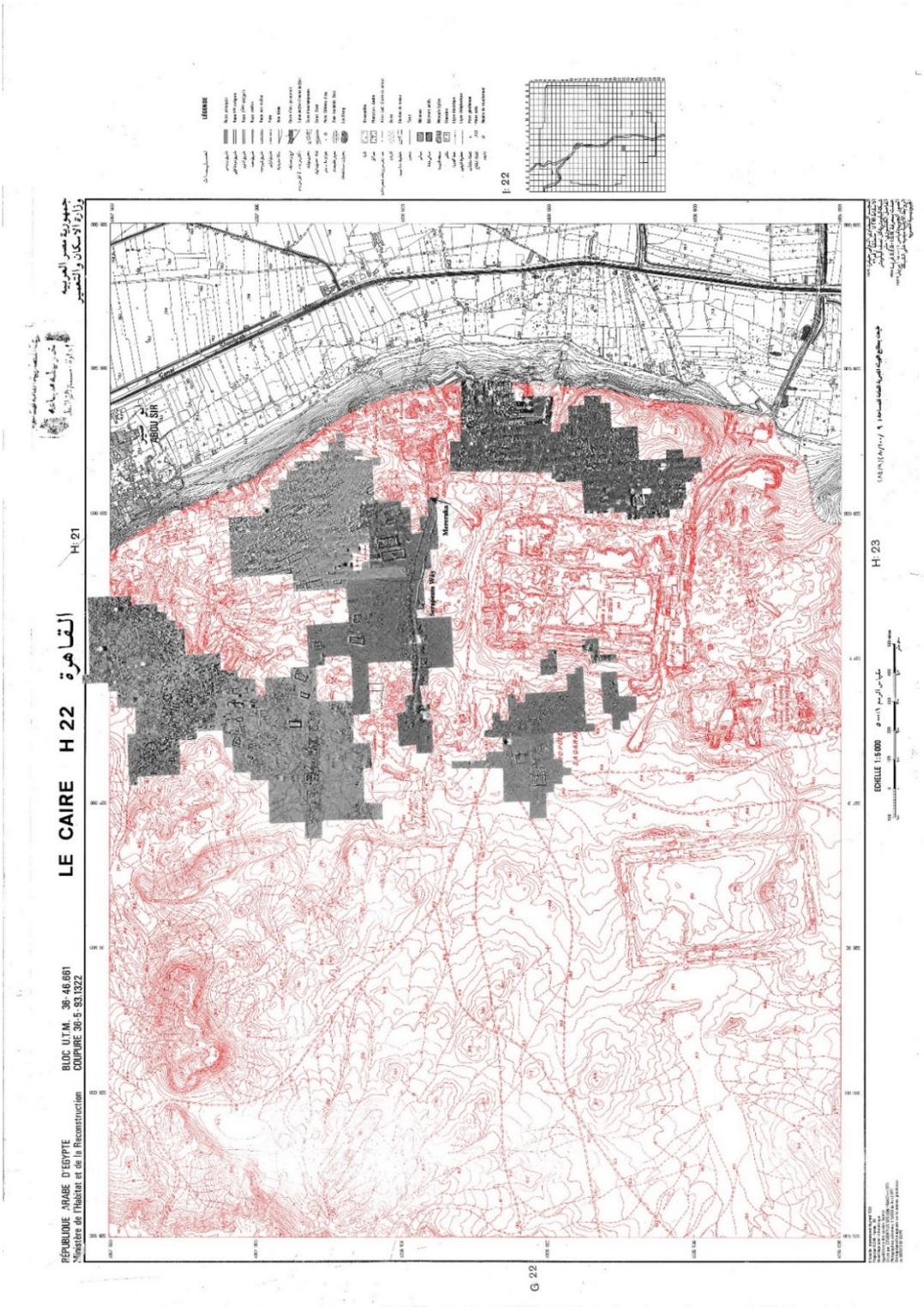


Figure 5.7. The MHR1978 map with the SGSP survey data (Mathieson and Dittmer 2007) overlaid. With thanks to Adel Okasha Khafagi of the Egyptian Antiquities Service for making this data available.

The GPR survey undertaken by the SGSP team has provided accurate sub-surface data for the location and orientation of the route of the Serapeum Way, and has been employed during the construction of the digital landscape model. The GPR data of the

SGSP team shows a distinct hard-edge to the boundaries of the way (Figure 5.8), and it is uncertain whether this represents the walls that Mariette noted bordered the route (Arnold 1999, 109), or whether this is a cut into the rock to create a level surface for the route. It has been assumed that the thick-line data most likely represents mud-brick boundary walls that respect the alignment of the pathway, being used to keep the route from sanding up.⁹ The sacred way is more likely to have been constructed atop the existing sand level rather than within cut trench (see below), such as that employed for the Unas Causeway. The southern boundary wall extends as far as the collection of tombs that flank the south side of the pathway, with the northern boundary wall extending further to the west, stopping prior to the pathway's turn towards the south and the East Temple of Nectanebo II.

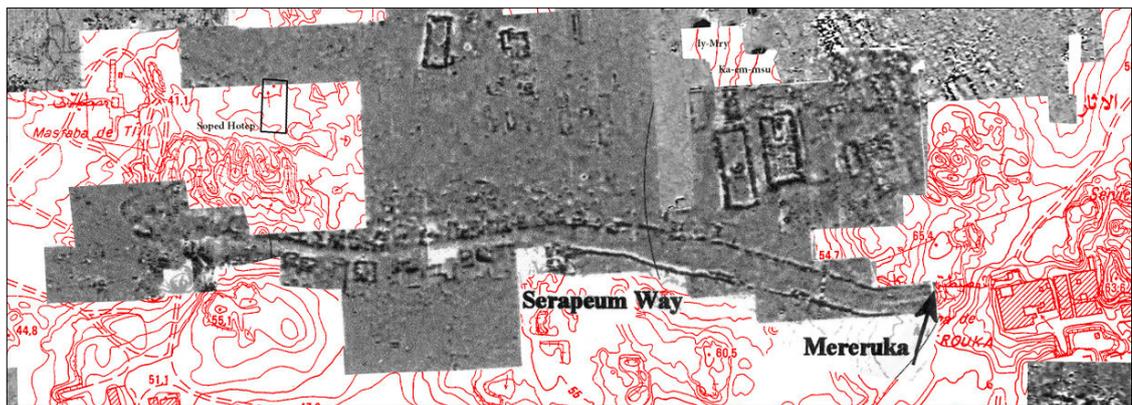


Figure 5.8. Detail of the Serapeum Way as defined by the SGSP GPR data (Mathieson and Dittmer 2007).

The position of the Serapeum Way appears to traverse through the area of the Teti North Cemetery. Whilst the SGSP survey did not extend here, it has been possible to project a continuation of the path towards the east based on its trajectory.¹⁰ In doing so it became apparent that, if this projection was correct, the ceremonial pathway would have crossed over the tombs of the Old Kingdom cemetery. An excavation plan by Quibell and Hayter (1927, Plan of excavation West of the Mastaba of Mereruka) shows a short section of the Serapeum Way, labelled as “Paved road to Serapeum” situated to the west of the Mereruka Mastaba. When this plan was aligned and overlaid

⁹ See above for a discussion on the possible remnant of the southern wall near to the Anubieion enclosure.

¹⁰ The location where the projection meets the western wall of the Anubieion has already been discussed above.

with other excavation plans of the area, the Serapeum Road appears to partially superimpose over Mereruka's mastaba. A photograph which incompletely shows this area during excavation was published in Duell (1938, Plate 3B). It is difficult to ascertain from the image whether the mastaba of Mereruka has been cut through to enable to transit of the ceremonial way, but the mastaba plans appear to show that this is not the case. That having been determined, it must follow that the sacred way was constructed over the top of the tombs within the cemetery. During January 2017, the cemetery was visited and the depth of sand surrounding the excavated tombs observed. The surrounding sand, considering the piling up of excavation debris, was estimated approximately 4m in depth. This depth of overburden would have sufficiently covered the Teti North Cemetery tombs and provided the foundation upon which the Serapeum Way was constructed. It is credible to suggest that the builders of the sacred way may not have known about the tombs beneath the sand. To replicate this scenario in the digital model, the excavation hollow of the cemetery was infilled with a solid block to allow the Serapeum Way to traverse over it. The edge vertices of the block were adjusted to best fit the surrounding terrain and to allow the land-fill to blend seamlessly. The result being that no trace of the Teti North Cemetery remains in the LP/EP landscape model.

The Old Kingdom pyramids of Iput, Khuit, and Sesheshet, situated at the periphery of the Teti North Cemetery, have been presented in a ruined condition, protruding from the sand. It is unclear whether these structures would have been visible during this period or whether they would have been completely buried. Whichever the case, having them partially visible does not enhance or detract from any views around the area of the Anubieion west gate.

The Serapeum Way has been constructed based on the SGSP survey data and, as previously discussed, the dark-line data respecting the alignment of the way has been assumed to be boundary walls for excluding drift sand. It is possible to determine the position of some of the plinths for the sphinx statues (Mathieson and Dittmer 2007, 93) and these have been used to organise the layout and positions of the sphinxes flanking the ceremonial pathway. Towards the western end of the ceremonial way several

structures are depicted on the historical maps of Mariette (1885), Rhoné (1877, 216) and de Morgan (1897, 10) and some are discussed in Mariette's excavation account (1882, 11). The structures appear to be variously dated from the Old Kingdom through to the Late Period and are located either side of the ceremonial way. Several structure outlines are visible on the SGSP survey data, however, it proved extremely difficult to reconcile the layout and locations of the structures depicted on the historical maps against the modern data. Because of the discrepancy between the historical and modern data, a decision was made to follow the SGSP survey map as being a true and accurate representation of the subsurface archaeology. The structure models constructed for the digital landscape were therefore located based on the modern data and have not taken account of the historical depictions.

Serapeum enclosure and dromos

Like the Bubastieion, there is limited information regarding the layout of the Serapeum enclosure including its internal features. The subterranean catacombs have received detailed attention (Mariette 1882), but less so for the surface structures. The 1874 Rhoné (1877, 216) plan appears to be partly based on the earlier Mariette (1856, Planche II) map of 1854 and presents a detailed and well-arranged impression of the Serapeum enclosure and its surface features. It appears from these plans that Mariette, and presumably therefore Rhoné, believed there to be a large temple structure located above the entrance to the subterranean chambers, and a portico entrance gate situated in the northern wall of the enclosure. The Mariette (1856) plans depict the southern and western extents of the main enclosure wall in two different conditions. On the *Sérapéum de Memphis 1850-1854* plan there is no western wall and the southern wall respects the alignment of an escarpment, below which it is situated. However, on the *Plan de la Nécropole de Memphis 1854* a western wall is depicted which traverses the escarpment to the west of the monument. The southern wall is portrayed as crossing the escarpment to the south. The Rhoné (1877, 216) plan follows the second Mariette plan discussed and provides additional details of internal features within the enclosure, though what many of these features are remains unclear. In contrast, the de Morgan (1897, 11) plan presents less internal detail of the enclosure, concentrating more on the location and layout of the subterranean chambers. He shows the barest outline of a

gateway in the northern wall, and does not show the enclosure walls spanning the escarpment. The northern gateway was reconstructed after the Rhoné (1877, 216) plan. The pronaos front is hypothetical, as from the plans it is unclear what this structure is. This external feature may represent a pylon. However, Arnold (1999, 111) comments that a Hathor-Isis temple was located somewhere at the north side of the Serapeum complex which may have been attributed to Nectanebo I, and so the entrance was conjecturally reconstructed after the pronaos of Nectanebo I at Hermopolis magna (Arnold 1999, 112).

The total area encapsulated by the enclosure differs between the plans of Mariette/Rhoné (Area = 104427m², Perimeter = 1337m) and de Morgan (Area = 75110 m², Perimeter = 1129m) which presents a substantial variance. This was somewhat problematic as there is little to no visible extant evidence of the structure at surface level. However, it was decided that the Mariette/Rhoné plan would be used to inform the digital model owing to the inclusion of the plan of the central temple and the location of the north gateway, which, when examined against satellite photography, matched a visible mound at surface level. When the plan was georeferenced in the GIS, the enclosure wall to the west did not cross the western escarpment, rather it respected the alignment and was located adjacent to its lower slopes.

The internal structures of the Serapeum Precinct, presented on the historical plans, have been excluded from the landscape model due to their uncertain character. An example being the probable column-lined structure to the south-east of the main temple area. It is entirely unclear how this structure was constructed in relation to the escarpment that it is shown overlying on the plan. Additionally, the features to the south of the central temple are equally unclear as to whether they represent surface or subsurface constructions. Modelling and realising these structures within the digital representation may be of future use in understanding their potential purpose and form, and could indeed be achieved as part of a continuation of the project. Features representing settlement activity have been added to the model to show possible locations of occupation within the enclosure.

The Serapeum dromos plan follows Kessler (1989, Abb.5) which is a reproduction of a Mariette plan of the area. The main difficulty encountered with this plan was in its correspondence with the route of the Serapeum way (as defined by the SGSP survey data, see above) and the plan of the Serapeum enclosure. Some minor restructuring was required to the western end of the Serapeum Way (which is not depicted in the SGSP data) and the western extent of the dromos where it meets the Serapeum enclosure to make the three plans align. This involved a slight shortening of the dromos pathway to allow a fit with the enclosure eastern gateway and affecting a tighter curve in the southwards turn of the Serapeum Way than is displayed on the historical plans, to allow it to join the dromos at the location of the hemicycle. The structure model of the East Temple of Nectanebo II was constructed based on its ground plan and stylised after other temples of the same period (see Arnold 1999). The only extant feature of the dromos visible at surface level that appears on the plan is the Hemicycle of Poets and Philosophers. This was used to align the plan to a satellite image and real-world coordinates.

Probable Late Period temples located to the north and south of the Serapeum enclosure

The extensive geophysical work undertaken by the SGSP has expanded the upper-subsurface knowledge of the necropolis. The temple platforms identified through GPR survey and later examined through excavation have been characterised as dating from the Late Period to the mid-Ptolemaic period (Mathieson and Dittmer 2007, 87). Their proximity and relationship to the Serapeum enclosure required examination. Therefore, despite the scarcity of upstanding archaeological remains, beyond that of the brick-built platforms comprising lower masonry courses, it was decided that digital models fitting the architectural temple styles of the period would be constructed for inclusion. The structure modelling was informed by Arnold (1999) and Martin's (1981, 18) suggestion of possible peripteral shrines atop the platforms of the Southern Dependencies.

Pathways to and from the structures were omitted due to a lack of evidence (in their favour). However, it can be assumed that routes leading to and from the monuments did indeed exist, though what form they took is open to debate. Analysis of the GPR data appears to suggest archaeological remains of mud-brick platforms and possible

enclosures surrounding structures. This has been represented in the digital model, where a combination of these features is depicted. The representation of the northern and southern remains is speculative and open for debate. The features respect the alignment of the Serapeum Enclosure and therefore are likely related to its use. How they relate to the function of the Serapeum requires further investigation informed by archaeological excavation.

The structures located to the north of the Serapeum precinct are aligned roughly perpendicular to the route of the wadi road, and are approximately 200m to the north of the Serapeum enclosure North Gate. The SGSP GPR data appears to depict an opening roughly central within the alignment of structures (Figure 5.9). In a discussion with Harry Smith and Sue Davies it was considered that this potentially empty space probably represented an accessible route towards the Serapeum North Gate, which would facilitate transit from the wadi road. The potential of the GPR data to be a structure is depicted in the GIS, however, the probable empty space is reflected in the digital landscape model, where a structure is omitted at this location.

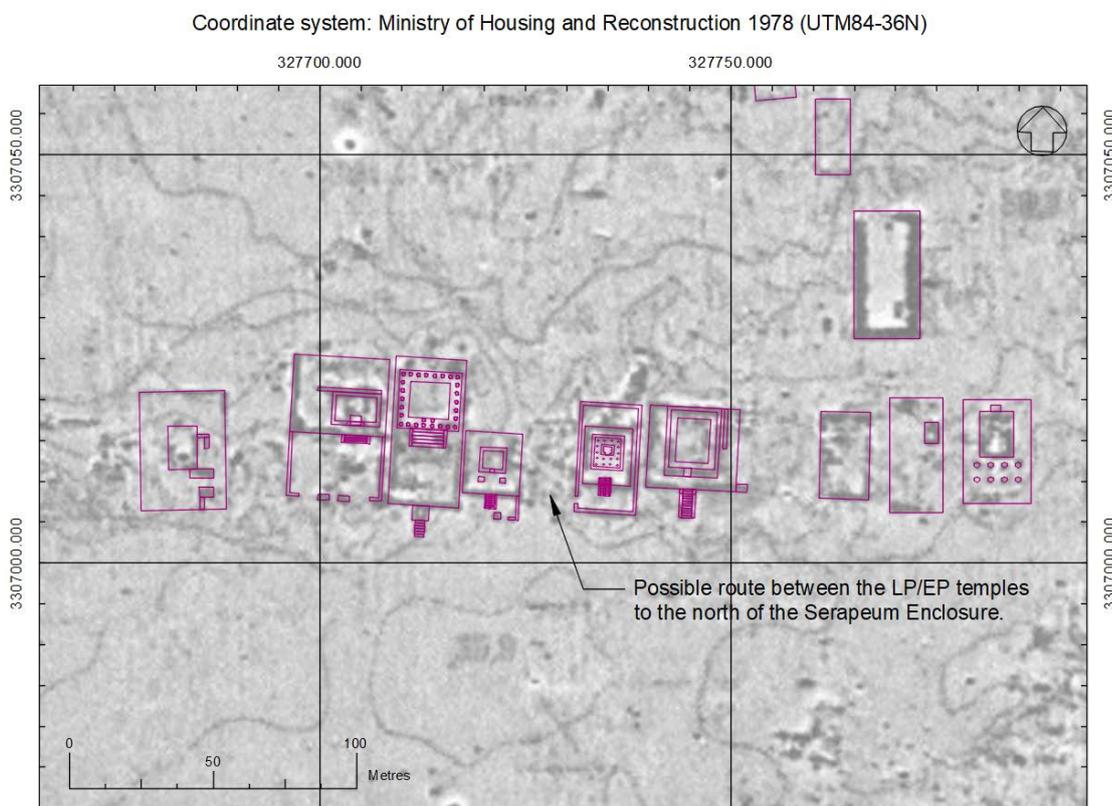


Figure 5.9. Interpretation of the structures to the north of the Serapeum Precinct, based on SGSP GPR data (Mathieson and Dittmer 2007) (source author).

Lakes

The two areas of water included in the landscape model represent a small lake situated by the Unas Valley Temple, and the larger Lake of Pharaoh by Abusir, beyond the north of the necropolis. The dimensions and locations of the lakes follow Earl (2011), whose work suggests that the smaller lake of the Unas Valley Temple was likely to have been seasonally inundated during the LP/EP (Earl 2011, 87). During this time, the Lake of Pharaoh may have been a semi-permanent lake which would divide into smaller pools and marshy areas through evaporation. It is possible that the water levels may have been supplemented through irrigation to create a constant supply throughout the year. Both the Unas Valley lake and the Lake of Pharaoh have been represented in the digital model at their greatest extents for the LP/EP. Whilst it is unclear what type of vegetation may have surrounded the lakes, small shrub and tree assets have been added to soften the lake edges and provide a more credible experience of how the lakeside area may have appeared.

Sacred Animal Necropolis (SAN) main temple enclosure (MTE)

Systematic excavation has been undertaken at the site of the Sacred Animal Necropolis over many years by Emery (1965–67; 1969–71) and, later, Smith (Smith 1976; Smith and Jeffreys 1977; Smith *et al.* 2006) and Davies (Davies 1998; 2006; Davies and Smith 2005), Martin (1973; 1974; 1981), Nicholson (1994), and Nicholson *et al.* (2013; 2015). The publications of Smith and Davies present detailed excavation plans and reconstructions of the main temple enclosure and additional features. Surveyed and drawn by (the late) Ken Frazer, these plans provide an extremely detailed record of the structures as excavated and were used to inform the construction of the digital structure models. Additionally, detailed discussion with Harry Smith, Sue Davies and Dorothy Thompson afforded further nuanced details of the structures and their location within the greater landscape. Smith has viewed and critiqued the digital models based on Frazer's reconstructions, which assisted in creating a credible representation of the monuments.

The MTE was constructed over several phases. Whilst each phase has been digitally reconstructed following Smith *et al.* (2006), it is Phase III (Smith *et al.* 2006, Fig.3) that is

depicted in the landscape model. This phase of use represents a completion of the temple enclosure during the LP/EP, prior to its later reuse by a Christian community whose village was built within its walls (Smith *et al.* 2006, 19–20). Understanding the construction of the earlier phases was critical for the completion of the Phase III representation and additionally for investigation into the location choice of the temple builders. The reproduction of the early phases may provide future opportunities for regressive examination of the sacred complex. Certain details within the temple enclosure, such as ramps, stairways, and smaller chapels, have been omitted from the model due to time constraints. Decisions of this nature were informed by project development limitations imposed by time considerations.

The Northern Enclosure of the temple complex may have once been occupied by a sanctuary or small temple structure. This was suggested by archaeological evidence. However, reconstructing the location and superstructure of this feature would be speculation. Whilst speculative temples based on LP/EP styles have been used elsewhere in the model, such an approach was considered of little benefit in this case. The sanctuary, being situated within the walls of the enclosure, may not have been visible from the outside of the complex, and its inclusion would have added little information to the overall investigation.

Southern Dependencies of the SAN

Excavations of the Southern Dependencies of the SAN main temple complex, published by Martin (1981), provided detailed ground plans of the archaeological features. There were insufficient remnants beyond the foundations and lower masonry courses to suggest the upper form of the structures. Where the location of temple platforms has been postulated, albeit without *in situ* temple remains, digital temple models appropriate to the style of LP/EP architecture have been applied.¹¹ This has allowed for a more credible visual impression of this area to be created, rather than omitting the postulated features and leaving empty space. The ability to include these types of

¹¹ The temple models have been reused from the group of possible temples and shrines that are situated to the northern and southern sides of the Serapeum.

monument, which although conjectural, are probable, helps to characterise the proposed use of the area in relation to the main temple complex to the north.

Archaeological investigation determined that the terrain was partly terraced to facilitate the construction of the buildings (Martin 1981, 21) and that the platforms were constructed directly onto the wind-blown sand to create a level mud-brick box (Martin 1981, 17). The digital terrain based on the modern mapping did not reflect this, rather it comprised sandy mounds at this location. These mounds may be the spoil tips from the archaeological interventions, which are prevalent across the necropolis (see below). The terrain was adjusted where necessary to afford the structures a more credible elevation.

North and South Ibis gardens

The North and South Ibis catacombs both feature external garden or forecourt areas. These areas comprise pathways, boundary walls and other structures, in addition to the entrance to the subterranean catacombs. Archaeological investigation has proven that the gardens were landscaped with trees and/or bushes (Nicholson in preparation, North Ibis plan) and this feature has been depicted in the model through the inclusion digital assets representing small trees. Whilst the digital trees may not be the correct variety as found during excavation, they serve to present an image of how the gardens may have appeared with vegetation.

The North Ibis catacomb is carved into a promontory of bedrock and its main access is gained via a small plateau part-way up the promontory's escarpment. The terrain of this area required contour grading to facilitate the installation of the garden model, which would otherwise have been lost beneath the surface. Grading was kept to a minimum to reduce creating a false representation of the space. A minor amount of terrain grading was required around the South Ibis garden to flatten the surface within the boundary walls and remove the overburden of sand.

North-South Sacred Way

Exiting the southern gate of the SAN MTE is a section of pathway known as the North-South Sacred Way. The extent of the path to the south remains unknown. However, it is apposite to consider the possibility that the path may have extended as far as the Serapeum Way leading to the Serapeum Dromos and Precinct. A projection of this pathway to the Serapeum Way has not been included in the digital landscape model, but could be considered for future inclusion.

'Wadi Valley Road' village

The SGSP survey data depicts a density of archaeological remains in the wadi valley towards the northern end of the necropolis, immediately opposite the SAN MTE. It is within this area that Smith (1974, 69–70) suggests that the houses and workshops of embalmers and other trade-persons may have been located. The data depicted by the SGSP survey clearly shows some larger structures surrounded by smaller, more indeterminate, features, which may or may not represent such a settlement. Some of the features could be mastaba tombs, they depict the correct size and shape for such a structure. However, this possibility does not provide an answer for all the features. Using only the SGSP data that represented credible structures, a small village was constructed to represent the possibility of settlement at this location. This village, whilst based on GPR sub-surface data, is speculative and open to debate.

Map contour amendments

It was necessary to amend the map contours of the MHR1978 map that comprise the TIN surface and so a brief review is appropriate. The contours presented on the MHR1978 maps represent the land surface during the period of the late 1970s when the map was created from aerial photography. This means that both modern structures and large mounds of archaeological spoil debris, which often obscure areas of the necropolis, are indicated on the map through contours representing topography. Although the spoil mounds are now a part of the archaeological record they are a complication which obfuscates the surface beneath. The aims of this study required that they were removed by digital process.

Using early aerial photography (where available) (see Chapter 3) to understand the topography prior to the overburden of the archaeological spoil, it was possible to adjust the contour data to resemble the land-surface as it may once have appeared (or indeed did appear where the aerial photos were used).¹² This was an important task in the construction of the landscape model. The modern spoil mounds are not insubstantial features, obscuring both the ground-surface beneath them and, visibility across the plateau. Both undesirable impediments may have led to incorrect hypotheses or theories regarding the monuments and landscape use if not considered and remedied. Where aerial photography was not available, or did not show the ground-surface prior to the addition of the archaeological spoil mounds, a considered approach was adopted, whereby the surrounding terrain was studied and a sympathetic interpolation between the adjoining areas created. In practice, this method relies on educated guesses, which, in the absence of a more scientific solution, was the only feasible approach that would yield credible results.

Summary

This chapter has discussed the decision making applied in the construction of the terrain and structure models that comprise the digital landscape model of North Saqqara. Decisions made during construction have been examined and justified. This approach is intended to provide researchers with an understanding of the process that led to the current build of the 3D landscape model. This ensures that each aspect of the model is based on accountable and researchable data, and each decision during the process is documented and transparent. The next chapter considers the physical landscape of the Memphite necropolis.

¹² ESRI's ArcGIS was used to remove the unwanted contour data (see Appendix 5).

CHAPTER 6

The Memphite necropolis

Introduction

From the early years of the 19th century onwards, the Memphite necropolis of Saqqara became a focus of archaeological investigation, which led to the site now being one of the most visited archaeological areas in Egypt (Bresciani 2003, 61) with thousands of tourists arriving at Saqqara every year. Access to the necropolis is controlled by security guards of the Ministry of State for Antiquities (formerly the Supreme Council for Antiquities) and strict routes of movement are in place that guide the visitor to certain permitted groups of tombs (Bresciani 2003, 61). Scattered across the plateau are small huts where the *gafirs*, often local men, watch over the monuments. This network of surveillance and management is intended to restrict access to many areas of the expansive site and creates a dictated experience for the visiting tourist and working archaeologist alike. Prior to the beginning of modern archaeological activity at the site the necropolis was visited by early travellers (Baber 2016) who were most often escorted by local *fellahin*, who acted as guides and souvenir vendors.

But what of the necropolis during the ancient past, and specifically the LP/EP era? When considering the potential living population of the necropolis several questions arise:

- Who was allowed into the necropolis?
- Was access limited to the officials of the cults, or were the general populace permitted?
- Were people permitted to go anywhere without constraint or were their movements controlled by the authorities, just as they are today?
- When was access permissible?

- Was access time-restricted, i.e. only during festival days?
- Were there settlements in the necropolis and if so, where were they?

To comprehend how the necropolis was used and by whom, these questions required consideration. This knowledge may then assist in elucidating an understanding of how the monuments and landscape were exploited.

The ancient necropolis of Memphis

It requires mention here that the name by which the Memphite necropolis of Saqqara was known during the Late Period was *ʿnh-t3wy* (‘Ankhtawy’), and within the northern extent of *ʿnh-t3wy* were the locations of *Pr-Wsir-Ḥp* (the Serapeum) and *Ḥp-nb.s* (Hepnēbes) (Davies 2006, 3; Ray 1976, 146–7; Thompson 2012, 24). Each of these localities comprised smaller regions, often known through surviving texts (e.g. Ray 1976), though it is not always clear as to their exact location (Figure 6.1).

The title Serapeum, as we have come to understand it today, is synonymous with the hypogea of the Apis bulls, but the Late Period/Ptolemaic use was more complicated. Indeed, *Pr-Wsir-Ḥp* was a name that encapsulated the area of the Apis burials, enclosure, temple and dromos, probably the ceremonial Serapeum Way and that of the landscape to the north where another sacred way led to and from *Ḥp-nb.s* (Davies 2006, 3). The associated locality of *Ḥp-nb.s* appears to define the area north of the Serapeum Precinct, and it is here that the burials of the Mother of Apis and the other cult temples and interments of the SAN are located (Ray 1976, 148). The application of *Ḥp-nb.s* during the Late Period may have been interchangeable with that of *Pr-Wsir-Ḥp* or simply used to differentiate the location of the northern animal galleries from that of the Apis burials. However, the title *Pr-wʿb-nb.s* is also applied to the region of *Ḥp-nb.s* (Ray 1976, 148; Thompson 2012, 27), but appears to specifically relate to the temples and galleries of the Ibis and Hawks and may only signify a local designation (Ray 1976, 148–9).¹

¹ For a comprehensive map of place names and their locations within the necropolis see Ray (1976, 152 Fig.3).

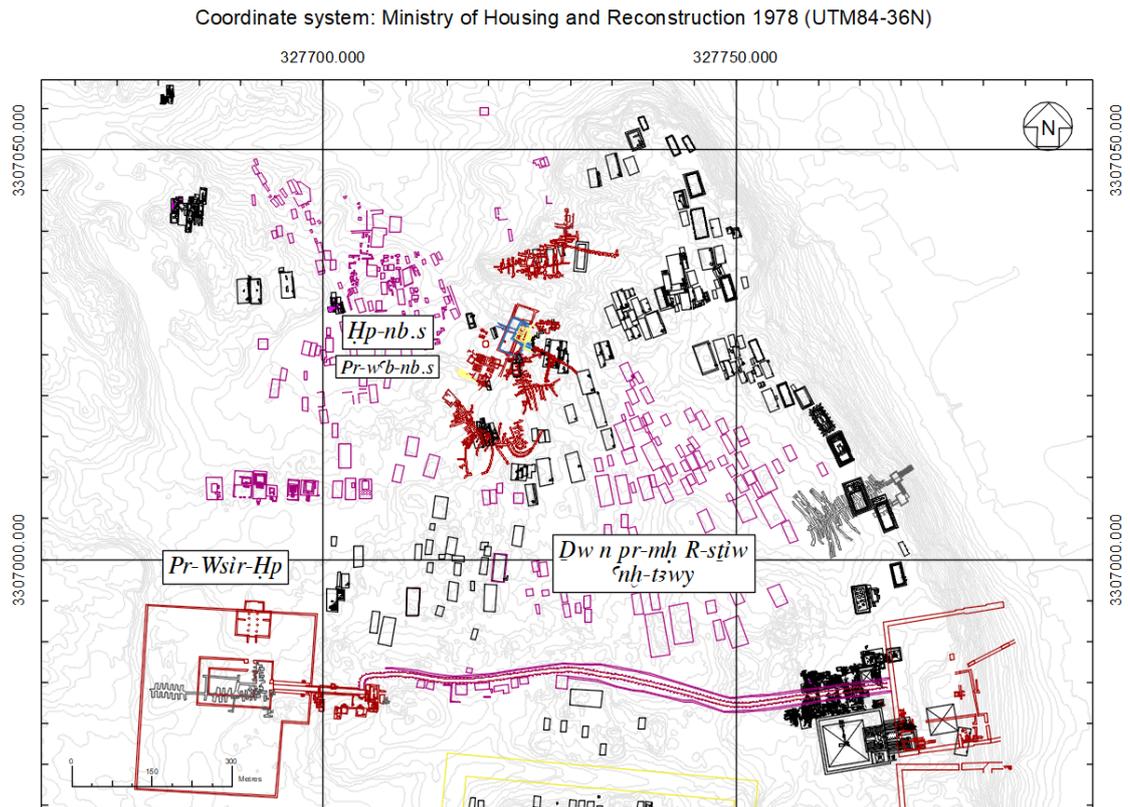


Figure 6.1. Locations of the ancient place-names of the Memphite necropolis at North Saqqara (source author).

For clarity, Serapeum Precinct will be used to define the wider area of the Apis burials, including the dromos, enclosure, north gate and temples. The Serapeum Way will refer to the ceremonial processional way leading west from the lower terraces of the valley, up through the Anubieion towards the Serapeum. The area of Hepnēbes to the north of the Serapeum Precinct will be referred to by the modern title of the Sacred Animal Necropolis (abbreviated to SAN), and this includes the main temple enclosure and subterranean catacombs of the Mothers of Apis, Hawks, Baboons, the North and South Ibis gardens and catacombs, and the Southern Dependencies. The ‘Lake of Pharaoh’ relates to the now dry lake or pool of Abusir (Ray 1976, 134), the vestiges of which are visible on satellite photography of the area.

Life at the necropolis

A limited number of contemporary accounts of life at the necropolis have survived (see Legras 2011; Martin 2009; Ray 1976; Thompson 2012, Chapter 7). The accounts date to the early Ptolemaic Period, and it is likely that conditions were similar during the Late

Period also. They generally describe the circumstances and tribulations of a few Memphite *katoché* during the Ptolemaic period.² These *enkatachoi* are sequestered within limits, often the temple boundaries and, in some circumstances, are restricted to their *pastophorion* or cells. Some individuals participate in temple community activities and industries, such as the procurement of food and water, for which they are financially remunerated. They are often fiscally supported by relatives residing away from the temples (Thompson 2012, 207), and Ray (2001, 131) suggests that some may have been given license to beg. Certain states of *katoché* permitted the *enkatachoi* to leave their cells and access the wider temple areas and beyond. For example, those who collected the water required by the community each day would have recourse to venture down to the valley below to the canal or lake. The economic status of the *enkatachos* may also suggest that those supporting them with endowments may have visited, or at least passed contributions to those who were permitted entrance to the temples.

The surviving accounts portray a cramped community environment within the precincts of the Serapeum (Ray 2001, 136), active with commerce, administration and interaction with people from outside of the temple districts (Thompson 2012, 204). This was a busy temple-town, where professional dream interpreters offered their services to visitors and inhabitants alike. Some appear to have been associated with specific temples whilst others were private practitioners (Ray 1976, 135). The Serapeum was established as a destination for those who sought this service, for which there must have been a promising demand. Despite the framework of constraints within this enclosed environment, merchants, workmen and visitors, comprising a transient population, were probably able to move in and out of the Serapeum.

The Anubieion is also known to have been an important centre for administration and commerce, where a sizeable population would have lived and worked (Thompson 2012, 23). Here too, in this active and dynamic temple-town, dream interpreters offered their services. The Bes chambers situated along the southern wall of the Anubieion, that

² The term *Katoché* describes a detention within the boundaries of a shrine or temple and relates to individuals indentured therein, either through choice or obligation.

Quibell speculated were ἀφροδίσια from their abundance of phallic figurines (Quibell 1907, 12–14), likely drew visitors for purposes that Thompson conjectures may have related to prostitution and female dowry (Thompson 2012, 22). These temple-towns were the places where workers of the cults of the necropolis most likely inhabited and from where they conducted their business. It is likely that it was through these settlements that visitors to the necropolis would have passed, sampling merchandise and purchasing votives as offerings to the gods.

During the later Late Period into early Ptolemaic times, the popularity of the animal cults was at its highest (Nicholson 2005, 49), and it is most likely during the festival days of the cults that many pilgrims and visitors would have entered the necropolis for feasts, procession, worship and offering. Several caches of votive depositions are known from the area of the SAN (Nicholson and Smith 1996), deposited as offerings for the gods. These votive items were purchased and donated by the pious who wished to receive oracles or favours from their gods (Gosling *et al.* 2004), and their use provides examples of the trade and manufacture of such objects, possibly from merchants and workshops in the near vicinity. It is tempting to suggest that the congestion of data visible on the SGSP geophysical survey (Figure 6.2) situated along the Abusir wadi may represent such workshops that follow the route southward into the necropolis (see below). Pilgrims who may have journeyed south along the wadi could have passed through a dense market where the sale of religious paraphernalia was abundant. For it is from that location that Ray suggests that visitors from Memphis may have entered the necropolis and travelled southward, past the great temples of the animal cults towards the Serapeum itself (Ray 1972, 702).

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

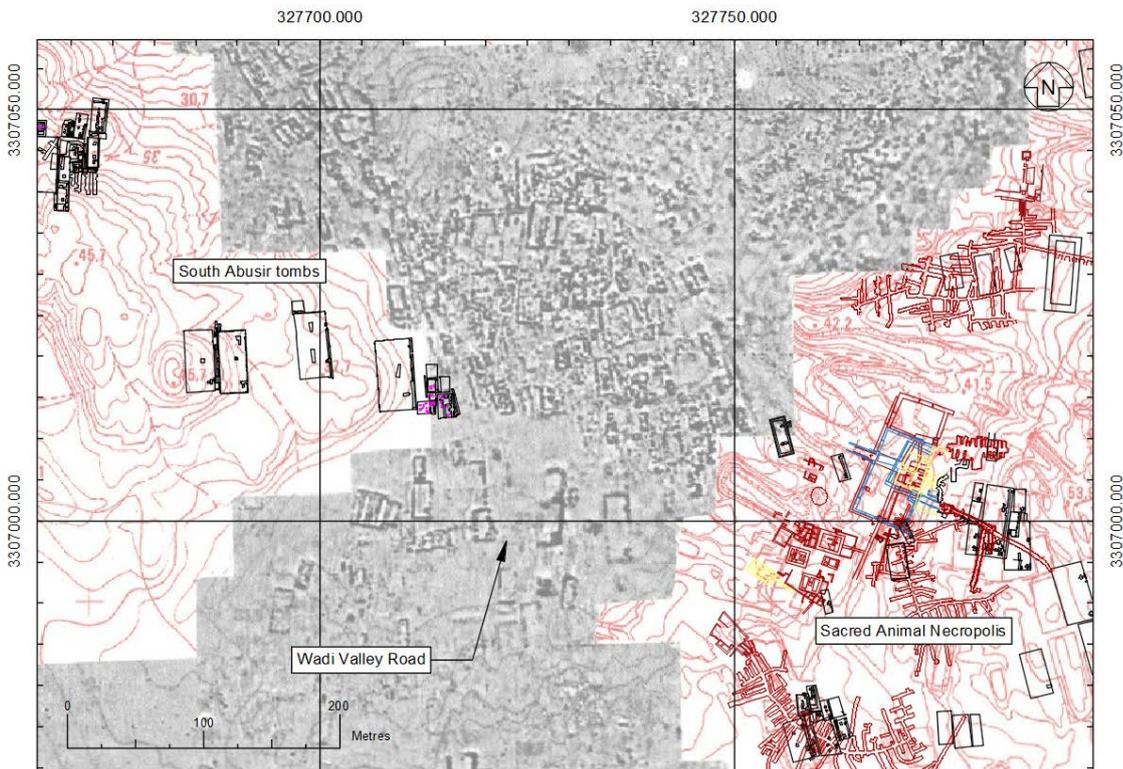


Figure 6.2. The Wadi Valley Road at the northern end of the necropolis. Structure plans are overlaid on the MHR1978 map and SGSP survey data (Mathieson and Dittmer 2007) (source author).

Networks of movement

In the past, as now, several pathways provided means to enter and negotiate the necropolis (Thompson 2012, 18), and it is probable that these were used by both officials of the cults and visitors alike. Despite much of the necropolis terrain being predominantly shifting sand interspersed with discreet areas of bedrock, paths of movement appear to endure. Reich (1933, 14) considers two main routes that would convey people from Memphis to the necropolis. The first route he discusses appears to correspond to the location of the modern motor road into the necropolis which probably follows an ancient pathway (Thompson 2012, 18) originally leading to the south Bubastieion gateway. Dodson's (2016, 3) argument against this as an ancient route into the necropolis does not preclude this as being the case. For whilst he suggests that the modern road lies atop a build-up of debris accumulated over the centuries and therefore is not the ancient route, this situation is not without parallel elsewhere in archaeology, and does not discount the modern route from following an

ancient one.³ Repetition of use imprints and embeds networks of movement into the landscape. Thus, an entangled relationship between path and traveller becomes manifest on the terrain as a symbol of movement within the landscape and perpetuates its use. Discontinued use, and the manifestation becomes attenuated by nature through erosion and concealment by sand. However, it is possible that vestiges of embedded pathways leave indicators of their existence etched into the terrain surface.⁴

The principle ancient route into the necropolis was along the wide wadi valley which extends southwards from the direction of *Pr-**W**sir* (modern Abusir) (Bárta and Vachala 2001; Dodson 2016; Malek 1997, 92; Reader 2004). The ancient name of this wadi is unknown, and Dodson suggests that the use of this route as a formal processional way may date back as early as the 2nd Dynasty, initially providing a route to the subterranean tombs of Hetepsekhemwy and Ninetjer (Dodson 2016, 8). From the Late Period at least, the great sarcophagi of the Apis bulls were transported south along this route to the Serapeum Enclosure and their final resting place in the subterranean catacombs beneath its temple (Smith 1981, 338). The suggestion by Smith (1981, 338), that transport of the sarcophagi by water via the Lake of Pharaoh⁵ was the obvious route during the inundation season, would appear sensible. It is uncertain if the lake connected to the Phchêt canal which itself would have become a lake during inundation. Although, the canal appears to have been a boundary to be crossed to get to the necropolis, rather than a means of conveyance to it (Thompson 201, 8).

If one visits the site now it is possible, though not always permissible, to access the plateau from the lower terraces where the Antiquities villas are located, via a steep compacted pathway running obliquely up the escarpment, just north of the extant

³ An example from the author's own work in professional archaeology in Great Britain can provide clarity here. Whilst excavating a pipeline for a new housing estate, the following stratigraphy was encountered: a modern road surface, laid and re-laid over many years to a depth of approximately 0.5m, beneath was a paved medieval turnpike surface which overlaid an accumulation of soil and debris to a depth of approximately 0.8m, beneath this accumulation was a metalled Roman road, complete with wheel ruts. The span of time between the abandonment of the Roman road, leading to the accumulation of soil, to the reinstatement of the modern road is beyond 1500 years and shows that networks of movement endure over time (Williams 2014).

⁴ See Chapter 9 for a discussion on the possible pathway from the Anubieion north wall leading to the Dog Catacombs to the north.

⁵ See Cílek *et al.* 2014; Earl 2011.

exposed Anubieion ruins. This path is used daily by local workers and leads from the modern guard station in the Antiquities service compound up to the ramshackle *Qufti* village perched on the edge of the escarpment. The sand has become extremely compacted with pebbles and detritus to create a stable route that is often firm underfoot, and the path is located spatially close to the route of the Serapeum Way through the Anubieion (Figure 6.3). It may be that this transit route has been in use for millennia and has shifted slightly during that time. The sands are fluid and where they have not been trodden down or compacted they offer a changeable surface upon which to move. This often makes for difficult and tiring transit. Established paths provide easier movement around the necropolis, whereby people and goods can pass between the monuments unhindered, and these networks of movement retain favourable use because of this.

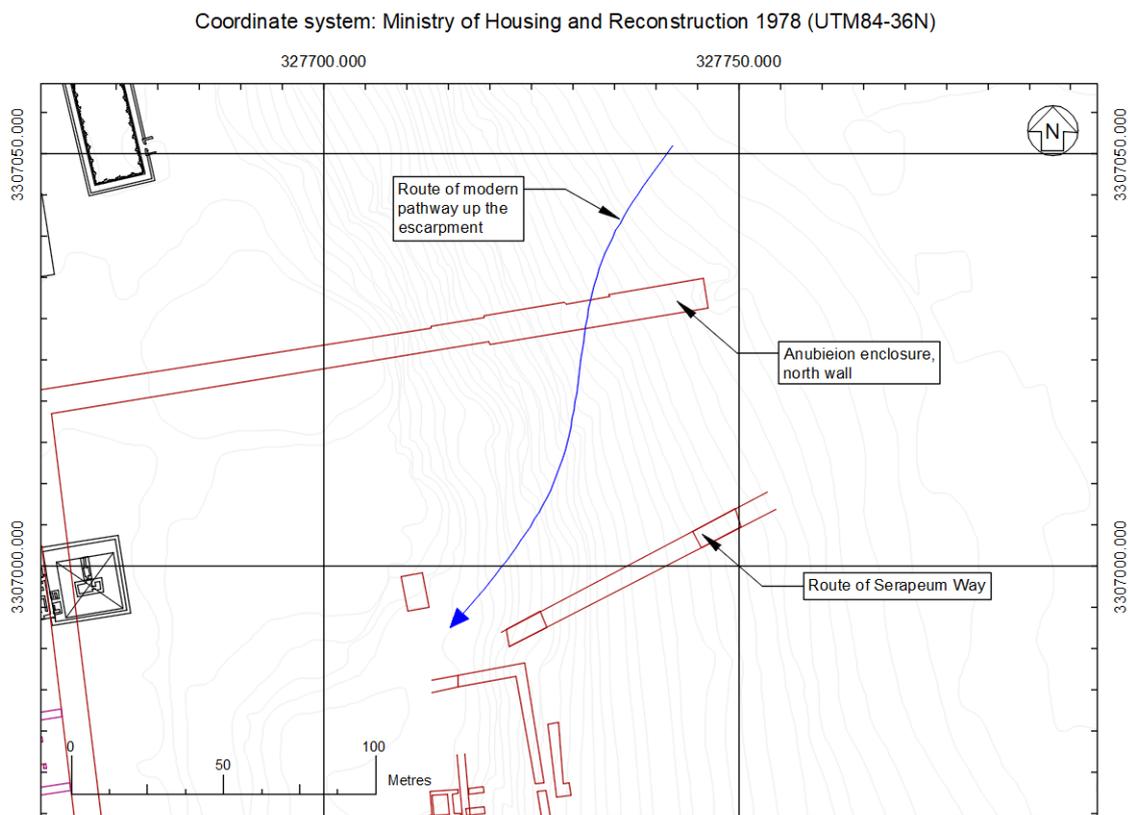


Figure 6.3. The modern route up the escarpment, indicated by the blue arrow (source author).

Sight-seeing tourists?

Visitors graffiti dating mainly to the 18th and 19th Dynasties are known from the complex of Djoser and the tomb of Horemheb (Navrátilová 2007, 65) at North Saqqara. The

graffiti, often etched into the stone of the monuments, appears to have been made predominantly by scribes for their own purposes, also perhaps on occasion for visitors accompanying them. The tradition of graffiti in the Djoser complex continued through into the Late Period, where examples are known from up to, and including, the 26th Dynasty. This accords well with the renewed interest and general archaism of this period with the earlier dynasties (Stammers 2009, 83–88) and the Saite opening and restoration of the tunnels beneath the Step Pyramid (Stammers 2009, 15). Although the date of the graffiti in Horemheb's tomb it is unclear, it does suggest that visitors had access to certain tombs. Navrátilová (2007, 133) notes that it is difficult to determine whether the scribes who wrote on Horemheb's tomb were on a leisure walk through the necropolis or there on official business, but the use of certain terminology may suggest that they were out walking and amusing themselves. A certain formula of New Kingdom visitors' graffiti has been assigned the nomenclature *The stroll*, in that it appears to demonstrate a visit of a casual character, rather than that of a pious pilgrimage and may have been connected to sightseeing and tourism.

Based on the interpretation of these formulae, the probability that the wider necropolis was accessible to visitors is credible, with the graffiti evidence implying it was a destination visited by people for touristic amusement. This does not preclude an element of controlled access to the funerary site, but it does appear to give the impression that in the ancient past, as now, the site generated interest not just for the pious pilgrim, but for sightseeing tourists who were able to negotiate the necropolis. That graffiti was being etched into the monuments may also suggest that visitors moved around the site without official supervision or oversight. That said, it is entirely possible when visiting the necropolis nowadays to either avoid the site guards and view proscribed areas unhindered (although this is not entirely advisable) or pay *bakhsheesh* to the guards to be given limited access, and this situation may have also occurred in the ancient past. The graffiti provides us with an insight into the 'tourist' destinations at the necropolis and allows us to surmise that parts of the funerary site were accessible for such an undertaking. In addition to visiting popular monuments, tourists will have also come to the necropolis to donate offerings to their gods or partake in religious festival days.

Spalinger (1998, 241–260) concludes that religious festivals were commonly closed to the general populace, taking place within the seclusion of the temples, away from general view. He contends that Pharaonic religion provided a less than inclusive approach to religious practices. However, Assman (1991, 108) makes a clear distinction between everyday cultic activity and the religious festival, characterising them as secret and public respectively. He remarks that the everyday cult is undertaken within the confines of the temple, strictly excluding the public to which it remains a mystery, but that it is through procession that the religious experience is made public and the cult activity is taken into the outside world. Through this latter activity, the general populace participates in religious life and would have gathered from afar for such events. Spalinger (1998, 241) concedes that during major annual festivals such as Opet, riverine journeys or processions would have been viewed by a broader audience. He also notes that for Assman, movement characterises these public cult celebrations, which contrasted against the secretive and static daily cult activity (Spalinger 1998, 244). Assman (1991, 110) declares that the requirements of the procession are principally determined by the processional way. That riverine journeys were publicly observable would seem probable, if only for the difficulty in policing the public along such a route. A public audience would have been improbable during daily cultic activities which occurred within the confines of the temples. It would have likely been during such mundane daily rituals that votive offerings and animal interments took place during the LP/EP at Saqqara, from which the public would have been excluded. However, wider public worship undoubtedly occurred, for it is unlikely that the animal cults would have attained such popularity without it, attested by the deposition of so many animals and offerings.

Spalinger (1998, 244) contends that even the unrestricted religious ceremonies remained exclusive and made no attempt to connect the general populace with the priesthood or high officialdom.⁶ The performance of procession, whilst crucial to the complete religious act, only represented part of the event, and his comments that these

⁶ He uses the example of Opet during the New Kingdom, but the point he makes is probably valid for LP/EP public ceremonies as well.

festivals sought to maintain segregation between viewers and participants are noted, and likely apply to processional events during the LP/EP at Memphis and its necropolis.

Performance of procession

The performance of procession would have engendered movement through the necropolis during religious festivals and attracted audiences (Assman 1991, 108) who may have lined the sacred ways. A small number of processional ways are known to have existed in the necropolis, with perhaps that of the Serapeum Way being the most well-known. The route began at the temple of Apis at Memphis, some 5km distant (Arnold 1999, 109), and approaching from the lower terraces of the Nile valley, traversed up the escarpment through the precinct of the Anubieion, continuing west to the Serapeum Precinct and the hypogea of the Apis bulls. The paved route was flanked either side by mud-brick walls (Reich 1933, 37) to hold back the sand and lined with sphinx statues sitting atop plinths (Mariette 1882).⁷ At its apogee, this sacred route would have been a remarkable sight.

After death, the mummified Apis bull was transported from the embalming house at Memphis along this route, and through various stages, to its final resting place within the necropolis. This journey was accompanied by considerable performance (Thompson 2012, 186) and crowds of observers participating in this national event (Thompson 2012, 188). If the audience was permitted to view the procession along the latter extent of its route, i.e. towards the western end near the Serapeum Precinct, then the topography of the site would lend itself to favourable viewing conditions. The terrain either side of the route along this section is dense with early *mastabas* (Figure 6.4), which, although probably badly denuded and (partially) buried by this time, would have provided possible viewing platforms, either as the remnants of the mud-brick structures themselves or from the sand piled atop them. This situation persists to this day, where conspicuous mounds of sand with eroded mud-brick protruding through attest to the hidden structures beneath.

⁷ Mariette's (1856, PL.II) plan depicts at least 162 sphinxes flanking the Serapeum Way beyond the Anubieion.



Figure 6.4. Decaying mastaba tombs situated alongside the Serapeum Way, seen here protruding from the overburden of sand (to the left and right of the image) (photo author).

Another two known processional ways at Saqqara are those of Anubis and Shabaka. These ceremonial routes are known only from writing, their locations remaining open to interpretation. The Demotic papyri (P. Dem. Memphis) (Martin 2009) convey in rather vague terminology⁸ the Processional Way of Anubis as running “along the eastern side of a sepulchre (whose western side is the gebel [...]) and a tomb [...], the other three neighbours of which were tombs, and that these tombs were in the southern part of the necropolis” (Martin 2009, 48). Whilst the description is ambiguous and not very helpful in locating the ceremonial route, it does evidence a processional way that is very likely associated with the precinct of the Anubieion.

The tomb “whose western side is the gebel” may be that of Bakenrenef (Figure 6.5), a notable Late Period tomb in the desert escarpment towards the southern extent of North Saqqara. Smith (Martin 2009, 48 footnote 142) has suggested that the Processional Way of Anubis originated near the Ptah temple in Memphis and would have approached the Anubieion from the south, negotiating the escarpment along the route of the modern motor road, also suggested as an ancient pathway by Thompson (2012, 18), probably passing through the south gate of the Bubastieion precinct. It

⁸ This is Martin’s summarisation of the demotic text.

would appear then that the Processional Way of Anubis did not lead directly onto the plateau of the necropolis, rather, it traced the periphery of the escarpment towards the great Late Period temple precincts. The papyri do not discuss the use of this processional way, i.e. when and by whom, but that it granted access to the great terraced temple enclosures where many people worked and resided (Thompson 2012, 23) appears most likely. In addition to its use as a ceremonial routeway, it is possible that it provided a transit route from Memphis to the necropolis for those who were living and working there.

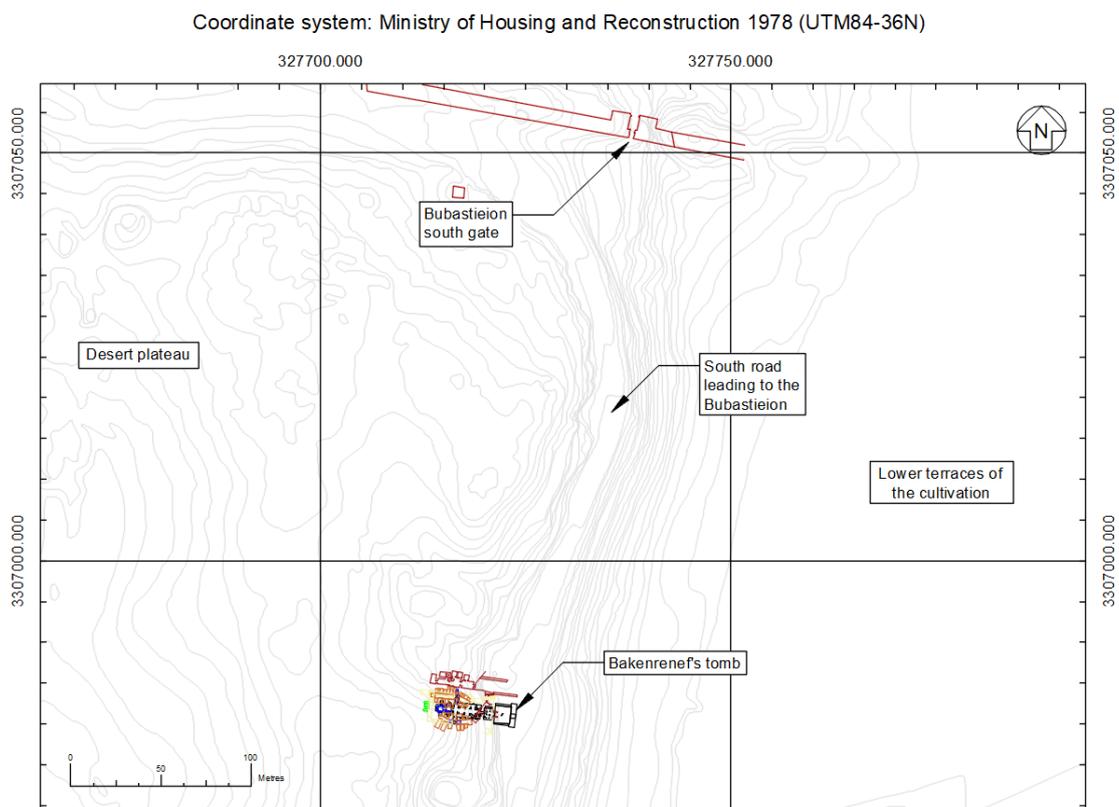


Figure 6.5. The tomb of Bakenrenef set into the desert escarpment. The modern motor road can be seen to the right of the tomb (source author).

The second processional way mentioned in the papyri is that of Pharaoh Shabaka. This processional route is known only from a single line in the papyri text, and little information is given. As with the Processional Way of Anubis, an abstruse description of the routes' location is offered, which Martin summarises as being "located in the southern part of the Memphite necropolis, to the east of a tomb whose northern and western neighbours are sepulchres" (Martin 2009, 50). None of the tomb names

recorded in the papyrus, that are spatially associated with the processional way, provide any clues to situate the route, as they are either not annotated on the historical maps (such as Lepsius, Mariette, or de Morgan) or, if they are, they have been marked with different names. What is certain is that the route threads its way between tombs and sepulchres, implying that it crosses the plateau within the boundaries of the necropolis. The course taken by the processional way may have been dictated by the same tombs that it wound between, but as there is currently no obvious way of locating the route, this suggestion remains speculation. No detail is provided regarding the use of this processional route, but its existence serves as evidence that officiated movement around the necropolis took place. The processional way facilitated access amongst the tombs and, it is likely, given the evidence examined previously, that audiences may have been in this surrounding area to observe the performances taking place.

Settlements of the necropolis

For the necropolis to be busy, dynamic and lively, as previously described, a substantial population either inhabiting and/or visiting would have been required. It is very likely given the evidence formerly considered that the living population of the funerary site was made up of both occasional visitors and (semi-)permanent residents, and the necropolis would have included defined areas of settlement. Whether these settlements were permanently or infrequently occupied is unclear. Those residing on the plateau within the necropolis would have likely comprised the people and their families occupied with the mortuary cults, not simply members of the general population, who were more likely to make up the category of visitors and pilgrims to the site.

The primary locations where settlement activity could be expected to be found are the enclosures of the Bubastieion and Anubieion, the Serapeum Precinct, and the greater area of the SAN. The wadi valley leading from the Lake of Pharaoh southward into the necropolis, may also have hosted an established settlement. There may well have been other minor settlements on the plateau, but currently there is no evidence of this. A situation that may well change over time with continued archaeological investigations at the site. The dwellings, guest houses, workshops and shops have often left limited

archaeological trace evidence, but that does not mean that we are unable to attempt to reunite the living of the necropolis with the funerary landscape.

Bubastieion

Limited information is available for the Bubastieion. Beyond the work of Jeffreys and Smith (1988) and Zivie (1983; 2009; 2013) little else is known about the archaeological remains. Thompson (2012, 19) remarks that the Bubastieion (*Pr-b3stt*) housed at least two, probably three, stone temples in addition to subsidiary shrines, dwellings for the priesthood and additional buildings. The Temple of the Peak was probably located within the great enclosure. This important monument to the falcon, hawk and ibis cults was administered by priestly scribes of the temple and men of the cults who oversaw the windows of appearance. Unfortunately, the area where the temple may have been located has been built over the by Antiquities service, leaving archaeological investigation currently impossible. The Asklepieion, a temple of great importance dedicated to the scribe and architect Imhotep, was located somewhere nearby, and buildings of the temple personnel and other Egyptians of many professions bordered the structure (Thompson 2012, 22).

Little is known archaeologically of these potential dwellings. Vestiges of mud-brick structures within the Bubastieion area can be seen along the lower terraces of the plateau. These denuded and heavily sanded features were excavated some time prior to 1925, although by whom remains unclear, and no report has been published (Jeffreys and Smith 1988, 78). The buildings appear to lie within the boundary of the great enclosure (Jeffreys and Smith 1988, Fig.1) and respect the general orientation of the temple-complex. Jeffreys and Smith (1988, 78) contend that these buildings were situated on terraces connected by stairs or ramps, and that the entire area of the lower enclosure may have been occupied by similar brick buildings on the same scale (Figure 6.6). They surmise that this may represent the domestic and administrative quarter of the temple. This would reflect the situation as recorded within the Anubieion temple complex situated to the north.

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

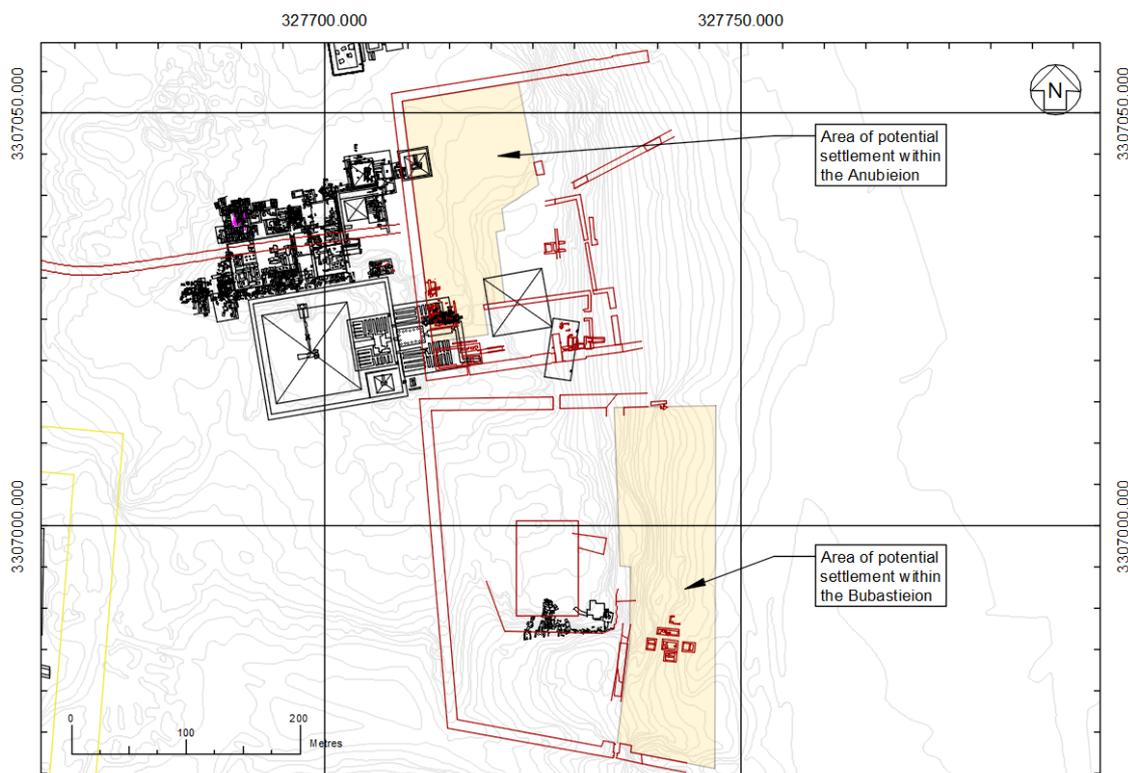


Figure 6.6. The temple enclosures of the Bubastieion and Anubieion. Potential settlement locations are marked in pale-yellow (source author).

The lower terrace of the Bubastieion encompasses an area measuring approximately 25,000m²,⁹ which if fully occupied would represent an extensive area of occupation along the edge of the escarpment. The occupation may have extended beyond the boundaries of the temple enclosure, with additional structures being located outside of the temple walls, similar perhaps to the pyramid towns of Kahun or Giza (see Snape 2014, 64–68 and 179–180) which developed beyond and away from the structures with which they were associated. This, however, is conjecture as no evidence is yet forthcoming.

Anubieion

Adjacent to the Bubastieion, situated beyond its northern boundary, lies the enclosure of the Anubieion. This substantial monument has benefitted from a greater extent of archaeological investigation than its neighbour to the south, and, as a result, more is

⁹ This area calculation assumes that the presumed eastern wall of the Bubastieion is roughly straight and continuous from the northern to southern enclosure walls. Without further excavation, this situation remains unclear (see Jeffreys and Smith 1988, 79).

known of the settlement within its boundary walls. Jeffreys and Smith (1988, 25) contend that the Anubieion settlement is a dependency of the temple complex due to its position between the main sanctuaries and the western boundary wall. Thompson (2012, 23) remarks that papyri evidence denotes the Anubieion complex as an important administrative centre where official documents were registered in the *grapheion*, and the *stratêgos*, the area governor, had a local representative based here. Additionally, a unit of police was stationed in the complex, which also housed a prison. The area comprised houses, storehouses and mills and was densely populated by people of various trades. Situated adjacent to the southern wall of the Anubieion enclosure were the enigmatic Bes chambers (Figure 6.7), excavated by Quibell in 1905 (1907, 12–14). These decorated chambers may have been connected to prostitution and/or dream interpretation (Thompson 2012, 22), and provide evidence of business being conducted within the temple-town, which must have attracted customers for these services.

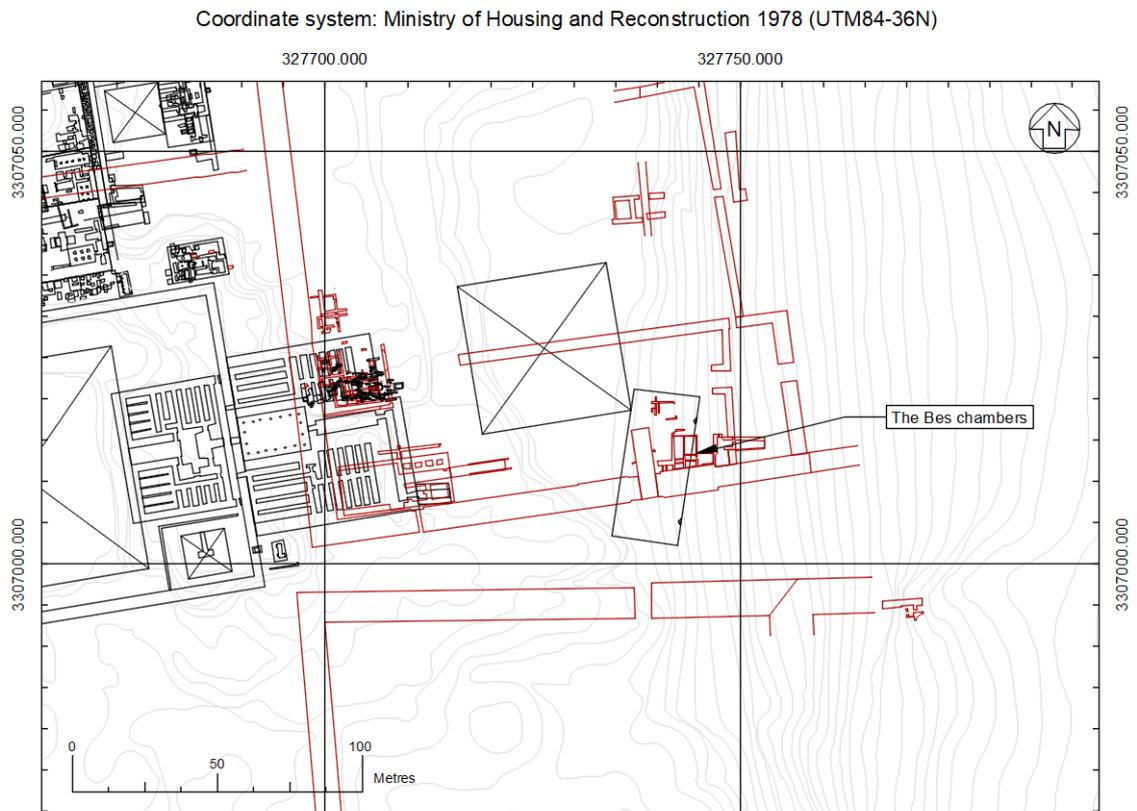


Figure 6.7. The location of the Bes chambers within the Anubieion complex (source author).

Archaeological excavation in the settlement area within the Anubieion has provided evidence of densely arranged shelters, storerooms, and domestic structures with kitchens, replete with food preparation areas, firepits, and subterranean storage cells (Jeffreys and Smith 1988, 26–27). Characterised during their early phases as rather transitory, the structures later stabilise and endure (Jeffreys and Smith 1988, 29). There is evidence that the settlement area may have been surrounded by a compound wall, although it remains unclear whether this extended along the southern length of the area due to poor preservation (Jeffreys and Smith 1988, 27). The building squares appear to have been laid out in a regular pattern which respected the alignment of the Anubieion complex in general. External access to the buildings was gained from small streets and internal rooms were accessed via through corridors. Open areas adjacent to, and in amongst, the structures were presumed to be for cattle tethering. Walled courtyards were interpreted to be for external domestic activities, such as food preparation and washing (Jeffreys and Smith 1988, 27). Amongst the domestic buildings were probable guest houses or hostels, suggested by long communal rooms whose rapid accumulation of floor layers concealed quantities of coins, perhaps made in payment or sequestered away and subsequently lost. Documentation supports the view that parts of the Anubieion complex were let over to hostelry giving rise to this interpretation (Jeffreys and Smith 1988, 29).

Over time the settlement solidified from a transitory foundation to a stable community of a reasonable size with densely arranged buildings set around a communal area adjoined by kitchens, storage and, farther out, residential properties and hostelries (Jeffreys and Smith 1988, 29). The area may have been delineated within the Anubieion complex by a boundary wall. The settlement was an active and dynamic place, where modifications and reconstructions were ongoing, leading to several different phases of use (Jeffreys and Smith 1988, 29–30) over time. Smith contends that this is a situation that endures in Egypt today, where houses are extended, part-demolished, reconstructed, partitioned and divided according to needs and considerations, which results in a network of streets, alleys and courtyards in-between contiguous blocks of structures built around and against one another. Whilst presenting an outwardly casual

appearance, he maintains that the whole was regulated by a legal framework of possession and mutual responsibility (Smith 1972, 707).

The interpretation of the archaeological evidence exemplifies a flourishing community occupying a crowded settlement of buildings situated within the greater Anubieion temple enclosure. A similar situation is likely to have been extant in the Bubastieion, where the structures discussed above appear in plan, at least, to be very like those of the Anubieion settlement. Further to the west at the Serapeum, similar structures have been recorded.

Serapeum

There is much documentary evidence (see Ray 1972; 1978, Thompson 2012) providing details of life in the greater precinct of the Serapeum, as discussed above. However, archaeological evidence for structures within the enclosure is limited and, where observed, poorly recorded. The excavations of the Serapeum and its dromos, carried out under Mariette in the mid-1800s, are not particularly well published, with little information available to aid understanding of all but the major features of the precinct. It is understood from Mariette's plan of the Serapeum dromos (Kessler 1989, Abb.5) that a structured layout of temples, shrines and buildings, for priests and presumably *katoché*, were constructed outside of the main enclosure. Unfortunately, Mariette's (1856, Pl.II) plan of the enclosure's internal features is lacking this type of detail.

That a busy settlement was situated here is almost certain, but how it was laid out or precisely where it was situated is more difficult to explicate (Figure 6.8). Excavation has provided some clues for the location of buildings which have been interpreted as either dwellings or guest-houses and most likely associated with the Serapeum. Smith describes a *katalumata* (Smith 1975, 421) excavated by Macramallah (1940, 77) situated in the location of the Serapeum.

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

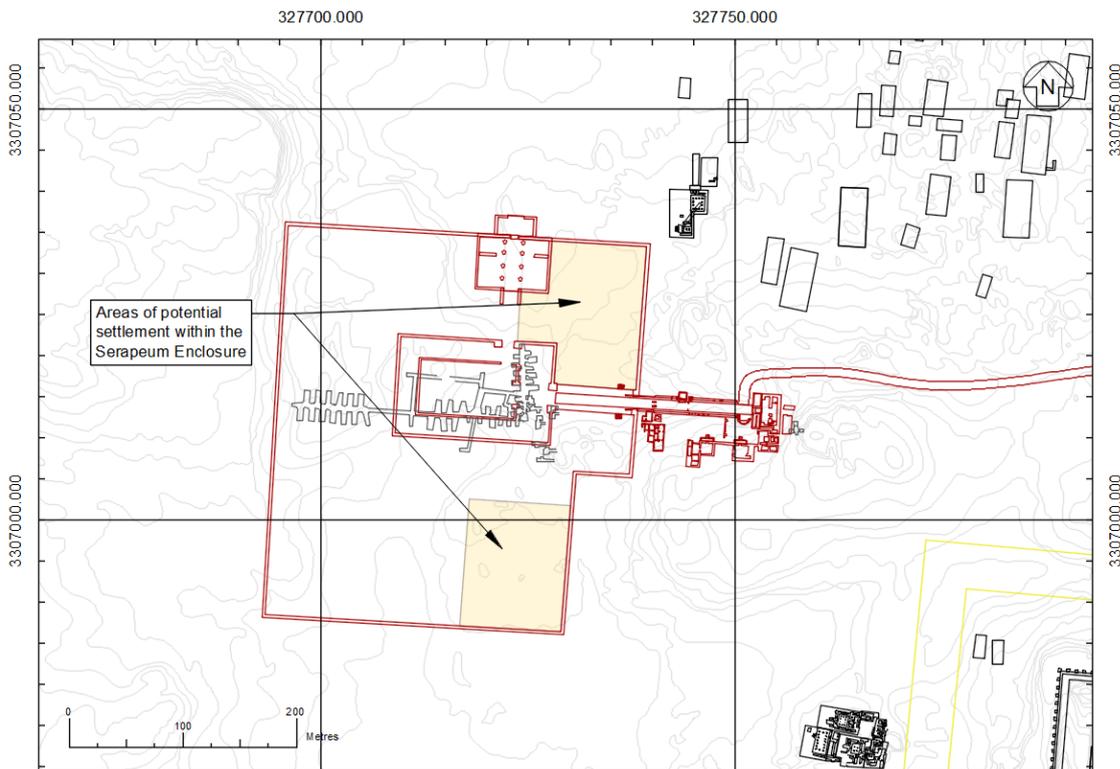


Figure 6.8. The Serapeum temple complex. Potential settlement locations are marked in yellow (source author).

The buildings, dating to the Late/Greco-Roman Period, are comparably constructed to those settlement structures already described within the Bubastieion and Anubieion temple complexes. They differ however in the building materials used, being constructed of limestone rather than the mud-brick of the eastern temple-settlements. The buildings comprise a collection of small rooms adjoining and abutting one another in a regular grid-like pattern. Additions to the main collection of rooms can be seen to the east and west of the structure. Macramallah (1940, 77) comments that some of the rooms have no visible exits, and that access to the structures, as far as was discernible, was attained from the south side, facing the Serapeum. A large chamber or possible corridor was recorded at the centre of the main building, and interpreted as a public or communal area like those described in the Anubieion settlement. Steps led from the passageway to the interior of the structures. Some of the internal spaces were interpreted as storerooms from the number of utilitarian objects recovered from within.

This small cluster of buildings was interpreted by Macramallah either as possible shelters or guest-houses for pilgrims and visitors or as dwellings for the servants of the gods of the Serapeum temples. Either way, the limited number of structures excavated continued towards the south. Unfortunately, being beyond the focus of Macramallah's cemetery project, excavation work did not continue in this direction leaving these structures in isolation and without a definitive interpretation.

When the plan of Macramallah's excavation is georeferenced in the GIS,¹⁰ the location of the Late Period/Greco-Roman buildings appear within the Serapeum north gate structure (Figure 6.9). However problematic this may first appear, allowances should be made for errors in the planning and location of the feature, the drawing of the map and the reconstruction of the Serapeum enclosure from the Mariette and de Morgan plans. It is entirely possible that the settlement area was located within the periphery of the enclosure and adjoined and abutted the north gate of the feature.

¹⁰ The Macramallah plan was resized using the scale reference provided and georeferenced using the location of the mastaba of Ti, shown in the upper right corner.

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

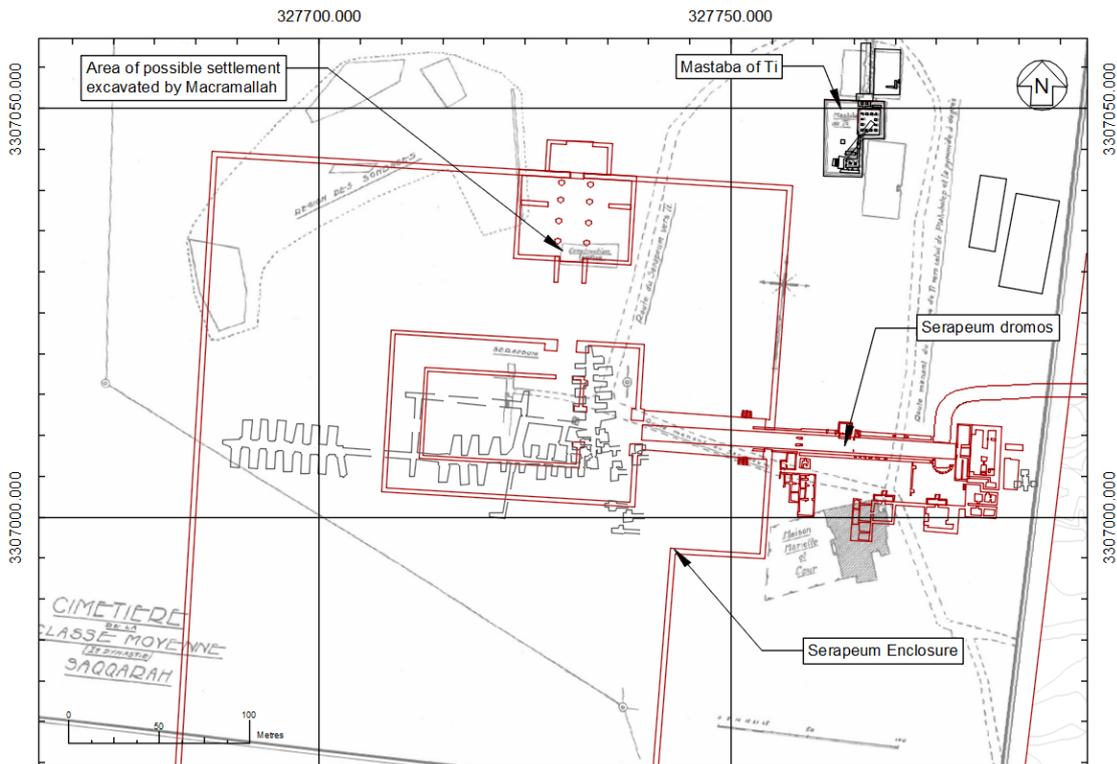


Figure 6.9. Macramallah’s location plan (1940, PL.I), georeferenced and shown with the Serapeum complex overlaid (source author).

This possibility is demonstrated in Mariette’s 1854 plan, which, whilst lacking in detail, does appear to suggest that rectilinear features are present in the north-eastern corner of the Serapeum Enclosure (Mariette 1856, Pl.II). These features (Figure 6.10) appear to respect the general alignment of the temple complex in the same manner as those of the Bubastieion and Anubieion. Similar features are present in the south-eastern corner to the south of the fragmentary plan of a temple structure situated adjacent to the central temple compound. These features appear somewhat ephemeral on the plan, presenting little more than an indication of something beneath the sand. It is likely that Mariette noted their presence and alignments but did not investigate further. It is entirely possible that the buildings excavated by Macramallah were a small percentage of these features suggested on Mariette’s plan.

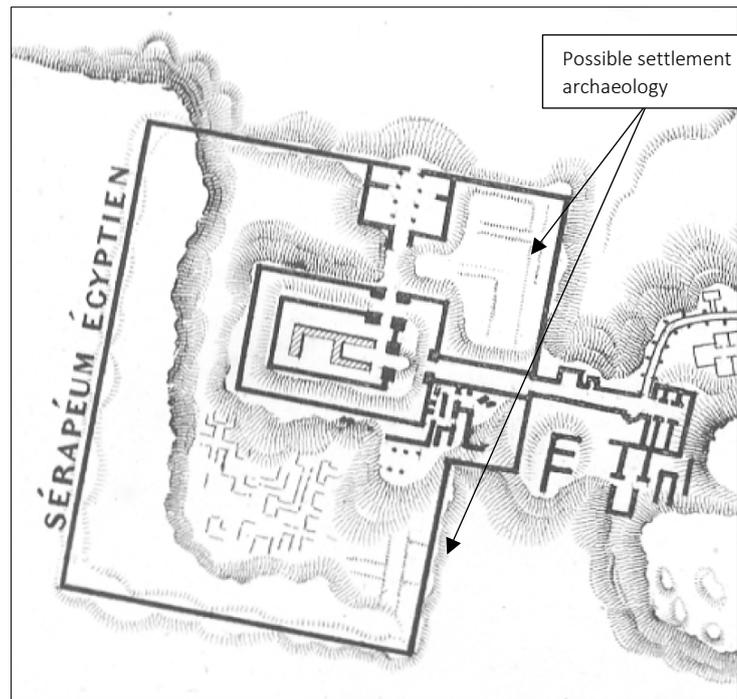


Figure 6.10. Possible settlement archaeology shown as hatched lines on the Mariette plan (Mariette 1856, Pl.II).

Similarly, excavation undertaken in 1971 of an area some 200m east of the Serapeum entrance, situated close to Maison Mariette, produced evidence for the remains of roughly built house structures with mud plastered walls. From the floor level of the houses numerous *shabti*-figures were recovered which were dated to the 30th Dynasty (El-Khouli 1973, 155). A lack of archaeological plan to accompany the report makes it difficult to determine whether these houses were within the boundary of the Serapeum enclosure. What can be remarked upon is the definite evidence that they provide of a settlement towards the south-eastern edge of the Serapeum Precinct. As with the excavations of Macramallah, this evidence appears to correlate with the ephemeral features shown on the Mariette plan (Figures 6.9 and 6.10). It is entirely possible that the houses excavated by El-Khouli were beyond the Serapeum Enclosure boundary, which would indicate that the settlement associated with the temple complex extended beyond the confines of its walls. This could imply that the settlement grew over time, but without further evidence of the internal structures this must remain supposition.

If the houses discussed above represent the foundations of settlement areas within the Serapeum Enclosure, then they appear to fit with the pattern observed in the Bubastieion and Anubieion, where the settlements are situated around the periphery of the main temple area. There does not appear to be any suggestion on the map of any structures situated atop the escarpment at the western extent of the enclosure. It may, however, be the case that this area was not investigated. It is worth noting here that the escarpment to the west of the enclosure is reasonably substantial and provides a natural boundary along that edge. Mariette's plan displays the Serapeum Enclosure wall as being continuous, whereas de Morgan's plan does not. The area to the west of the enclosure is without a boundary wall on the de Morgan plan. It is unclear whether this indicates an absence of wall during the time of use (meaning that perhaps Mariette filled in the gap) or that the wall was no longer extant during the time when de Morgan surveyed and drew his plan.

Sacred Animal Necropolis

The SAN is located towards the northern extent of the necropolis and covers an extensive area. The SAN encompasses the North and South Ibis catacombs, the catacombs of the Hawks, Baboons and the Mother of Apis, along with the MTE and its Southern Dependencies. The western side of the wadi valley, opposite the MTE, has been included within the descriptive area of the SAN for the Late Period re-use of the 3rd Dynasty mastaba AS33. This palace façade decorated tomb was reused for the deposition of bovid remains (Bárta *et al.* 2010, 181).¹¹ Additionally, Smith has remarked that some 250m to the south of the South Ibis catacombs, towards the Serapeum, the shrine and catacombs of the Rams may be awaiting discovery (Smith 2017, pers. comm.). A rectilinear stone structure was partially excavated in this location but never published (Davies and Smith 1997, 118, see note 34) and therefore its character remains unknown.

Beneath the later phases of the MTE, and beyond its southern and western walls (Figure 6.11), archaeological excavation revealed small rectilinear structures of varying

¹¹ This idea will receive further discussion in Chapter 10.

dimensions and interpreted as ‘workmen’s houses’ (Smith *et al.* 2006, 67–73; Martin 1981, 18). Within the MTE the crude buildings were constructed upon the sloping sand of the escarpment, therefore predating much of the structure. They may have been contemporary with the earliest phases, but Smith has associated with them with the secondary phases of the temples’ expansion (Smith *et al.* 2006, 72). Similarly, the workers village observed within the southern dependencies was discovered situated beneath mud-brick platforms and enclosures attesting to their earlier date. To the west of the MTE west wall the building foundations observed there were constructed on the sand of the escarpment slope. These mud- and *tafl*-brick structures were similar in construction to the other presumed workmen’s houses and their topographical location spatially associated them together.

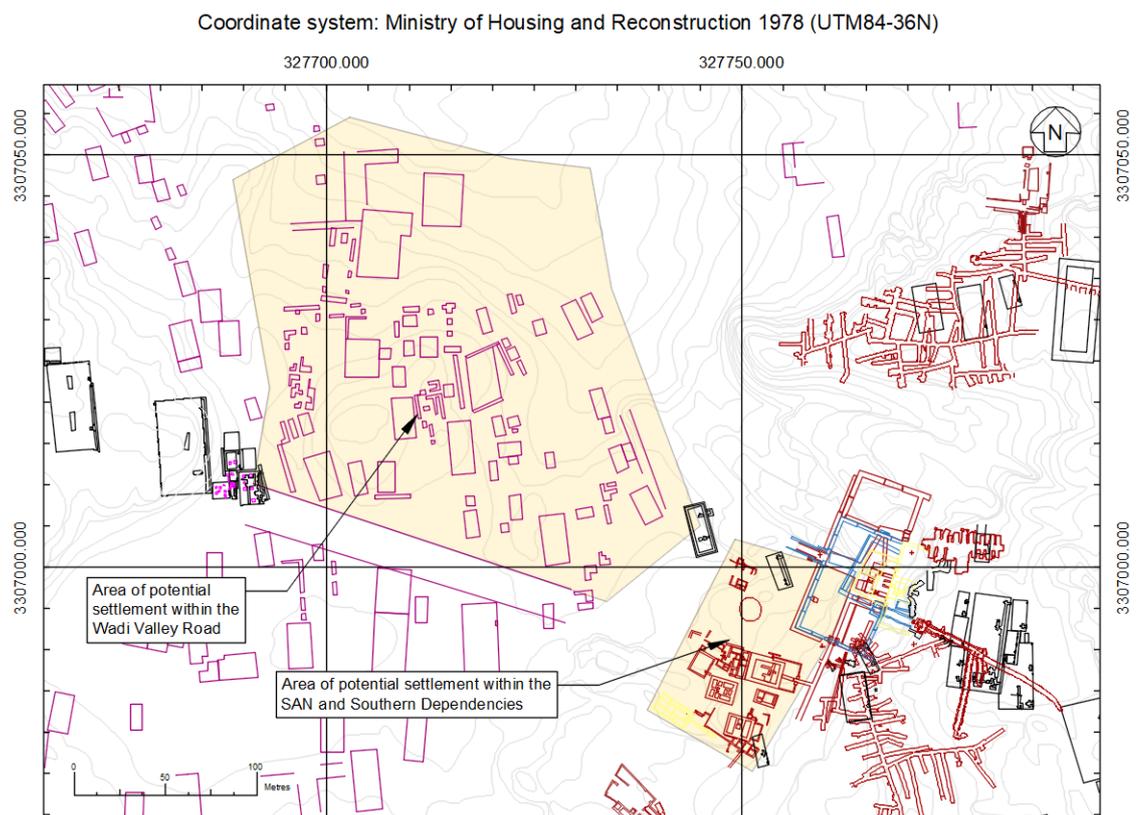


Figure 6.11. The SAN and Wadi Valley Road, potential settlement locations are marked (source author).

The three separate clusters of small buildings cannot definitively be shown to be part of a contiguous group, due to later overlying structures which and a large deposit of archaeological spoil from the earlier excavations of Emery (Smith *et al.* 2006, 73) which bifurcates the northern and southern groups. Jeffreys suggests that it is likely that they

all belong to a settlement of workmen or artisans employed in the construction of the SAN and its ancillary buildings (Martin 1981, 83). Although it is suggested that the settlement followed no regular plan, the structures appear to present a certain uniformity, respecting a similar alignment. Jeffreys postulates that not all the buildings are of the same date, some being earlier than others (Smith *et al.* 2006, 175) suggesting an evolving, albeit, transitory settlement. The character of the buildings appears to resemble those seen in the other large temple enclosures previously discussed, with small compartmentalised rooms, adjoining corridors and courtyard spaces. This settlement may have been developing during the earliest phases of the MTE construction (Phase I) which comprised the reuse of rock-cut tombs in the escarpment and the construction of a terrace, sanctuary and precincts (Smith *et al.* 2006, 175) but probably firmly correlates to the building of Terrace II of the MTE upon whose construction it is likely the workers were employed.

The buildings produced various evidence of domestic occupation including a possible miniature shrine (Smith *et al.* 2006, 72) and artefacts interpreted as belonging to the workers trades (Smith *et al.* 2006, 71). The dispersed artefacts were predominantly discovered without a robust context, and therefore their association remains tentative. The houses appear to have been abandoned at some time during the cutting of the subterranean galleries and were therefore contemporary, at least partially, with their use (Martin 1981, 83–84; Smith *et al.* 2006, 110–111).

It is possible that further structures await discovery beneath areas that are yet to be investigated. The buildings to the north of the South House (Figure 6.12), for example, were left incompletely excavated (Smith *et al.* 2006, 73), leaving the question of their extent open. It is possible that these structures represent part of a larger area of the settlement situated externally to the MTE.

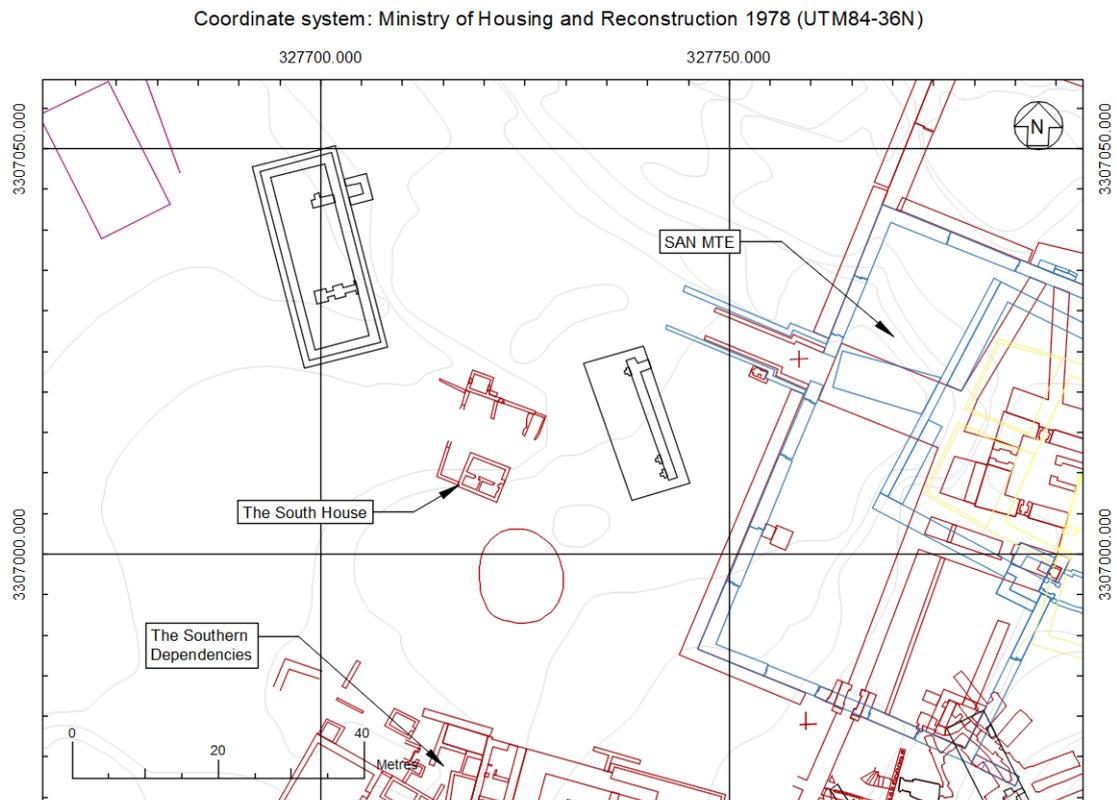


Figure 6.12. Location of the South House in relation to the SAN MTE (source author).

The settlements of the Bubastieion, Anubieion and Serapeum are presumed to have accommodated workers of the cults, their families, visitors and guests, and were contemporaneous with the functioning of the temple-complexes. The workers village of the SAN presents a different character. It appears to be a temporary settlement for labourers employed in the construction of the MTE and subsidiary buildings, and as such, it was abandoned once these tasks were completed. It is unclear where those occupied with the cults would have resided. One would perhaps expect a similar situation to the other temple-complexes, but the fact that the SAN MTE is much smaller than the other three temple enclosures attests to the improbability of a settlement internally situated within the temple compound during its use. The South House and structures situated to its north are of a slightly different character than the other buildings within the MTE and the Southern Dependencies. It would have been tempting to suggest that they may represent part of such an ongoing residential settlement, except that these structures appear to have been abandoned in a similar period. Perhaps the answer to this question lies slightly farther to the west, within the wadi valley.

The 'Wadi Valley Road'

The central area of the Abusir wadi valley is currently devoid of visible structural remains, however, that is not to say that this was always the situation. Several authors contend that this route was the principle approach to the necropolis during ancient times (Bárta and Vachala 2001; Dodson 2016, 6; Malek 1997, 92; Reader 2004), leading south towards the monumental tombs of the 2nd and 3rd Dynasty rulers. It would seem appropriate then that a settlement may have evolved at the opening of this routeway, close to the Lake of Pharaoh. Geophysical prospection was conducted by the SGSP across the greater necropolis (Mathieson and Dittmer 2007). A considerable area was surveyed allowing an unprecedented glimpse of subsurface archaeological remains. Across the wadi the survey plot displays a high density of subsurface anomalies that gave strong readings (Figure 6.13).

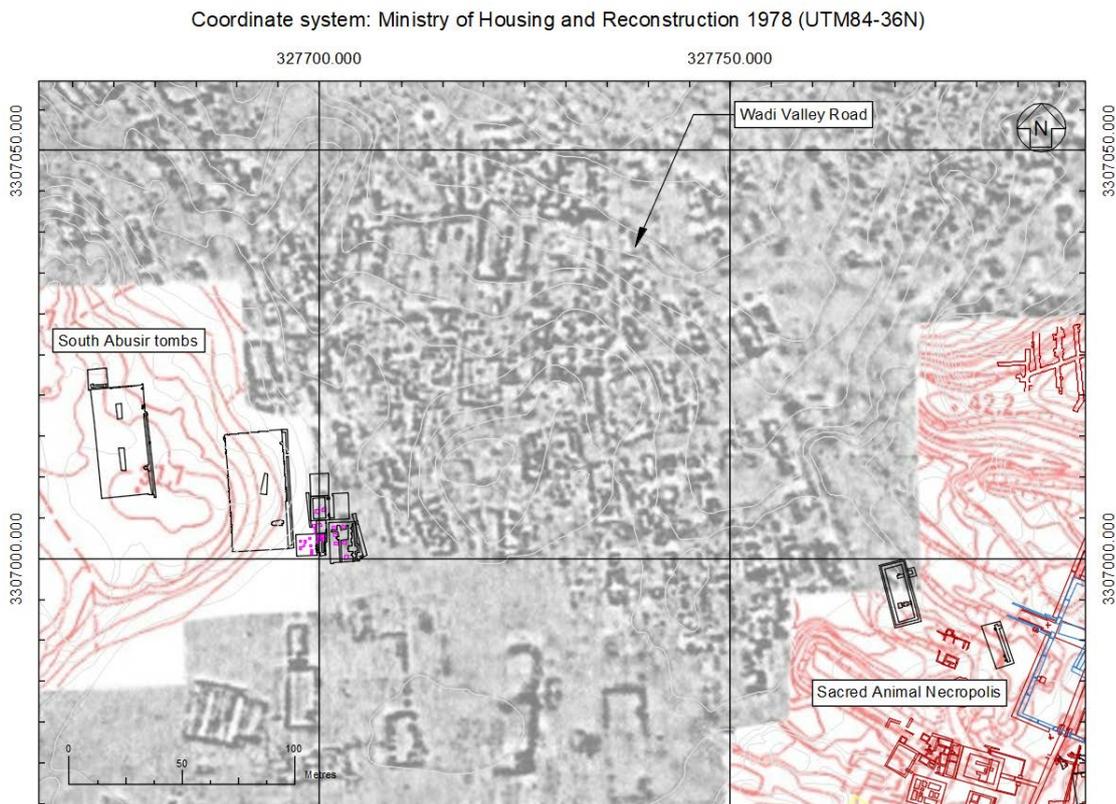


Figure 6.13. The SGSP geophysical survey data of the area of the Wadi Valley Road between the Abusir South tombs and the SAN (source author).

It is clear from a review of the geophysical survey results that the wadi valley has a high concentration of archaeological remains of interesting character. Whilst it is difficult to

make sense of many of the features represented in the data, examination allows for the recognition of individual structures, perhaps surrounded by smaller more ephemeral features (the noisy data on the plan). Without excavation, there can be no clear understanding of what is represented by the data, whether the features were contemporary with one another or with their surroundings, when they began in use and were abandoned. However, this valuable data, which displays a congestion of activity, informs the archaeologist of potentialities and allows for the formation of hypotheses.

An attempt to provide an interpretation of the geophysical data, as best as time constraints would allow, has been made (Figure 6.14). The interpretive illustration is in no way comprehensive. Many of the smaller features, which are problematic to distinguish in the noisy data, have been omitted for clarity. A general alignment is discernible within the layout of the features, which appear to follow a roughly north-south orientation, with some deviations. The structures appear to take a similar orientation to the presumed mastaba tombs situated slightly further south. The directionality is at odds with the orientation of the wadi valley, which is aligned north-north-east to south-south-west, setting them obliquely across the routeway.

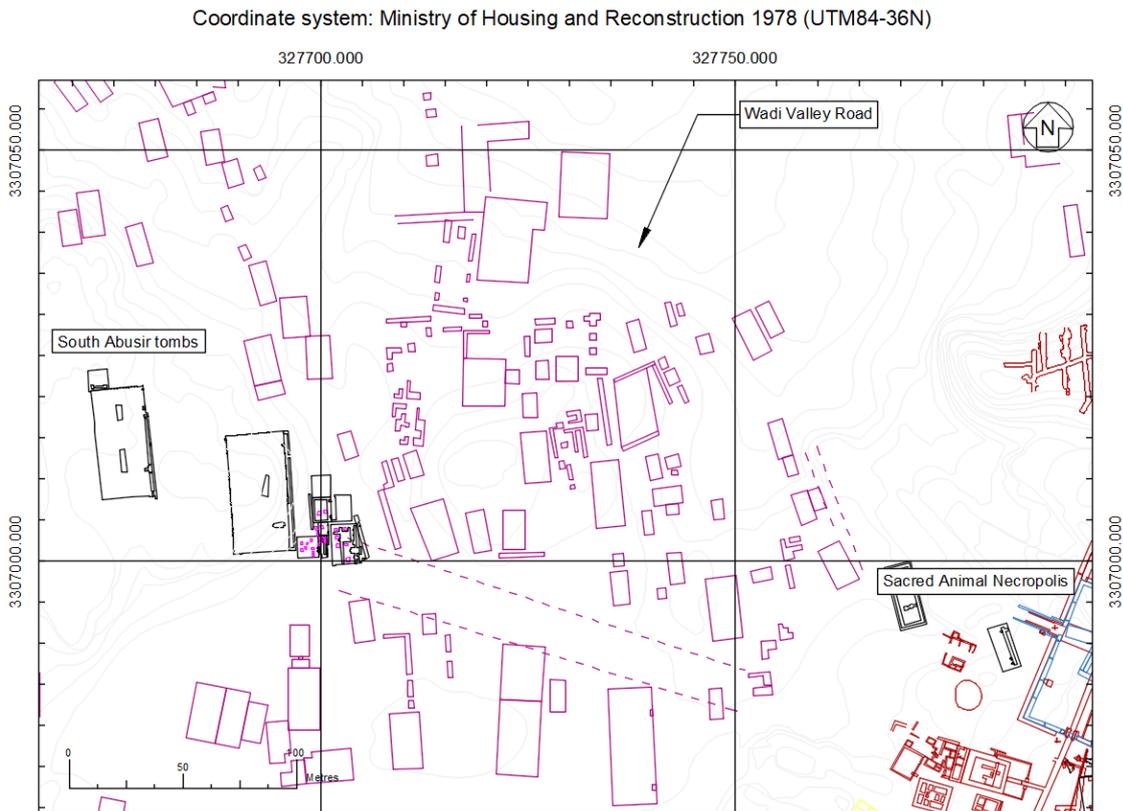


Figure 6.14. Interpretation (drawn in purple) of the potential structures depicted in the SGSP survey data of the Wadi Valley Road area (source author).

Allowing for the area adjacent to the SAN MTE that was not examined by the geophysical survey, there still appears to be a dearth of structures along the eastern edge of the wadi valley. The spatial arrangement of presumed structures would appear to suggest that the route along the wadi road from the Lake of Pharaoh may have been directed up the eastern side of the valley, towards the MTE and Southern Dependencies (Figure 6.15). This postulated route should be approached with some caution, as there is no information regarding the usage and longevity of these structures. What is presented by the data is a singular image of a palimpsest of archaeological remains from an unknown duration of time. However, the lack of anomalies along the eastern edge of the valley is provocative in its suggestion. Additionally, a linear feature may represent a demarcated pathway (annotated on Figure 6.16) which respects this suggested route alignment.

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)



Figure 6.15. The postulated route of the 'Wadi Valley Road' leading into the necropolis and towards the SAN is indicated by the black arrows (source author).

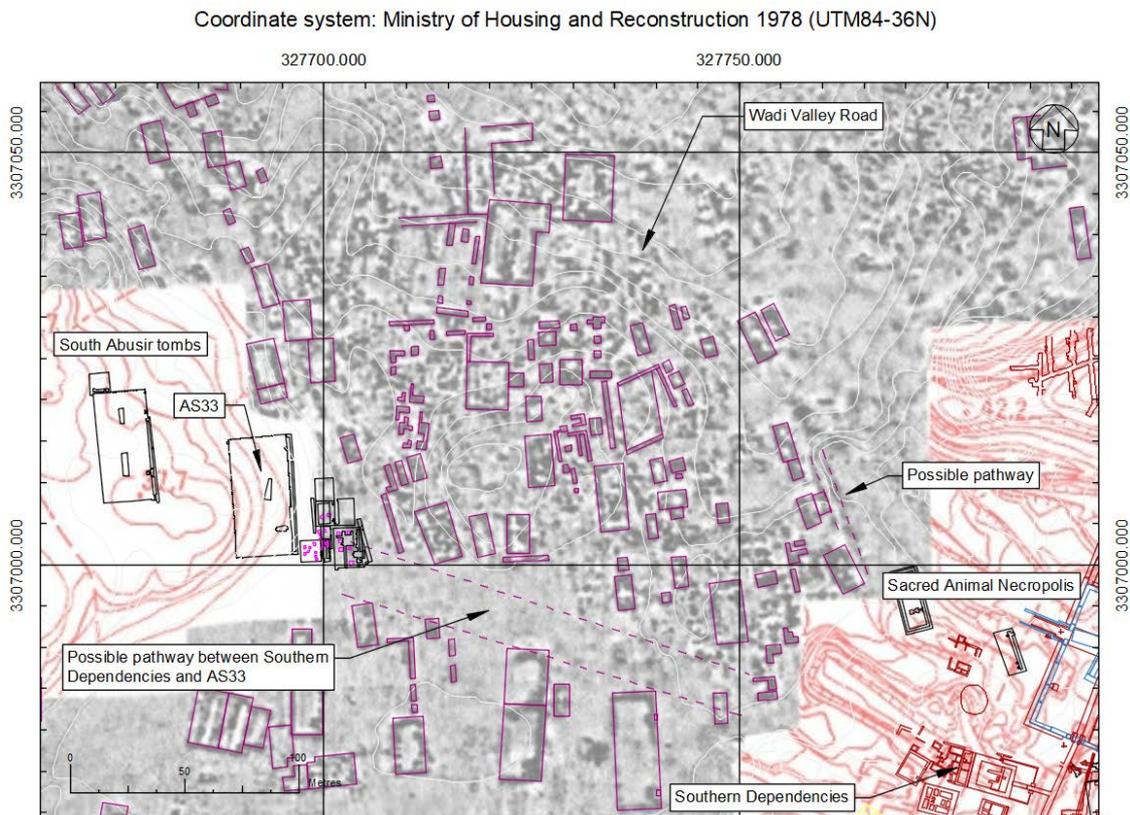


Figure 6.16. Two possible pathways in the Wadi Valley Road visible in the SGSP survey data (Mathieson and Dittmer 2007) (source author).

The structural features set against the western escarpment of the wadi valley appear to respect the alignment of the edge of the valley and follow its orientation, and it is likely that the features spreading to the north-west are small mastaba tombs, like those excavated by the Czech mission (Bárta and Vachala 2001; Bárta *et al.* 2001; Bárta *et al.* 2009; Bárta *et al.* 2010; Bárta *et al.* 2014; Vymazalová *et al.* 2011). There is an intriguing linear transect across the wadi valley, situated between the presumed settlement activity to the north and the mastaba tomb structures to the south (Figure 6.16). This feature is aligned roughly south-south-east to north-north-west and appears to communicate between the area of the southern dependencies and the palace-façaded 3rd Dynasty mastaba AS33, situated on the opposite side of the wadi valley. Mastaba AS33 was reused during the Late Period for bovid burials, which were deposited into pits carved in the denuded upper surface of the tomb (Bárta *et al.* 2010, 181). This appears to be an important correlation which will be discussed further (see Chapter 9).

The subsurface anomalies displayed on the geophysical plot may represent a small, disorganised settlement. It is in this location that Smith suggests the houses and workshops of embalmers and other trade-persons may have been located (Smith 1974, 69–70). This collection of buildings would be well located to house both those employed in the daily activities of the cults and those who offered services to visitors and pilgrims. If the Wadi Valley Road passed by this small settlement as suggested, then the structures along the approach to the SAN MTE could possibly have been shops or stalls that sold offering bronzes, such as those discovered deposited near the falcon catacombs (Gosling *et al.* 2004; Nicholson and Smith 1996), and other religious paraphernalia. The postulated settlement may have housed both permanent or transient workers and craftsmen that served both the temples of the sacred animals and the living ibis on the Lake of Pharaoh.

Summary

The necropolis existed as more than a place of death and burial. Whilst that was certainly its primary focus, the landscape was dynamic and full of activity. Reich (1933, 38) discusses pilgrims visiting the Serapeum, and remarks that the great dromos was used like a market place, with the government auctioning state property there. Both Reich (1933, 39) and Ray (1972, 701) provide lists of a variety of professions all working and living together, which characterises the Serapeum more like a market town than a mortuary establishment for the Apis bull. Ray (1972, 701) comments that the settlements of the Serapeum may have resembled the expansive workers villages at Kahun and Deir el-Medina.¹² There would have been the addition of guest-houses for pilgrims, apartments for dream interpretation, shops and inns that catered to the needs of visitors (Ray 1972, 701). It is likely that this population would have increased during the festivals of the cults, where an influx of the general populace would have journeyed to the necropolis.

During the public aspects of the religious festivals, the necropolis landscape near and around the cult centres may have been busy with people who had come to observe the

¹² See Snape 2014, pages 64–68 for Kahun, and 74–86 for Deir el-Medina.

processions and partake in the religious experience. Whilst, as noted above, the general populace would have been separated from the officials and activities of the cults, they would have been an integral part of the public performance through association and being there in the landscape. Public participation may have supported the rising popularity of the animal cults, which Nicholson contends were a “religious expression of nationalistic feeling” (Nicholson 2005, 49). The embalming and burial of animals reminded the people of less troubled times than those in which they lived (Nicholson 2005, 49), and the inclusive aspect of purchasing a mummified animal or votive offering for the gods, which the priests of the cult would deposit, may have engendered a closeness with those gods whom they worshipped and revered, and helped make them feel part of a unified Egypt.

With the complex settlements associated with the large temples and the sacred animal cults, it would be remiss to assume that there was not an abundance of people moving around and through the necropolis. These settlements appear to have begun as somewhat transitory collections of poorly built structures which solidified over time into permanent villages comprising residential and commercial properties. Their character is generally one of diverse structures adjoining and abutting one another in an arranged pattern of small holdings accessed by passageways and courtyards. At the large temple-enclosures of the Bubastieion, Anubieion, and Serapeum, the settlements appear to have developed around or near the central temples within the enclosure precinct. The SAN does not follow this pattern, where the postulated village appears to be external to the main temple enclosure, situated along the approach to the necropolis in the wadi valley. The residents of this settlement may have served both the MTE, where the catacombs of the Mother of Apis, Baboons, and Falcons are situated, in addition to the North and South Ibis catacombs, and the ibis breeding grounds at the Lake of Pharaoh.

It is likely, given the evidence considered above, that a mixture of priests, craftsmen, merchants and many more people involved in the daily activities of the temples and cults, with the addition of pilgrims, worshippers and tourists, would all have been negotiating the necropolis. In some way, the necropolis may well have been like the Giza archaeological site as it is experienced today. The modern tourist will find an active

and dynamic location crowded with people, sounds and smells. Giza can provide an off-putting experience for the modern visitor, who would perhaps prefer to encounter the site without the hassle of the traders, food sellers, camel and donkey rides, and pickpockets alike. But even within this environment of crowded activity there remains an overall element of control by the authorities which dictate where the tourist can go and what they are permitted to see. It would not be improper to assume that a similar situation may have existed in the LP/EP, although there is no current way of proving this.

CHAPTER 7

Challenging the narrative

Introduction

As discussed in Chapter 6, the living population of the necropolis were not static agents in a fixed landscape. Rather, they were actors performing in a dynamic and constantly changing environment through which they moved and lived. To help understand their use of the landscape, how they may have moved among the monuments and terrain, the archaeological narrative can be a knowledge-making device. As an epistemological tool, it can challenge existing understandings, and test new ideas and potentialities. Archaeological narratives attempt to explain a place or period in a meaningful way that allows the modern reader to engage with and understand the past through informative description (Nicholson 2016, 19). The narrative engages the imagination through the evocation of a past no longer extant, comprehensibly composed of description and detail. Two such narratives set during the LP/EP exist for the landscape of Saqqara.

Smith's (1974, 64–82) spirited narrative is presented in the form of a story involving two Athenian merchants who visit the Saqqara necropolis during the burial of a Mother of Apis cow in the early years of the Ptolemaic Period. Whilst he, modestly, regards his publication as popular, rather than scholarly (pers. comm. to Nicholson 2016, 19), and now sees much of it as problematic (Smith 2017 pers. comm.), the merits and usefulness of the narrative cannot be understated. Smith has constructed a lively representation of the past which, although problematic in places, permits the reader to experience a journey through the Memphite necropolis.

Nicholson's (2016) narrative diverges in style from that of Smith. He aims to represent the Late Period Saqqara landscape to the general reader through the exposition of features that may have been observable at that time. He presents archaeological

features within their landscape setting rather than attempting to populate the landscape through a story driven approach. Drawing upon scholarly publications and archive reports he contrives a hypothetical journey around the necropolis landscape during the LP/EP, during which he provides descriptions of what the visitor might encounter.

Both narratives, whilst diverse in character and approach, offer the reader an experience of the LP/EP landscape of North Saqqara that they otherwise would not encounter. This chapter will briefly review the Smith and Nicholson narratives, and then provide a critique of both comparing their accounts against the digital landscape model to assess its accuracy, and that of the narrative. This approach will provide a credibility test for the landscape model, by assessing the construction against the knowledge of two experts in the period, and through a blend of traditional and digital media permit the creation of a new landscape narrative for the Late Period necropolis of Saqqara. In doing so it is envisaged that the output will be useful in addressing research questions about the use of the terrain and the monuments.

A brief review of the landscape narratives

Two Athenians at the Funeral of a Mother of Apis (Smith 1974)

In the third lecture presented in the publication *A Visit to Ancient Egypt* (Smith 1974), the reader is introduced to two characters: Aristodamus and his travelling companion Peitho. The former recounts a tale of their travels in and around Memphis during the early Ptolemaic Period, describing their experiences during that excursion. Through the voice of Aristodamus, Smith conveys his knowledge of ancient Saqqara and the animal cults by constructing an imaginary event founded mainly on archaeological and historical documentary evidence. The protagonists of this tale secure themselves lodgings in the Greek Quarter of Memphis so that they may experience the city and its necropolis.

After the preamble and introduction of the story, the specific interest within the narrative for this project commences when the Athenian tourists journey from

Memphis up to the necropolis proper (Figure 7.1). Their approach to the site is not stated, beyond that they make their way through the Anubieion (Smith 1974, 68). They travel through the great enclosure and head north alongside the desert escarpment. Beyond the north wall of the Anubieion the tourists pass the entrances to the Dog Catacombs, which are given little remark.

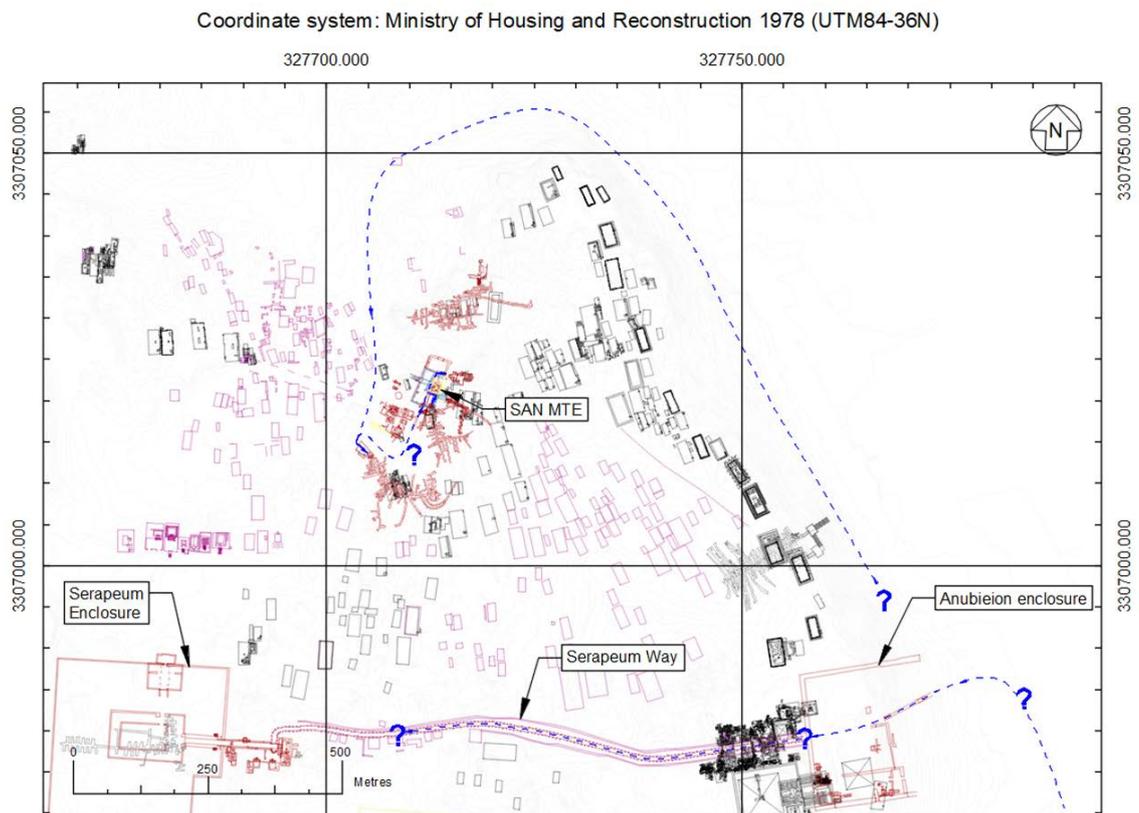


Figure 7.1. The possible routes used within the necropolis by the protagonists in the Smith (1974) narrative account. The routes are marked as dashed lines due to their uncertain locations as described in the text. “?” indicates the uncertainty associated with access or distance taken along a route. Memphis is not included on this plan (source author).

The Athenians continue their journey around the northern tip of the escarpment, passing the location of the Lake of Pharaoh. Here Smith (1974, 69) remarks upon the temple enclosure of the feeding place of the ibises with its waterside quay and hatcheries. After rounding the cliff outcrop, the Athenians pass through a gateway which marks the entrance to Hepnēbes. Smith (1974, 69–70) delivers a detailed account of the embalmers workshops which he situates towards the entrance to the wadi, further along which he places houses, shrines and courtyards set against the valley

escarpment. Behind these is a large mud-brick temple enclosure—the SAN MTE. Along a winding sacred way, the visitors are introduced to a garden courtyard, presumably that of the South Ibis catacombs. They are unable to observe the dromos and entrance to the catacombs which is screened from view by a gate. The courtyard is said to be planted with a grove of trees. After travelling along another sacred way, through shrines and houses, the guide points out the pylons of the Serapeum as they near the sanctuary of the Ram of Mendes. After a brief rest, the visitors make their way into the main temple enclosure through a stone gateway constructed by Pharaoh Nectanebo. Here they observe a sacred way which ran along the edge of a terrace which was above an open court complete with large stone gateways. Stone-faced shrines are set against the escarpment.

The Athenians are taken to view the Falcon sanctuary. Whilst not allowed into the shrine, they are however permitted to enter the catacombs,¹ which are summarily described. From here they visit the sanctuary of the Baboons. They see the limestone statues of Osiris the Baboon who heard petitions or oracle questions. They then proceed to visit the baboon catacombs, which are undergoing reconstruction, and then the courtyard of the Mother of Apis sanctuary, going from here into the northern enclosure and the Mother of Apis catacombs. The first visit by the Athenians to the Memphite necropolis was concluded at this point, and Smith expands on the mummification ritual of the Mother of Apis cow Taese and the temples of Memphis associated with these rites.

Over a period of days, the Athenians go to the necropolis to view the dragging of the sarcophagus of the Mother of Apis bull, which Smith describes as being hauled up the escarpment along the sacred way, precariously held in place by chocks whilst the dragging crew rested. Upon arriving at the House of Rest of the Mother of Apis, the sarcophagus is described as ascending the escarpment and sliding down a ramp to the entrance from where it is manoeuvred into its vault.

¹ Thompson (2012, 194) notes that access to temples and shrines was restricted to priests, but passes no comment on the subterranean burial tunnels. However, it is debatable whether they would have been permitted access to the catacombs but, as today, Baksheesh may have granted them such admission (Nicholson 2018 pers. comm.).

Later Smith describes the funeral procession, leading from the Ptah temple in Memphis, as comprising officials of the cults, along with elites and members of the general populace, mixing without consideration of rank or status. The procession conveys the funeral bier of the mummified bull along the Serapeum road (Way?) and to the House of Rest of the Mother of Apis in Hepnēbes where it is interred with due ceremony.

The Sacred Animal Necropolis at North Saqqara: Narrative of a Ritual Landscape (Nicholson 2016)

Nicholson's landscape narrative attempts to portray the character of the necropolis of North Saqqara during the time of the Sacred Animal Cults from the Late Period into Ptolemaic times through the exposition of the features within the landscape. This method of providing an accessible overview is akin to that of the Smith narrative, but uses a different method of conveyance. Rather than attempting to contrive a scenario set during the time, this narrative describes the landscape and the setting of the temples of the cults in a way that an observer visiting the necropolis may have experienced them. Being more recent in date than the Smith narrative, Nicholson's work has benefitted from more recent archaeological work.

Nicholson's narrative begins with the approaches to the necropolis and he remarks upon the two probable main routes (Figure 7.2). The approach around the northern tip of the escarpment to the Wadi Valley Road, as travelled by Smith's Athenians, is described as used to convey the sarcophagi of the Apis bull and his mother to their final resting places, having the benefit of a shallower gradient into the necropolis than is provided by the eastern escarpment (Nicholson 2016, 23). Nicholson indicates the location of the catacombs of the Mother of Apis and the Serapeum relative to this route. The second route into the necropolis described is an approach from the eastern side of the plateau, either leading to the south gate of the Bubastieion, or an eastern gate of the Anubieion. The Anubieion route would lead to the Serapeum Way, rising from the lower terraces, up the escarpment through the great temple enclosure and into the necropolis.

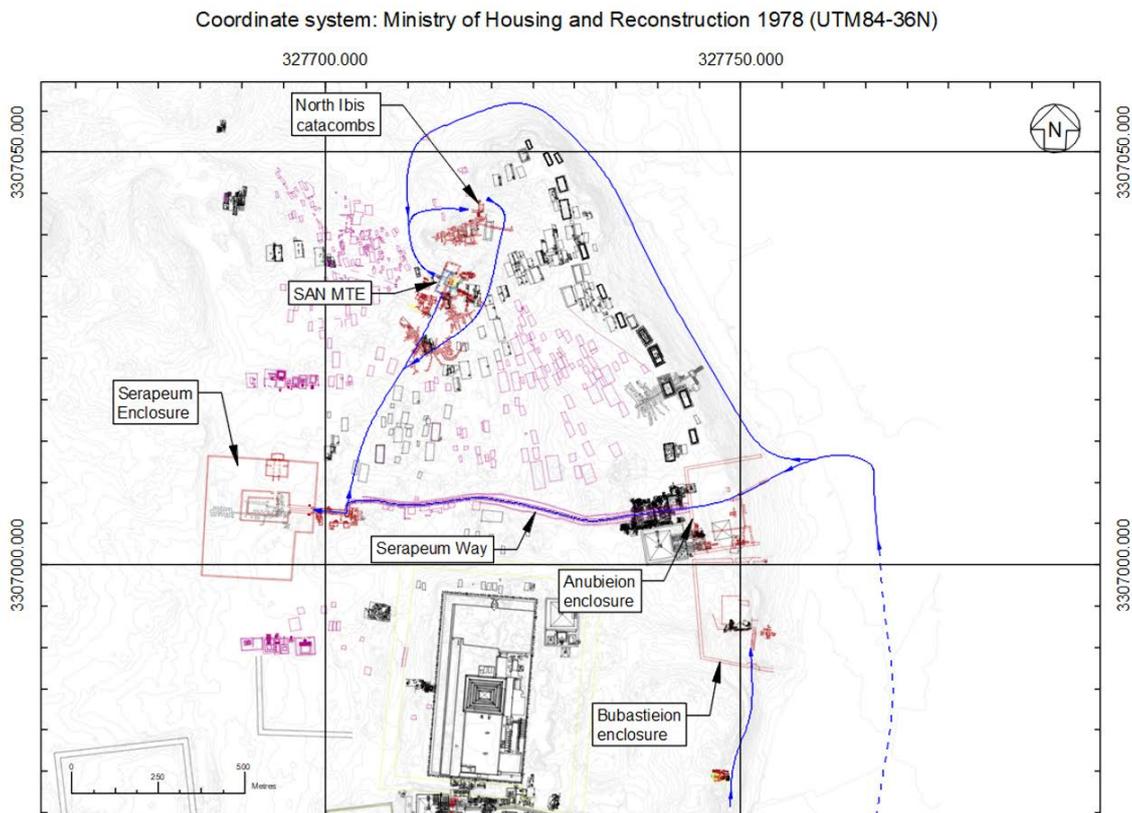


Figure 7.2. The routes used within the necropolis throughout the course of the Nicholson (2016) narrative account (source author).

Nicholson (2016, 23) briefly describes the large temple-town of the Anubieion. He presents the possible uses of the temple district and its surroundings, from the breeding of dogs for the cults and their mummification rituals, through to general administration by the detachment of police and the local governor situated there. The settlement within the precinct walls is mentioned, as are those who may have resided there, and Nicholson (2016, 23–24) speculates what may also have existed outside of the temple enclosure, such as workshops and places of manufacture. He provides an impression of the busy and chaotic life that must have occurred there during the Late Period onwards. He discusses the enigmatic Bes chambers (Nicholson 2016, 25) and the dream interpreters who practiced their craft there.

Situated at the edge of the escarpment to the north of the temple enclosure, and associated with the Anubieion and its cults, are the two Dog Catacombs (larger and smaller). Nicholson (2016, 24) suggests that the subterranean galleries would have been connected to the temple enclosure by a dromos. He briefly mentions the large

Bubastieion brick-enclosure and its possible temples, situated to the south of the Anubieion, as little is known of this structure in comparison to its neighbour to the north.

He then takes the reader from the Anubieion, heading westwards into the necropolis along the sphinx-lined Serapeum Way. He remarks on the shrines that were very likely situated along the route, and the possibility of sellers of religious offerings at or near these locations. He directs the reader's attention to the Old Kingdom mastaba tombs through which the ceremonial way meanders. Visitors may have been aware of these tombs as they passed along the Serapeum Way on their journey to the western enclosure, their visibility being dependent on covering by drift sand, a situation which frequently changes. It is possible, Nicholson remarks, that many undiscovered Late Period burials may be situated around or near the animal cult monuments, due to a desire to be buried close to the Osiris-Apis. He notes that these types of burial may not have received a grave superstructure (Nicholson 2016, 25), and therefore would have not been immediately visible at surface level.

Upon arrival at the end of the sphinx-lined way, the visitor, remarks Nicholson, would first see the East Temple of Nectanebo II, and in the early Ptolemaic Period the hemicycle of Greek philosopher statues. It is here that the dromos proper leads to the eastern gate of the Serapeum enclosure, and Nicholson utilises the famous drawing by Barbot (Ray 1976, pl. I) to illustrate what this area looked like when excavated by Mariette in the 1800s (Nicholson 2016, 26). Here he describes the small shrine for the Apis bull statue and the *lychnaption* structure next to it, where those who attended the god resided. Nicholson contends that the everyday visitor to the site would not have been permitted beyond the gateway at the western end of the dromos. This gate, surmounted by two lion statues, marked the entrance to the Serapeum enclosure, where the temple and subterranean burial galleries of the Apis bull are located. He states that heading north from the Serapeum, the visitor would have encountered a settlement that may have included guest houses, providing refreshments and respite from the journey (Nicholson 2016, 27).

Nicholson then guides the reader back towards the north of the necropolis, along the north-south sacred way which lead into the south gate of the SAN MTE. He points out the South Ibis catacomb garden-courtyard and entrance which lies to the west of this route, which may have been visible if not sanded up. Of the main temple enclosure, Nicholson describes the position of the shrines for the Falcons, Baboons and Mother of Apis, set against the escarpment and leading to their respective subterranean galleries. Here a great number of votive depositions were discovered, and Nicholson suggests that this may support the theory that vendors and manufacturers of such items were operating in the nearby vicinity. Above the Baboon temple of the *Hearing Ear* is the large 3rd Dynasty mastaba tomb 3518 where many votive *donaria* were deposited during Ptolemaic times, and Nicholson suggests that this may have been visited as part of a progression around the necropolis (Nicholson 2016, 28).

Nicholson's narrative then departs the temple terrace of the SAN through the brick-built pylon of Nectanebo II, and turns north towards the Lake of Pharaoh, where he envisages the flocks of Ibis birds reside. As Smith before him, he too suggests a congestion of booths for the embalmers of the ibis, workshops and storage structures in and around this area (Nicholson 2016, 28). Overlooking the lake, on the northern side of a promontory, is the North Ibis garden and catacomb entrance. Brief mention is given here to this monument, before the visitor's possible departure route from the necropolis is discussed. Nicholson proposes two possibilities by which the visitor may have left the plateau, and notes that they may have also seen or visited the animal galleries that are known from writing but whose precise locations remain unknown.

Critiquing the narratives

Both the Smith and Nicholson narratives explicate versions of the Saqqara necropolis that the average modern visitor will most likely be unaware of. The casual tourist to the site may not have prior knowledge of ancient Egyptian history, or may have little comprehension of the extent and duration of activity at the necropolis. Constrained as they are in their movement around the archaeological landscape by official oversight, the modern tourist is only able to visit the monuments that survive and remain open to

the public, and as is often the case, that their time-schedules allow. Archaeologists can often face similar debilitating constraints, being only permitted to access their own work concession and not often allowed to roam across the site. These restrictions are not conducive to an understanding of the site, where monuments may be viewed in isolation, removed from their historical context and with little information regarding their setting within the landscape. By constructing narrative accounts, the funerary landscape that is no longer wholly extant can once more be experienced and understood. However, these narratives are more than simply an information resource for the casual tourist, they can be epistemological tools for addressing research requirements and questions.

Both narratives seek to explore the possibilities that visitors to ancient Saqqara may have experienced and provide insight into the ancient funerary landscape for both the casual visitor and seasoned archaeologist alike. The Smith narrative focuses on a specific date during which the protagonists visit the necropolis for the burial of Taese, the Mother of Apis, and through this mode of delivery contrives details in the text that the Nicholson narrative does not. Nicholson describes a walkthrough of the landscape as it may have been experienced during the Late Period into Ptolemaic times, and seeks to explain what a visitor to the necropolis may have encountered or been permitted to visit. Both narratives have their positive and negative aspects—Smith's, whilst rich in detail, focusses on a limited number of locations within the necropolis and, as a result, does not present a complete impression of the extent of the LP/EP funerary landscape; whereas Nicholson's provides a wider account of the funerary landscape but lacks the dynamism of the story-driven details.

The narrative accounts communicate their interpretive descriptions through the following methods: the process of movement, topographic and structural description, and agential actions. The latter relates mainly to the Smith narrative, as the Nicholson narrative does not include participants as such, but rather a generic visitor or pilgrim, whereas the actions of the protagonists in the Smith narrative direct the account. The creation of the narratives drew upon both author's considerable knowledge of the site and its landscape, with the likely addition of maps and archaeological publications to

conceptualise and realise their accounts. However, within these narratives, certain considerations do not appear to be immediately manifest, such as the visibility of monuments at distance or the potential for topographic screening in creating a dictated panorama. Both considerations are the types of contribution that the digital landscape model can provide to a narrative account.

In Smith's narrative for example, when the guide and the Athenians approach the SAN MTE after visiting the South Ibis garden, they see glimpses in the distance of the pylons of the Serapeum (Smith 1974, 70). If they had departed the South Ibis courtyard and walked down into the wadi then they would only be afforded a very limited view of the Serapeum pylons from this location. Additionally, what they were seeing would be meaningless unless they had *a priori* knowledge of the monument (in this case they are offered an explanation by their guide). The Serapeum Enclosure, its north gate and pylons, are unlikely to be immediately distinguishable from the row of temples and/or shrines aligned parallel to it and situated some 200m to its north (Figure 7.3). From this vantage point it may appear that one is viewing a line of buildings situated beyond a rise in the landscape. If the Athenians looked towards the Serapeum from the entrance to the South Ibis courtyard they would have been presented with slightly clearer view (Figure 7.4). This brief example serves to illustrate how visual affordances in the necropolis are location dependent.

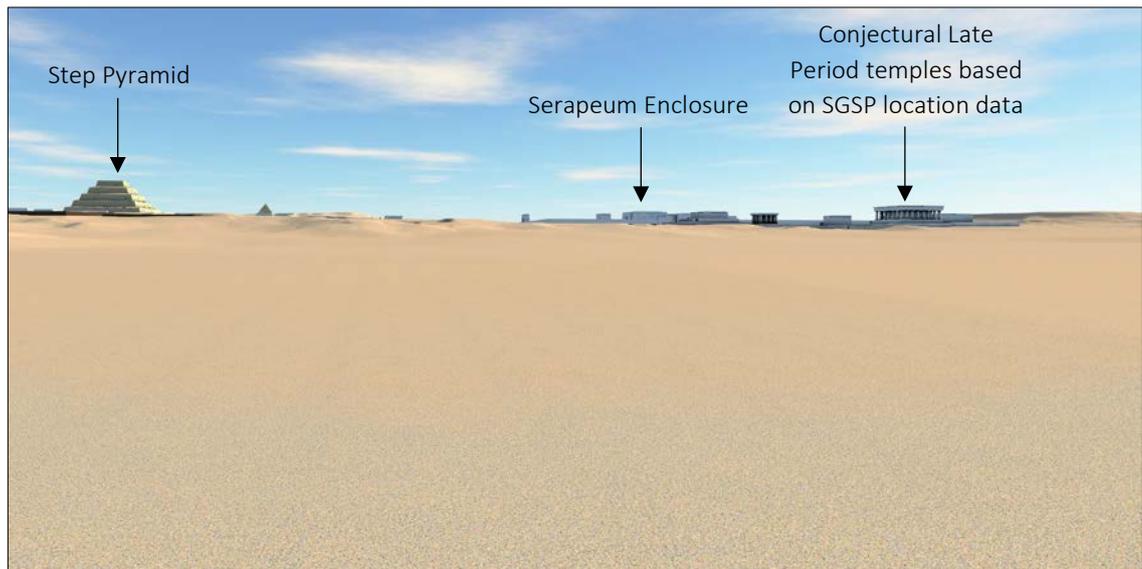


Figure 7.3. View towards the Serapeum from the wadi valley, facing south-south-west. The South Ibis garden and catacombs are located some 60m to the left of the image. The north gate of the Serapeum Enclosure is approximately 530m away. It is possible that there may have been hostelries and other buildings in the foreground further obscuring the view (source author).

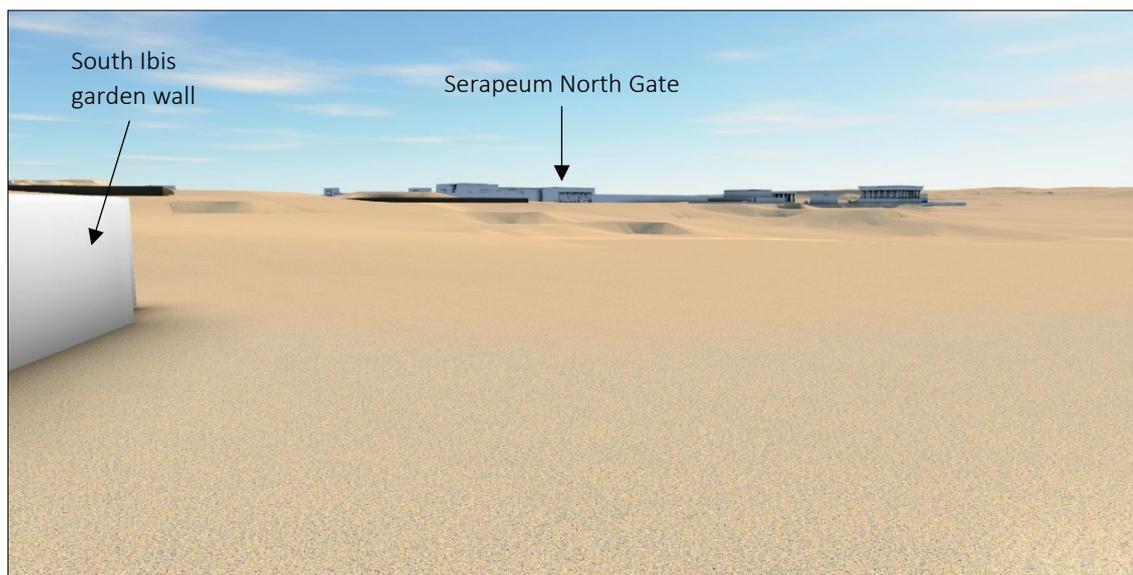


Figure 7.4. Standing outside of the entrance to the South Ibis garden, facing south-west, gives a clearer view of the Serapeum Precinct than when standing in the wadi valley (source author).

The process of movement

Both Smith and Nicholson begin their approach to the necropolis from the lower terraces heading in a northerly direction (although Nicholson also offers an alternative route leading through the Anubieion and up the escarpment via the Serapeum Way) and rounding the edge of the escarpment before the Lake of Pharaoh is reached. This

route may have required the traveller to pass through the great temple enclosures of the Bubastieion (Figure 7.5) and Anubieion (Figure 7.6) on their way north, or may have perhaps skirted around them, remaining below the necropolis on the lower terraces at the edge of the cultivation. Either way, the imposing structures of the mud-brick temples would have made for an impressive sight on the journey into the necropolis. Remnants of Old Kingdom Mastabas may have been visible atop the escarpment from the lower terraces, lined, as they are, along the edge of the plateau. Visibility would likely be dependent on sand cover and the proximity of the traveller to the escarpment—the top of the plateau is less visible when standing closer to the escarpment.

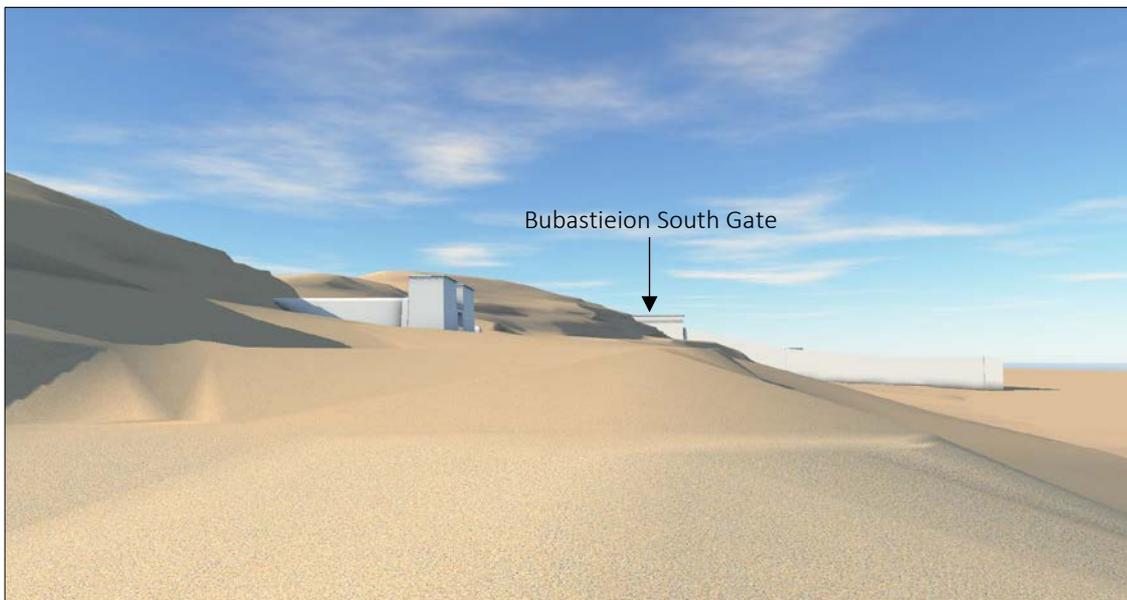


Figure 7.5. The probable southern approach towards the south gate of the Bubastieion, the tomb of Bakenrenef is to the left of the image. Facing north (source author).

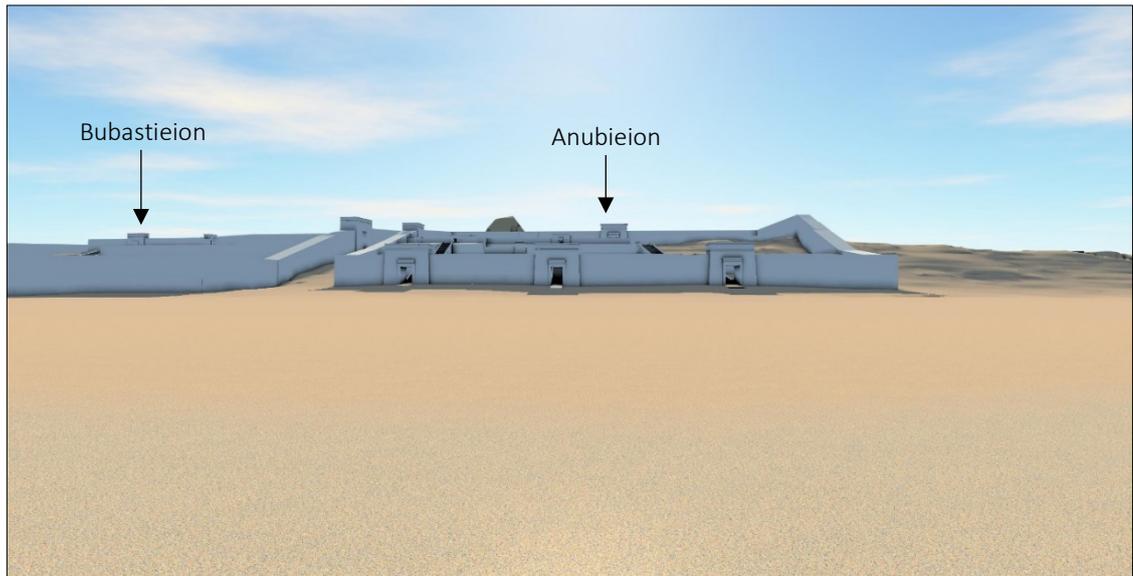


Figure 7.6. Possible view of the Anubieion complex when approached from the lower terraces of the cultivation. Facing west (source author).²

The route alongside the escarpment, taken by the sarcophagi bearers of the Apis and Mother of Apis (Davies and Smith 2005, 5), was a relatively flat surface to traverse. Around the northern extent of the escarpment (Figure 7.7) the approach to the wadi valley began, where the incline was probably quite shallow.³

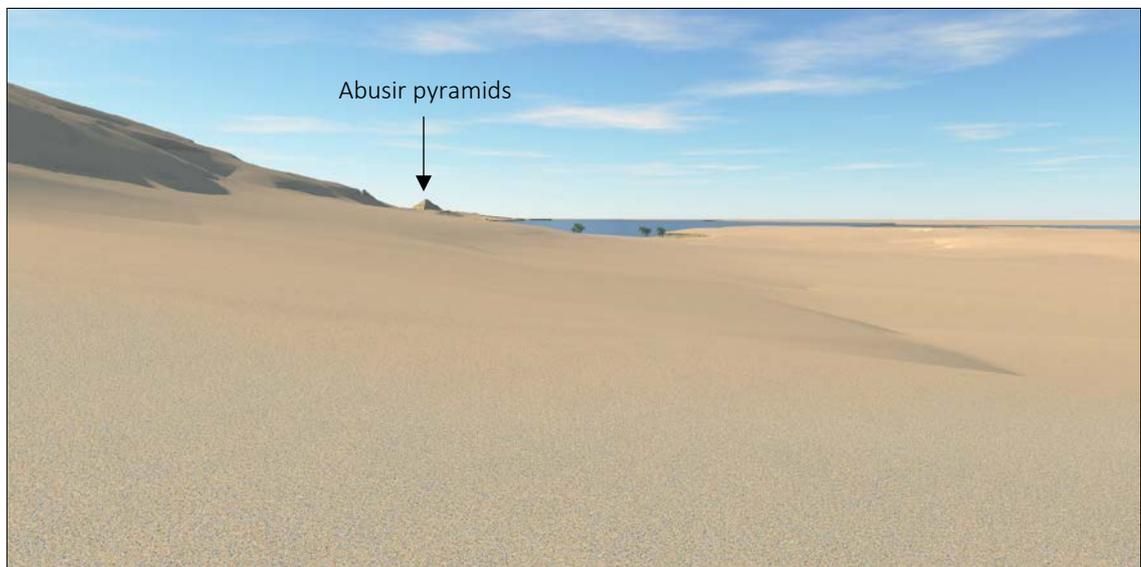


Figure 7.7. Possible view when travelling around the promontory of the plateau towards the Lake of Pharaoh and the wadi valley. Facing north-west (source author).

² See Chapter 5 for a discussion on the reconstruction of the eastern façade of the monument.

³ The incline of the wadi valley may have been slightly steeper in ancient times due to the false gradient that the current infill of sand has likely produced.

Nicholson discusses the pathways of movement in more detail than Smith, who is more equivocal in his approach, and relates the monuments to the route travelled. It is through the process of movement that the Nicholson narrative explicates the setting of the monuments and their position within the landscape. He offers a journey, travelling the pathways that lead to and from the major LP/EP structures, providing a brief interpretation of their use, and what a visitor may have been able to experience. It is by means of movement through the landscape, by visualising the positions of the monuments relative to the topography and other monuments, that one experiences the arrangement of the funerary site. The experience of the necropolis is dissimilar when dynamically encountered on the ground than when viewed from above on a static map. The setting of the monuments and their relation to the topography can assist towards the understanding of their placement and use. It should be remembered, however, that the modern experience and understanding of the landscape does not necessarily translate to an ancient experience or understanding which would depend on several factors including the reason for visiting the necropolis, when the necropolis was visited, who was visiting and their reason for doing so.

Smith's approach to movement is one of necessity, by which the protagonists arrive at their next destination therefore providing a continuation of the story. The direction that the protagonists are moving is often inferred rather than explicitly stated:

"Past the embalmers' workshops beyond the lake we passed through a gate that marked the entrance to Hepnebes, the sacred necropolis. A stone flagged sacred way mounted up a desert valley to the North entrance of the Serapeum, where the Apis bulls were buried. On the left the escarpment of the valley was filled with houses, small shrines and courtyards over which loomed a large brick-temple enclosure. Khelkhons took us first up a winding sacred way to the shrine of Thoth the Ibis ... Khelkhons took us down into the valley again and up a second narrow sacred way ... Khelkhons then took us to the temple enclosure through a fine stone gateway built thirty years ago by Pharaoh Nektanebos..." (Smith 1974, 70)

This excerpt begins at the entrance to the Wadi Valley Road at the northern end of the necropolis (Figure 7.8).⁴ Smith presents movement within a formula analogous to ‘we travelled to there from here and saw this on the way, when we got there this happened’, which works satisfactorily for the type of narrative that he has imagined. It allows the story to progress without getting caught-up in the minutiae of details of passage from one place to another. However, to better understand the landscape those are prerequisite details, which the Nicholson narrative provides.

Much of the detail in Smith’s narrative occurs within the structures rather than externally to them, and as such it appears that the means of approach to, or topographic location of, the monuments is inconsequential. Whereas this is the focus which drives the Nicholson narrative.

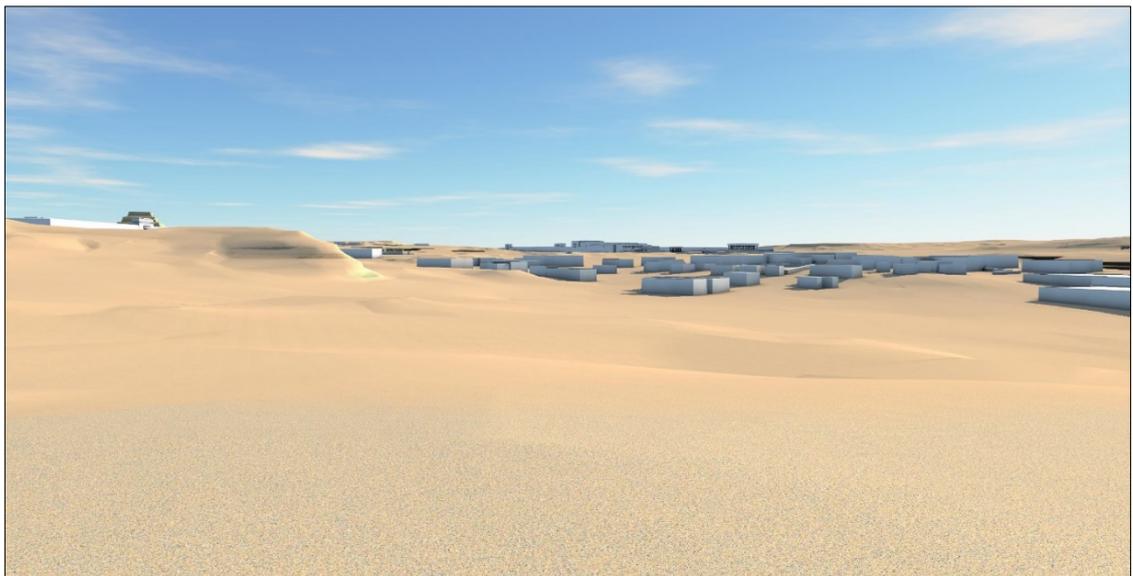


Figure 7.8. The congested wadi valley as it may have appeared during the LP/EP. Facing south-south-west (source author).

⁴ The wadi valley, situated to the west of a promontory which marks the end of the desert escarpment, and where the North Ibis catacombs are located, leads from the Lake of Pharaoh in a south-south-westerly direction towards and beyond the Serapeum enclosure complex. The approximate distance from the entrance to the wadi to the north gate of the Serapeum is in the region of 800m. The buildings of the SAN are mainly located against the escarpment to the east of the wadi, with the exceptions being the South Ibis catacombs, which are situated approximately 350m along the wadi road on the eastern side, and the North Ibis catacombs previously mentioned. These are located on the northern side of the promontory, screened from the view of the rest of the sacred animal complex.

Description of monuments and landscape

Smith limits his description of the monuments and their setting within the landscape, for his narrative they provide placeholders for the events in which the Athenians partake. This is not to say that he does not provide details of the structures and their locations, but if tasked to produce a map based on the Smith narrative, it would be a challenge to supply an accurate representation of the necropolis as discussed. His narrative captures the atmosphere of the necropolis during festival, how people may have conducted their business during this time, and what people may have been there to witness. His account shows a bias towards the SAN over and above the other temple complexes of the Bubastieion, Anubieion and Serapeum. However, the period in which this narrative was written is when Smith was engaged in work on that area of Saqqara, so his approach is understandable.

He omits mention of the Bubastieion altogether, whose great south gate may have provided access along one of the probable main routes into the necropolis (Figure 7.9). This omission is curious, if only for the temple's close spatial association with the Anubieion. It has been suggested that the area of the Bubastieion complex may have housed the Asklepion (Thompson 2012, 19; Ray 1976, 151), which would have been somewhere that the Athenian's may have wished to visit. This suggestion, however, appears to post-date the Smith narrative.



Figure 7.9. Approaching the Bubastieion South Gate from the route leading past the tomb of Bakenrenef. Facing north (source author).

The Serapeum Enclosure is mentioned in passing, witnessed from a distance, and the protagonists do not venture to this part of the necropolis, rather they spend their time between Memphis and the area of the SAN. From the narrative, it is difficult to estimate the location of the Serapeum Enclosure and its relationship to the rest of the LP/EP animal temples. Its link to the Anubieion through the Serapeum Way is not declared, but a route leading from the Abusir wadi is mentioned. The protagonists enter the necropolis along the wadi, which directs movement southwards towards the Serapeum. At the northern extent of the wadi valley, beside the Lake of Pharaoh, Smith (1974, 69) locates the temple enclosure of the feeding place of the ibises, complete with a waterside quay and hatcheries. Though there is currently no archaeological evidence to support these features, it is credible that they existed somewhere in the vicinity. Upon entering the wadi valley, the Athenians pass through a gateway marking the entrance to Hepnēbes. Again, no such feature is currently known, and the SGSP geophysical survey data of this area would appear to discount this as a possibility. The protagonists never venture any further south along the Wadi Valley Road than the South Ibis courtyard (Figure 7.10), and as a result the connectedness of the animal temples is not developed within the narrative. The temples do not exist in isolation of one another, rather they form part of a networked landscape. The temple-enclosures are connected and communicate through a system of paths and sacred ways. This element of

connectedness is absent from the Smith narrative, where even the journey from Memphis to the necropolis lacks description and dimension, and does little to unite the two centres. The same applies to the necropolis, where the networks within the landscape are left unexplored.

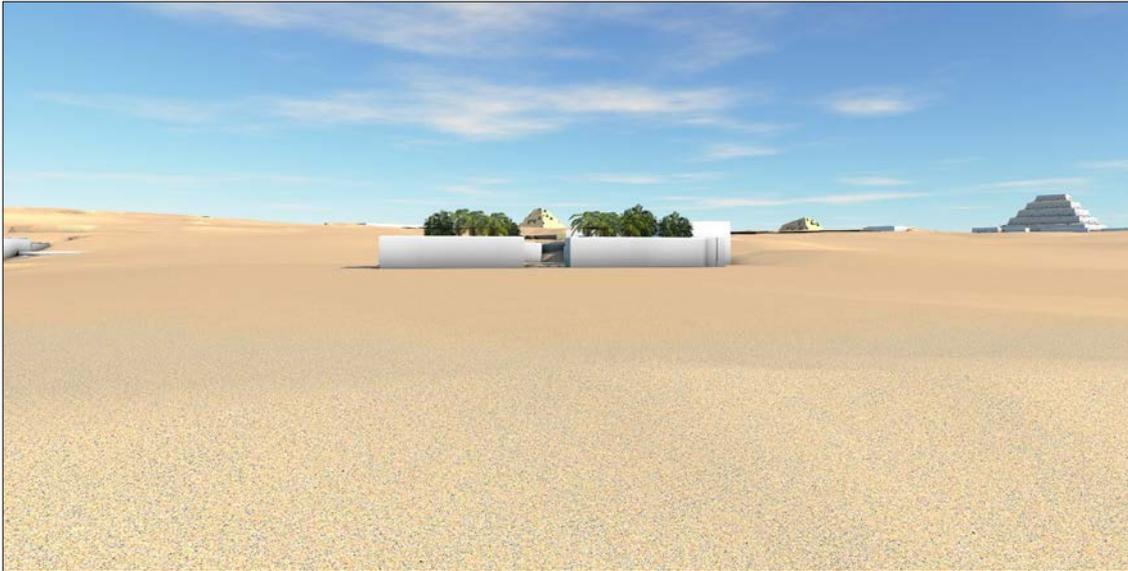


Figure 7.10. The approach to the South Ibis garden taken by Smith’s protagonists. Facing south-east. Smith (1974, 70) suggests a “winding sacred way” leading from the valley to the catacomb, however, Martin (1981, 12) suggests that no such ceremonial approach existed and access was gained over a deposit of excavation chippings. (source author).

The Nicholson narrative provides a brief description of the monuments and their landscape setting, but generally provides more information than the Smith narrative. He briefly describes the position of the Bubastieion and Anubieion temple enclosures as gateways of entrance to the necropolis, and their location along the edge of the escarpment. The settlement of the Anubieion is described along with the people and animals that may have resided there. From the Anubieion, Nicholson’s visitor makes the connection to the Serapeum via a journey along the Serapeum Way, lined as it was with shrines and sphinxes (Figure 7.11). Here he remarks on the Old Kingdom mastaba tombs which spread across the plateau (Figure 7.12). This detail gives the reader a sense of there being much more to discover beyond what is being described.

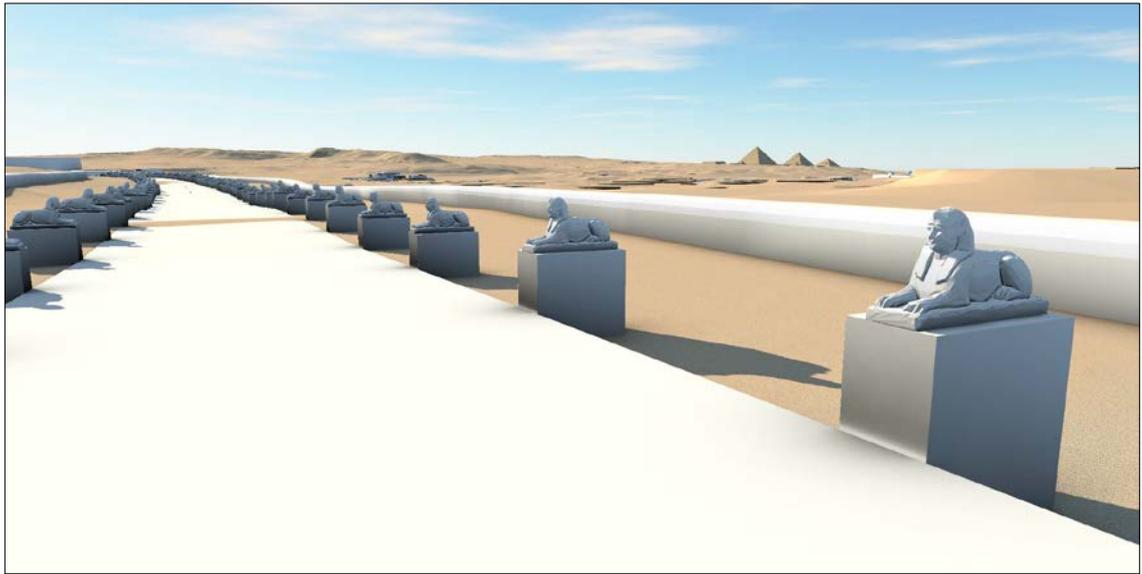


Figure 7.11. A conjectural view from the Serapeum Way towards the Abusir pyramids and the SAN. The denuded remnants of Old Kingdom mastaba tombs are visible in the middle-distance (source author).⁵



Figure 7.12. This panorama towards the north allows a better view of the Old Kingdom mastaba ruins (the dark brown features), which are situated between 90m–460m distant from the Serapeum Way (source author).

⁵ The sphinxes depicted in the model have been included for representation. Whilst they are modelled on a 30th Dynasty sculpture it is acknowledged that they are not specifically correct for those found alongside the Serapeum Way. The Sphinx model, created by Scan The World, is used under a free license and was obtained from <https://www.myminifactory.com/object/3d-print-sphinx-49998>. Accessed 11/04/2018.

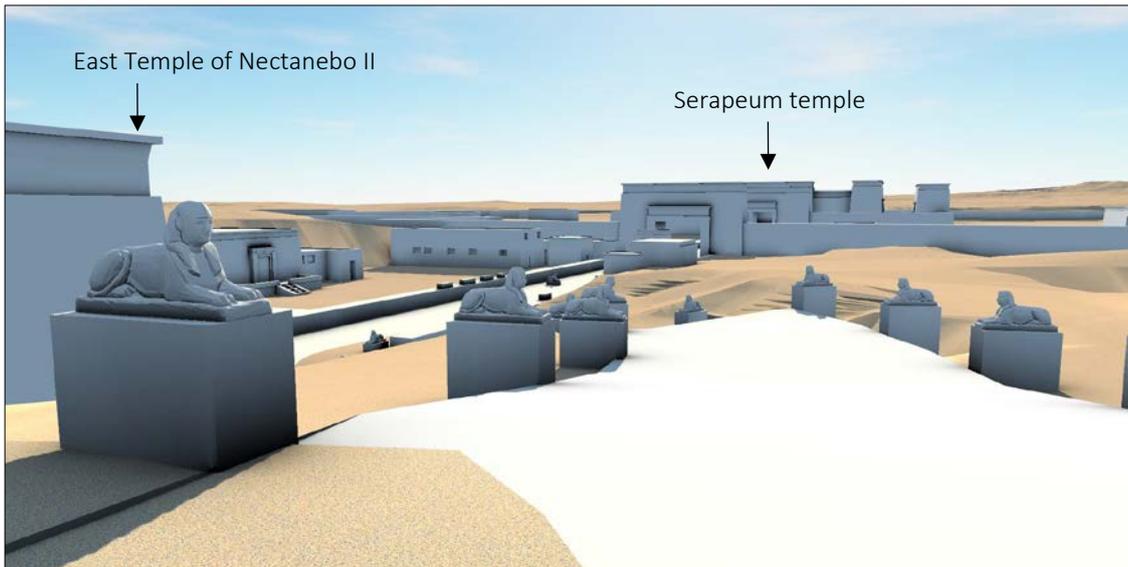


Figure 7.13. Approaching the Serapeum Dromos, facing east (source author).

Upon arriving at the Serapeum Dromos, Nicholson states that the visitor would first see the East Temple of Nectanebo II and the semi-circle of Greek philosophers. However, as one approaches the dromos it is the façade of the Serapeum and the small temples which are most prominently visible (Figures 7.13 and 7.14). The East Temple of Nectanebo II, whilst clearly visible, would be witnessed from the rear until the visitor arrives at the level of the dromos proper, having left the sacred way which slopes down considerably at this point. Only then does the frontage of the temple present itself to the viewer (Figure 7.15). Nicholson (2016, 26) notes that this area is a sand-trap in modern times, with the philosopher's hemi-cycle regularly filling up. A similar situation must have occurred in ancient times.

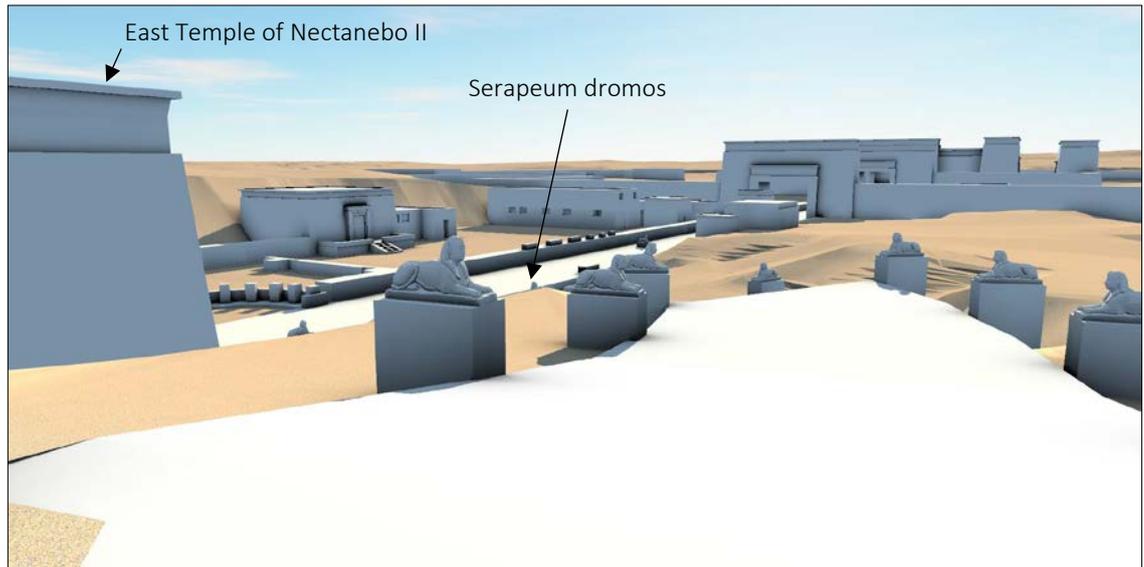


Figure 7.14. A closer view of the Serapeum Dromos, facing east (source author).



Figure 7.15. A reconstruction of the East Temple of Nectanebo II, as viewed upon arrival at the Serapeum Dromos. Facing south-east. The Philosopher's Hemicycle has been represented as orthostatic blocks (source author).

Nicholson uses the famous Barbot lithograph (Figure 7.16) to illustrate the view along the Serapeum Dromos toward the Nectanebo II temple. Whilst a welcome addition to the narrative this can only present a single perspective created partway through the excavation of the site. This is certainly an invaluable piece of historical data which assisted in the construction of the digital representation of the necropolis. However, the

digital model enables a view that Barbot could only have imagined (Figures 7.17 and 7.18).

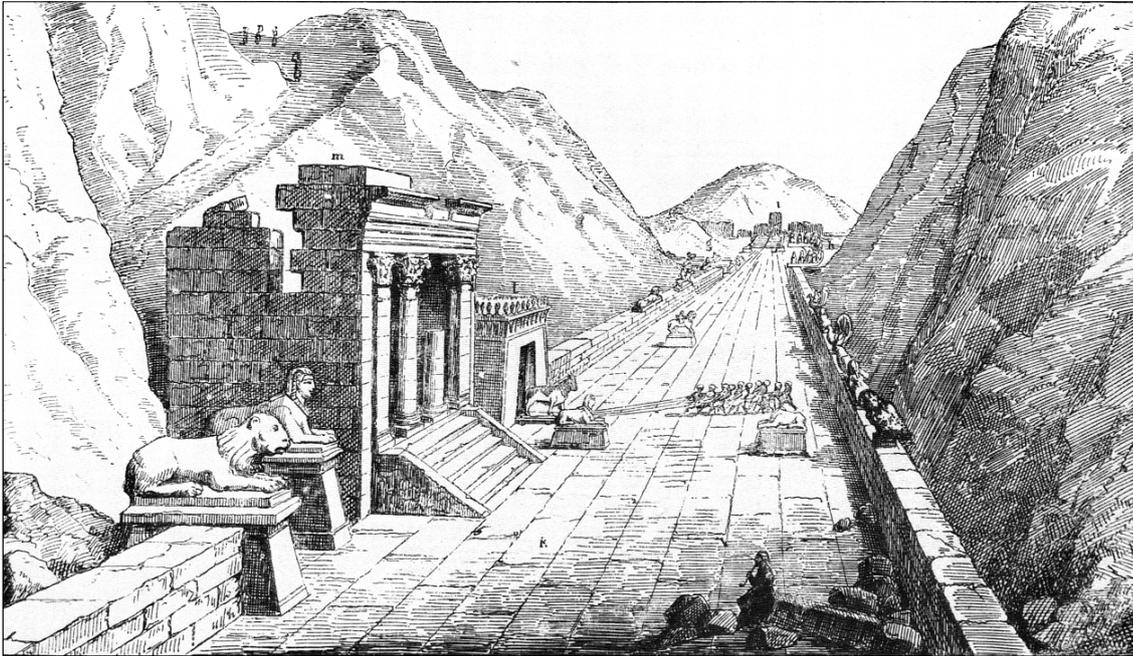


Figure 7.16. The Barbot lithograph, looking east from the Serapeum (Ray 1976, Plate I).



Figure 7.17. A reconstruction of the Serapeum Dromos area, which recreates the perspective of the Barbot lithograph. Facing east (source author).⁶

⁶ The lion statue to the left of the image has been included for representation and is not specifically correct for the statue depicted on the Barbot lithograph. The model, created by Scan The World, is used

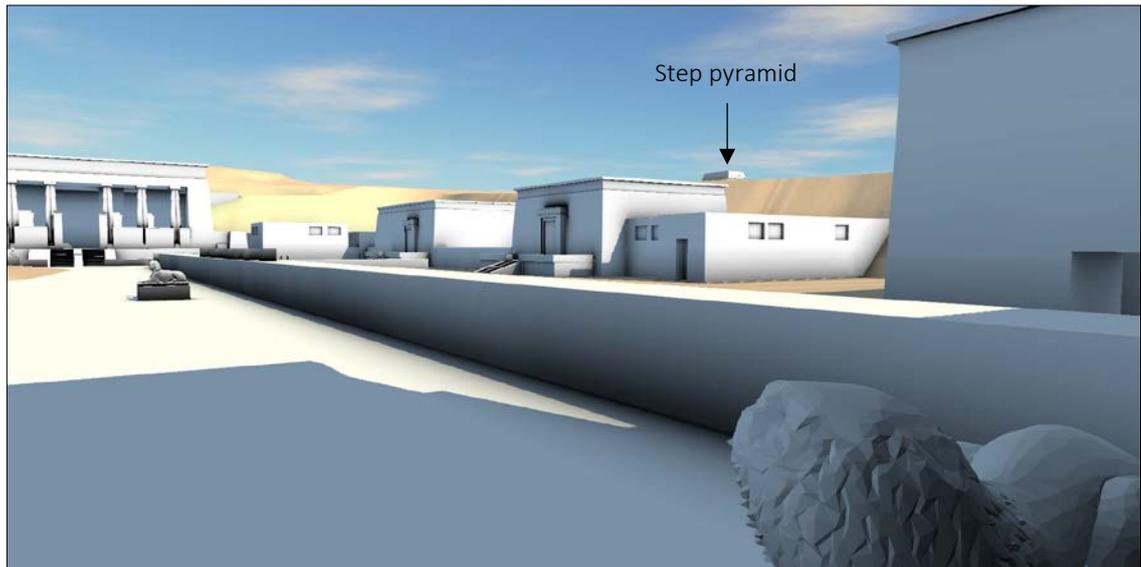
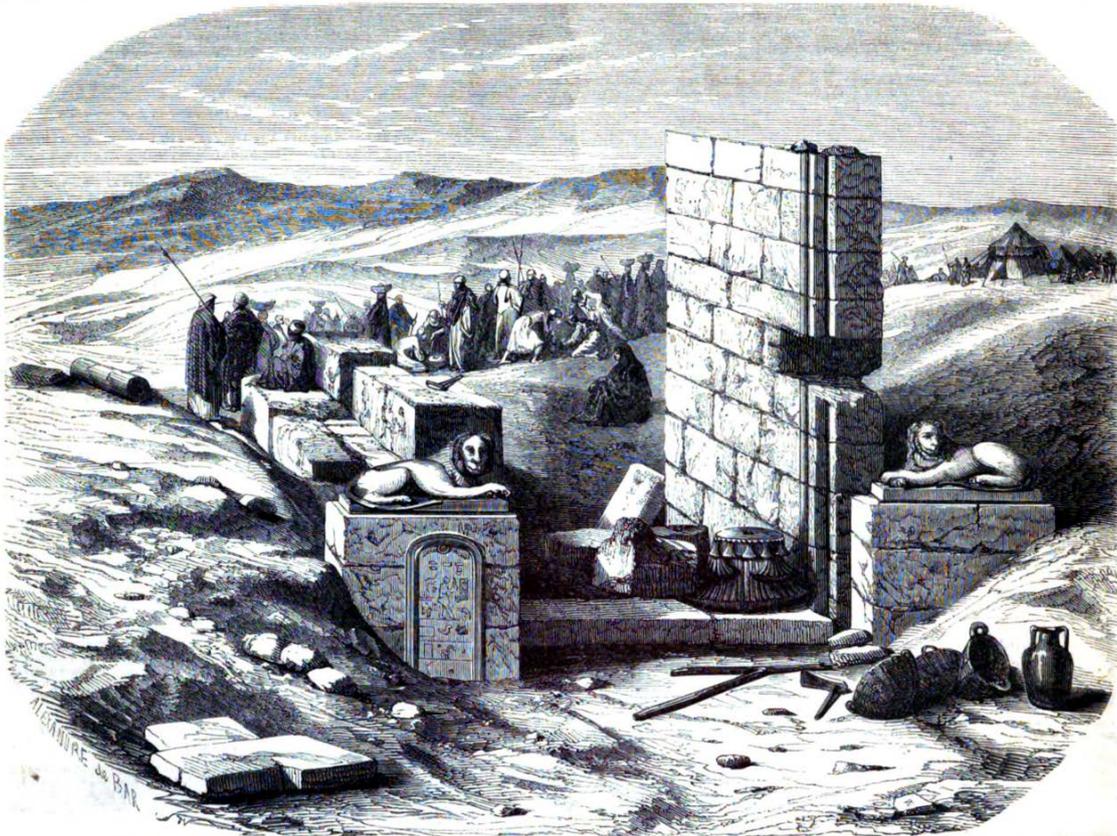


Figure 7.18. A view of the small temples to the south of the dromos from the same location as the Barbot drawing. Facing south-east (source author).

Nicholson (2016, 27) goes on to explain that were the visitor permitted to continue along the dromos towards the Serapeum temple (which was unlikely—see above) they would have passed through the gate of Nectanebo I. This feature was illustrated by de Bar (1858, 144) after a drawing by Barbot, and was depicted during excavation in a ruined condition (Figure 7.19). A potential view experienced by Nicholson’s visitor can be simulated using the digital model (Figure 7.20).



FOUILLES DE MEMPHIS. L'UNE DES PORTES D'ENTRÉE DU SERAPEUM NOUVELLEMENT DÉCOUVERTES. — D'après un dessin de M. Barbot.

Figure 7.19. The gate of Nectanebo I illustrated by de Bar (1858, 144), after a drawing by Barbot.

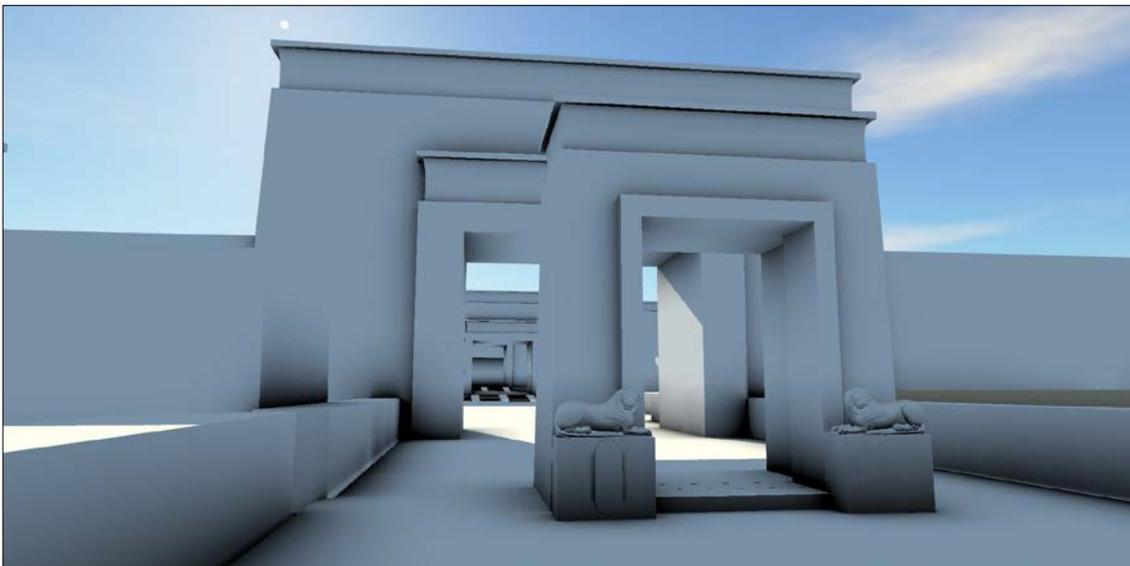


Figure 7.20. Facing west towards the Serapeum temple and the gate of Nectanebo I, viewed from a slightly oblique angle (source author).⁷

⁷ The lion statues depicted in the model have been included for representation. It is acknowledged that they are not specifically correct for those recorded at the Nectanebo I gate. The model, created by

From here Nicholson directs his visitor northwards beyond the Serapeum Enclosure, towards the settlement described by Smith (1975, 421). However, it appears more likely that most of the settlement at least was situated within the Serapeum Enclosure (see previous chapter). This does not preclude the settlement having either evolved or advanced outside of the enclosure, but the evidence appears to point to the internal north-east area of the enclosure. Nicholson's visitor then continues northwards towards the SAN. He takes them along a pathway oriented north-north-east from the Serapeum Enclosure, and he remarks that the location of the Ibis galleries lies to the west of this route. This would make the pathway travelled the North-South Sacred Way that leads into the south gate of the SAN, past the Southern Dependencies (Figure 7.21).

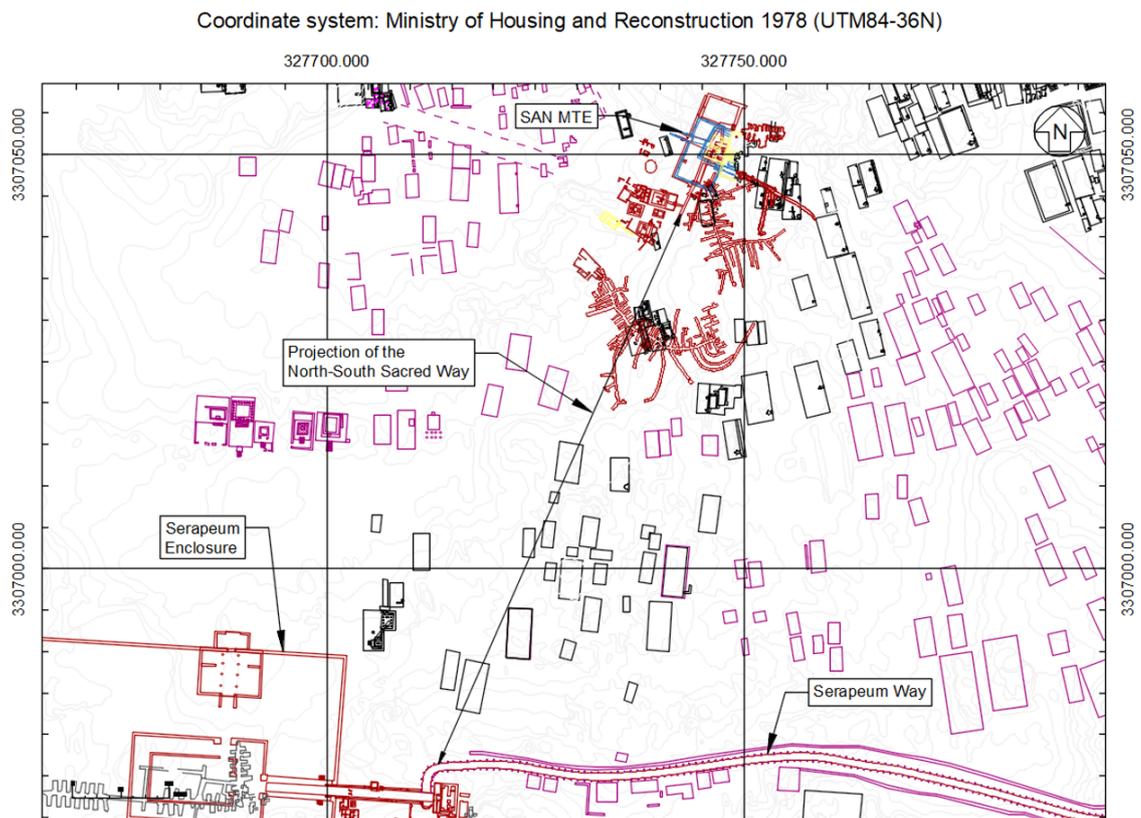


Figure 7.21. A projection of the North-South Sacred Way from the SAN MTE towards the Serapeum Precinct (source author).

It is unknown whether this paved way linked the SAN to the Serapeum Precinct, as there is currently no archaeological evidence to support this. The sacred way certainly

Geoffrey Marchal, is used under a free license and was obtained from:
<https://www.myminifactory.com/object/3d-print-recumbent-lion-26110>. Accessed on 11/04/2018.

connected the SAN MTE with the structures of the Southern Dependencies, and it appears plausible to suggest that it continued south-south-west to the Serapeum Precinct. The paved way may have also linked the SAN with the shrine and catacombs of the Rams, and perhaps the Children of Apis (Davies and Smith 1997, 118; Smith 2017 pers.comm.) if their location was situated near its route.

If the North-South Sacred Way is projected from the SAN MTE, and assuming little or no deviation from its course, it would join the Serapeum Way as it turned south to join with the Serapeum Dromos by the East Temple of Nectanebo II. The terrain along this suggested route is comparatively flat but the remnants of denuded mastaba tombs may have been cause for deviation along the way. If the route followed the suggested projection then it would have passed over at least eight Old Kingdom tombs and probably numerous shafts. This would have been unlikely to have caused any substantial concerns however. For example, the Serapeum Way passed directly over the top of the substantial mastaba tombs of Kagemni and Mereruka and the rest of the Teti North Cemeteries before arriving at the Anubieion. This area would have been sand filled during the time of construction. The builders may even have been unaware of the existence of the tombs beneath their feet. Based on this premise, it is fair to assume that topography and structures would not be a cause for concern when planning the route of a sacred way. Even if the sacred way were to take a more meandering route around the decaying mastabas, it seems probable that it would have connected with the Serapeum Way at, or near, the suggested location. It is also possible that a connection was made somewhere farther along the Serapeum Dromos.

Nicholson's visitor, having moved along the sacred way then arrives at the SAN MTE. Two approaches are mentioned. The one from the south, along the sacred way (Figure 7.22), which is the route that the visitor is taking, and the other from the north, leaving the wadi road towards the east and heading towards the main gate of the temple-complex (Figure 7.23).



Figure 7.22. The south gate of the SAN MTE as it may have been seen from the North-South Sacred Way. To the right of the image is a reconstruction of the pillared-portico (see Smith *et al.* 2006, 97) situated to the south of the SAN MTE. To the left of the image is a reconstruction of Block 1 of the Southern Dependencies. Just out of the image, a reconstructed peripteral temple has been placed atop the platform of the block to represent the type of structure which may have been present there (see Martin 1981, 17–18 and Fig.31) (source author).

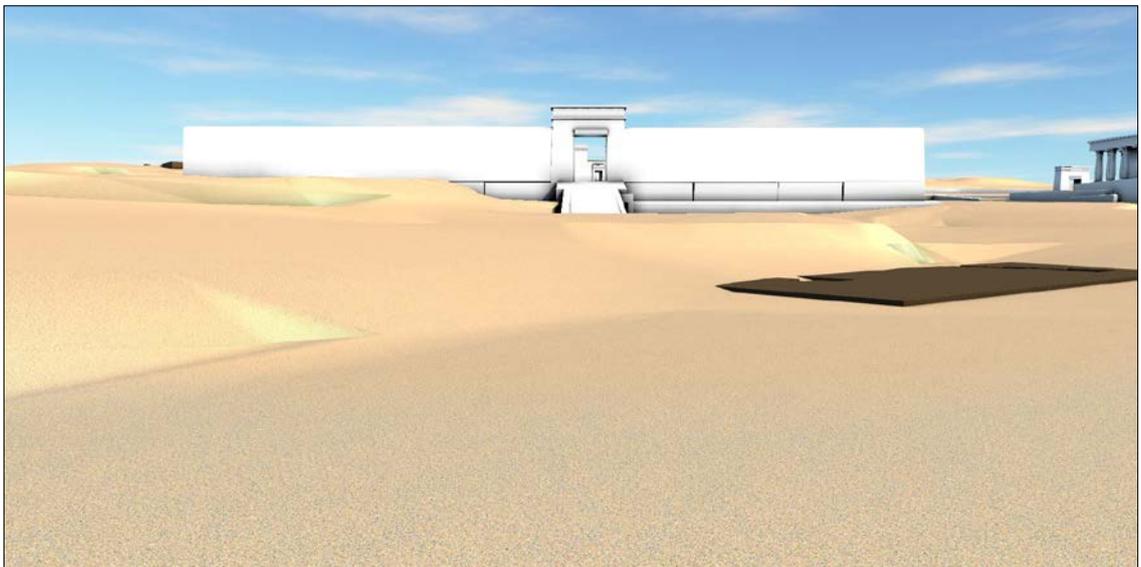


Figure 7.23. The western approach to the SAN MTE towards brick-built pylon of Nectanebo II, seen from the wadi road. The temple structure on the right of the image is the conjectural peripteral temple set atop Block 1 of the Southern Dependencies (source author).

He briefly describes the shrines and sanctuaries found in the MTE and he also remarks upon the position of the 3rd Dynasty mastaba S3518, situated above the temple-enclosure, where offerings were made in the hope of receiving cures for ailments (Figure 7.24).

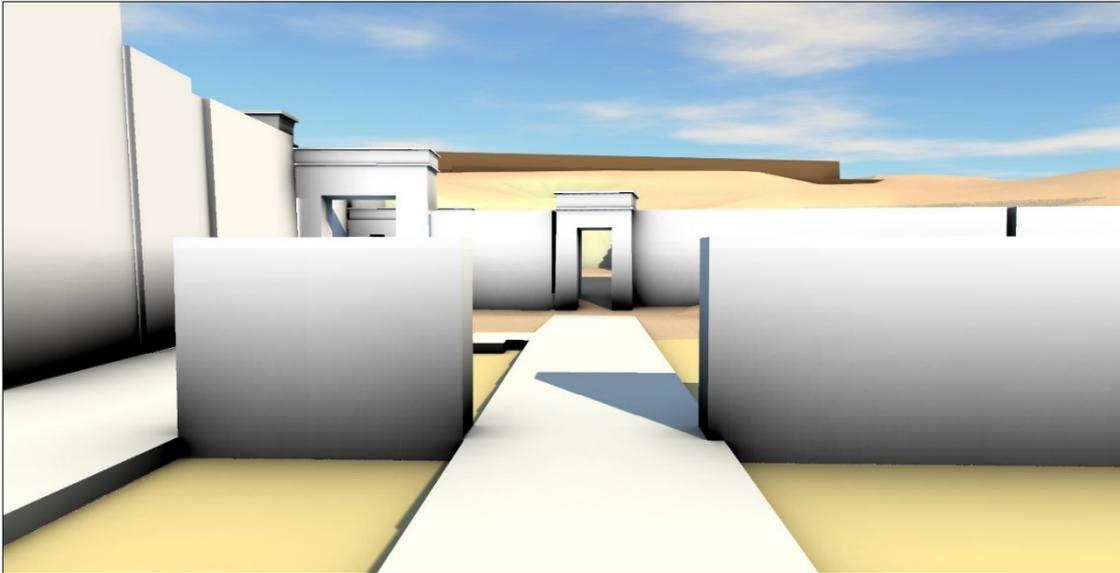


Figure 7.24. A view towards the gate leading to the dromos of the baboon catacombs. Mastaba S3518 is visible on the crest of the escarpment above the temple-complex (source author).

Nicholson's visitor leaves the MTE through the western gateway and heads north along the wadi valley towards the Lake of Pharaoh (Figure 7.25). He remarks upon the possibility of workshops and storage areas at the mouth of the wadi valley.



Figure 7.25. View towards the Lake of Pharaoh from the entrance to the wadi valley, facing north. The pyramids of Abusir are visible to the north west—left of image. A small number of earlier tombs are known to exist between this viewpoint and the pyramids. As denuded structures during the LP/EP they are not visible from here (source author).

The visitor then turned towards the east and visited the garden of the North Ibis catacombs which sits on a shelf at the side of the promontory (Figure 7.26). This funerary feature defines the most northerly extent of the SAN yet known. Nicholson (2016, 28) suggests that the visitor may have walked up the escarpment onto the plateau above the vaulted entrance to the catacombs (Figure 7.27) and headed south once again back towards the Serapeum Precinct.

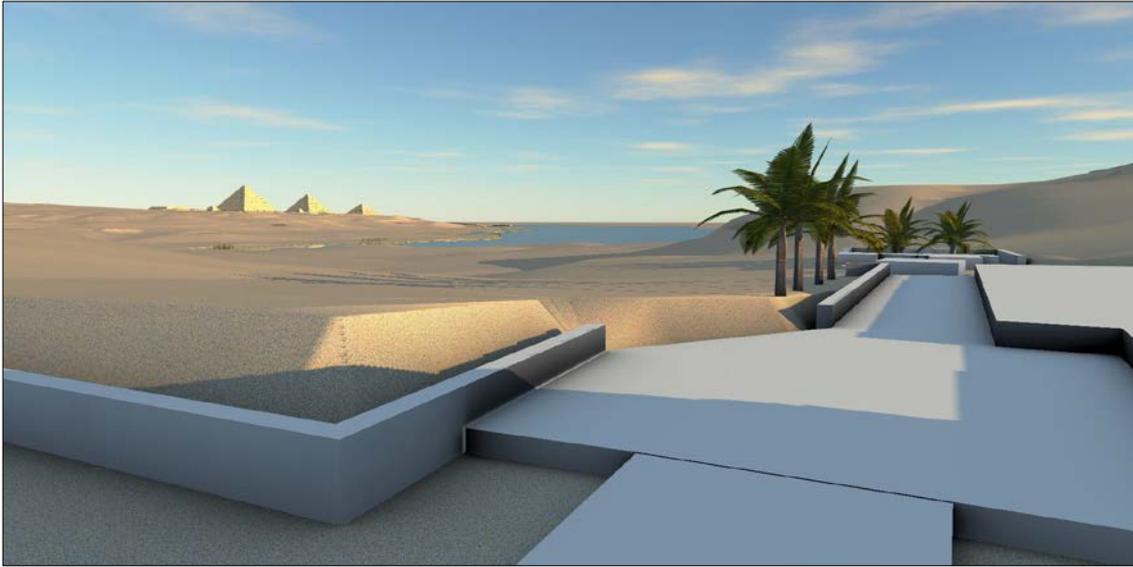


Figure 7.26. View towards the Lake of Pharaoh from the garden of the North Ibis catacombs. The time-of-day has been altered—to early morning—to accentuate the elevation of the garden above the wadi valley. Without some form of shading a false representation is given (source author).

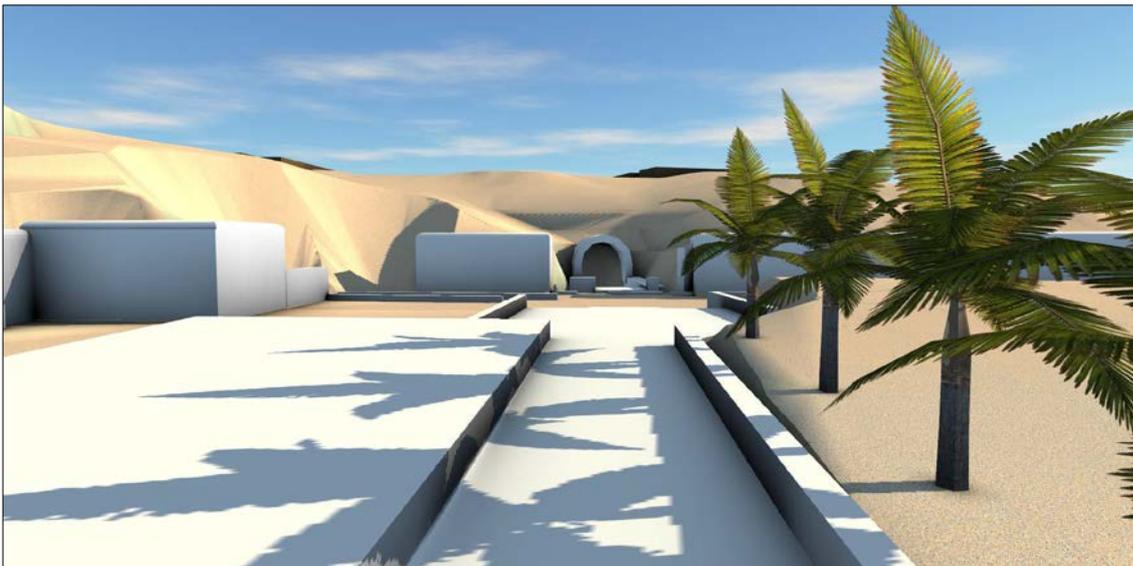


Figure 7.27. View towards the south from the North Ibis garden, facing the escarpment of the plateau. The vaulted entrance to the North Ibis catacombs is against the escarpment, between the walls to the right of the image (source author).

There is no known marked pathway that takes this route, but that is not to say that one did not exist. The escarpment is quite steep along the promontory, but not impossible to traverse. It would seem more probable that the visitor would have made their way back to the wadi valley, and either circumnavigated the northern extent of the plateau to travel south towards the Anubieion and Bubastieion enclosures, a suggestion also

made in Nicholson's narrative, or travelled back along the Wadi Valley Road towards the Serapeum Precinct. Alternatively, it may have been possible for the visitor to have continued north around the Lake of Pharaoh to *Pr-^ḥWsir* (modern Abusir) or headed north-west towards the 5th Dynasty pyramids and the cluster of Late Period shaft tombs situated close by.

Nicholson's narrative journey around the necropolis describes the connectedness of the LP/EP sacred landscape. It is perhaps through the topographic location of the monuments that this circuit is dictated and topographic affordances that guided the decision-making process when locating these monuments.⁸

Agential actions

The actions of the agents within the narratives are either active or passive, in as much as they either dictate the sequence of events or follow them, and their activities impose concealed boundaries and limitations on the narratives. The Smith narrative is built around the actions of the story's protagonists, whose activities progress the events that develop throughout. Visiting Memphis during the time of the burial of the Mother of Apis cow, Taese, the Athenians have little requirement to visit the Serapeum Precinct, as their time at the necropolis is mainly focused on the area of the SAN MTE where the burial takes place. Here the story construct has limited their experience of the funerary landscape by omitting a visit to the Serapeum Precinct. Nor do the Athenians stop to view the Serapeum Way during their time passing through the Anubieion. The connection within the landscape between these southern features and the northern animal catacombs and temples is not made, nor hinted at. The Athenians are led around the necropolis by a local guide who assists in their access to certain monuments and takes them to visit the craftsmen and traders on the plateau, much like an organised visit to Saqqara or Giza might be like today. The similarity between Smith's narrative visit and one that might be experienced by a modern tourist is salient. Modern organised sight-seeing tours often visit specific monuments, where limited information is provided on the history of a feature, often constrained by time considerations, and its

⁸ This idea is discussed further in Chapter 10.

place in the landscape is neglected. This creates a divide between the monument as a feature of interest in and of itself, and its function within a wider landscape context.

The Nicholson narrative does not attempt to engage in a story-driven account, rather it explicates the features of the necropolis through a postulated journey undertaken by a generic visitor/pilgrim. This ambiguity of the journeying character allows Nicholson to progress the narrative without the immediate limitations faced by Smith. However, boundaries are still present. The casual visitor or pilgrim would not have been allowed into the sacred areas of the shrines and temples, where only certain members of the priesthood were permitted. This restricts the areas that the visitor would be allowed to attend, and as a result, Nicholson chooses to describe certain areas (such as the Serapeum Enclosure beyond the dromos) using a caveat of “if the visitor were permitted...” which allows him to include them in his account.

The narrative account, if agent led, is regulated in its approach by the permissions granted to the category of agent. A casual visitor, for example, would experience the necropolis differently than a member of the cults who worked there, where each would be afforded different access permissions and have different motives for being there. A pilgrim visiting during a festival day would encounter a different experience again. There are as many reasons that each experience would be different, as there would have been people to experience them.

Summary

Critiquing the Smith and Nicholson narratives has provided an opportunity within which to examine and compare the landscape that they depict with that offered by the digital landscape representation. Just as the narratives require no *a priori* knowledge of the funerary site, the digital representation does not require archaeological proficiency to mediate the viewed experience of the landscape, as perhaps understanding an archaeological survey or site drawing would (Evans 2004, 110). This connects with aspects of the written narrative which seeks to provide an experience of a time or place that is no longer extant. Through detailed description the narrative imparts the

components that enable the reader to form a mental image of what they are reading, the digital model offers an immediate visual representation.

The next chapter will present a new landscape narrative for the LP/EP sacred landscape at Saqqara. The narrative account will be employed to address the overarching research questions of this project in a meaningful way, appropriate to the medium of the digital landscape model.

CHAPTER 8

Developing a new narrative

Introduction

To develop a new landscape narrative of the Saqqara necropolis, a consideration of perspective is first required: from whose perspective should the account be presented? Should the narrative be story driven and related through the experience of central characters, as the Smith (1974) account is? Should there be no central character and no story, rather the account is presented as a series of locations? Or, should the narrative be offered using the movements of a generic visitor to the site, as the Nicholson (2016) account provides? The character of the agent, or observer, will affect the possibilities that the account affords. A casual visitor to the site would likely be restricted in accessing any of the sacred areas, if indeed they were granted access at all. A priest occupied within the cults would have different access privileges to the necropolis and therefore would offer a different account of the funerary site.¹

It would be possible to construct a scenario where a modern archaeologist is deposited back in time. They describe their journey around the necropolis, remarking upon the monuments, their visibility, and topographic relationships, approaches and routeways. This would permit access to all areas without condition, and they would have a priori knowledge of the site from a modern archaeological perspective. This method would remove the need to assume specific knowledge and understanding of a person from the time (i.e. pilgrim or priest), and the privileges conferred by character or status. However, it does present the problem of sanitizing the site, where everything is visible and accessible without context. Therefore, a deliberate compartmentalisation of the site would be requisite where it was to be accessed by a casual visitor/tourist/pilgrim or

¹ The generic terms 'priest' and 'priesthood' represent a hierarchical system of differing authority and privileges. For example, certain areas of the temples would be restricted for a *wꜥb* priest, whereas a *sm* priest may be permitted.

priest/necropolis worker. This introduces a disconnect, separating areas of the site from one another, where they are all part of a greater whole. The site is a funerary mechanism dedicated to the sacred animals and the gods they represent, with a hierarchical system of restriction applied. Thus, we return to the character of the agent and their privileges.

Alternatively, the narrative could be presented in the format of a travel guide which attempts to recount potential experiences to a casual visitor to the site, contemporary with the period. The narrative need not be story driven like Smith's account, rather, it will provide a commentary of a potential journey around the LP/EP funerary landscape. The narrative will explain what can be seen and experienced at various locations, like one might expect from a modern *Baedeker*. Through this literary device, the need for a name or history of a fictional visitor is removed. As a travel guide, it connects with any generic visitor to the site. Neither is a reason for attending the necropolis required, other than the explanation that this guide presents a visit to the sacred monuments. Thus, this removes the need to assume any a priori experiential knowledge of a participant in the account and does not preclude the provision of details for areas that a visitor may not be permitted to enter.

The new landscape narrative that follows will take the second approach suggested above. It was considered that this approach offered the best opportunity to represent the necropolis landscape and its monuments through the literary approach of a 'second-person pronoun narration'. The landscape will be examined through a journey around the sacred temples and monuments undertaken by a casual tourist (the reader). The new narrative will take a mixed media approach, presenting a traditional written account with the inclusion of still images, maps and plans, and digital video where apposite. This combined approach will provide the best opportunities to explicate the monuments and their potential relationships with the topographic affordances, entanglement between monuments, people and place, and pathways of movement. It should be noted here that the digital landscape has been left intentionally unpopulated. Whilst the narrative may describe the hustle and noise of the settlements to attempt to convey their character, the digital images are not generated to reflect this, where only

the terrain and monuments are represented.² Like the decision made early in the project not to include textures or wall paintings on the structures and to present them as conceptualised models, the decision to leave the landscape empty of humans or animals was made for practical reasons. Firstly, model creation is very time consuming, research is required to ensure a high degree of accuracy and build times can add to an already difficult schedule. Secondly, the inclusion of characters within the scenes would likely go against the conceptual approach employed and detract from the focus of monument and landscape.

General notes

Many of the statements made within the narrative will either have been referenced in the preceding chapters or are discussed in the following chapter. However, references, where applicable, are included in footnotes, so as not to interrupt the flow of the narrative. Additionally, the footnotes have been used for general clarification. For example, certain tomb structures that are discussed have modern find numbers allocated to them, and whilst this numbering was not considered appropriate for inclusion in the main text, it was judged helpful to enable the reader to relate their location in the text to the landscape of Saqqara.

There are some features included in the digital model that are based on written accounts, but whose locations and characteristics remain speculative. These are presented in the narrative account as they appear in the landscape model. They are identified through footnotes and are discussed in the following chapter.

The route taken around the necropolis in the narrative is without historical precedent (Figure 8.1). However, the narrative follows known routes or pathways that are referenced in historical accounts or modern publications. It is known that the sarcophagi of the Apis and Mother of Apis bulls were transported north, probably along the escarpment edge, around the promontory to the wadi valley and onward to its

² Where human figures are used, their purpose will be to show the scale of the structures and their setting within the landscape. The figures, which are included with the software as part of their conceptual design tools, are presented as is, in modern clothing and not styled to represent ancient Egyptians.

destination (Smith *et al.* 2006, 3; Thompson 2012, 188). It is also known that the mummified Apis bull was taken in procession along the Serapeum Way to the burial chambers under the Serapeum temple (Smith 1981, 339) and that this was a major route of procession across the necropolis to the Serapeum Precinct. Dodson (2016, 6) contends that the Wadi Valley Road was the primary access to the necropolis from early times, and this route links the northern ‘entrance’ to the necropolis with the SAN and Serapeum precinct, which was built directly over it. Excavation has also shown that a North-South Sacred Way existed from the SAN leading towards the Serapeum Precinct, though whether it reached that far has yet to be proven. These ancient routes negotiating the necropolis all appear to have a commonality, in that they connect each of the sacred animal monuments with one another. Nicholson’s narrative suggests the possibility of a circuit around the necropolis (Nicholson 2016, 28) and the new narrative adopts this approach. Details of the journey from the town of Memphis, a likely destination from which a tourist or pilgrim may have arrived at the necropolis, are intentionally omitted as they are beyond the scope of what this narrative aims to achieve.

Notes on numbering

The narrative account is presented with titled sections. Each section will be analysed and critiqued in the following chapter. Within the body of the text, square brackets contain filenames of movie files available on the accompanying CD—for example [Mov_8i—follows (2) through (4)] refers to file Mov_8i.wmv, whilst ‘follows (2) through (4)’ denotes the map locations which define the route taken. Curved brackets contain figure references to the images representing the locations discussed—for example (Figure 8.1) refers to the image captioned Figure 8.1.

The image caption adopts the following format:

Figure chapter number. Image number. **(Map location number)**—Image description.

The map location number is bold and set within parenthesis (for example: Figure 8.1. **(1)**)—Looking west towards the Unas valley temple ruin located at the far edge of the

lake.) This number corresponds with the numbers in the blue circles on the maps, which depict where the still scenes were visualised, much like that of the *Underwood and Underwood Patent Travel System* (1911). Arrows projecting from the circles depict the direction that the scene was visualised.

Notes on the video files

The videos which portray movement through the landscape are not depicted at natural walking pace. This decision was made because the distances often covered would equate to long durations of movement, therefore the videos are intentionally sped up. The video files are located on the accompanying CD in the following folder:

0845241_SAWilliams_PhD_Thesis\Chapter_8_Video\

Notes on Egyptian names

The naming convention for the features and areas described in the necropolis follows Ray (1976, 152) except for the Serapeum Way, which follows Thompson (2012, 18) to differentiate it from the Serapeum Dromos. The ancient names are presented as transliterations of their hieroglyphic form.

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

328000.000

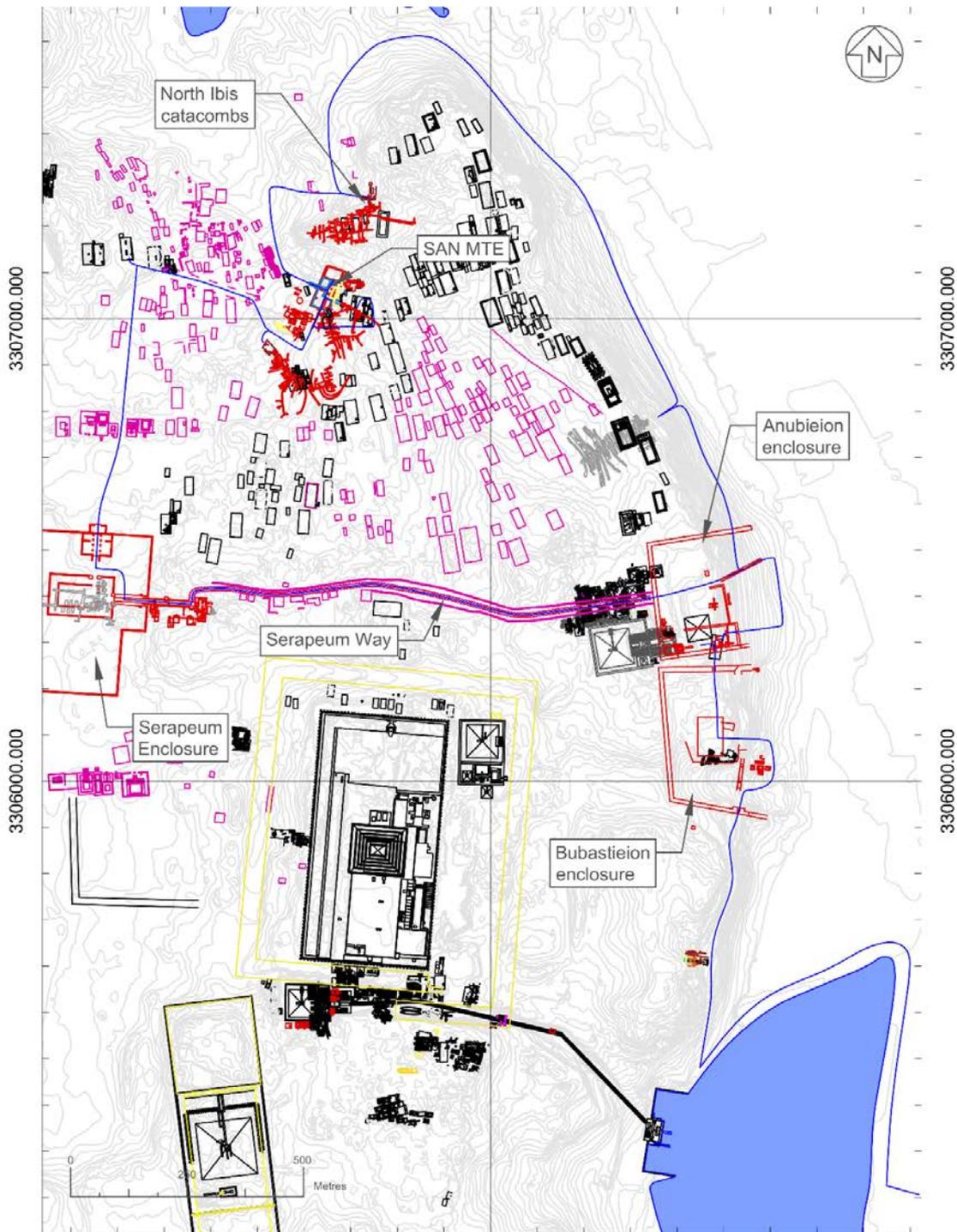


Figure 8.1. Map 1—General overview of the Memphite necropolis of North Saqqara. The route proposed by the narrative account is shown as a blue line. Detail maps used throughout the narrative depict view locations using numbered circles as described above (source author).

ḥnh-tꜣwy, the Memphite necropolis

Approaching the necropolis from the direction of Memphis (Figure 8.2), you arrive at the fringe of a small seasonal lake situated in front of the ruined valley temple of Pharaoh Unas. Once an impressive entrance structure granting access to the pyramid causeway, now ruined and decayed. Looking across the desert, towards the west, the cut of the causeway is visible leading up through the sand to the pyramid in the distance. The Step Pyramid of Djoser and the southern part of the great enclosure are visible, augmenting the boundary between land and sky. This conspicuous monument dominates the view and its stepped edges present an unnaturally angled enhancement to the natural contours of the landscape (Figure 8.3). Towards the north, the white walls of the great mud-brick enclosure of the Bubastieion links the lower terraces of the cultivation area with the top of the plateau and the necropolis proper. At its western extent, the top of the ruined pyramid of Teti is just visible above the escarpment edge. Beyond the Bubastieion, the walls of the Anubieion complex are barely visible (Figure 8.4).

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

328500.000

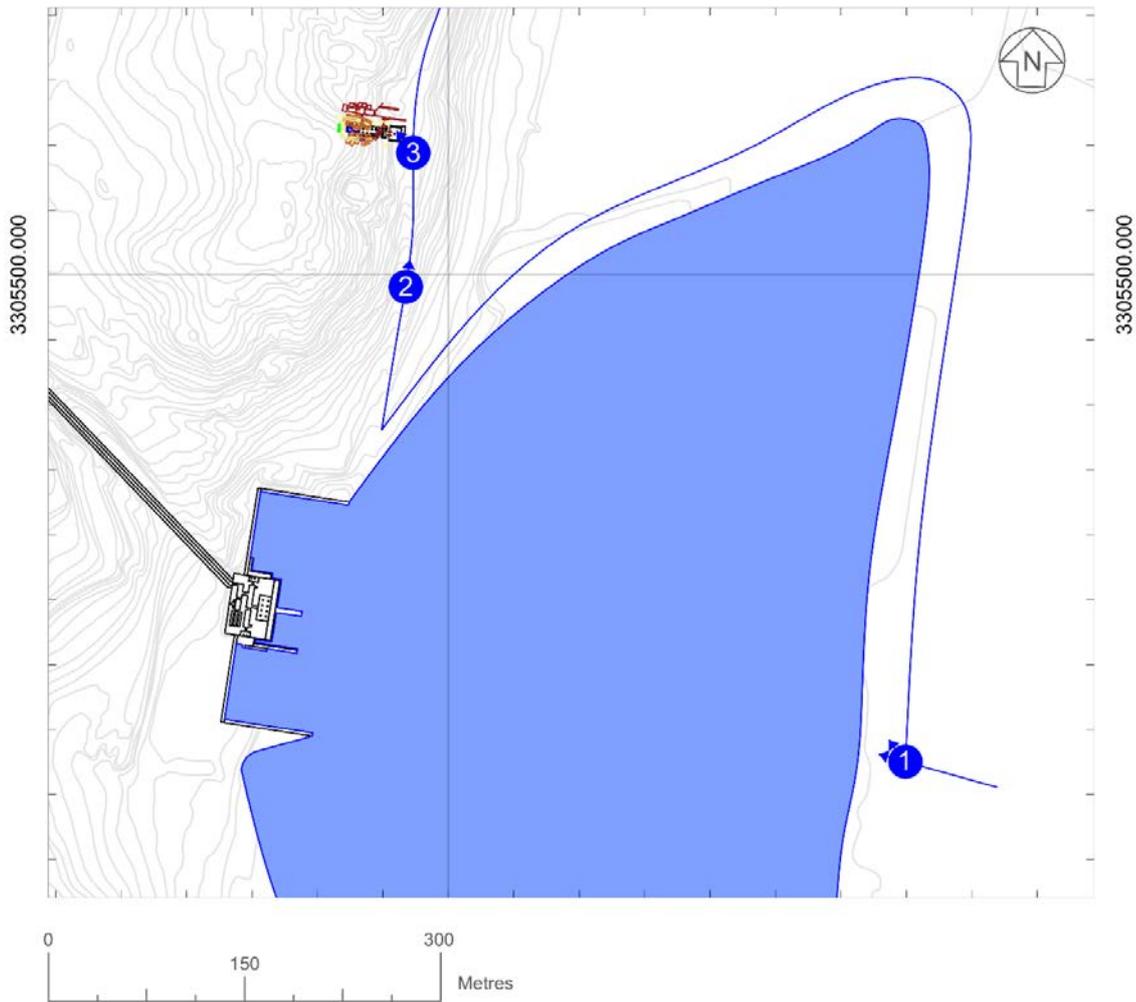


Figure 8.2. Map 2—The southern route to the necropolis, arriving from the direction of Memphis. The blue arrows indicate the direction of view (source author).



Figure 8.3. **(1)**—Looking west towards the Unas valley temple ruin located at the far edge of the lake. The pyramid of Unas is visible to the left of centre. The Step Pyramid of Djoser is located to the centre. The tomb forecourt of Bakenrenef, partway up the escarpment is just visible towards the right of the image. The ruined Teti pyramid and enclosure wall of the Bubastieion are visible to the right (source author).

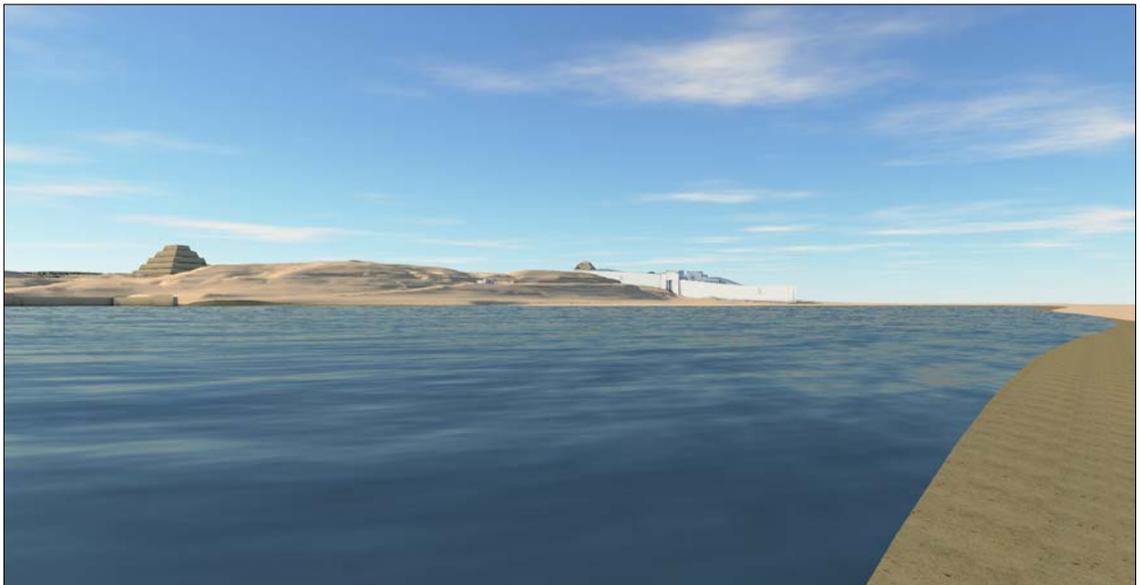


Figure 8.4. **(1)**—Looking northwest from the same position. Part of the Unas valley temple is visible to the left of the image, along with the Step Pyramid. The top of the Teti pyramid is situated beyond the Bubastieion complex which is visible to the centre-right (source author).

After negotiating the periphery of the lake an approach to the necropolis can be made along the northern inclined routeway leading to the great South Gate of the Bubastieion. This pathway follows the side of the escarpment, offering a gradual sloping incline by which you can ascend towards the plateau. About half way along the route,

situated to the west of the road and cut into the bedrock of the escarpment, lies the tomb of Bakenrenef and adjacent tombs (Figure 8.5). Of Bakenrenef's tomb, a pylon gateway, courtyard and entrance door are visible, if somewhat sanded-up (Figure 8.6). Continue northwards towards the Bubastieion (Figure 8.7). The full size of the south gate does not become apparent until you pass the protruding escarpment edge (Figure 8.8), only then is the size of the pylon evident [Mov_8i—follows **(2)** through **(4)**]. Westwards, up the escarpment, only the top tier of the Djoser pyramid is visible, hinting at the multitude of funerary installations on the plateau (Figure 8.9).

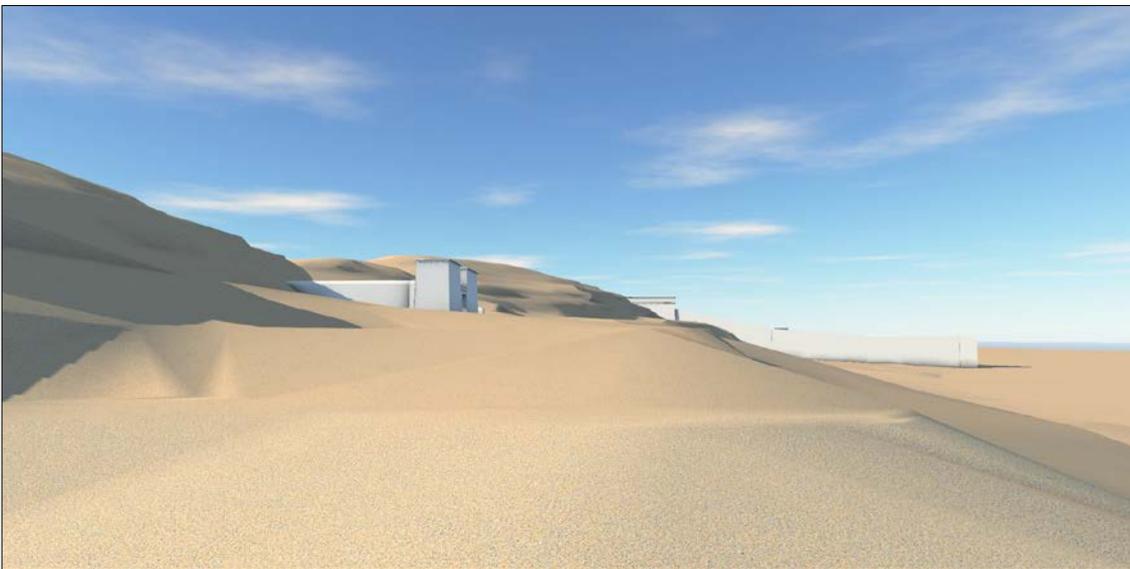


Figure 8.5. **(2)**—Standing on the pathway at the edge of the escarpment, leading to the Bubastieion temple complex. Facing to the north, the pylon gateway and part of the forecourt of Bakenrenef's tomb are visible on the left atop the sandy slope, set against the escarpment edge. Beyond the escarpment, the pylon of the Bubastieion south gate and its enclosure walls are clearly visible (source author).



Figure 8.6. **(3)**—Looking from the road towards the pylon-gated courtyard of Bakenrenef's tomb. The south gate of the Bubastieion is just visible behind the terrain to the right of the image (source author).

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

328500.000

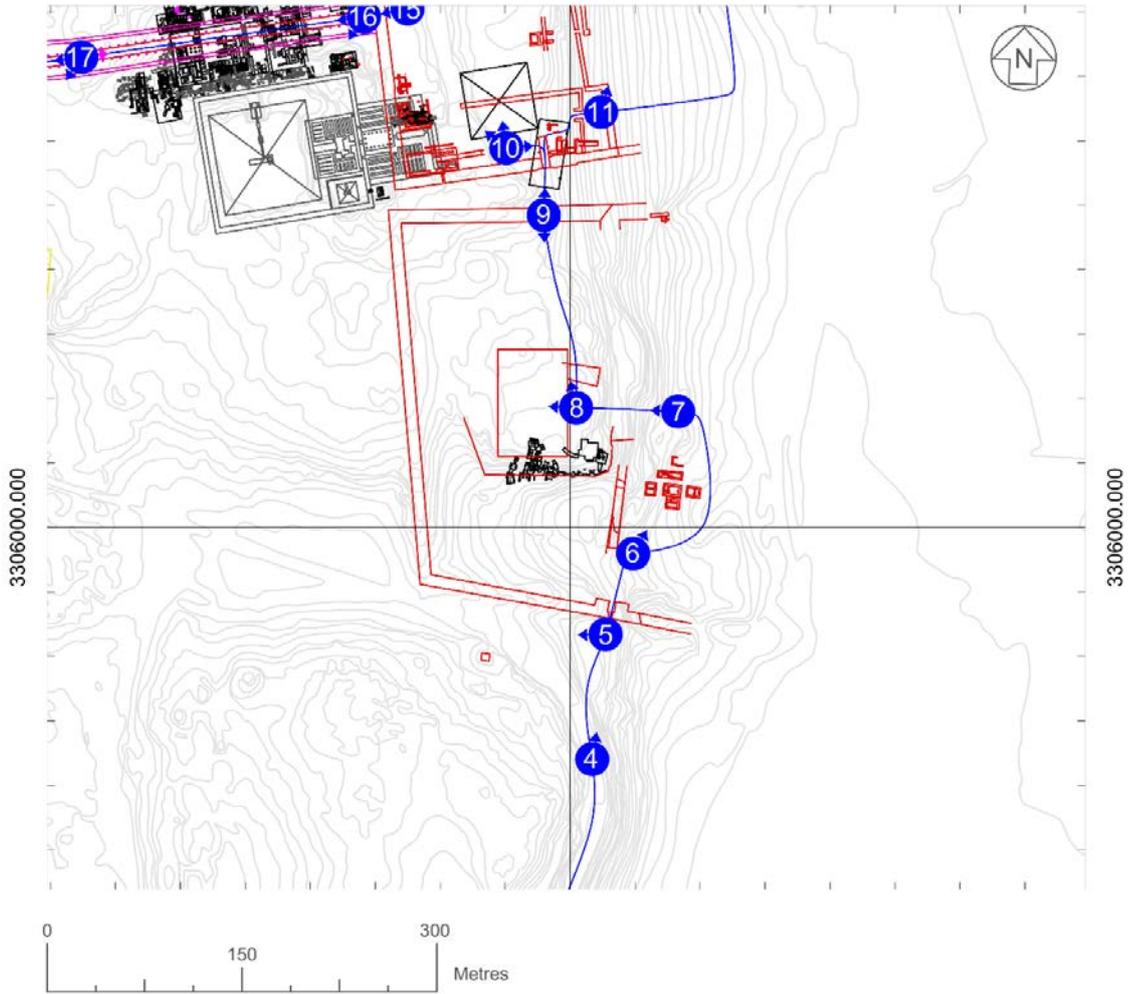


Figure 8.7. Map 3—The Bubastieion area (source author).



Figure 8.8. (4)—Facing north, towards the Bubastieion south gate (source author).



Figure 8.9. (5)—Standing beside the Bubastieion south gate, facing west up towards the plateau. The top tier of the Step Pyramid is just visible (centre) at the top of the rise (source author).

***Pr-B3stt*, the Bubastieion**

Although it may be possible to traverse the slope up to the escarpment from this point, following the substantial mud-brick walls of the Bubastieion, you should enter the complex through the South Gate. There you are confronted with a dense and busy settlement (Figure 8.10), comprising a collection of small, multi-roomed buildings built adjacent to and abutting one another.³ Here is where the members of the cults reside along with their families. The temple-town is busy with the sounds of daily life, animals

³ Jeffreys and Smith 1988, 78.

and children noisily rushing around, the smells of food preparation and cooking. Beyond, a great stairway leads up to the main temple on top of the plateau (Figure 8.11). Upon ascending the many steps [Mov_8ii—follows (7) to (8)], you stand before the great temple compound at the centre of the complex (Figure 8.12). Hewn into the southern face of the escarpment below the temple are many rock-chamber tombs. *ꜥwy-n-ḥtp n nꜣ miw*, the Cat ‘catacombs’ are in these tombs, where they have been reused for the deposition of the sacred mummified animals. The temple interior is restricted to members of the cult and priesthood, but windows of appearance engage the public with performance during festival days when ceremonies take place. A treasury is also located here, along with other smaller temples.⁴ Bypass the temple by walking north around the exterior and head for the north gate of the main enclosure and the causeway which leads to the Anubieion complex (Figure 8.13). From the gateway, you can turn and face the south which offers a view of the main temple enclosure (Figure 8.14).

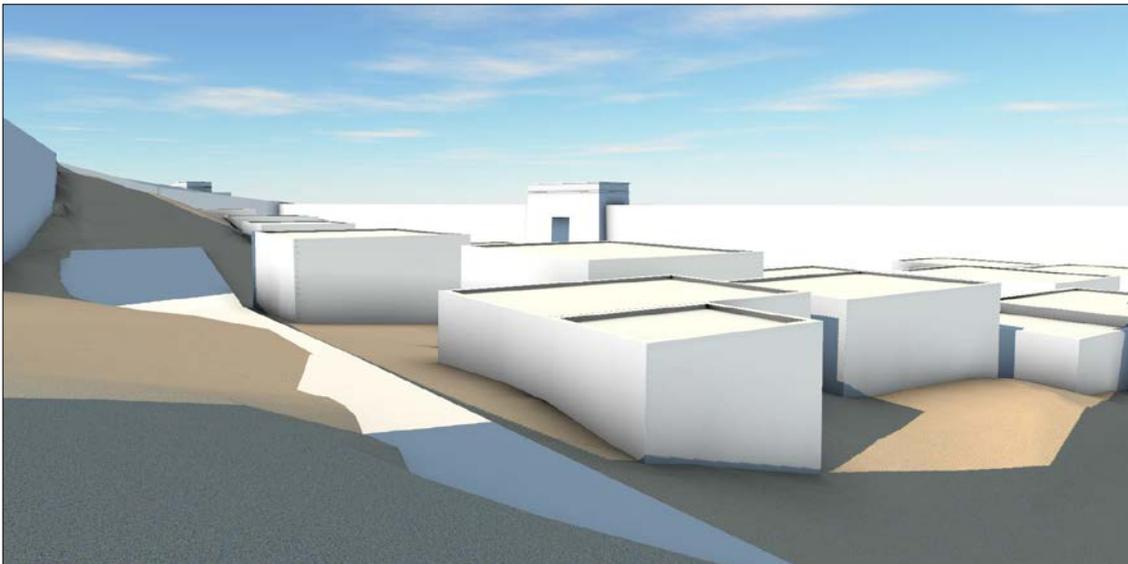


Figure 8.10. (6)—Standing inside of the Bubastieion South Gate facing north-north-east offers a view of the densely packed settlement within the enclosure (source author).

⁴ Thompson 2012, 19.

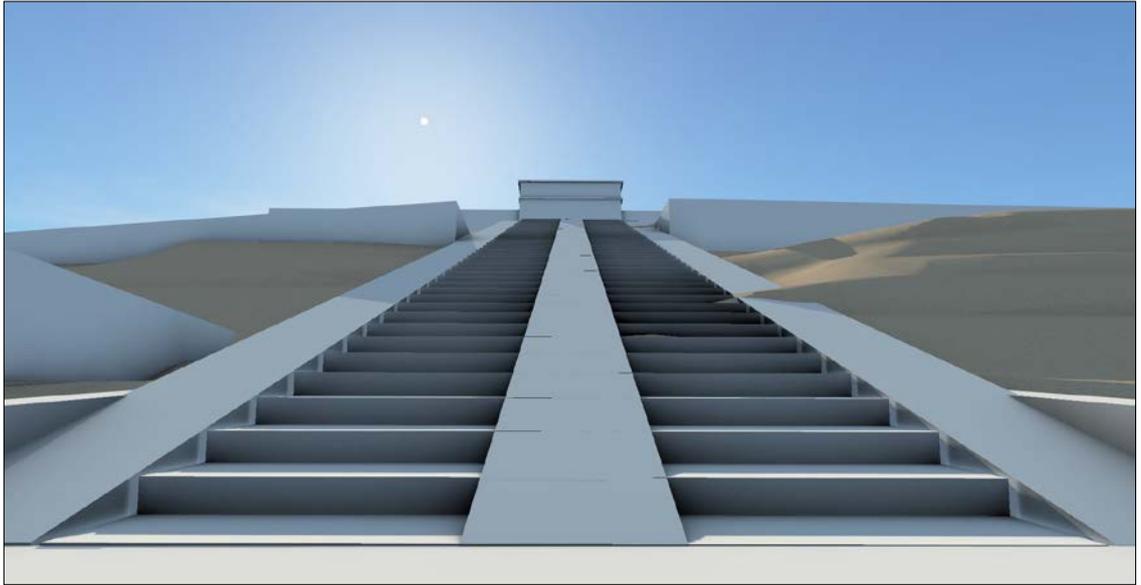


Figure 8.11. **(7)**—A view from the base of the main stairway of the Bubastieion leading up to the Temple of the Peak (source author).



Figure 8.12. **(8)**—Standing at the top of the main stairway, facing east towards the pylon gated enclosure of the Temple of the Peak (source author).



Figure 8.13. **(8)**—A view looking south towards the north gate of the Bubastieion enclosure, from the same location as (Figure 8.12) (source author).

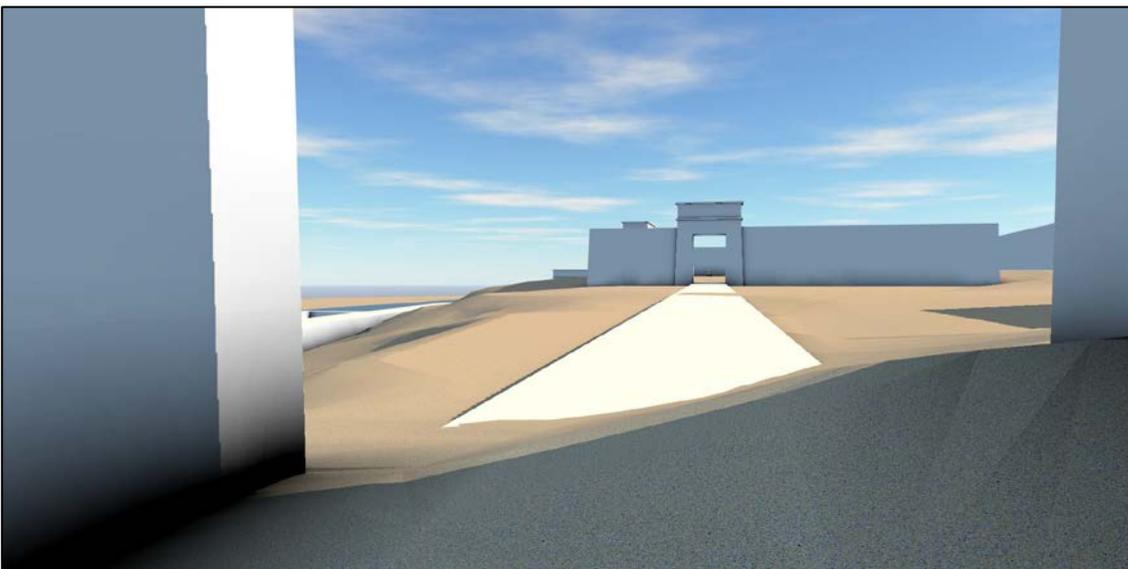


Figure 8.14. **(9)**—Standing in the Bubastieion north gateway, facing south towards the central temple enclosure(source author).

***Pr-hn-īnp*, the Anubieion**

Cross the short causeway connecting the enclosures of the Bubastieion and Anubieion (Figure 8.15). The space between the great temple-complexes feels confined due to the massive enclosure walls which only permit views to the east and west along their lengths. Moving through the large south gate of the Anubieion you arrive on the upper terrace of this impressive complex (Figure 8.16). Immediately to the east, set against

the large enclosure wall, are the enigmatic Bes chambers (Figure 8.17). It is possible to stay overnight in the chambers to incubate dreams and receive an oracle, or perhaps for other, more intimate, reasons.⁵ A pathway flanked by sphinxes leads north,⁶ heading farther into the complex, and to the west stone steps lead up the escarpment to a small temple structure situated in the south-west corner of the great enclosure.

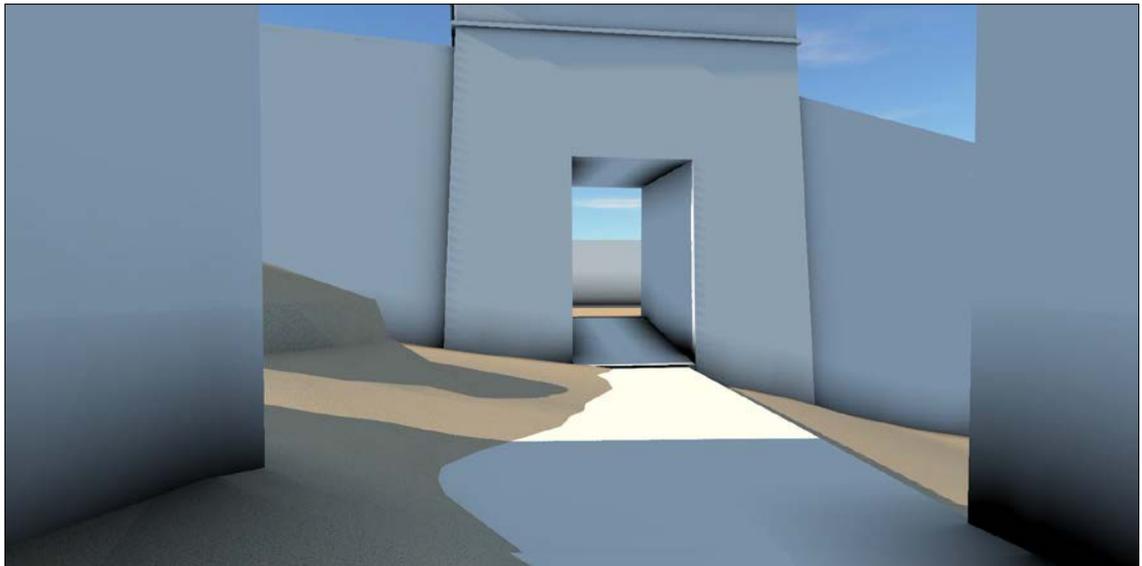


Figure 8.15. **(9)**—A view of the causeway joining the Bubastieion north gate with the Anubieion south gate. Facing north towards the Anubieion.

⁵ Thompson 2012, 22.

⁶ Quibell 1907, Pl.III.

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

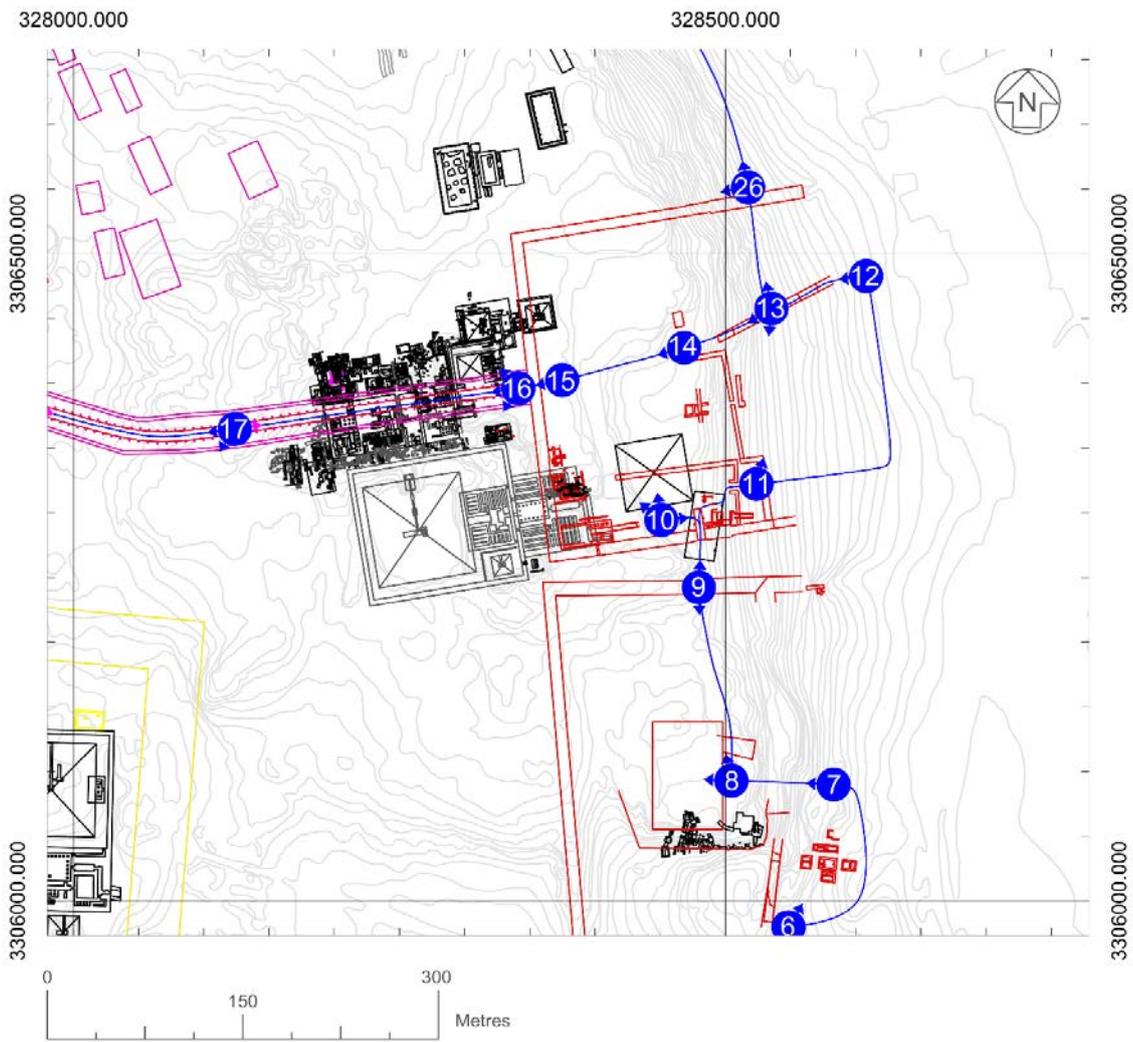


Figure 8.16. Map 4—The Anubieion area (source author).

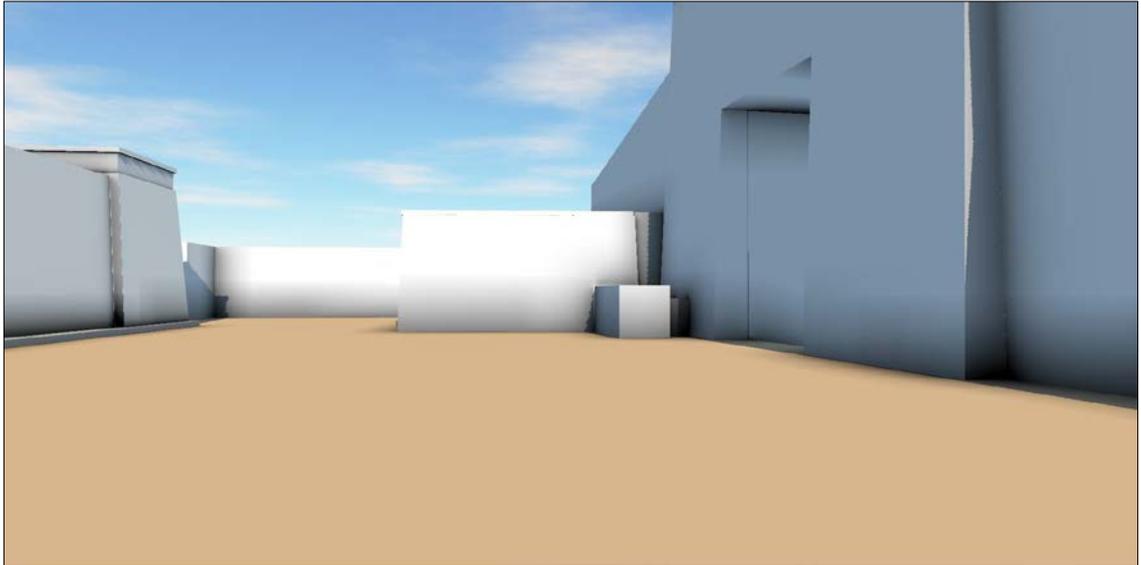


Figure 8.17. **(10)**—A view towards the Bes Chambers (image centre), facing east. The south gate of the Anubieion is to the right of the image (source author).

Directly ahead lies the central temple of the Anubieion complex (Figure 8.18). Access to the temple area is accomplished from the lower terraces by a lengthy stairway traversing the escarpment. To the west of the temple compound is a busy settlement (Figure 8.19).⁷ This densely packed area of small houses and storerooms fills the space between the compound wall of the central temple to the western wall of the enclosure. The temple-town comprises various houses for cult members and their families, intermingled with storerooms, corridors, courtyards and small open spaces. Buildings pertaining to administrative matters of the Anubieion complex are situated near this location, and somewhere in amongst the administrative quarter is a prison and lodging for a garrison of police. Moving east, follow the stairs down the escarpment to the lower terraces where the incredible size and complexity of the Anubieion enclosure becomes apparent (Figure 8.20).

⁷ Jeffreys and Smith 1988, 26-27.



Figure 8.18. **(10)**—Within the Anubieion enclosure, facing north. The central temple of the Anubieion is situated within the compound to the right of the image. To the west (left) of the temple are structures of the settlement, which also extend further north (source author).



Figure 8.19. **(10)**—Facing north-west towards the settlement situated west of the central temple (right of image).⁸ Behind the settlement buildings the western pylon gate of the Serapeum Way is visible (source author).

⁸ It is possible that the buildings of the settlement may have occupied more of the enclosure area than depicted in the digital representation.

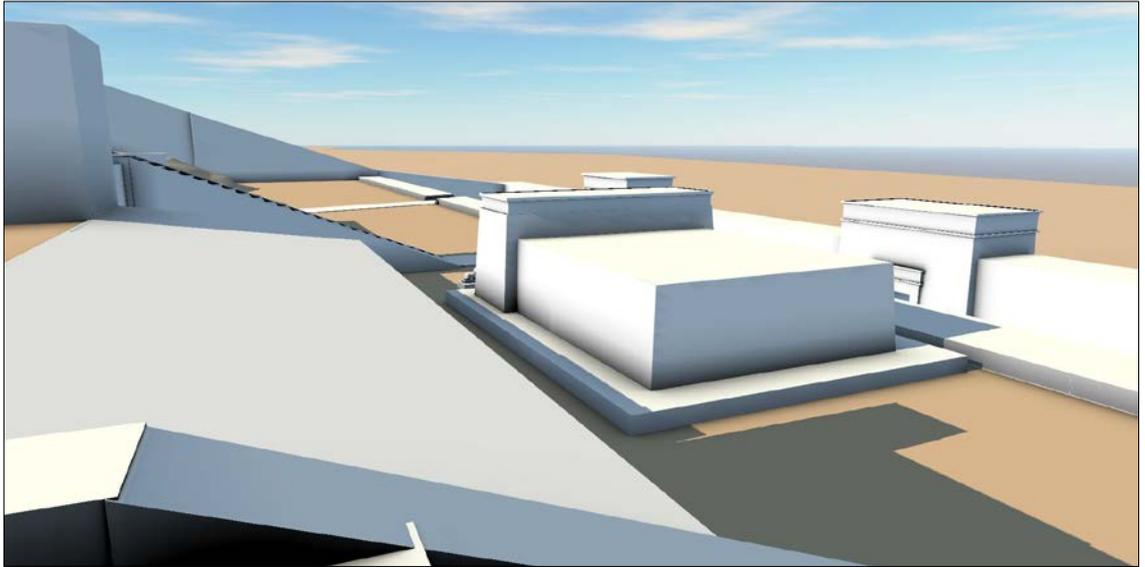


Figure 8.20. **(11)**—A view from the edge of the upper terrace of the Anubieion, facing north-north-east. The lower terraces are visible, and a small temple is situated in the foreground (source author).

Leaving the enclosure through a gate in the eastern wall leads to the edge of the cultivated area. A short walk to the north, following the eastern wall of the enclosure, passes the gate that leads to the central temple area and arrives at the gate of the Serapeum Way. Turn west through the gate, towards the first terrace. Standing in the gateway at the bottom of the steps one feels dwarfed by the size of the construction. The escarpment is steep and the steps leading up them present a formidable approach (Figure 8.21).

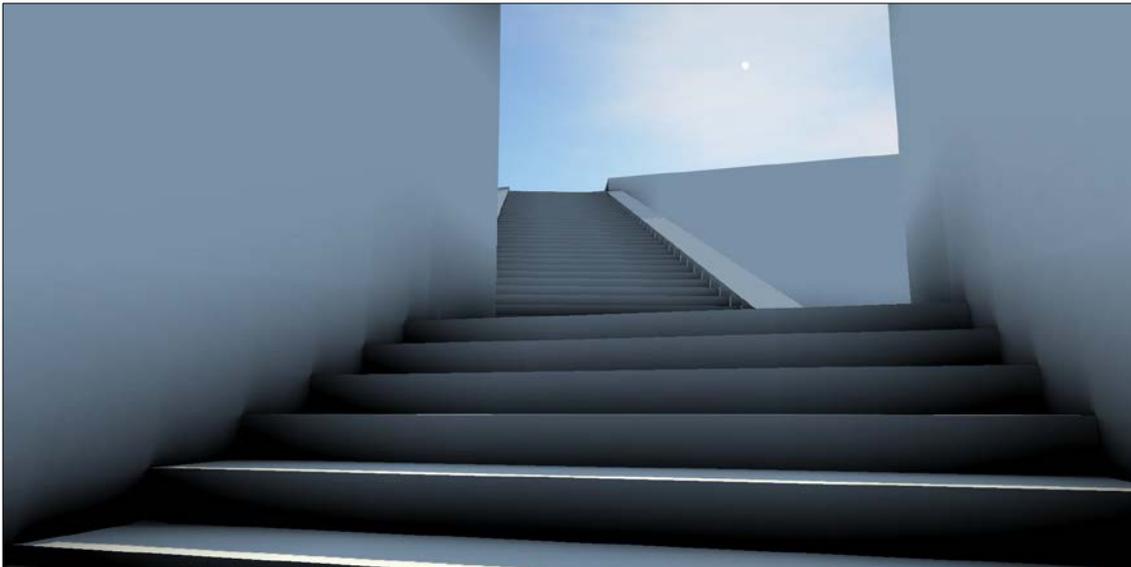


Figure 8.21. **(12)**—Standing in the east gate of the Anubieion enclosure on the Serapeum Way.⁹ Facing east-south-east along the steps to the first terrace (source author).

Ascending the steps, you will arrive at the first terrace. To the south is a small temple and the stairway leading to the central temple (Figure 8.22). The pylon gateway and enclosure wall of the central temple are visible upon the next terrace. The stairs continue westwards (Figure 8.23), towards the buildings of the settlement and onwards to the Serapeum Way heading west across the desert. You can return to this location to depart the Anubieion through a gateway in the northern wall (Figure 8.24), exiting the enclosure onto a sacred way leading to the catacombs of dogs. For the moment however, continue up the stairs towards the settlement and the sacred sphinx lined causeway [Mov_8iii—follows **(12)** through **(15)**].

⁹ It is possible that the Serapeum Way within the Anubieion was also flanked by sphinxes, as depicted on the Mariette (1856) and de Morgan (1897, 10) maps. However, this is not reflected in the digital representation due to the uncertainty of the construction of terraces, steps and ramps within this area.

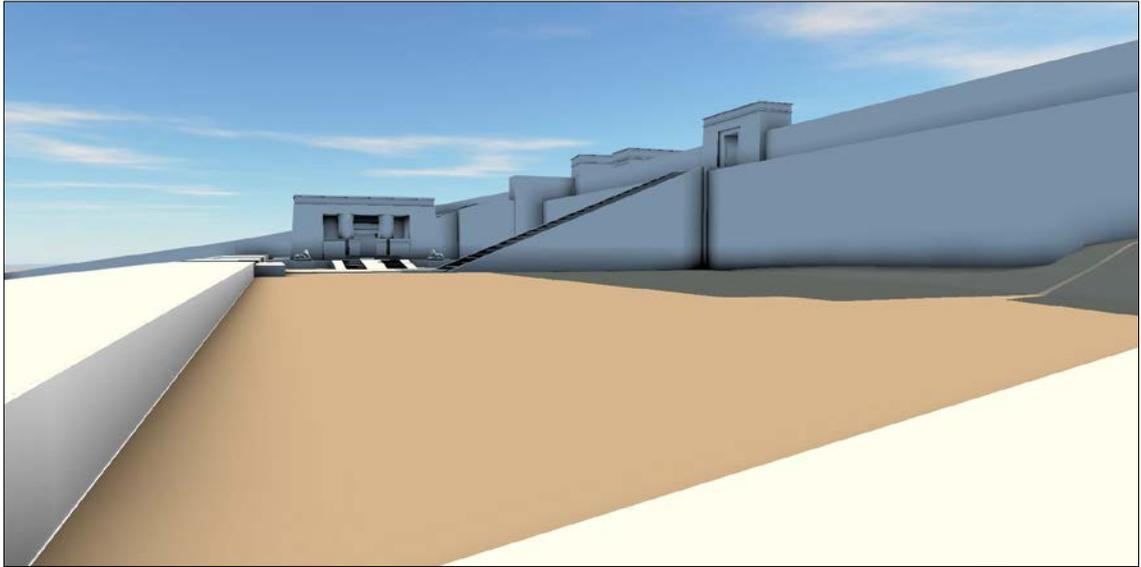


Figure 8.22. **(13)**—Standing on the Serapeum Way at the edge of the first terrace, facing south towards the stairs to the central temple. At the top of the stairs—on the second terrace—the pylon gateway to the temple enclosure is visible. The small temple from (8.17) is visible to the east (left) of the steps (source author).



Figure 8.23. **(13)**—Standing in the same location as (8.18) facing westwards, along the Serapeum Way. The stairs lead up to the second terrace. The central temple pylon-gate and enclosure are visible to the left, to the right is a revetment wall, and situated behind and to its left is the western gateway of the Anubieion enclosure (source author).



Figure 8.24. **(13)**—Standing in the same location as (8.18) facing north, towards the gate which opens onto the pathway leading to the Dog Catacombs (source author).¹⁰

As you ascend onto the third terrace of the Anubieion enclosure, your view to the south is screened by the main temple enclosure wall. To the north and south-west, you can see the congestion of settlement buildings either side of the ceremonial way. A great pylon pronounces the western gate of the sacred enclosure and marks the beginning of the ceremonial way in the necropolis interior (Figure 8.25). Making your way up towards the great pylon gateway you are surrounded by the congestion of the settlement. It feels very crowded and enclosed once you are in amongst the buildings. You can see part of the central temple from here and looking back towards the east gives you a partial view towards the lower terraces and the cultivation. Continue along the causeway towards the great pylon gateway. As you approach the gateway you can see row upon row of sphinxes beyond, flanking the ceremonial way stretching off into the distance (Figure 8.26).

¹⁰ See Chapter 5 for a discussion on this hypothetical gateway.



Figure 8.25. **(14)**—Standing on the Serapeum Way within the Anubieion enclosure, facing west towards the pylon gateway that leads out into the necropolis. To the north (right) and south (left) are the buildings of the settlement (source author).



Figure 8.26. **(15)**—Standing before the west gate of the Anubieion facing west along the Serapeum Way (source author).

Hft-hr, the Serapeum Way

Passing through the pylon onto the sacred way begins your journey along this sphinx-lined avenue (Figure 8.27) [Mov_8iv—follows **(15)** through **(24)**]. Facing towards the causeway, the sphinxes are set apart at regular intervals, bordering the length of the sacred way down to the Serapeum dromos (Figure 8.28).

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

328000.000

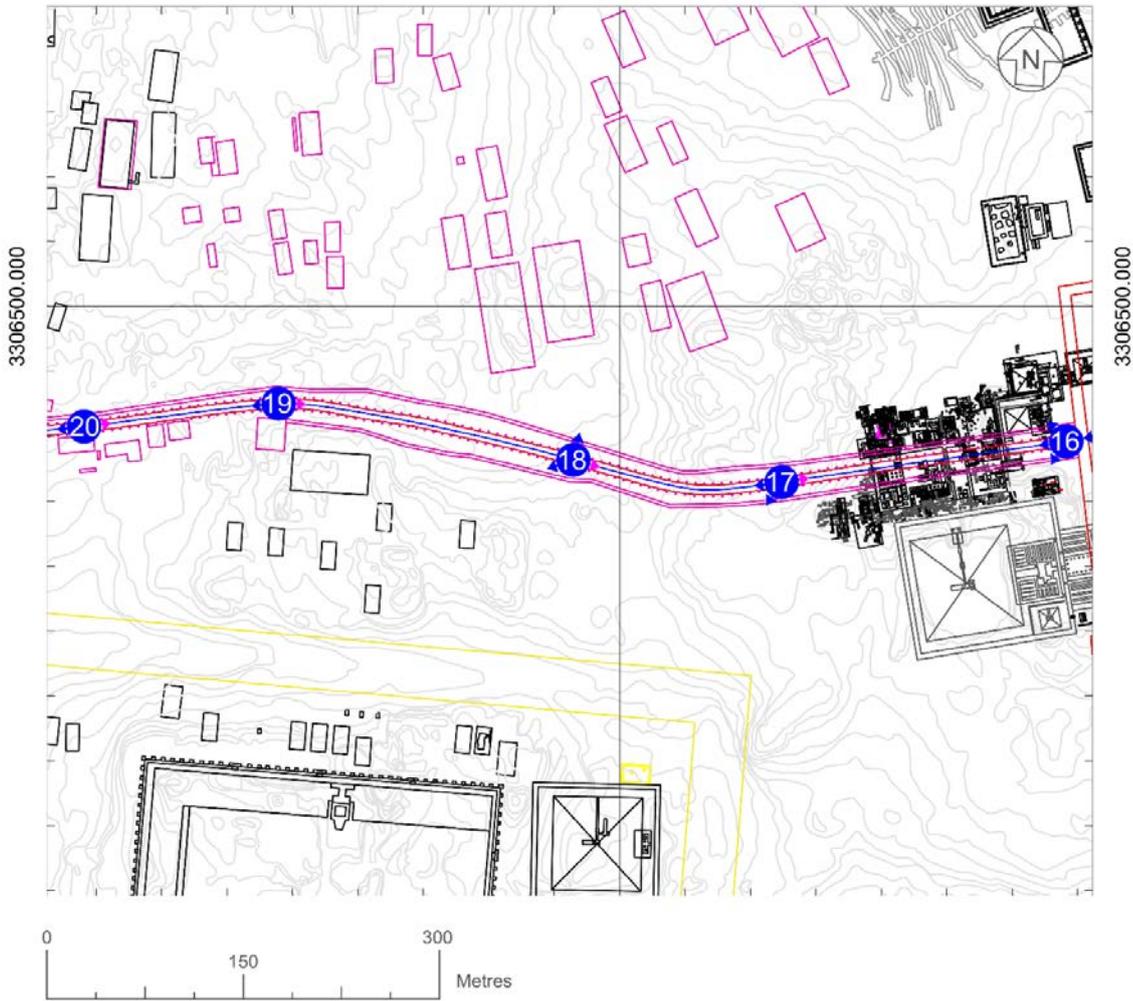


Figure 8.27. Map 5—The Serapeum Way (source author).

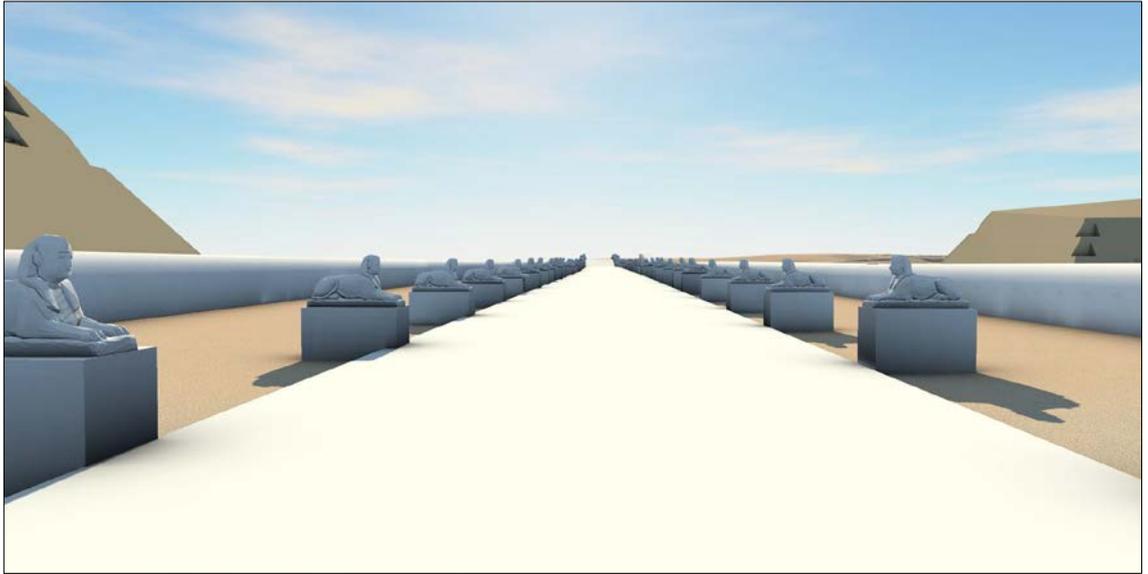


Figure 8.28. **(16)**—Standing just beyond the Anubieion west gate on the Serapeum Way facing west. The ruin of the Teti pyramid is visible to the left of the image, the ruin of the pyramid of Khuit II lies to the right of the image. Boundary walls are visible either side of the Serapeum Way (source author).

Immediately to the south is the ruin of the Teti pyramid (Figure 8.29). Two small ruined pyramids are situated just to the north of the sacred way, they are mostly buried in the sand which covers everything where it is not regularly removed (Figure 8.30). In respect of this, a low wall bounds each side of the sacred way, restricting the movement of sand which would otherwise cover the ceremonial causeway. Sand heaps against the outside of the wall. The landscape would return to its natural order were it not for the imposition of human control.

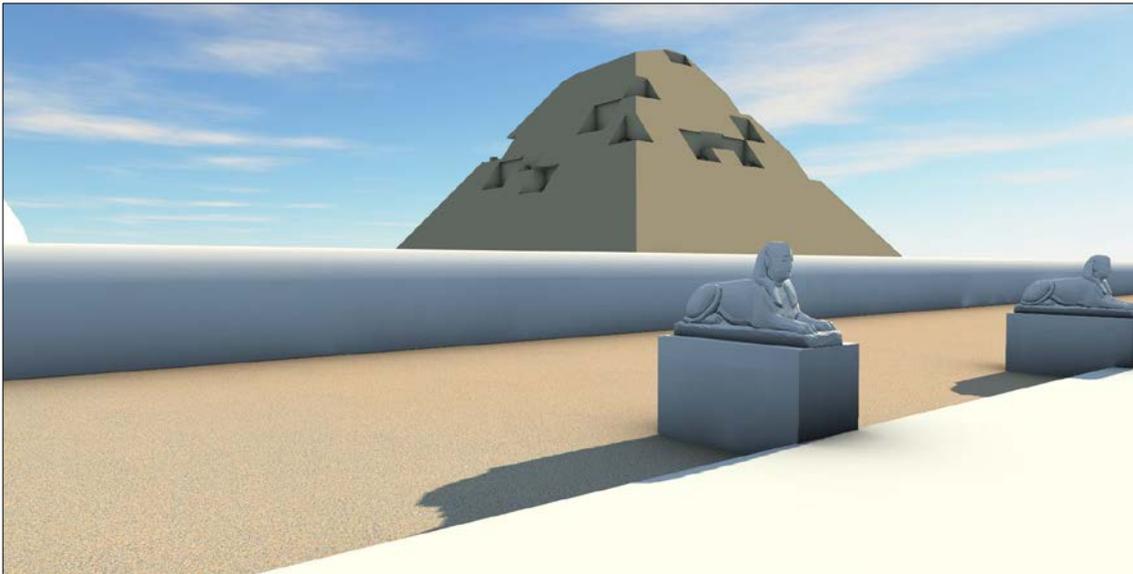


Figure 8.29. **(16)**—Facing south-west towards the pyramid of Teti. The southern boundary wall flanking the ceremonial way screens the view further south at this location (source author).

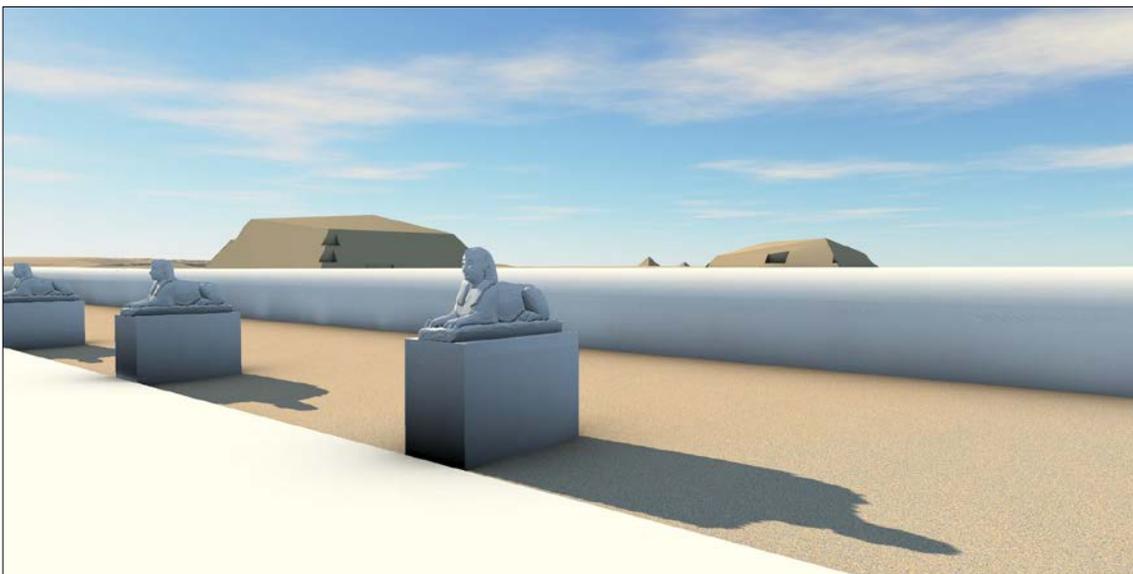


Figure 8.30. **(16)**—Facing north-west towards the ruined pyramids of Khuit II (left) and Iput (right). The pyramids at Abusir are just visible in the far distance (source author).

As you move along the causeway the land to the north appears barren, with the occasional decaying mud-brick tomb visible in the sand and the tops of the Abusir pyramids rising above the ridges. To the south the landscape is littered with the ruins of pyramids and their mortuary complexes. The stepped pyramid of Djoser stands decaying but stately within its grand enclosure, which is just visible (Figure 8.31).

Farther to the south, ruined tombs of New Kingdom nobles are visible on a ridge of land. The complex funerary landscape extends beyond the limits of your vision.

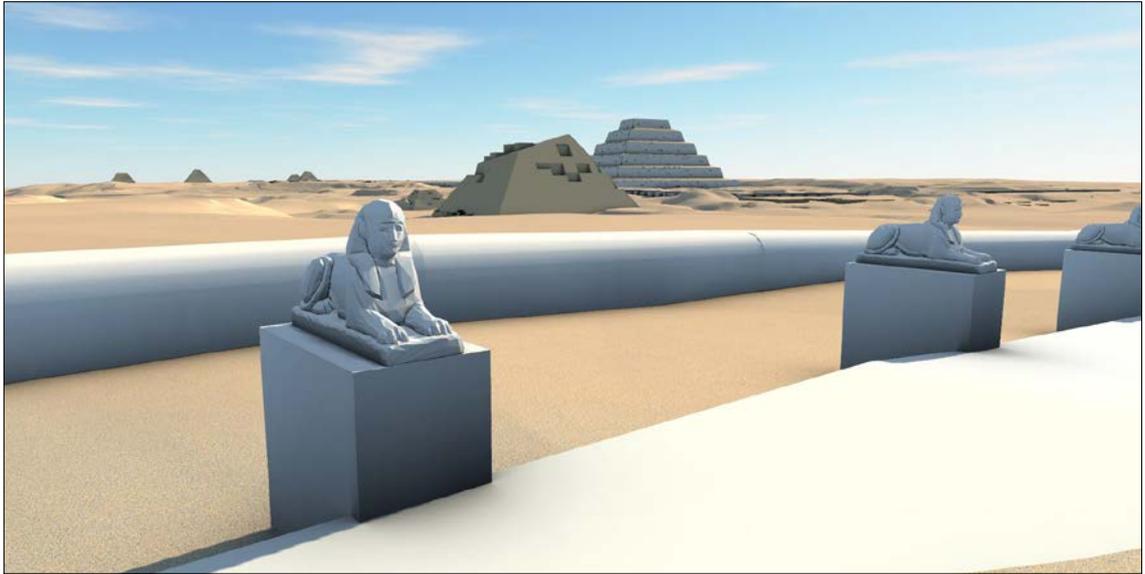


Figure 8.31. **(17)**—Standing on the Serapeum Way facing south-west. The pyramid of Userkaf is visible in the foreground, with the Step Pyramid of Djoser behind to the right. In the far distance to the left of the image the pyramids of South Saqqara are visible (source author).

A small rise in the terrain currently occludes the western extent of the sacred way from your view. As you travel up the slope to the top of the rise you can see the sacred way stretching towards the west, and you will gain your first glimpse of the Serapeum precinct (Figure 8.32). Here and there the drift sand is encroaching upon the causeway, and it is a daily task to keep the sacred way clear of too much sand intrusion.

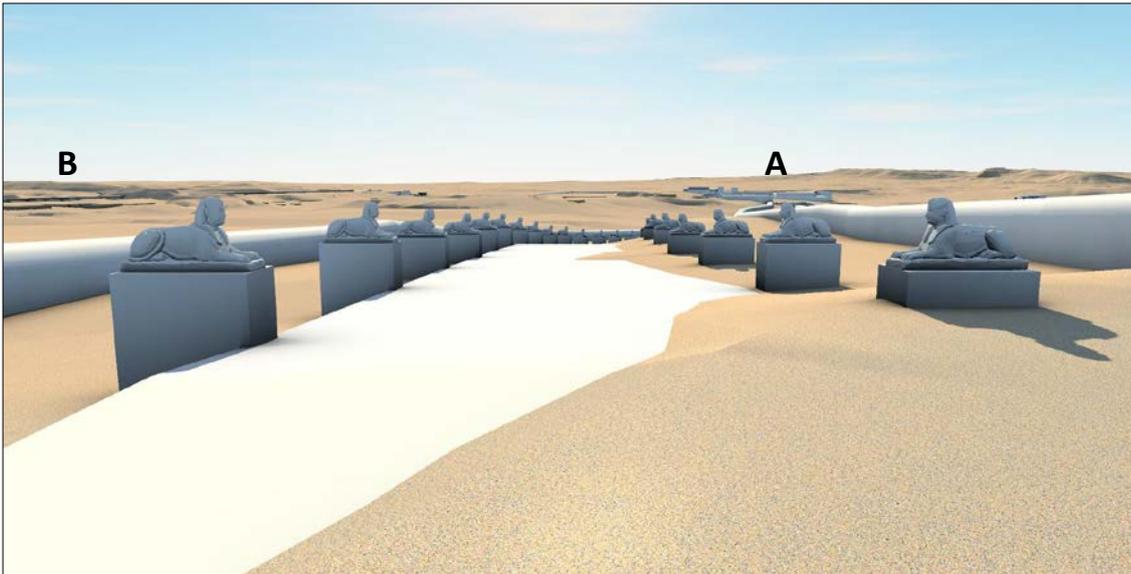


Figure 8.32. (17)—The view westwards from a rise in the terrain along the ceremonial way. The Serapeum Precinct is just visible to the right of centre in the distance (A). To the left, denuded mud-brick tombs and the Step Pyramid enclosure are just visible (B) (source author).

Situated to the south and north of the causeway boundary walls are low mounds covering ruined mud-brick tombs that are partially visible in the sand (Figures 8.33 and 8.34). These decaying ruins serve well as platforms for the pilgrims and visitors who come to watch the ceremonial processions that take place along the sacred way on festival days. The processional performance would pass directly in front of these tombs, providing a visual spectacle as it progressed along the sacred way towards the Serapeum. Standing atop the tomb-platforms would provide a panoramic view of the Serapeum Way and the processions taking place along its length.



Figure 8.33. **(18)**—Standing on the Serapeum Way facing north. Dark mud-brick ruins of tombs are visible beyond the flanking boundary wall. To the left of the image, in the distance, the south gate and enclosure walls of the main temple enclosure of the Sacred Animals are just visible (source author).

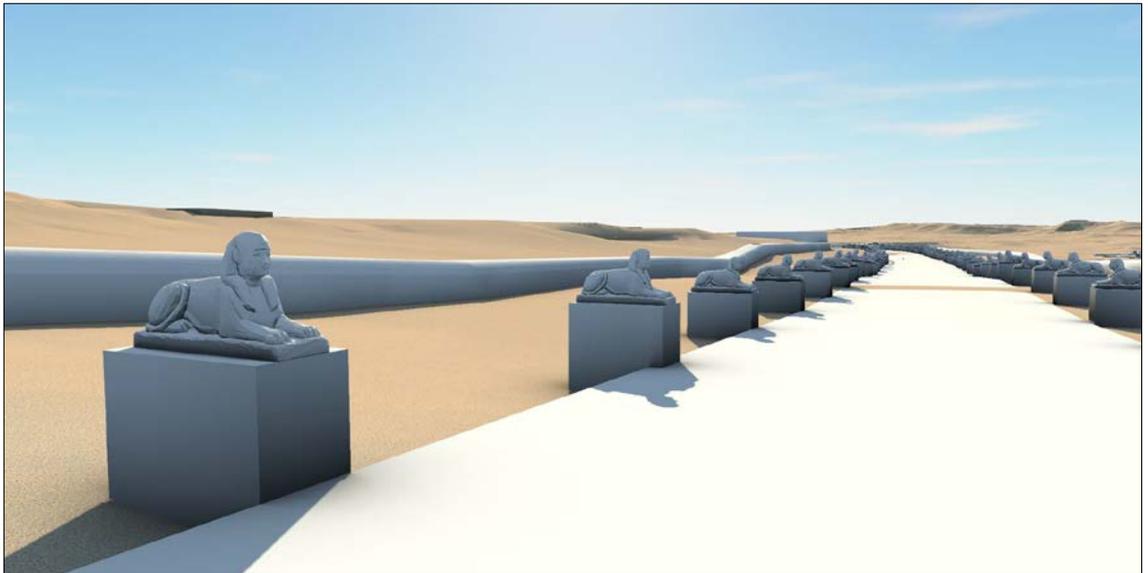


Figure 8.34. **(18)**—Standing on the Serapeum Way facing south-west. Low mounds are visible beyond the boundary wall revealing the dark mud-brick ruins of tombs (source author).

A congestion of tombs in various states of preservation flank the sides of the ceremonial way, growing more prevalent as you approach closer to the Serapeum dromos. These tombs appear to have been constructed to respect the causeway, their entranceways facing the ceremonial path (Figure 8.35). There are many along the southern side of the

causeway and the low boundary wall finishes before the tombs begin, which act as a permeable boundary (Figure 8.36).

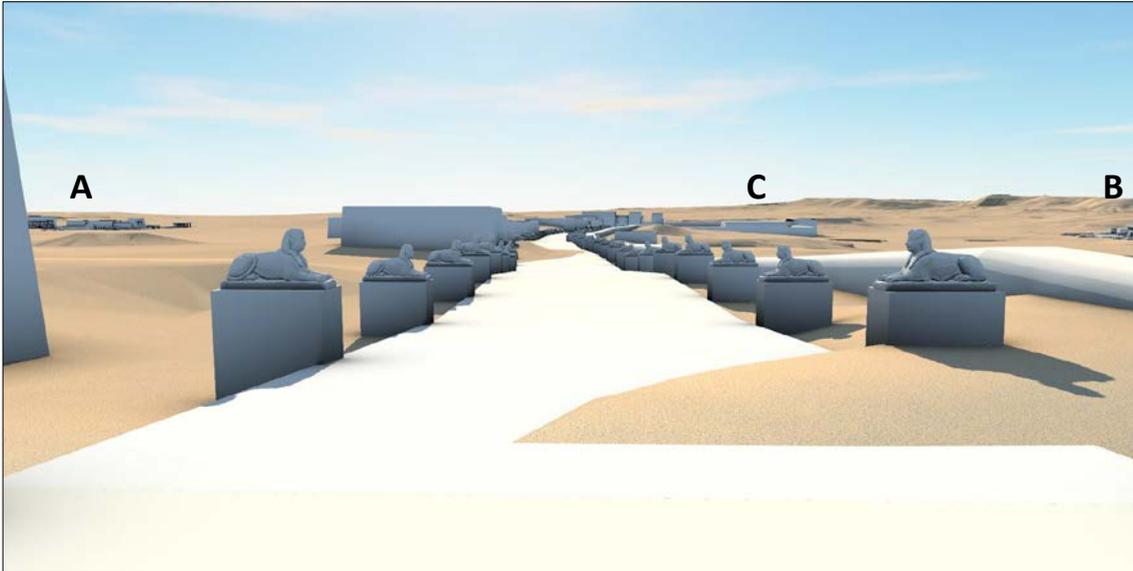


Figure 8.35. **(19)**—Standing beside the tombs to the south of the Serapeum Way, facing west. The boundary wall to the south is discontinued here. The alignment of shrines and temples bordering the south of the Serapeum Precinct are visible in the distance to the left of the image (A), with the northern alignment to the right of the image (B). The pylon gates of the Serapeum temple enclosure are just visible in the centre of the image (C) (source author).

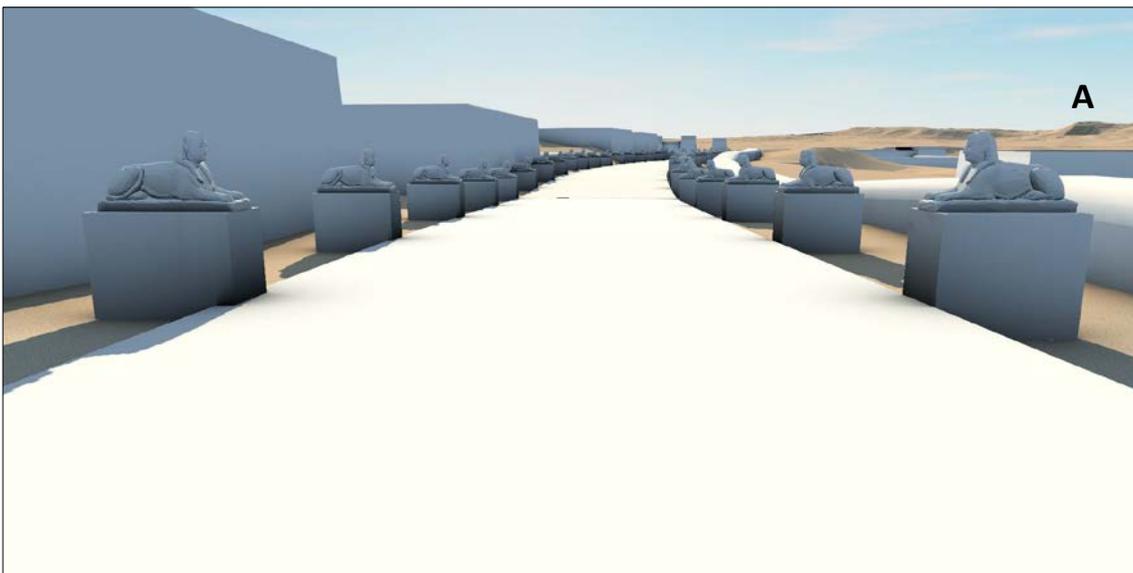


Figure 8.36. **(20)**—Farther along the Serapeum Way, nearing the dromos, facing west. To the south of the ceremonial way, the tombs increase in number closer to the Serapeum Precinct. The sacred mound and 3rd Dynasty stepped feature are visible in the far distance, to the right of the image (A) (source author).

The terrain begins to slope downwards on the approach to the Serapeum dromos (Figure 8.37), and your view to the west is concealed by the ranks of sphinx statues as the causeway curves southwards (Figure 8.38). You can see the row of temple platforms and shrines to the north of the Serapeum precinct and *Pr-w^cb-nb.s*, the Main Temple Enclosure of the sacred animals in *H^p-nb.s* is visible from here (Figure 8.39). Two large ruined mud-brick tombs stand either side of the wadi valley, although they are barely distinguishable from the other decayed tombs that are scattered around, and you must know what you are looking at to identify them.¹¹ In the far distance to the west, you can see a large outcrop and curious stepped feature protruding from its southern escarpment.¹² You begin to glimpse the Serapeum enclosure as you move further west (Figure 8.40).

¹¹ Old Kingdom mastabas S3518 and AS33.

¹² This feature, whilst not Late Period/Early Ptolemaic in date, would have presented a noticeable augmentation to the side of the outcrop, visible from a distance.

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

327500.000

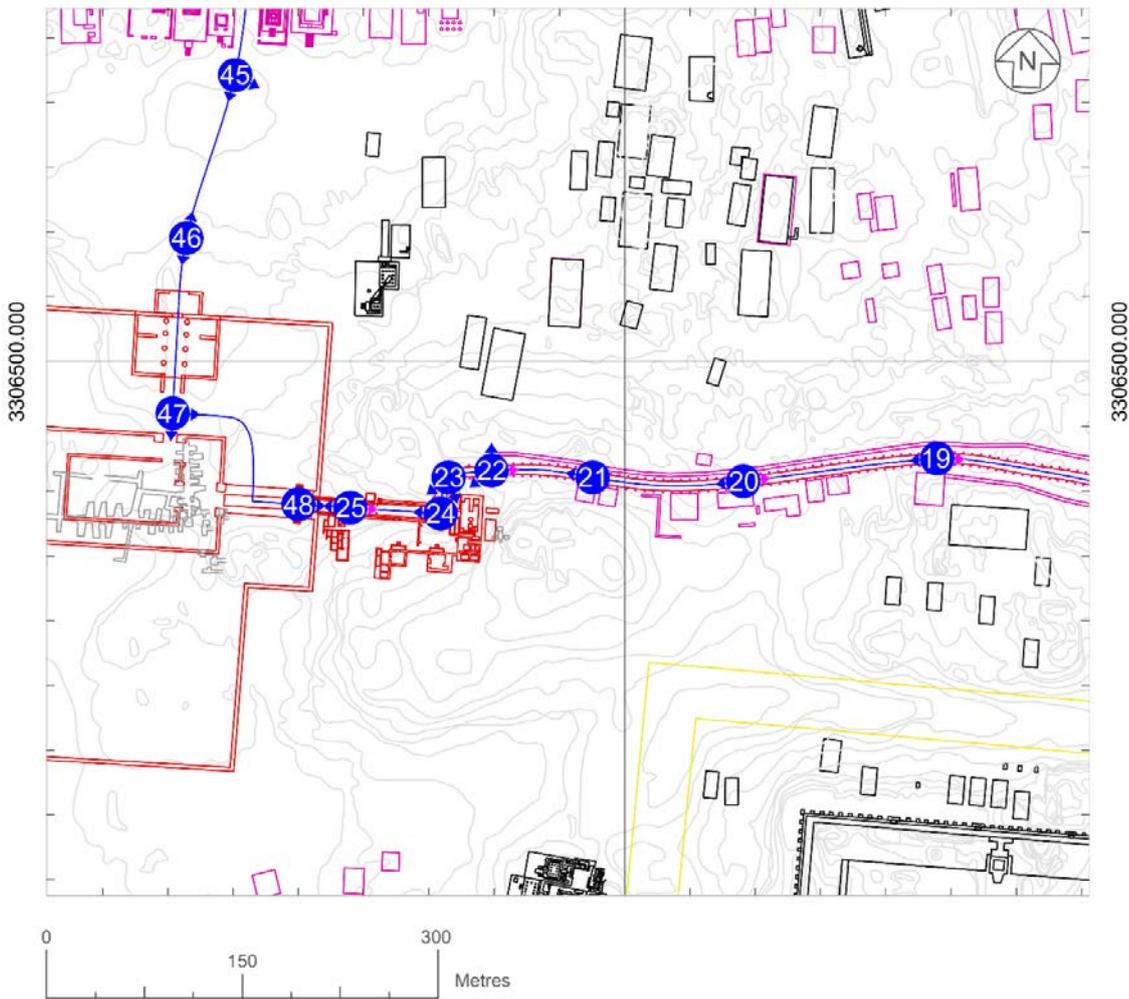


Figure 8.37. Map 6—The Serapeum Way and precinct. The magenta arrows indicated the view when travelling east (source author).

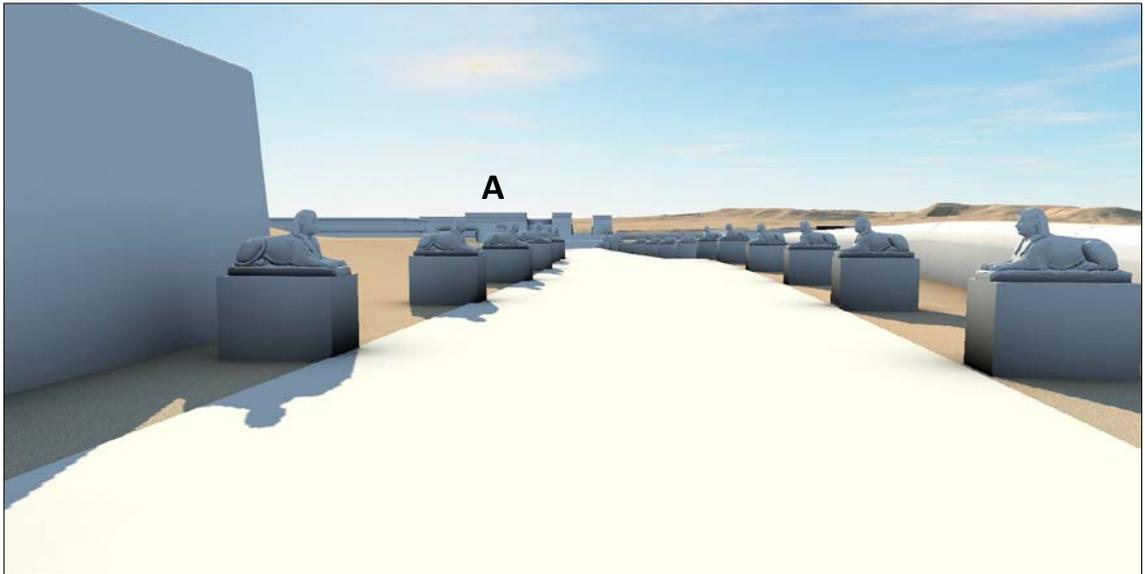


Figure 8.38. **(21)**—Approaching the dromos and Serapeum Precinct. The pylon gateways of the temple enclosure are visible between the sphinxes as the ceremonial way turns to the south. The East Temple of Nectanebo II is visible beyond the sphinxes towards the left of the image (A) (source author).

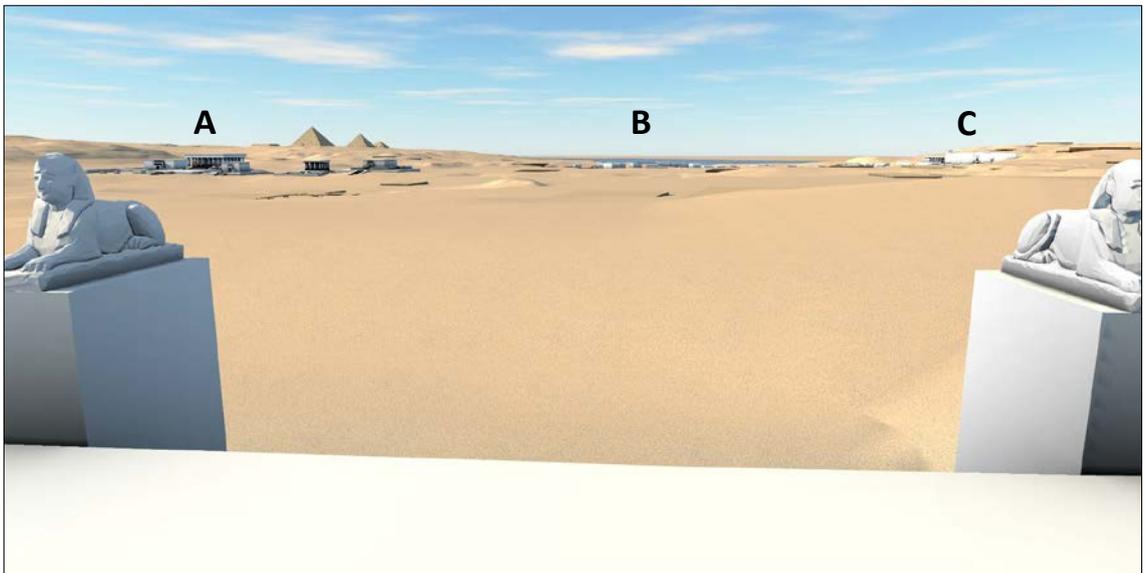


Figure 8.39. **(22)**—Facing north from the Serapeum Way by the slope to the dromos. In the far distance, the pyramids at Abusir are visible. The row of shrines and temples to the north of the Serapeum Precinct are visible in the near distance (A). The settlement within the wadi valley can just be seen before the Lake of Pharaoh to the centre of the image (B), and the main temple enclosure of the Sacred Animals and its Southern Dependencies are visible to the right of the image (C). The boundary wall to the north of the ceremonial way does not extend this far along the route (source author).

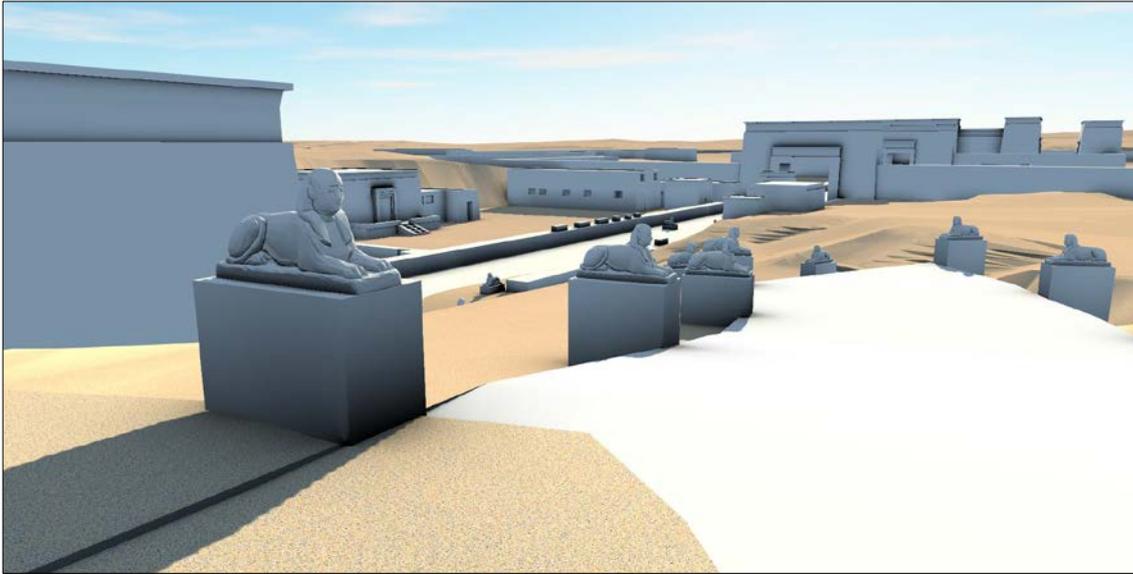


Figure 8.40. (22)—Approaching the slope down to the Serapeum dromos, facing south-west. The East Temple of Nectanebo II is to the left of the image, and the Greek Temple and Egyptian Sanctuary are visible in front of the pylon gate into the Serapeum Enclosure to the centre-right of the image (source author).

Hfth, the dromos

Moving along the western extent of the ceremonial way brings the pylons of the Serapeum into sight, your view is directed towards them by the avenue of sphinxes leading you onwards. The causeway slopes downward here, south towards the Serapeum dromos and its temples. As you descend the inclined path you are confronted by a wide dromos flanked by low walls with statues of Egyptian and Greek deities set on top. Here is a fusion of Egypt and Greece, where they meet and coalesce. Shrines, temples and *pastophoria* are located along the southern side of the dromos, with smaller shrines located to the north. This is a place of noise and activity. Priests and cult members move busily amongst the temples, merchants are trading and selling wares along the dromos. This area is often used as a marketplace, where even the government auction state property.¹³ People move back and forth along the dromos from the temples towards the Serapeum enclosure and the settlement within. There are small stalls here with vendors offering various goods.

¹³ Reich 1933, 38.

Immediately to your east, built against a bedrock escarpment, is the temple of Nectanebo II. It's grand columned pronaos and entrance stairway faces west along the dromos, towards the Serapeum gateway (Figure 8.41). To the south of the temple are a series of small buildings constructed adjacent to the main structure. Directly to the south of you is a small semi-circle of statues. These are statues of Greek philosophers and writers. Without constant attention, the display is prone to sanding up, with the sands blowing in from the higher ground around it. Beyond the Greek statues to the south are two smaller temples and to the west of those are the *pastophoria*, where priests of the cults reside (Figure 8.42).



Figure 8.41. **(23)**—Standing by the Serapeum dromos, facing south-east towards the East Temple of Nectanebo II. The hemicycle of philosopher statues (represented by blocks) is to the right of the image (source author).



Figure 8.42. **(23)**—Looking at the Serapeum dromos, facing south-west towards the *pastophoria* at the rear-centre of the image (source author).

Make your way down onto the dromos and turn to the west (Figure 8.43). Move west along the paved way towards the gateway of Serapeum enclosure [Mov_8v—follows **(24)** to **(25)**]. Two sphinx statues on plinths are situated either side of the sacred way and as you approach the western end you encounter a large ornate pylon gateway flanked by two lion statues. This ceremonial gateway was constructed by Nectanebo I and precedes a monumental pylon which provides access to the Serapeum enclosure beyond (Figure 8.44).

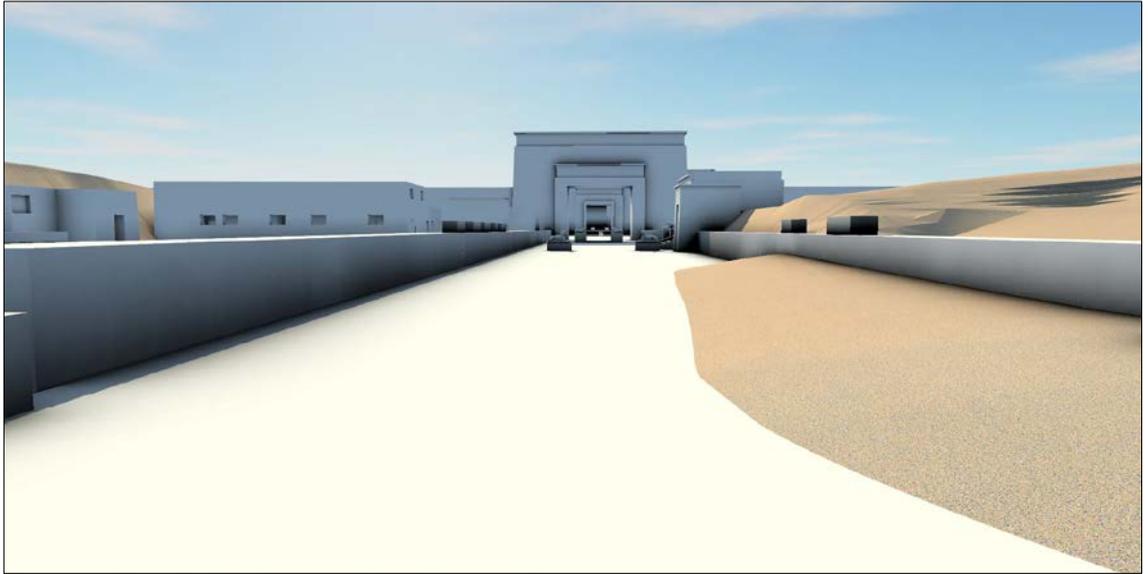


Figure 8.43. **(24)**—Standing beside the Philosopher's Hemicycle facing west towards the Gate of Nectanebo I (centre) and the entrance to the Serapeum Enclosure. The *pastophoria* are situated towards the left of the image. Against the boundary wall to the right of the image are the Egyptian Sanctuary and the Greek Temple. The position of statuary set atop the walls are represented by blocks in the digital model (source author).



Figure 8.44. **(25)**—Standing before the Gate of Nectanebo I. The *pastophoria* are situated towards the left of the image and this position provides a closer view of the Egyptian Sanctuary (right foreground) and the Greek Temple (right, behind the sanctuary) (source author).

The pylon dominates the eastern wall of the enclosure and the dromos over which it stands. Within the enclosure beyond, to the north- and south-eastern corners, is a congested settlement full of the activities of daily life in a temple-town. You will not

enter the Serapeum enclosure from this direction, you will come to it from another route in due course.

Turn around and face the Temple of Nectanebo II, which dominates the eastern end of the Serapeum dromos. You now need to make your way back along the Serapeum Way, heading towards the Anubieion. Moving east along the dromos you can see the mounds of sand and bedrock outcrop behind the temple and the sphinx-flanked sacred way leading up the sandy slope, curving south around the temple and back towards the east (Figure 8.45).



Figure 8.45. **(25)**—Facing east along the Serapeum dromos towards the East Temple of Nectanebo II. The sphinx flanked Serapeum Way leads south from the dromos then turns to the east (left of image) (source author).

Walk up the slope and turn the corner. The sacred way stretches ahead of you, affording you a glimpse of the Anubieion pylon and walls at its far eastern end. The great temple-town is not clearly visible due to the numerous sphinx atop their plinths which create a permeable screen at certain angles of approach (Figure 8.46).

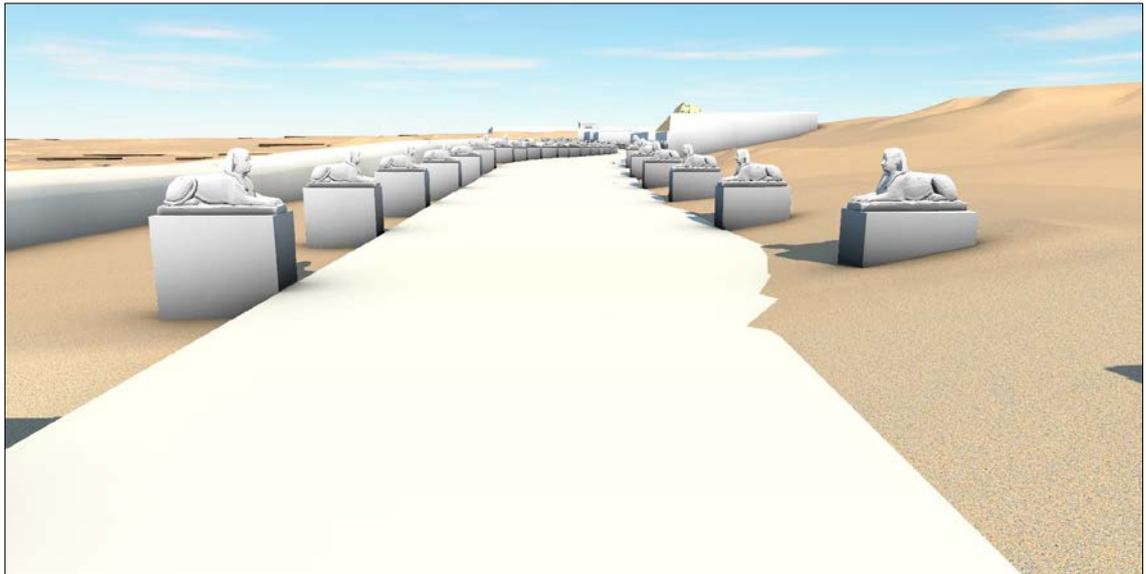


Figure 8.46. **(22)**—Standing to the top of the slope to the dromos facing east along the Serapeum Way. The tombs to the south of the route are visible to the right of the image, behind which is the ruined pyramid of Teti. In the far distance, the Anubieion enclosure and pylon gateway are barely visible (centre of image) (source author).

Moving farther along the Serapeum Way, the Anubieion becomes screened from view by the row of tombs that flank the southern side of the causeway (Figure 8.47), but you are afforded glimpses of the Step Pyramid and its enclosure to the south between the tombs as you move past [Mov_8vi—follows **(21)** to **(20)**]. Once beyond these tombs the tops of the walls of the Anubieion and Bubastieion are visible again, stretching across your view beyond a ridge of sand. The decaying pyramid of Teti dominates the eastern horizon and you can see the sacred way meandering northwards to avoid the pyramid and its temple ruins (Figure 8.48).



Figure 8.47. **(20)**—Standing beside the tombs to the south of the ceremonial route. The Anubieion enclosure has become screened from view in the far distance (centre of image) (source author).

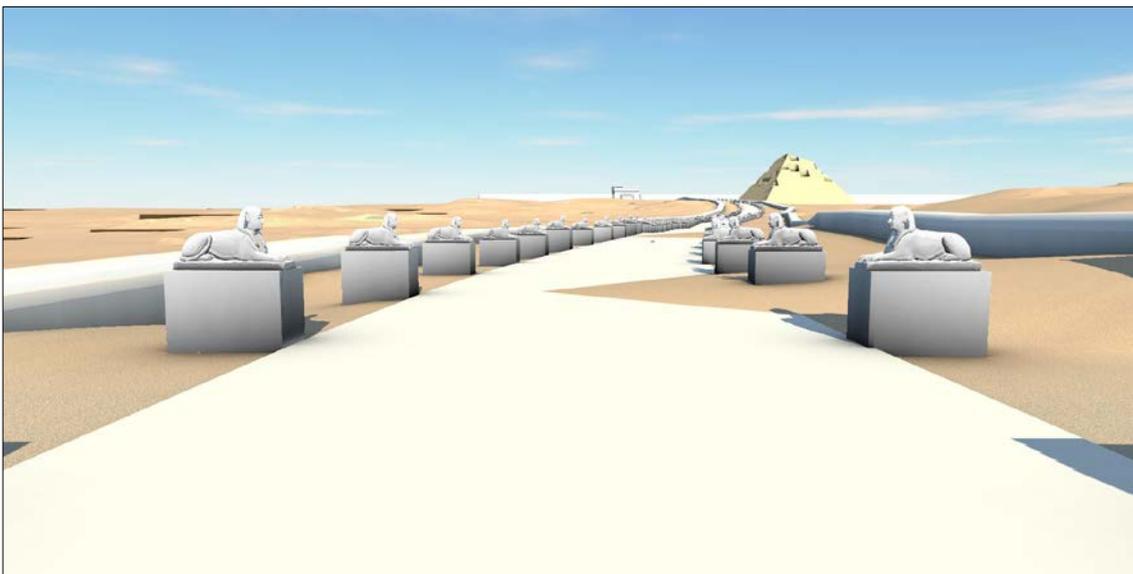


Figure 8.48. **(19)**—Facing east, past the tombs to the south of the Serapeum Way, the Anubieion enclosure is once again visible in the distance (source author).

As you approach the sandy ridge you will lose sight of the great enclosures (Figure 8.49), only the top of the Anubieion western gate pylon is visible. Farther up the slope however, the pylon gate is brought into focus by the lines of sphinxes leading towards it [Mov_8vii—follows **(20)** through **(17)**]. Upon reaching the top of the ridge you can see the Anubieion at the end of the sacred way, which terminates in the massive pylon gate (Figure 8.50). The pyramid of Teti obscures a portion of the great temple enclosures,

but from this vantage point you can get a sense of their width across the escarpment edge.

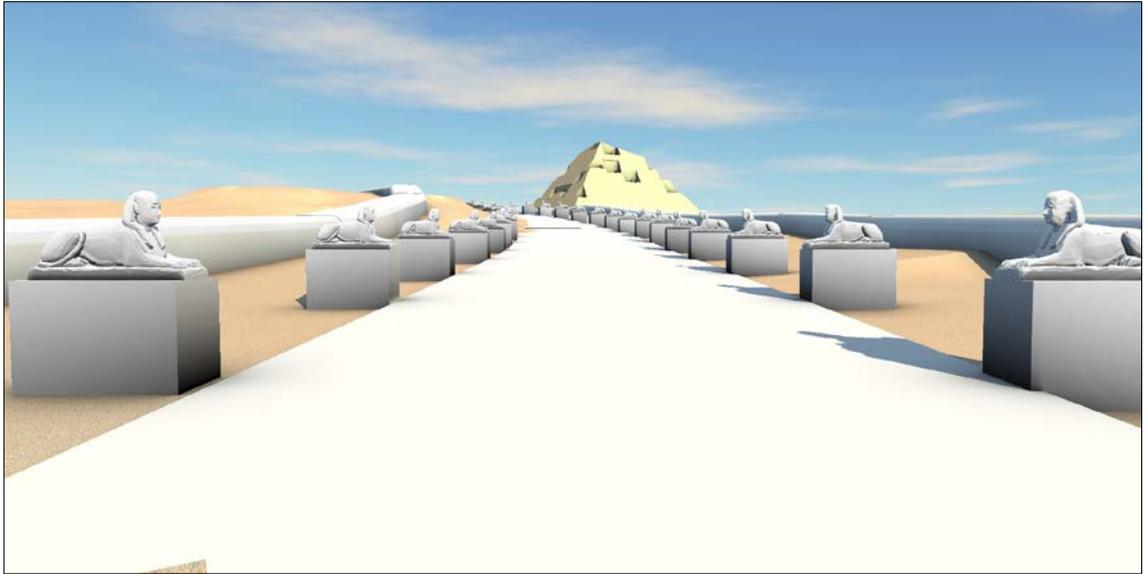


Figure 8.49. **(18)**—Facing east along the Serapeum Way. The raise in the terrain screens the Anubieion and Bubastieion enclosures from view. The ruined pyramid of Teti is visible at the top of the ridge (source author).

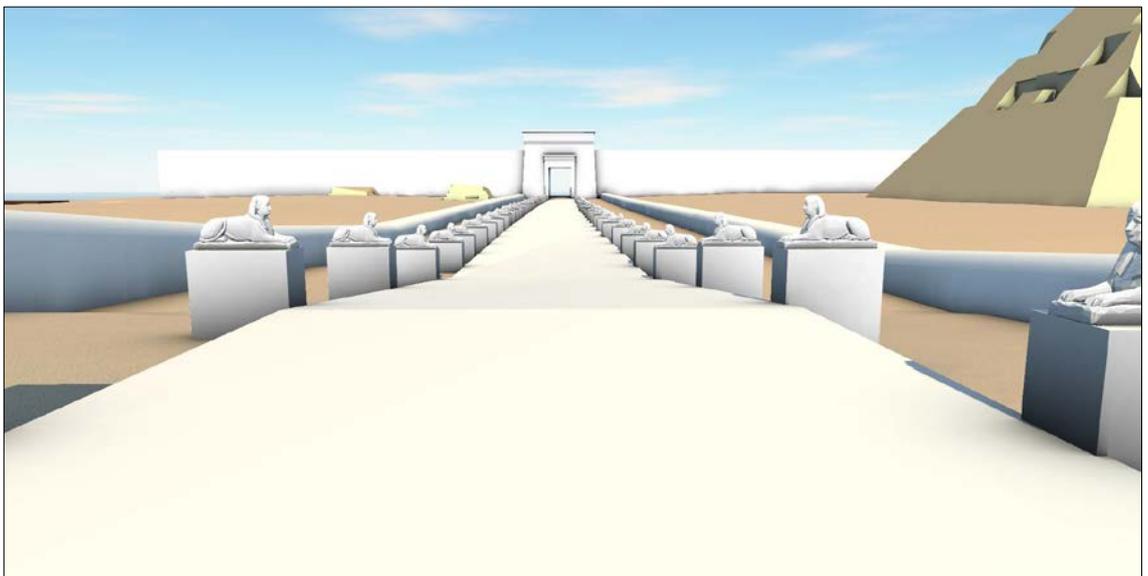


Figure 8.50. **(17)**—Moving further towards the east along the ceremonial way the Anubieion is brought into view (source author).

ꜥwy-n-ḥtp n nꜣ iwꜣw, the Dog Catacombs

Upon returning to the Anubieion and entering the enclosure through the western gateway, approach the second terrace and exit the enclosure through the north gate (Figure 8.51). You are now standing on a sacred way that follows a narrow flat shelf along the lower edge of the escarpment (Figure 8.52). You are unable to see to the top of the plateau from this position so close to the steep side of the cliff (Figure 8.53).

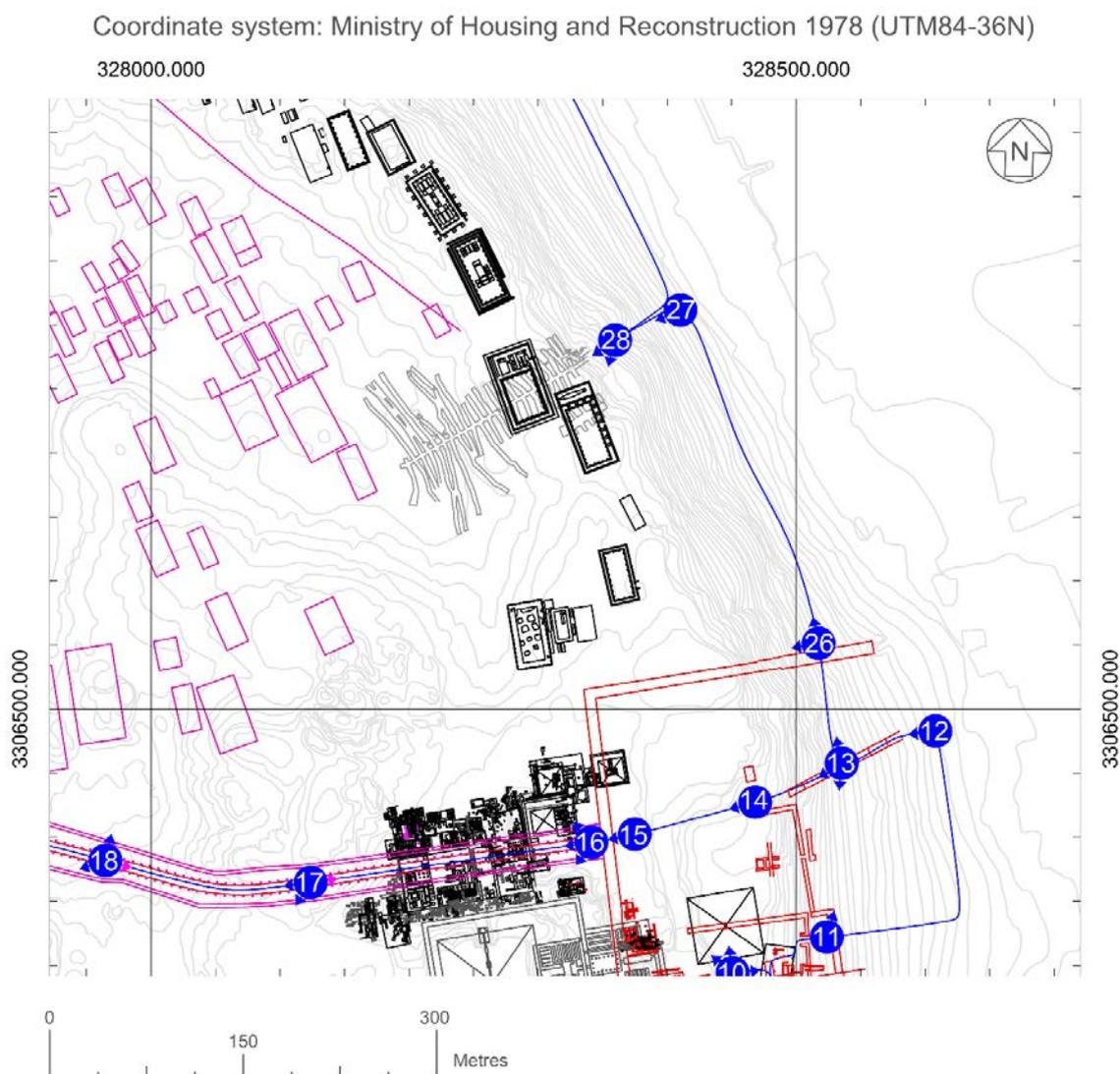


Figure 8.51. Map 7—North of the Anubieion, towards the Dog Catacombs (source author).



Figure 8.52. **(26)**—Standing outside of the Anubieion north gate, facing north towards the dog catacombs which are screened from view at this location by the terrain. The Lake of Pharaoh is just visible in the far distance (source author).

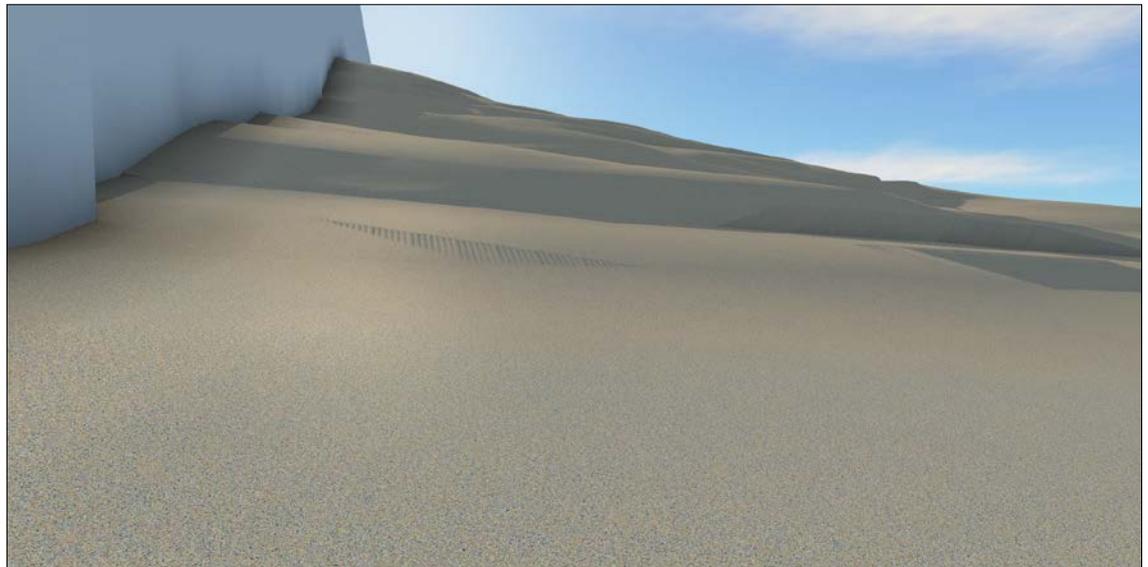


Figure 8.53. **(26)**—Standing outside of the Anubieion north gate, facing west up towards the plateau (source author).

Continue northwards along the path towards the courtyards of *ʕwy-n-ḥtp n n3 iwīw*—the Dog Catacombs. The catacombs, of which there are two, are carved into the face of the escarpment, about two-thirds of the way up, and their courtyards are set on terraced areas directly in front of the subterranean openings. The escarpment is steep here, and steps aid your ascent (Figure 8.54). From the courtyard garden, you can see

along the edge of the escarpment which continues to the north. In the distance there appears to be a shimmering lake. Here, you are standing in front of the entrance to the most northerly catacomb, which leads into the larger galleries (Figure 8.55). Buried within the subterranean tunnels are millions of mummified dogs, and there is a thriving industry in breeding these animals situated close by.¹⁴ The entrance to the smaller galleries is situated approximately 45m to your south (Figure 8.56).



Figure 8.54. **(27)**—Standing on the pathway at the bottom of the escarpment facing west up towards the steps which lead to the courtyards of the Dog Catacombs (source author).

¹⁴ Nicholson *et al.* 2015, 655.



Figure 8.55. (28)—Standing before the courtyard and entrance of the larger Dog Catacomb, facing west (source author).

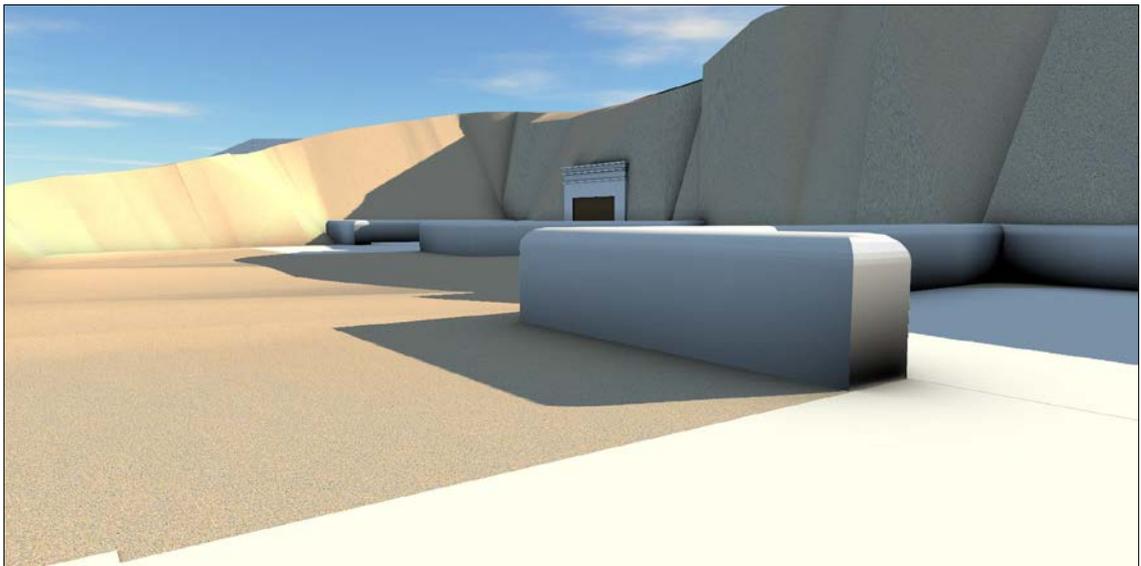


Figure 8.56. (28)—Facing south towards the courtyard and entrance of the smaller Dog Catacomb (source author).

***P3 šl n Pr-ḳi*, the Lake of Pharaoh**

Descend the escarpment to the lower terraces at the edge of the cultivation and turn towards the north (Figure 8.57). Walking adjacent to the slope it is just possible to make out sections of degraded mud-brick protruding from the top edge of the escarpment (Figure 8.58). These structures are all that remains of ruined tombs of nobles dating to

the time of the earliest rulers. They occupy a conspicuous location, lined against the edge of the escarpment.

To the north lies the small settlement of *Pr-**W**sir* (Abusir), situated alongside *Pꜣ šī n Pr-**i***—the Lake of Pharaoh. It is along this route that the great sarcophagi of the Apis bulls and their mothers are transported, dragged by teams of men over many days.¹⁵ Towards the end of the escarpment you begin to approach the lake (Mov_8viii—follows **(27)** through **(33)**). Here are where hundreds, perhaps even thousands, of Ibis birds are bred and kept for use in mummification rituals.¹⁶ On the opposite side of the lake you can see decaying pyramids of earlier rulers (Figure 8.59). From this location, the escarpment appears like the primeval mound, projecting from the terrain below. The similarity is even more apparent when this area is inundated by the Nile waters.

¹⁵ Smith 1981, 338.

¹⁶ Smith 1974, 69.

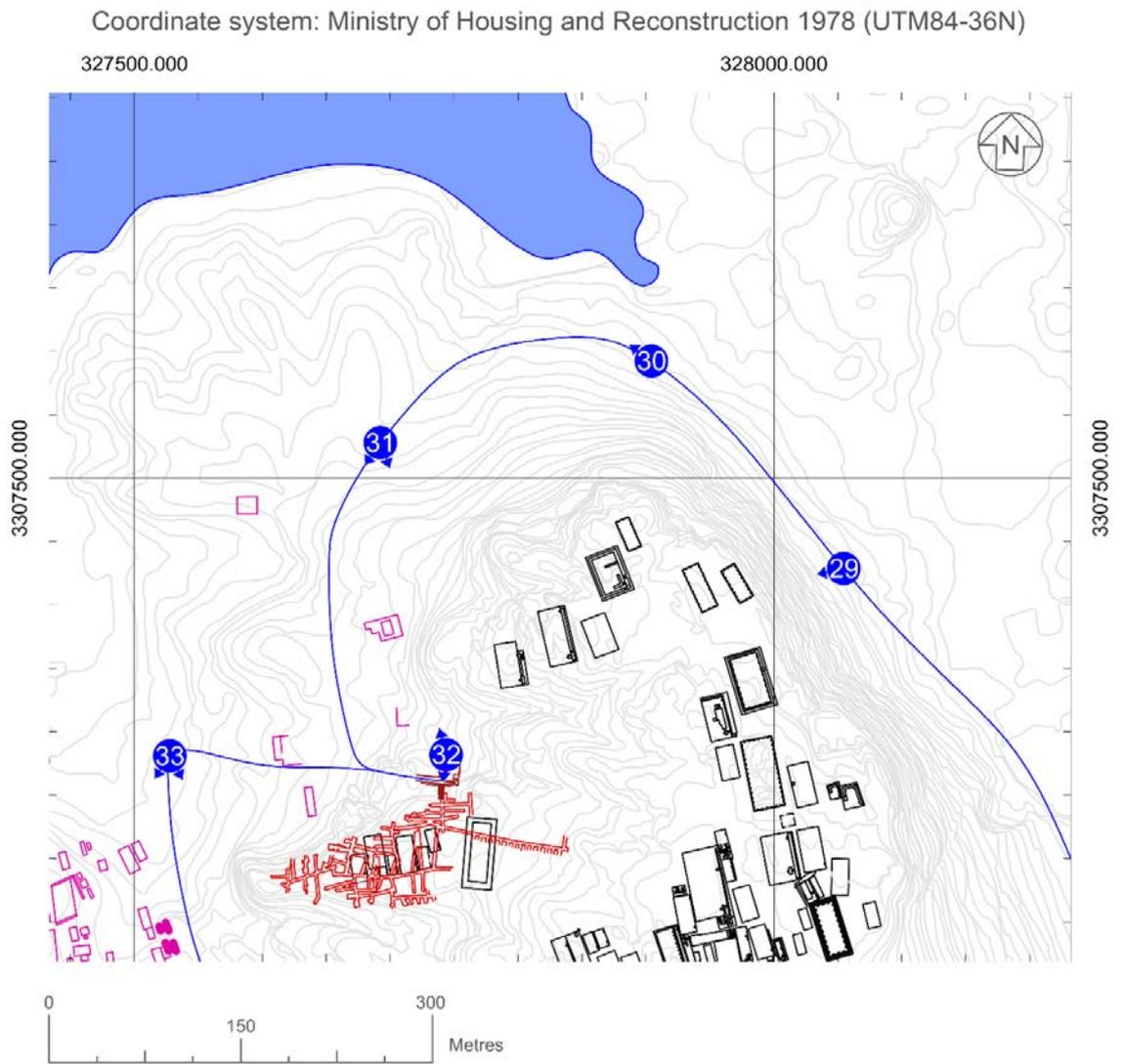


Figure 8.57. Map 8—The northern end of the desert escarpment and area of Lake of Pharaoh (source author).

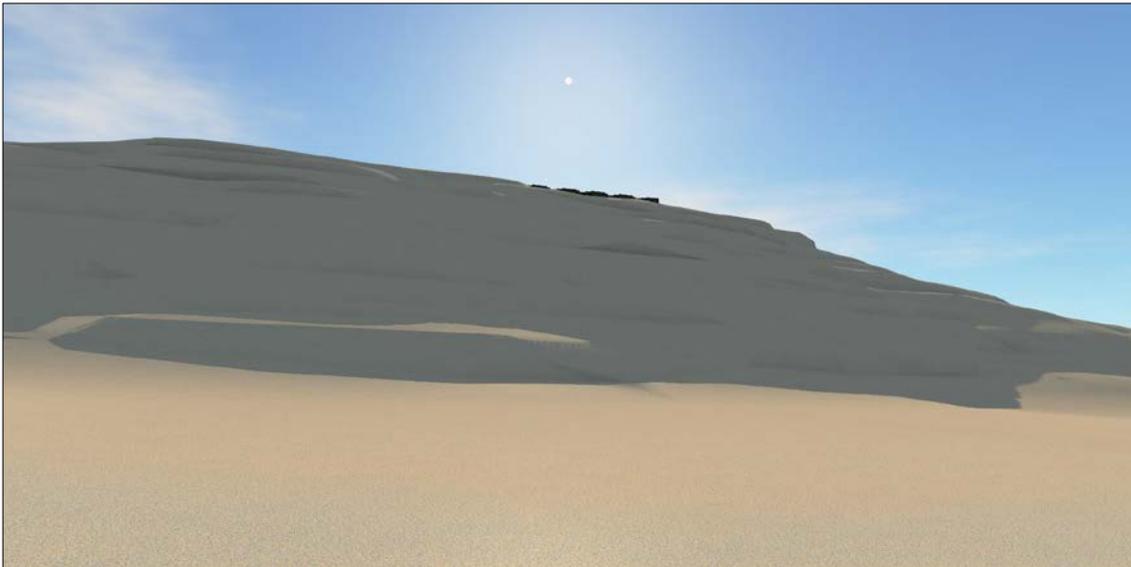


Figure 8.58. **(29)**—Looking up the escarpment towards the plateau, facing west. The decaying mud-brick of a denuded tomb is visible near the edge of the escarpment (source author).



Figure 8.59. **(30)**—Standing at the northern end of the desert escarpment, facing northwest, looking towards the Lake of Pharaoh. The pyramids of *Pr Wsir* (Abusir) are to the left of the image (source author).

Continuing westwards, following the escarpment edge and traversing a rise in the terrain, you encounter the entrance to a wadi valley (Figure 8.60). Littering the western side of the wadi escarpment more ruined tomb structures are visible. Though they are nothing more than remnants of mud-brick mounds protruding from the sand, they attest to the abundance of burials that have been made here. In the far distance

towards the west, there is a curious stepped structure clinging to the south side of a small hill. Barely visible on the top of the hill is a mud-brick enclosure which gives a flattened appearance to the summit of the hill. Turning towards the wadi valley you can see an abundance of small buildings of a community situated here.

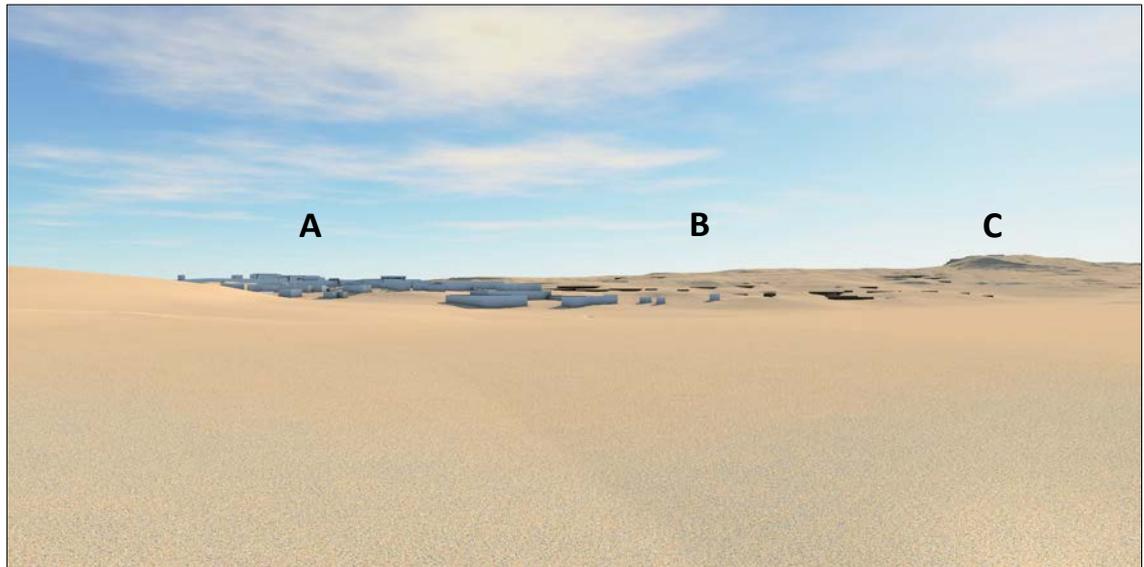


Figure 8.60. (31)—Standing near the Lake of Pharaoh facing south-west towards the entrance to the Wadi Valley Road. The buildings of the small settlement are visible across the wadi (A). Behind the settlement, on the western escarpment, denuded mud-brick tombs are visible (B). The sacred mound with its Old Kingdom stepped structure is visible in the far distance (C) (source author).

Turn back towards the east, a small garden is visible about half way up a promontory of rock that signifies the end of the escarpment (Figure 8.61). This is the garden of *ꜥwy-n-ḥtp n pꜣ hb*—the North Ibis Catacombs, one of the final destinations for the birds of the lake. On the plateau above the North Ibis garden are more ruined tomb structures marked by partially buried mud-brick platforms. In the far distance, the top two tiers of the large step pyramid are visible, and just over the bedrock promontory a large white pylon gateway and enclosure walls can be seen. To the north, located on the side of a slope near the pyramids beyond *Pr-*Wsir**, are large shaft-tombs of important individuals. Though they are not visible from here and their location is some distance from the necropolis, they are designed to be conspicuous in their placement, which is designed to confer importance on their eternal occupants.

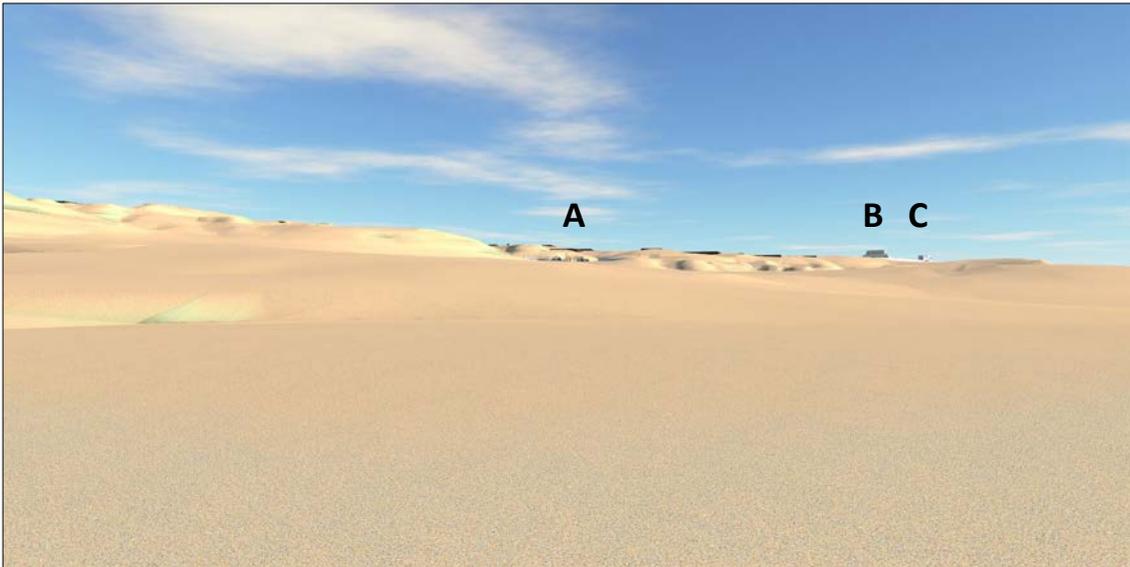


Figure 8.61. **(31)**—Standing near the Lake of Pharaoh, facing south-south-east. From this distance, the North Ibis garden is barely visible (A). The top two tiers of the Step Pyramid are just visible in the distance (B), the rest of the structure being obscured by the sand ridge in the terrain. The pylon gate and enclosure wall of the main temple enclosure of the Sacred Animals are just visible (C) (source author).

The wide wadi valley leads in a southerly direction and is partly congested by a disorganised village. Here are the shops, storehouses and stalls of the embalmers, craftsmen and sellers of religious offerings, and some structures house the members of the animal cults and their families. It is an active place, more so on festival days, where one cannot move past this area without being harassed by tenacious vendors to purchase a potted bird or bronze votive to offer to the gods. The route past the settlement is along the eastern edge of the wadi valley. The buildings are mainly located along the western side of the valley, forcing transit to move southwards beside the bedrock promontory, so as not to become lost in the confusion of buildings. Before travelling along the wadi into the necropolis, take a brief detour up to the North Ibis garden.

ꜥwy-n-htp n pꜣ hb, the North Ibis Catacombs

The north-facing courtyard-garden (Figure 8.62) is cut into a sloping terrace of the promontory escarpment (Figure 8.63). Access to the courtyard is gained via a shallow slope leading up to a path parallel with the rock face. This path leads to the east towards a reused rock-cut tomb of the Old Kingdom. Before the tomb is reached a

north-facing vaulted stairway leads down into the rock and to the animal galleries. The subterranean bird galleries are cut into the rock and millions of birds are entombed within. The galleries are extensive and complicated, presenting a maze of passageways with side chambers where the birds are placed in sealed ceramic pots and walled in. It is possible to present offerings for the gods to the cult priests, who will deposit them. Situated on the plateau above the garden are more ruinous mud-brick tombs of the Old Kingdom, they are partially visible where the sand has shifted and slid down the escarpment (Figure 8.64). The presence of the dead is manifest through the remains of their tombs, representing myriad years of use of this land.

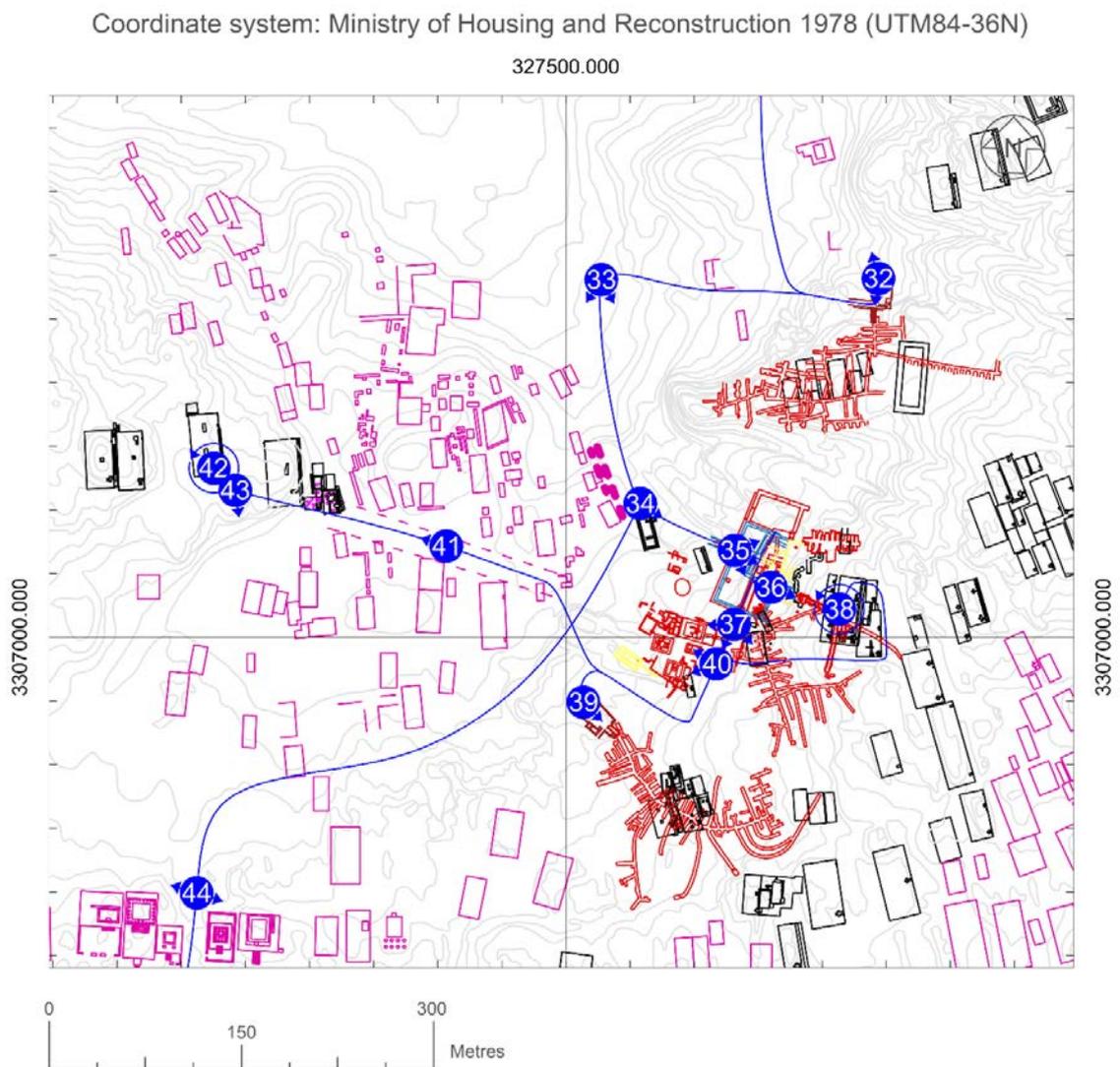


Figure 8.62. Map 9—The North ibis catacombs and the area of the main temple enclosure of the Sacred Animals (source author).



Figure 8.63. (32)—Standing in the garden courtyard of the North Ibis catacombs facing north-north-west towards the Lake of Pharaoh. The pyramids of Abusir are visible in the distance (source author).

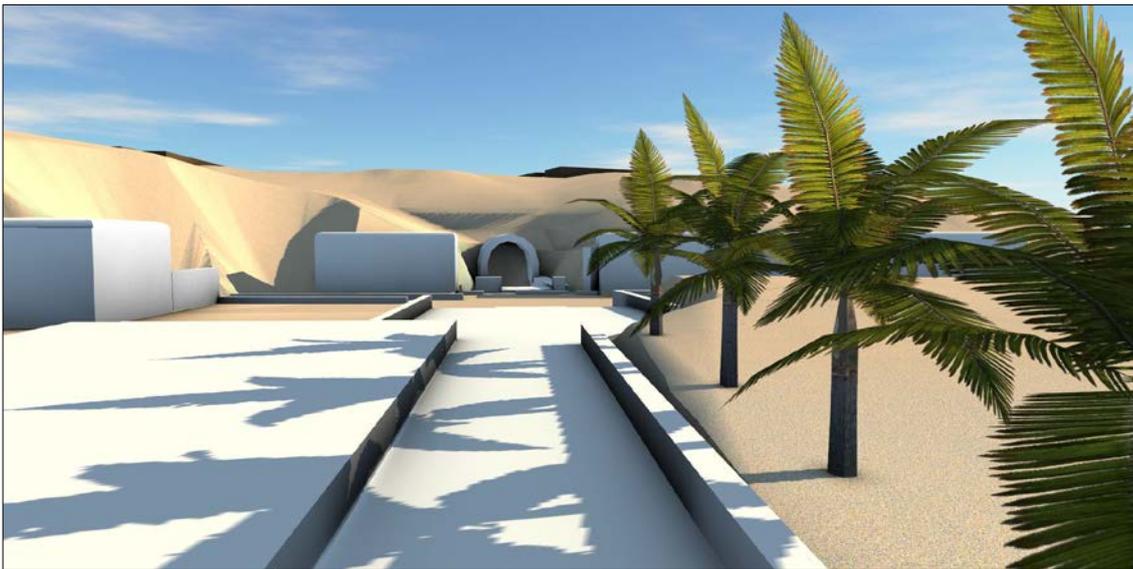


Figure 8.64. (32)—Standing in the garden courtyard of the North Ibis catacombs facing south towards the vaulted entrance to the subterranean tunnels. Denuded mud-brick tombs are visible at the top of the escarpment (source author).

***Hḫ-nb.s*, the Sacred Animal Necropolis**

Leave the garden and return to the wadi valley. The approach into the necropolis follows the curve of the promontory in a southerly direction, past the village (Figure 8.65). The terrain gradually inclines as the wadi path is followed [Mov_8ix—follows (33) through (35)], and rounding the promontory you begin to see a large white-walled

enclosure, complete with an imposing pylon gateway (Figure 8.66). After following the pathway and climbing over a shallow rise in the terrain, the great white temple enclosure stands to the east, captivating in its appearance. This is the temple terrace of *Hḫp-nb.s*—Hepnēbes, where animals sacred to the gods are buried in subterranean passages.

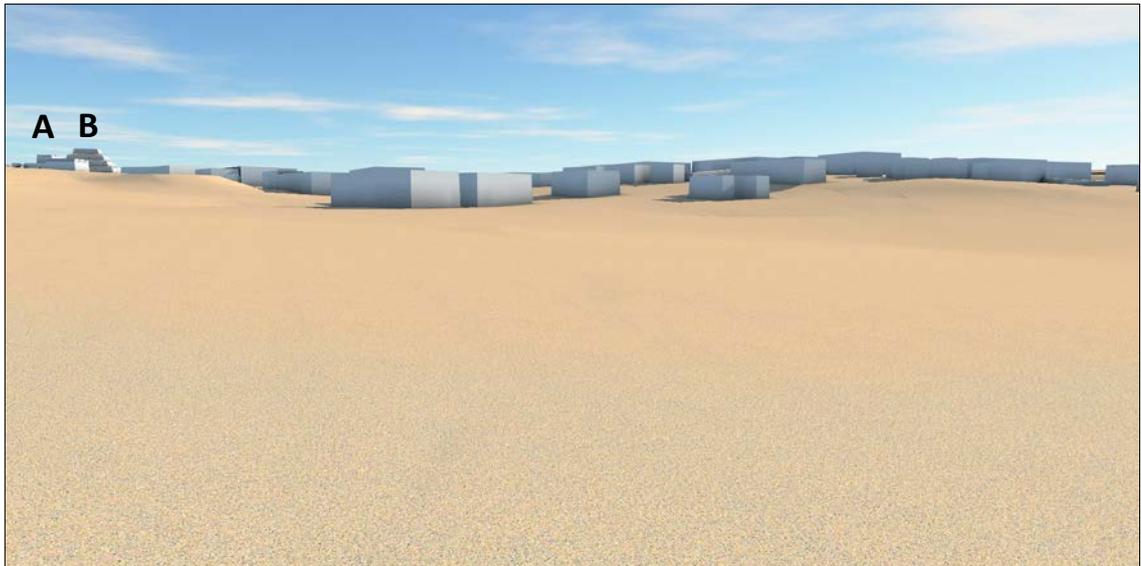


Figure 8.65. **(33)**—Standing in the Wadi Valley Road after descending the slope from the North Ibis Catacombs, facing south-south-west. The buildings of the small settlement stretch across the wadi valley. The Southern Dependencies are just visible (A), as is the Step Pyramid in the distance (B) (source author).

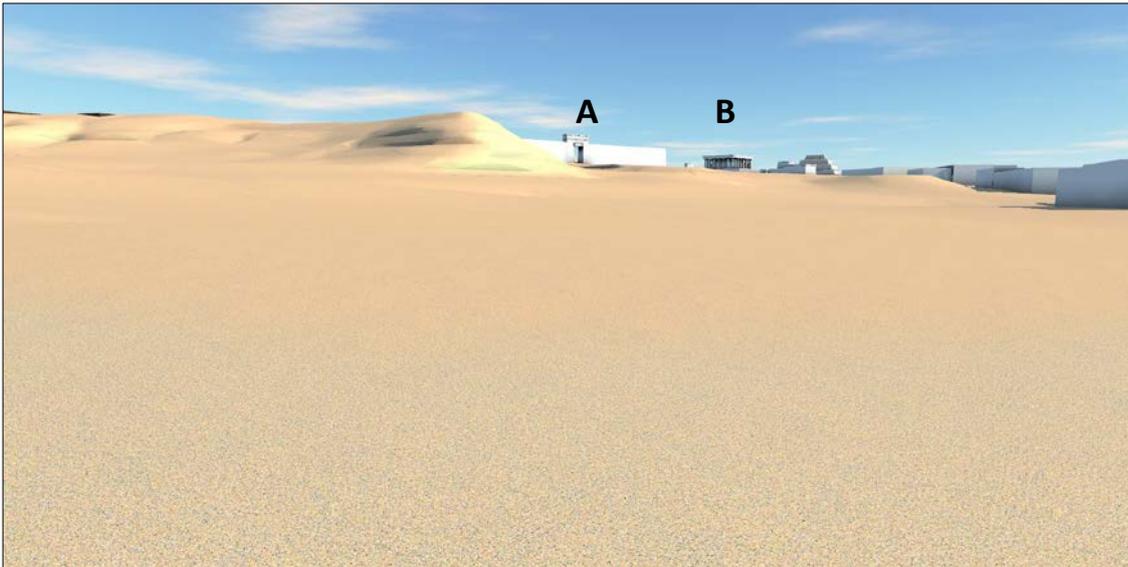


Figure 8.66. **(33)**—The view of the temple terrace of *Hp-nb.s* from the wadi valley when looking towards the south-east. The pylon gateway and enclosure walls are clearly visible atop the sandy rise (A). To the south of the enclosure is a temple structure of the Southern Dependencies (B), and the Step Pyramid is visible in the distance (source author).

A great ramp leads up from the desert surface to the pylon gateway which leads into the temple compound (Figure 8.67). A gatekeeper resides beside the entrance ramp in a small dwelling abutting the structure. Whilst the size of the temple-complex is much smaller than that of the Anubieion and Bubastieion temple-enclosures, it remains impressive. The temple terrace is adjacent to an escarpment, facing the wadi valley road, tucked in behind the promontory, and the barely visible remains of small mud-brick tombs are scattered in front of the temple walls. A few small buildings are to the south of the entrance ramp, and they look dwarfed by the enclosure walls.¹⁷ The temple-enclosure is situated just beneath a large and ruined tomb, which itself is surrounded by smaller tombs. This tomb of an important official has become the focus over time for the deposition of offerings in the hope of petitions being heard.¹⁸

¹⁷ Martin 1981. Structures numbered 1–10 in Sector 4.

¹⁸ Mastaba S3518.

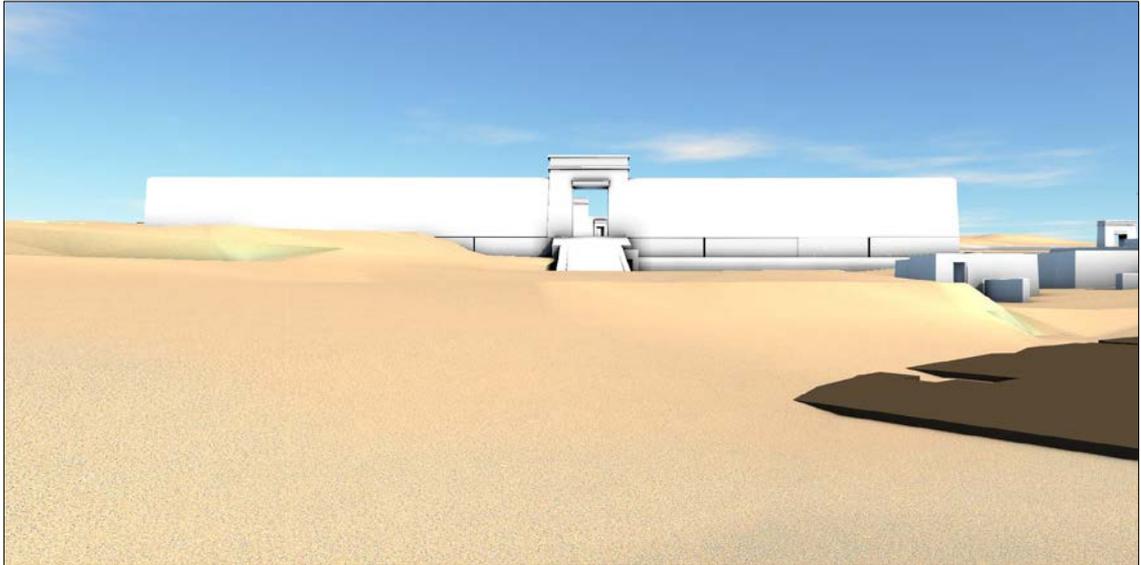


Figure 8.67. (34)—Standing in the Wadi Valley Road, facing east towards the temple terrace of *Hp-nb.s*. To the right of the entrance ramp, the small gatekeepers hut is just visible. A denuded mud-brick tomb can be seen emerging from the sand at the front-right of the image.¹⁹ Two small structures are in front of the main temple enclosure of the Sacred Animals, to the right of the image. The North-South Sacred Way and the beginning of the Southern Dependencies are behind the structures. The pylon gate to the right of the image belongs to Block 1 of the Southern Dependencies (source author).

Ascending the access ramp gains you entry to the temple-enclosure. Priests and cult members move busily around the enclosure, tending to their daily affairs at the various shrines, sanctuaries and catacombs. Many mummified animals are buried in this important place. On festival days when animal depositions are being made, this temple enclosure can be a crowded and busy location. A short pathway leads towards a large pylon gated courtyard directly in front of you (Figure 8.68).²⁰ This edifice dominates the terrace enclosure.

¹⁹ This tomb is unnumbered.

²⁰ Smith *et al.* 2006. Pylon A.



Figure 8.68. (35)—Standing within the western gateway of the main temple enclosure of the Sacred Animals, facing east towards Courtyard A. The North-South Sacred Way can be seen running from left to right across the terrace. To the left of the courtyard pylons is the entrance to Precinct D. To the right the entrance to Gate C and the Baboon Precinct is visible (source author).

Another pathway bisects the terrace north to south, leading from the southern gate of the enclosure to a gate in the north. By following the path to the north, you can stand in the gateway facing into *Sbtt n 3st*—the Compound of Isis or Northern Enclosure (Figure 8.69), in the centre of which stands a shrine. *ꜥwy-n-ḥtp n 3st t3 mwt n Ḥp*—the later subterranean burial galleries for the Mother of Apis, are located here. Access to the burial vaults is down a steep ramp that leads to an opening in the rock-face of the escarpment. The dromos to the galleries is fronted by gateway,²¹ which restricts your access into the subterranean passage. This area feels enclosed and confined, bounded as it is by large walls, and the escarpment to the east. The task of manoeuvring the sarcophagus down the steep ramp and into the catacomb is difficult due to the restricted space. Upon returning to the main temple enclosure you can observe a small precinct,²² situated to the south of the Mother of Apis catacomb entrance at the main enclosure level, adjacent to the central sanctuary. This precinct, now fallen into disuse, was once the sacred enclosure for the earlier Mother of Apis cow burials, made in vaults cut into the escarpment bedrock.²³

²¹ Smith *et al.* 2006. The Mother of Apis Gate.

²² Smith *et al.* 2006. Precinct D.

²³ Smith *et al.* 2006. Vaults D.



Figure 8.69. **(35)**—Standing within the western gateway of the main temple enclosure of the Sacred Animals, facing east-north-east towards the Northern Enclosure where the Mother of Apis catacombs are located (source author).

Examining the pylon gated courtyard, centrally located within the temple terrace compound, you can see into the interior from the main doorway at the front, but entry is prohibited to all but the priesthood (Figure 8.70). This large walled courtyard dating to the reign of Nectanbos II dominates the temple-terrace enclosure. Beyond the courtyard is the sanctuary proper.²⁴ Built against the bed-rock of the escarpment in front of small vaults carved into the rock-face,²⁵ this structure predates the courtyard in front of it. The sanctuary is associated with early cow burials which were made in the vaults behind it.

²⁴ Smith *et al.* 2006. Sanctuary A.

²⁵ Smith *et al.* 2006. Vaults A.



Figure 8.70. (35)—Standing on the pathway leading to Courtyard A, facing east into the courtyard towards the Sanctuary (source author).

Walking south past the pylon gate, you arrive at a partitioning wall that divides the main area of the temple enclosure with a partially restricted area towards the escarpment. Within this region you can see the gate leading to a small sanctuary (Figure 8.71),²⁶ behind which lies more rock-cut vaults.²⁷ The vaults, which may have been cut and expanded from a reused Old Kingdom tomb, were used for the earliest baboon burials, prior to the cutting of the larger subterranean galleries below. The dromos that leads to the baboon galleries is accessed through a gate to the south of the early sanctuary. Beyond the gate, a broad alley flanked by low walls leads to a stone doorway in the rock-face, beyond which is *ꜥwy-n-ḥtp n pꜣꜥn*, the Baboon catacomb. To the south of the dromos is the Baboon precinct (Figure 8.72). These are circumscribed areas where only the priesthood and cult members may enter. However, it is possible for you to visit to the chapel of the ‘Hearing Ear’. Situated within the thickness of the east enclosure wall, between the gate to the earlier Baboon sanctuary and the gate leading to the catacomb dromos,²⁸ is a small chapel room with an adjoining chamber. Here, two statues of Osiris the Baboon await pleas and petitions. In response, they will provide oracular advice. You may enter this chapel to obtain a prophecy but can proceed no farther, for the areas beyond are sacred and secret to the cults.

²⁶ Smith *et al.* 2006. Gate B and Sanctuary B.

²⁷ Smith *et al.* 2006. Vault B.

²⁸ Smith *et al.* 2006. Gate C.

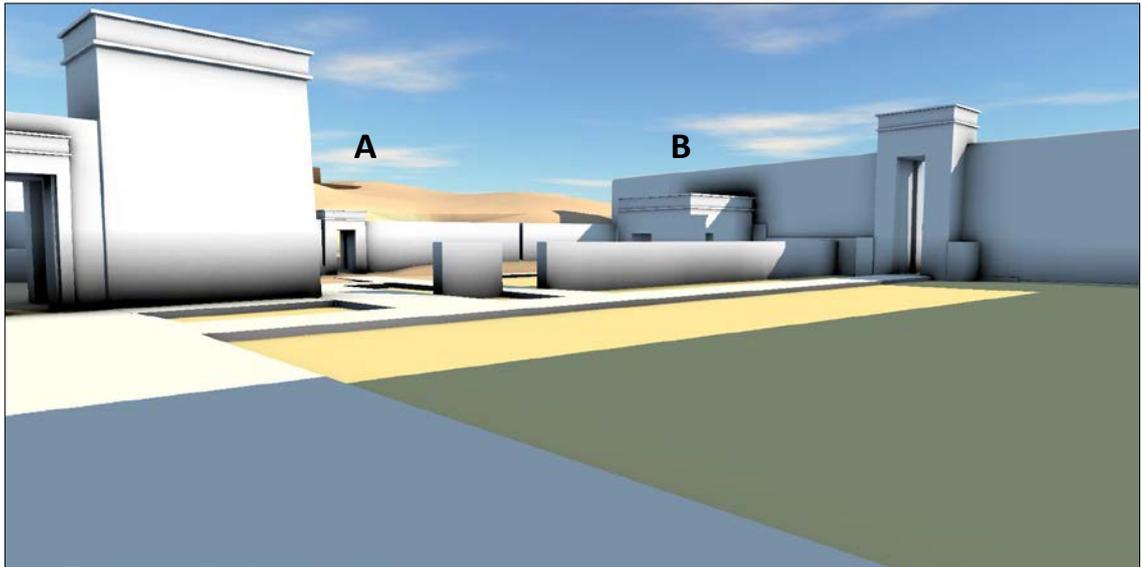


Figure 8.71. **(35)**—Standing within the western gateway of the main temple enclosure of the Sacred Animals, facing south-south-east towards the entrance to the Baboon Precinct (A) and the Falcon Precinct (B). The north-south partition wall divides the Falcon Precinct from the rest of the terrace and the entrance to the catacombs is within the sanctuary. The South Gate to the main temple enclosure of the Sacred Animals is towards the right of the image where the North-South Sacred Way exits the compound (source author).

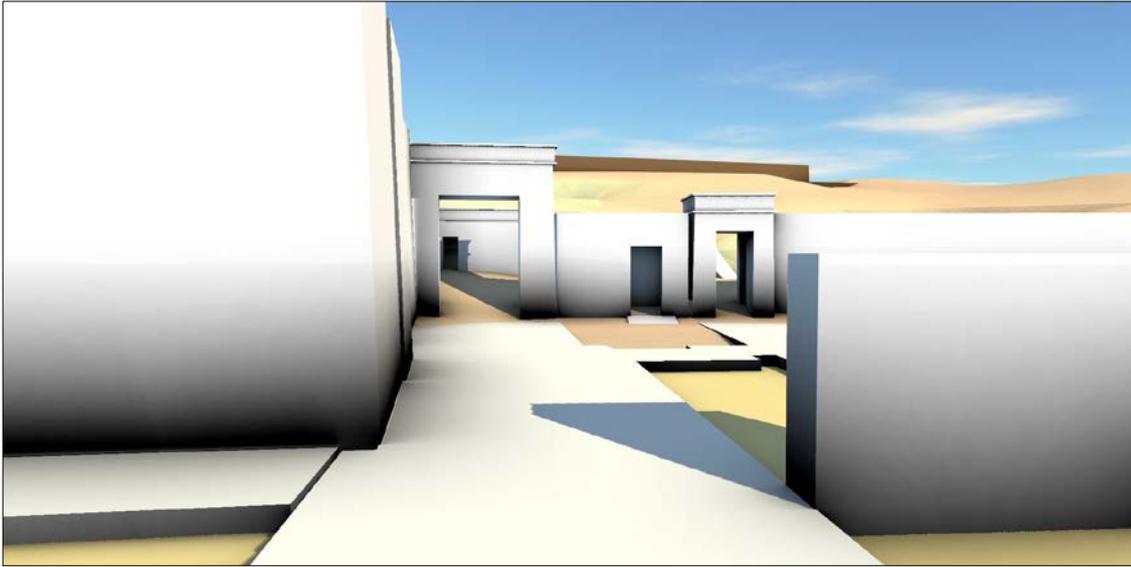


Figure 8.72. **(36)**—Standing on the North-South Sacred Way facing east towards the Baboon vaults and precinct. The gateway to the left leads to a sanctuary which stands before the earliest baboon vaults. The gateway to the right accesses the Baboon Precinct and dromos which leads to the Baboon Catacombs. The doorway in the wall between the two gates is the chapel of the ‘Hearing Ear’. On top of the escarpment above the catacomb vault entrances, the denuded remains of a large Old Kingdom tomb is visible (source author).²⁹

A short walk south along the Falcon causeway will lead you to the sanctuary and small courtyard of the Falcons. The sanctuary, situated in the south-eastern corner of the main temple enclosure, abuts the south enclosure wall and the wall of the Baboon precinct. Access to the sanctuary and *ꜥwy-n-ḥtp n pꜣ bik*, the falcon catacombs, are restricted, and entry to the subterranean galleries is down a winding flight of steps within the sanctuary building. A screen wall conceals this area from the main temple courtyard, but it is possible to observe the sanctuary when petitioning at the Baboon chapel. The compact size of the falcon sanctuary is in stark opposition to the complexity of the subterranean galleries situated beneath it, which are extensive. The falcon courtyard is a small space to the west of the sanctuary and is bounded by the screening wall to the west and the main enclosure wall to the south. This small area in the corner of the temple complex does not convey the same impression of importance as perhaps the baboons or cow sanctuaries and courtyards.

²⁹ Mastaba S3518.

After departing the chapel, return to the north-south sacred way in the main enclosure courtyard and turn towards the south gate. Leaving the temple enclosure through this gate presents you with a panoramic view. To the south-west is *Pr-wꜥb-nb.s*, the Southern Dependencies of the Main Temple Enclosure (Figure 8.73). To the west you can see the wadi settlement and immediately behind, a large mud-brick tomb set against the escarpment.³⁰ In the distance, the large stepped construction projects from the bedrock mound. The enclosure atop the mound in the far distance is barely visible from here.

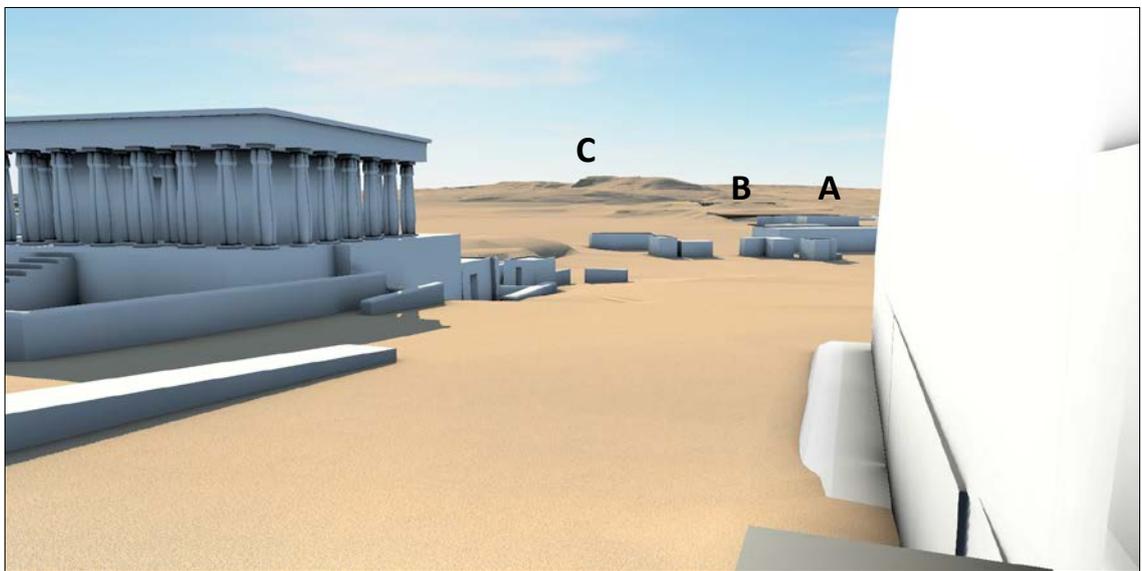


Figure 8.73. (37)—Beside the South Gate of the main temple enclosure of the Sacred Animals, facing west. A peripteral temple is situated atop a platform within the Southern Dependencies to the left of the image. In the distance is the wadi valley settlement (A). On the western slope of the wadi valley a large ruined Old Kingdom tomb is visible (B). In the far distance, the sacred mound and its stepped structure is visible (C) (source author).

Ahead, to the south-south-west, the pylons and enclosure walls of the Serapeum complex are partially visible due to screening by the buildings of the Southern Dependencies (Figure 8.74). Beyond a sphinx flanked section of the Serapeum Way and its shrines and tombs the great stepped pyramid of Djoser projects upwards from the sandy horizon, and the pyramid of Unas is visible in the distance. Immediately to your left is a broad pillared portico standing atop a limestone base parallel to the alignment of the sacred way (Figure 8.75). Walking up low set of steps will gain you access to the

³⁰ Mastaba AS33.

space beyond. The portico partially occludes the view towards the escarpment where there are some rock-cut openings.³¹ Mud-brick from a denuded tomb is also partly visible where it protrudes from below the sand just behind a boundary wall which extends south alongside the sacred way.³²

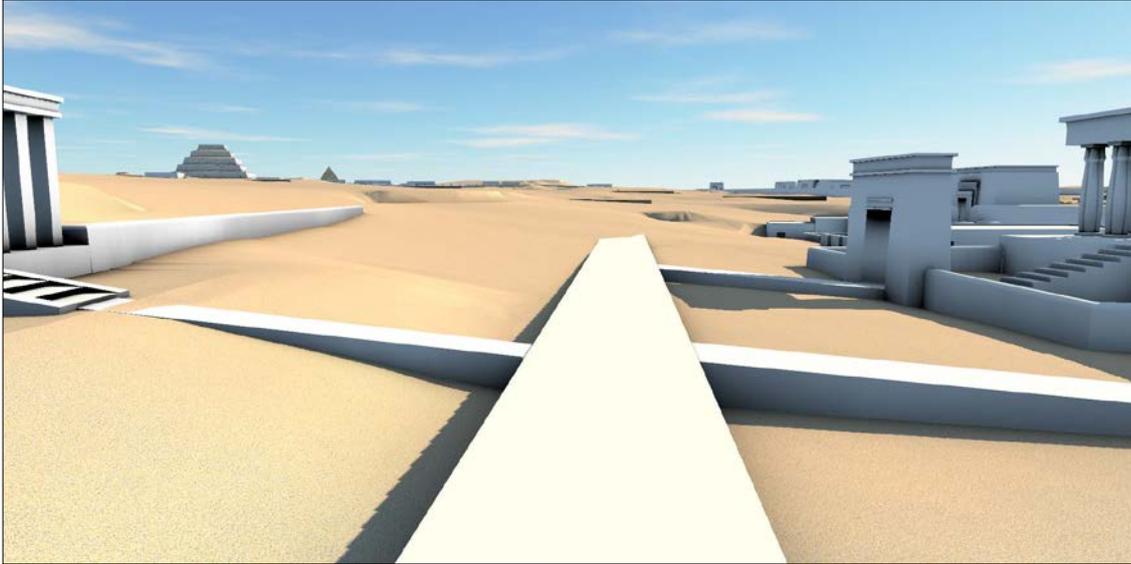


Figure 8.74. **(37)**—Standing beside the South Gate of the main temple enclosure of the Sacred Animals, facing south. The Southern Dependencies of the SAN are situated to the right of the image, which are partially screening the pylons of the Serapeum Precinct in the distance beyond. The pyramids of Djoser and Unas are visible towards the left of the image (source author).

³¹ Smith *et al.* 2006. Vault J.

³² Mastaba S3536.



Figure 8.75. **(37)**—Standing beside the South Gate of the main temple enclosure of the Sacred Animals, facing south-east towards the pillared wall.³³ The Step Pyramid is visible in the distance and the pyramid of Unas is visible to the right of the image (source author).

From your position on the sacred way you are afforded three routes which you can take from here. You can venture up over the escarpment to visit the large mud-brick tomb behind the main temple enclosure; you can continue south along the sacred way towards the dromos of the Serapeum; alternatively, you can make your way back down into the wadi valley visiting the South Ibis catacomb garden as you pass. From there you can continue along the wadi road towards the Serapeum North Gate.

Follow the boundary wall for some 40m and you will arrive at a block of steps which assist in moving over the wall and up the sandy slope. Here you will take a detour to visit the large mud-brick tomb that overlooks the temple terrace enclosure.³⁴ Ascending the steps and following the rise in the sand takes you directly over the top of the falcon galleries, situated deep beneath your feet. Heading in a north-easterly direction you will come to the denuded remains of the large mud-brick tomb. Deep within the rock beneath this large tomb are the Baboon Catacombs. Surrounding the large tomb are smaller tombs built up against it, presumably located to achieve a closeness to the important individual buried here.³⁵ You can offer votive *donaria* here, as many others

³³ Reconstructed after Smith *et al.* 2006, 97.

³⁴ Mastaba S3518.

³⁵ Mastaba numbers 3512, 3523–3527, 3529–3533.

have done, to appeal for a cure to an ailment or affliction.³⁶ These votive depositions are generally placed in front of the entrance to the corridor chapel of the tomb. If you were to stand atop the tomb structure you would be rewarded with a magnificent view of the funerary landscape and the monuments of the animal cults [Mov_8x—location (38)]. From this position, it is possible to see the Anubieion and Bubastieion to the south-east (Figure 8.76), the Serapeum Way leading to the Serapeum enclosure and temples to the south and south-west (Figure 8.77), the garden courtyard of the South Ibis catacombs is towards the south-west, the large temple terrace of the Sacred Animal Necropolis is immediately to the west (Figure 8.78), and the Lake of Pharaoh is clearly visible in the distance to the north (Figure 8.79). All around you, ancient ruined mud-brick tombs jut out from the desert sands.

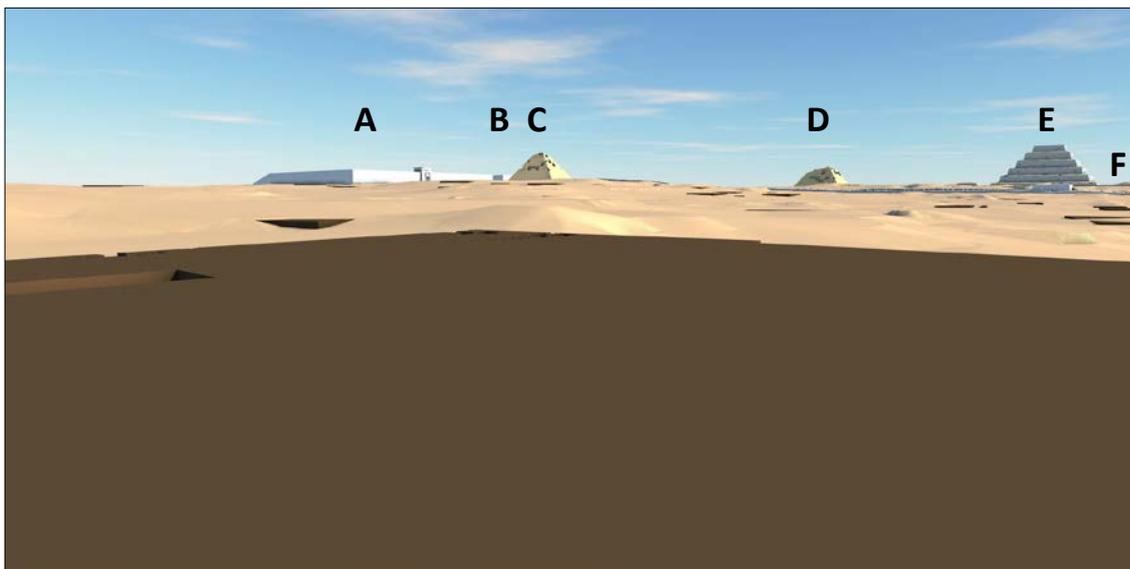


Figure 8.76. **(38)**—Standing on the denuded mud-brick tomb facing south-east. The Anubieion enclosure is clearly visible (A), and the Bubastieion enclosure walls partially visible (B) behind the ruined pyramid of Teti (C). The ruined pyramids of Userkaf (D) and Djoser (E) are easily distinguished. The Serapeum Way (F) passes in front of the Step Pyramid, with denuded mud-brick tombs visible in the foreground (source author).

³⁶ Emery 1970, 8–9; 1971, 3–4. The votive anatomical *donaria* from the entrance to the corridor chapel of tomb S3518, and those discovered in the upper level of the Baboon Catacombs, date to the Ptolemaic period. It is unclear if the practice of medical votive offering was conducted in the Late Period at this location.

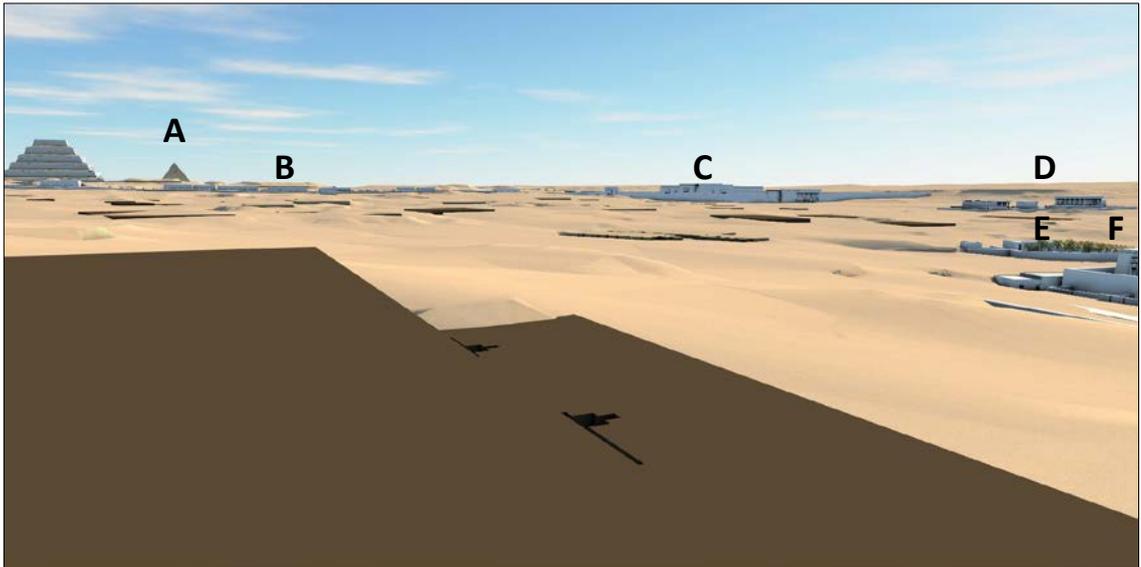


Figure 8.77. **(38)**—Standing on the denuded mud-brick tomb facing south-west. The pyramid of Unas is visible (A). The tombs that flank the south of the Serapeum Way are aligned east to west along its route (B). The Serapeum Precinct stands within the wadi valley (C) with the alignment of shrines and temples situated to its north (D). The courtyard garden of the South Ibis Catacombs (E) and the buildings of the Southern Dependencies (F) are to the right of the image (source author).

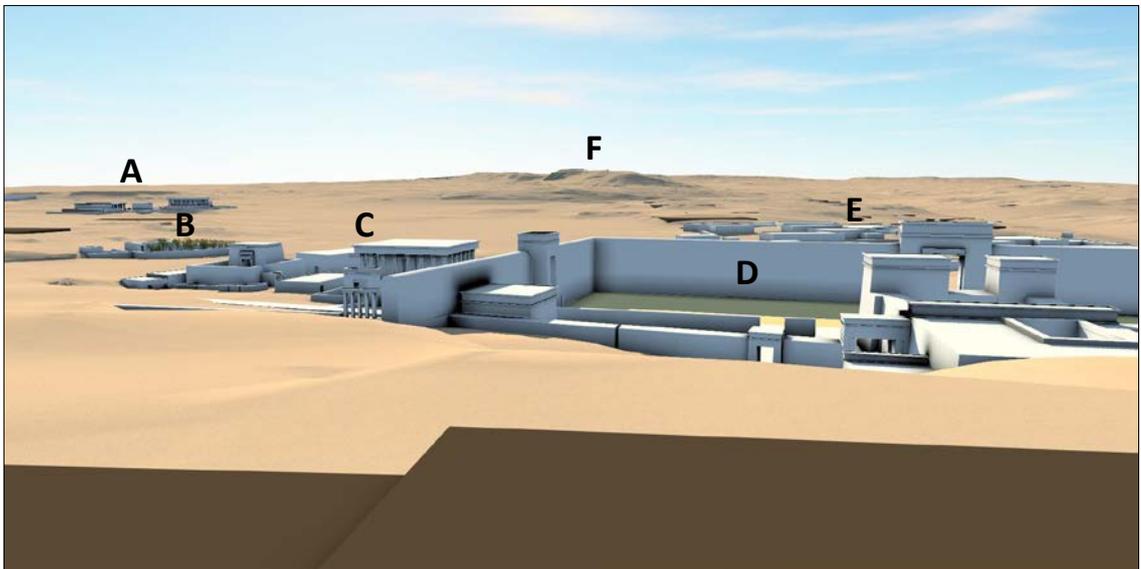


Figure 8.78. **(38)**—Standing on the denuded mud-brick tomb facing west. The alignment of shrines and temples situated to the north of the Serapeum Precinct are visible (A). The courtyard garden of the South Ibis Catacombs (B) and the Southern Dependencies (C) are visible. The main temple enclosure of the Sacred Animals dominates the view (D). In the distance, the wadi valley settlement is visible (E). The sacred mound and Old Kingdom stepped structure are visible in the far distance (F) (source author).

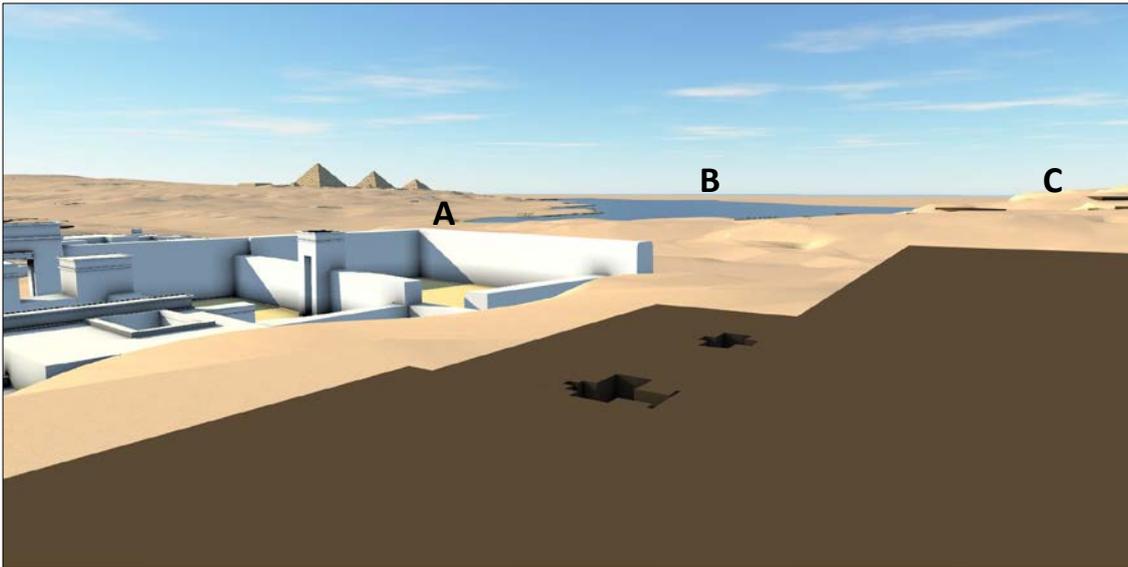


Figure 8.79. **(38)**—Standing on the denuded mud-brick tomb facing north-west. The SAN Northern Enclosure of the Mother of Apis is visible (A). The pyramids of Abusir are visible in the far distance and the Lake of Pharaoh can be seen beyond the wadi valley (B). Denuded mud-brick tombs are visible on the escarpment (C) (source author).

On the opposite side of the wadi valley you observe a similar mud-brick tomb creating a platform at the periphery of the escarpment (Figure 8.80).³⁷ This tomb appears to present a symmetry across the wadi with the tomb at your current location. There appears to be a clear route leading from the buildings of the Southern Dependencies across the valley towards that tomb. Heading back down to the North-South Sacred Way, make your way along the causeway towards the south. Once you are past the buildings of the Southern Dependencies turn towards the west and make your way to the garden courtyard of the South Ibis catacombs.

³⁷ Mastaba AS33.

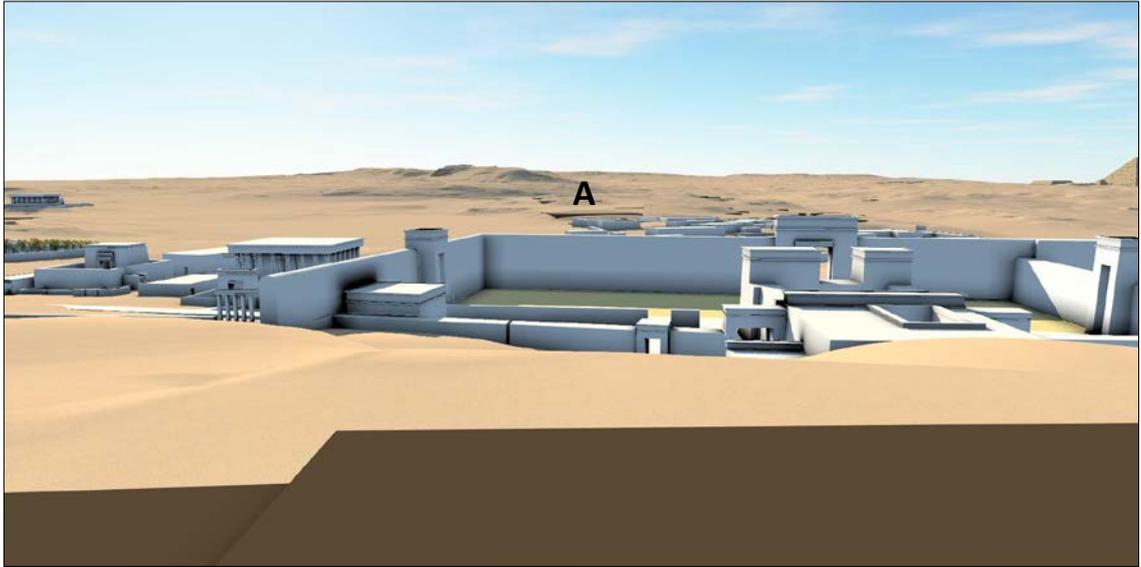


Figure 8.80. **(38)**—Standing on the denuded mud-brick tomb facing west towards the large denuded mud-brick tomb on the opposite escarpment of the wadi valley (A) (source author).

ḥwy-n-ḥtp n p3 hb, the South Ibis Catacombs

This walled garden courtyard stands atop a terrace of sand and is orientated in an east-south-easterly direction (Figure 8.81). At the eastern end of the garden, steps lead down to the dromos of the South Ibis catacombs. To the south of the dromos is a small gatekeepers hut. You can access the garden but are not permitted to enter the dromos or galleries beyond as this area is sacred and restricted to the priesthood. The garden is planted with trees and bushes, which flourish through regular watering by the cult members who tend to this area. Like the main temple enclosure, this catacomb garden would be busy on festival days and those times during the year when the priests deposit the mummified offerings here.



Figure 8.81. (39)—Standing before the courtyard garden of the South Ibis catacombs, facing east. The ruined pyramid of Teti is visible in the distance. The entrance to the catacombs are located to the left of the small structure visible at the back of the courtyard (source author).

***Pr-wꜥb-nb.s*, the compounds of Horus and Thoth, and the House of Thoth**

Before departing the area of the main temple terrace, take a moment to examine the Southern Dependencies. These various structures of the main temple are where other cult activities take place (Figure 8.82). There are also administrative buildings here amongst the platforms, and some dwellings for those involved in the cults. There is a small temple which is said to have been constructed by foreign men to worship their gods.³⁸ Access to the shrine is gained via a descent into the temple, contradicting the required ascent to access Egyptian temples. Also situated here are platforms for shrines supplementary to main temple complex.³⁹ They are constructed upon purpose-built terraces, to level out the slope of the escarpment. Alongside the periphery of the wadi valley, at the western extent of the structures, is the sunken feature *Pꜣ inhy hr pꜣ hb pꜣ bik*, the courtyard of the Ibis and the Falcon.⁴⁰ This is the place where the eggs of the Ibis and Falcon birds are incubated by the heat of the sun being intensified in the enclosed walled courtyard (Figure 8.83). It is not easy to see this feature from the sacred way due to screening by the other buildings, so to view it properly you must make your way down to the wadi. A path leads in that general direction from the

³⁸ Martin 1981. Block 5.

³⁹ Martin 1981. Blocks 1, 4, and 7.

⁴⁰ Martin 1981. Block 3.

causeway. There is also another gatekeeper dwelling here, next to the North-South Sacred Way, guarding the South Gate entrance of the Main Temple Enclosure.⁴¹

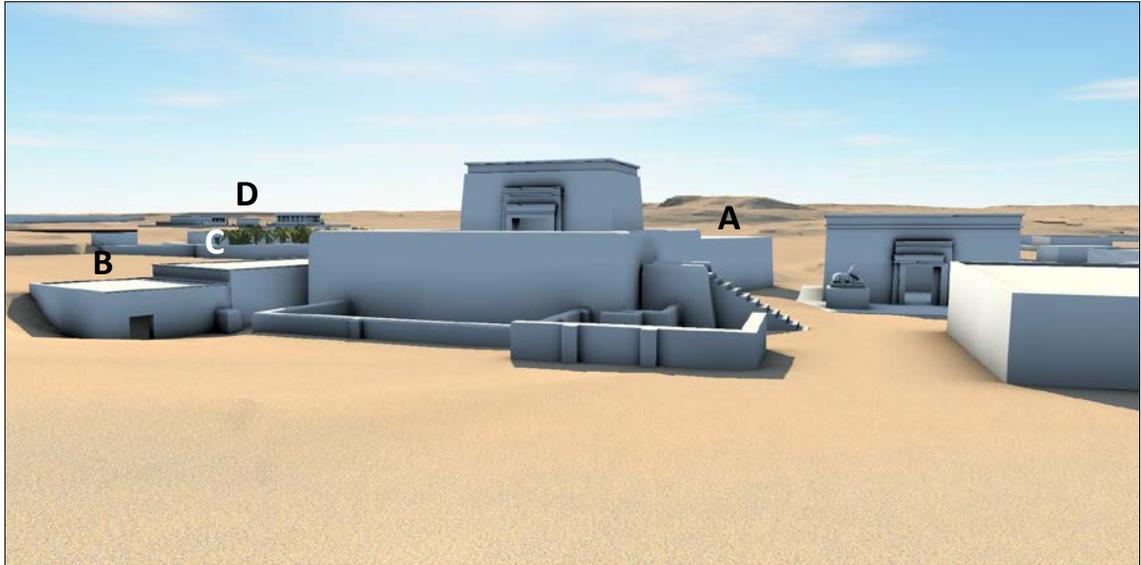


Figure 8.82. (40)—Standing on the North-South Sacred Way facing south-west towards the Southern Dependencies. The foreign temple is visible behind the steps of the temple platform (A). Administrative buildings are located to the left of the image (B), beyond which, in the distance, the courtyard garden of the South Ibis Catacombs (C) and the alignment of shrines and temples to the north of the Serapeum Precinct (D) are visible (source author).

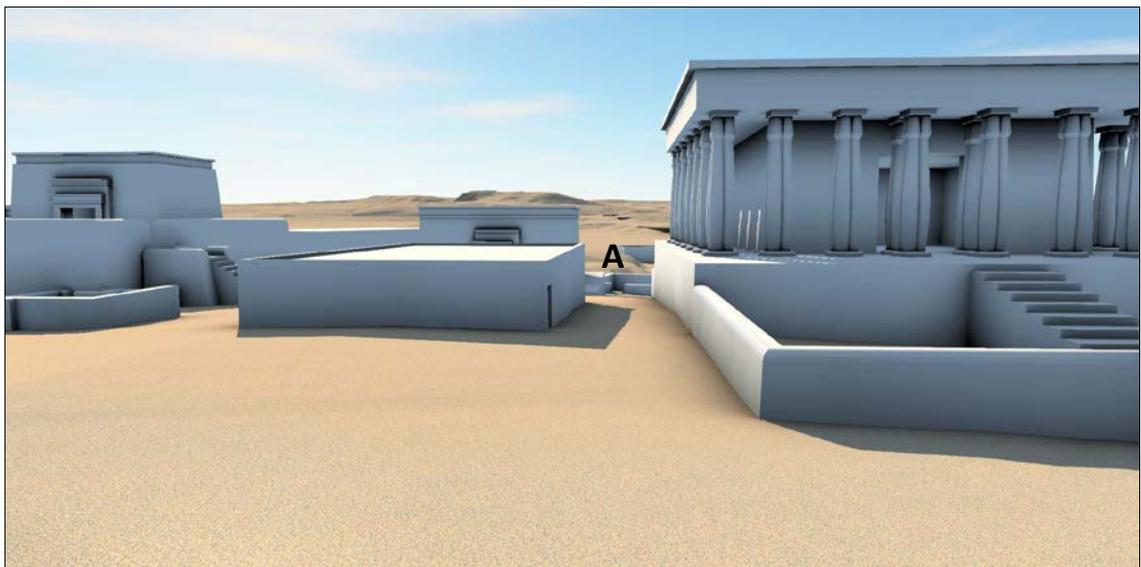


Figure 8.83. (40)—Standing on the North-South Sacred Way facing west. The sunken Courtyard of the Ibis and Falcon is just visible in the lower distance (A) (source author).

⁴¹ Martin 1981. Block 8.

Hp-nb.s, the wider area

Turning to the west it is possible to make your way across the wadi valley, skirting the periphery of the settlement buildings along their southern edge, following a clear routeway to the western side. As you approach the western escarpment of the wadi you can clearly see the large denuded mud-brick tomb protruding from the sand on the slope of the bedrock (Figure 8.84). The settlement terminates here, and denuded tombs continue towards the west. The large uncovered tomb remains appear to be very old, and pits have been cut into the upper surface to facilitate the burial of cattle and other animals. Some of the burials were mummified, others were sacrificial offerings made during feasting and festivals.⁴²

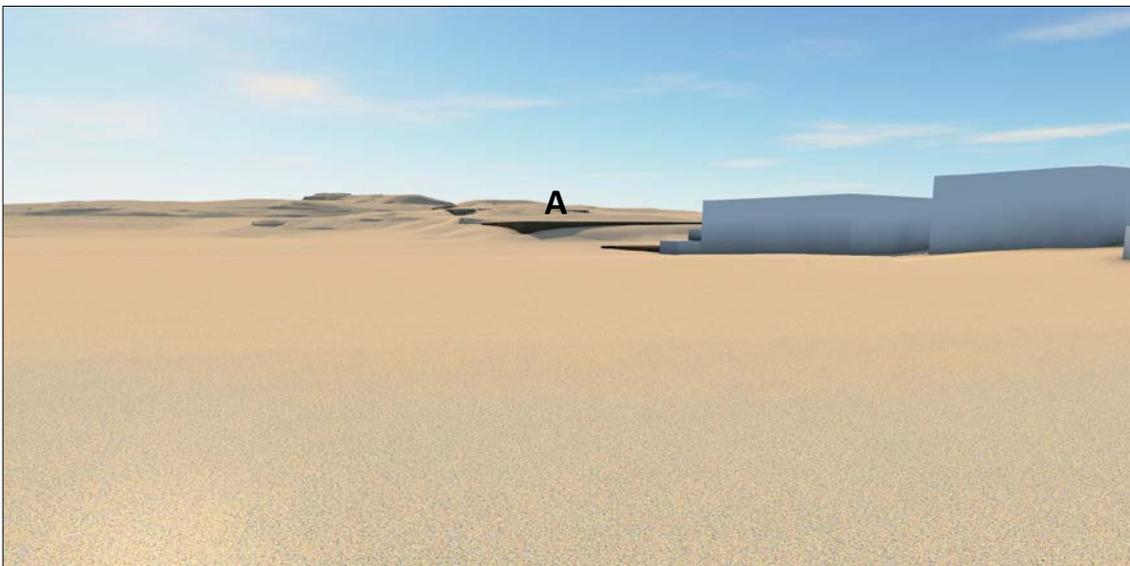


Figure 8.84. **(41)**—Standing in the Wadi Valley Road, facing west. The large denuded mud-brick tomb is visible against the western escarpment (A) (source author).

This tomb creates a symmetry with the large tomb on the opposite side of the valley and similarly provides a panoramic view of the landscape [Mov_8xi—location **(42)**]. Although not to the same extent as that from the opposite tomb, which commands a higher elevation. To the north you can see the Lake of Pharaoh (Figure 8.85); it is just possible to see the trees in the garden-courtyard of the North Ibis catacombs to the north-east (Figure 8.86); beyond the wadi settlement, directly to the east, you can see the main temple enclosure of the Sacred Animals and their Southern Dependencies

⁴² Bárta *et al.* 2010, 181.

(Figure 8.87) and, in the distance behind the enclosure, the mud-brick tomb situated atop the escarpment; the garden-courtyard of the South Ibis catacombs are towards the south-east and in the distance behind them are the walls of the Anubieion; the Serapeum Way is visible stretching from the Anubieion in the east towards the Serapeum enclosure, which you can see to the south. Beyond the row of temples and shrines you can see the grand north gate of the Serapeum enclosure and the pylons of the temple within (Figure 8.88). In the far distance to the west, the stepped feature juts from the edge of the bedrock outcrop and the mud-brick enclosure atop the mound is just visible. This enclosure, an earlier feature that has later been reused,⁴³ can be visited by a long journey across the desert to the rocky outcrop (Figure 8.89).

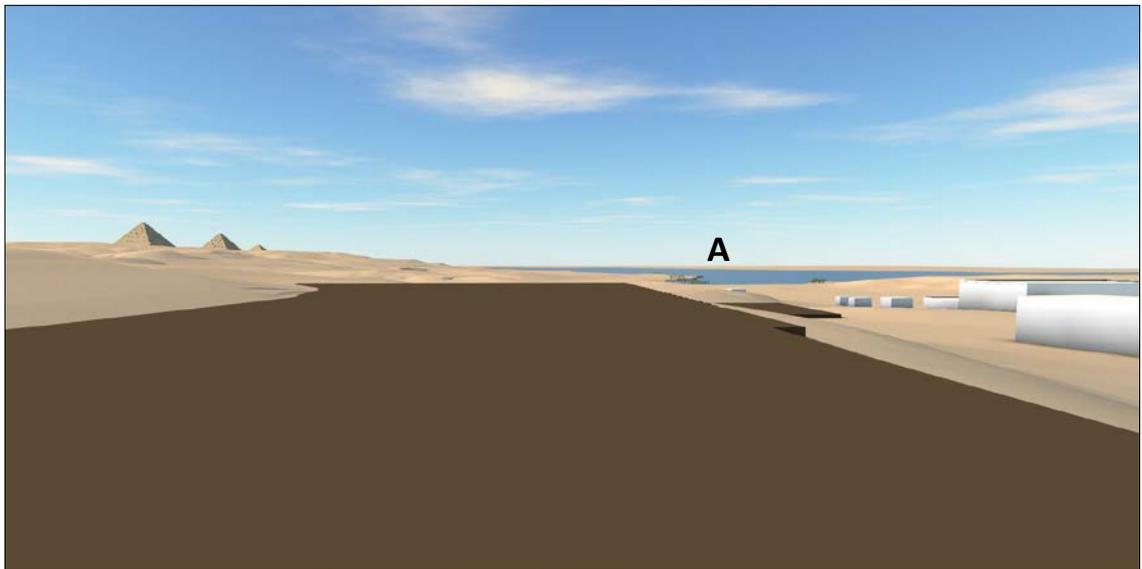


Figure 8.85. **(42)**—Standing on the large denuded mud-brick tomb on the wadi valley western escarpment, facing north. The pyramids of Abusir are visible in the distance, to the left of the image. The Lake of Pharaoh is visible (A), and the buildings of the wadi valley settlement are situated to the right of the image (source author).

⁴³ Yoshimura and Takamiya 2000, 163.

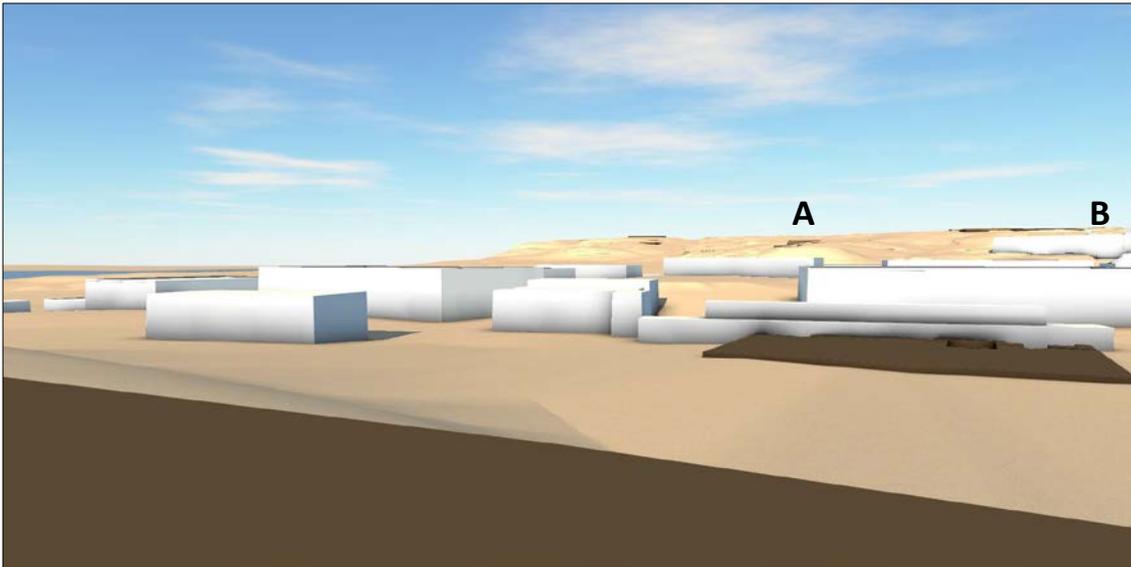


Figure 8.86. (42)—Standing on the large denuded mud-brick tomb on the wadi valley western escarpment, facing north-east. The courtyard garden of the North Ibis Catacombs is barely visible on the escarpment shelf (A). The wadi valley settlement stretches across this view. Set against the escarpment is the main temple enclosure of the Sacred Animals (B) (source author).

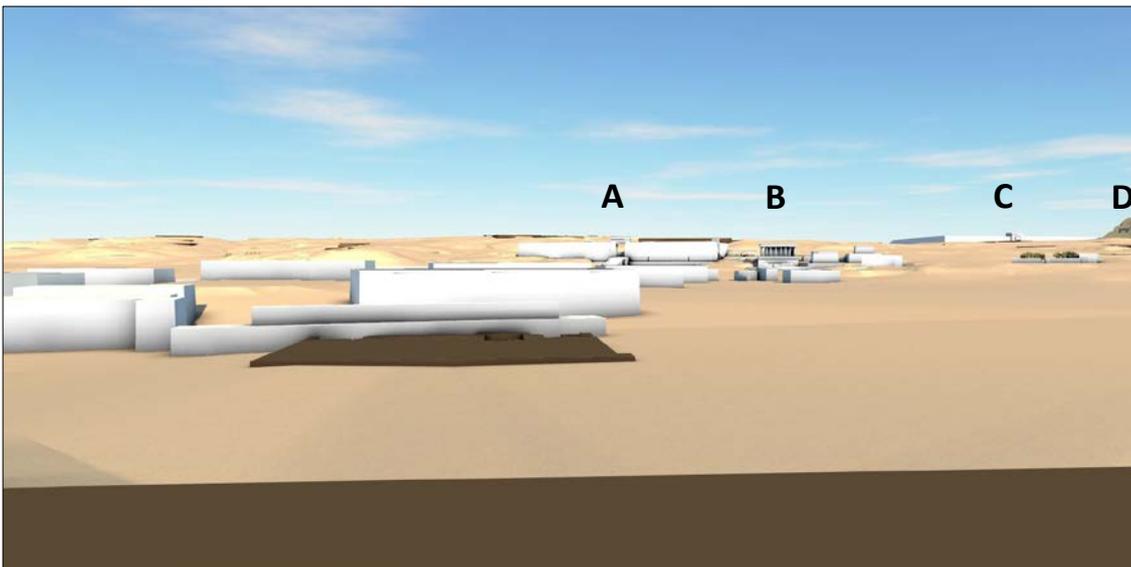


Figure 8.87. (42)—Standing on the large denuded mud-brick tomb on the wadi valley western escarpment, facing east. The main temple enclosure of the Sacred Animals is set against the escarpment (A), with its Southern Dependencies situated to the south (B). In the distance, the Anubieion enclosure is visible against the skyline (C), to the east of the Teti pyramid (D) (source author).

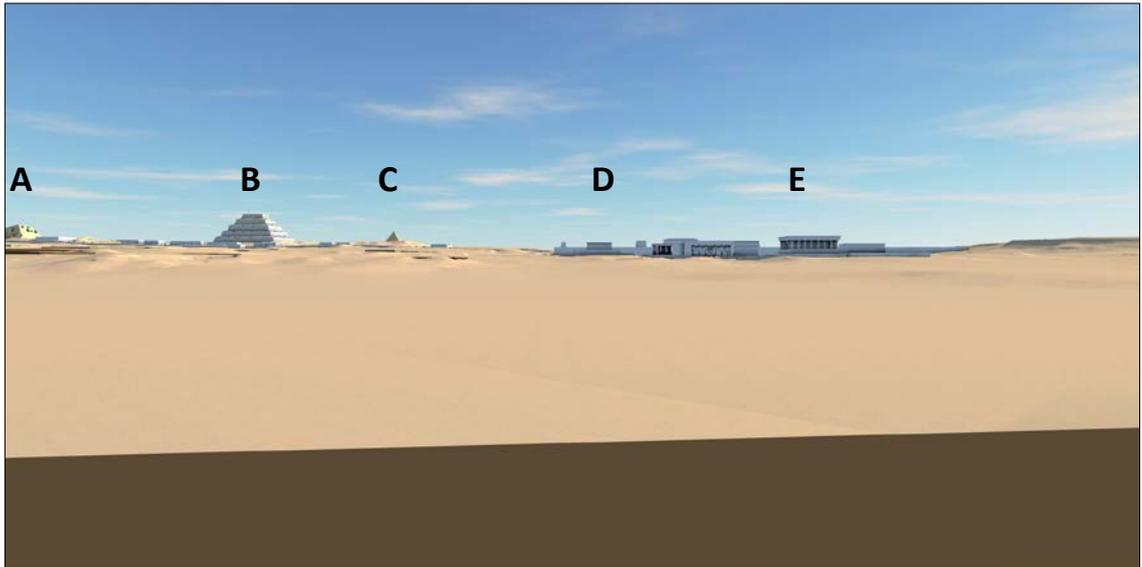


Figure 8.88. **(42)**—Standing on the large denuded mud-brick tomb on the wadi valley western escarpment, facing south. The ruined pyramid of Userkaf (A) is visible to the left of the Step Pyramid (B), with the reconstructed pyramid of Unas (C) visible to its right. The wadi road continues towards the Serapeum Precinct (D) which is partially screened from view by the alignment of shrines and temples to its north (E) (source author).

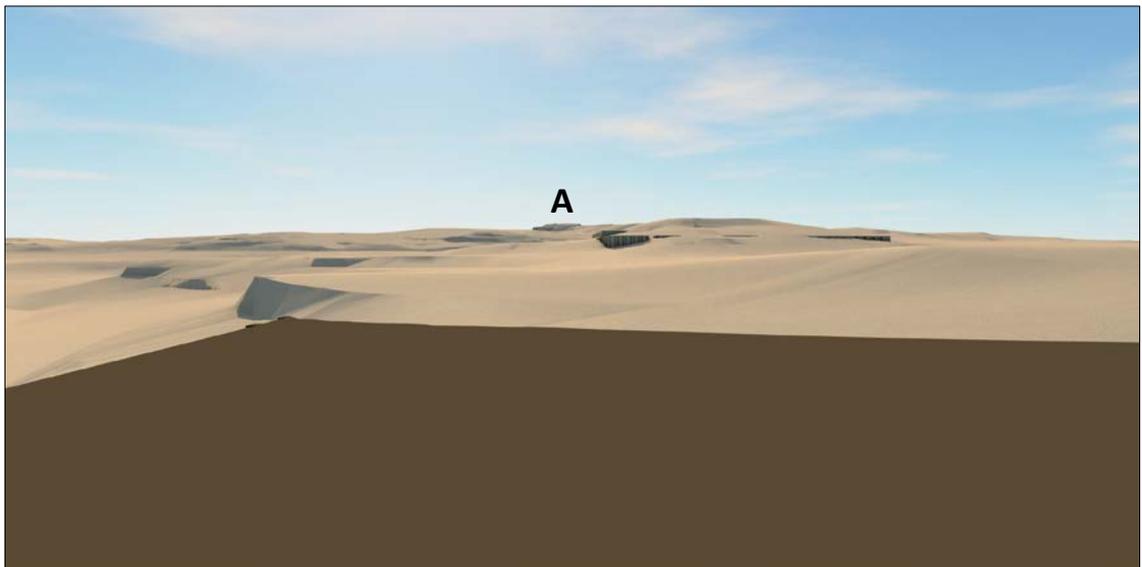


Figure 8.89. **(42)**—Standing on the large denuded mud-brick tomb on the wadi valley western escarpment, facing west. The Sacred Mound and Old Kingdom stepped feature are visible in the far distance (A) (source author).

Moving east, back down into the wadi towards the Southern Dependencies, turn towards the south and you will see a row of temples and shrines aligned before the

north gate of the Serapeum Enclosure (Figure 8.90).⁴⁴ Walking along the wadi in this direction you are following the route taken by the workers dragging the great sarcophagi of the Apis bulls to the burial vaults beneath the Serapeum temple. It is an arduous undertaking pulling the granite sarcophagus along the wadi road. Whilst the incline of the valley is shallow, the distance is considerable. As you pass along the valley, the landscape to your west appears barren and untamed (Figure 8.91), whilst to your east it is of a markedly different character, where order is manifest upon the terrain (Figure 8.92).

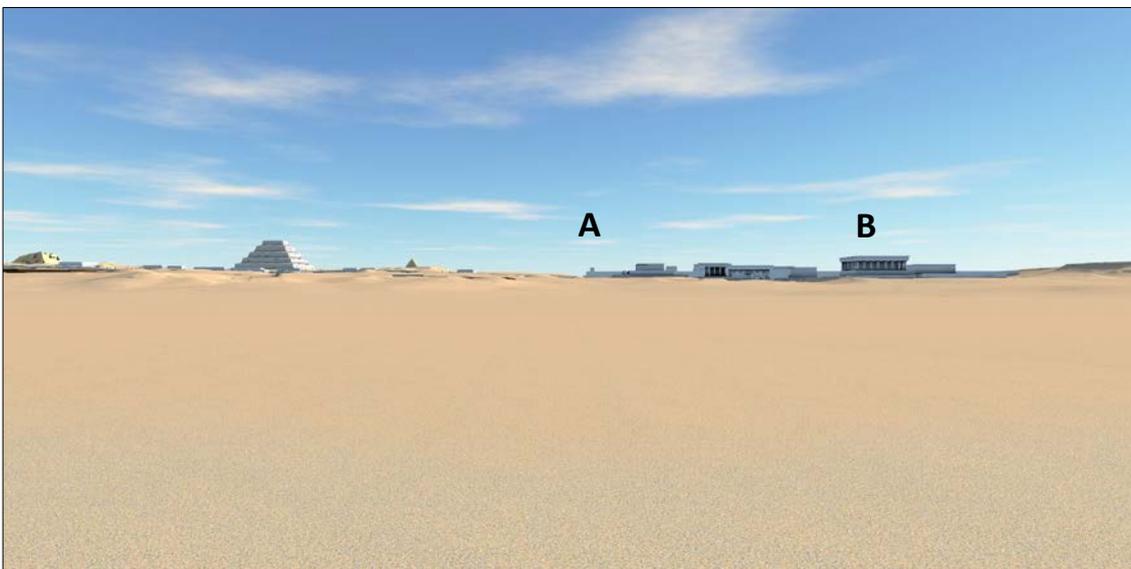


Figure 8.90. **(43)**—Standing in the wadi valley beside the large mud-brick tomb, facing south. In the distance, the east gate of the Serapeum enclosure is just visible (A) with the rest of the Serapeum enclosure hidden behind the northern alignment of shrines and temples (B) (source author).

⁴⁴ Mathieson and Dittmer 2007, 87.



Figure 8.91. (44)—Standing in the Wadi Valley Road beside the alignment of shrines to the north of the Serapeum Precinct (left of image), facing west. The land to the west is hilly and barren (source author).

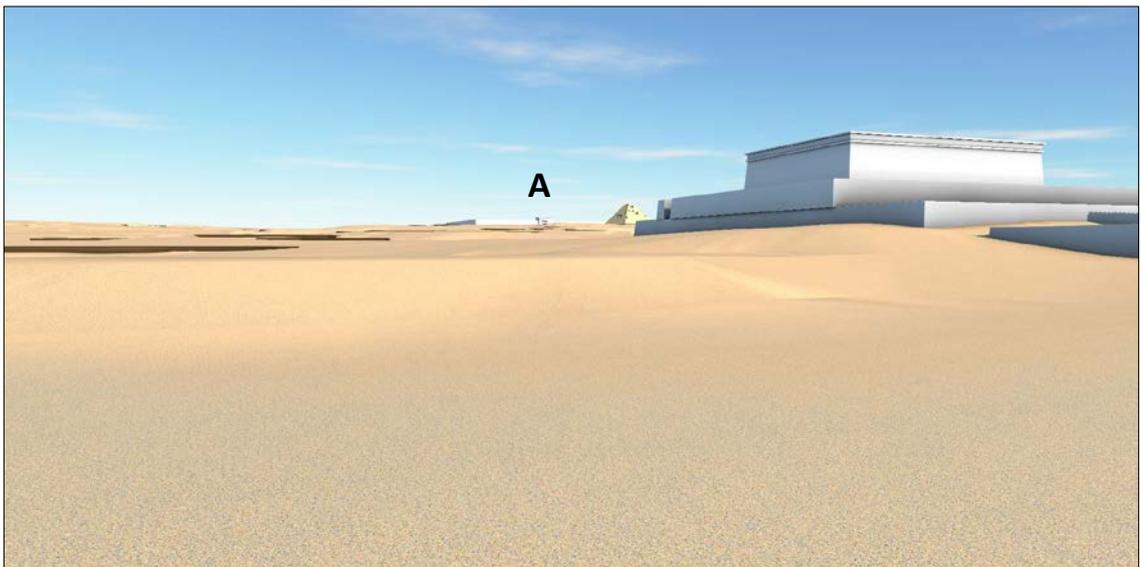


Figure 8.92. (44)—Standing in the Wadi Valley Road beside the alignment of shrines to the north of the Serapeum Precinct, facing east. The Anubieion enclosure is just visible over the rise in the terrain (A) (source author).

***Pr-wsir-hp*, the Serapeum precinct**

As you approach the temples and shrines parallel to the Serapeum (Figure 8.93), you will almost lose sight of the Anubieion behind a rise of the terrain [Mov_8xii—begins (34) then (44) through (46)]. The tops of the walls and the pylon gateway are just visible next to the ruined pyramid of Pharaoh Teti. Following the pathway between the row of

temples affords you a view of the Serapeum enclosure and north gate (Figure 8.94). If you turn towards the south-east, you will see the sphinxes of the Serapeum Way forming a line towards the Anubieion (Figure 8.95).

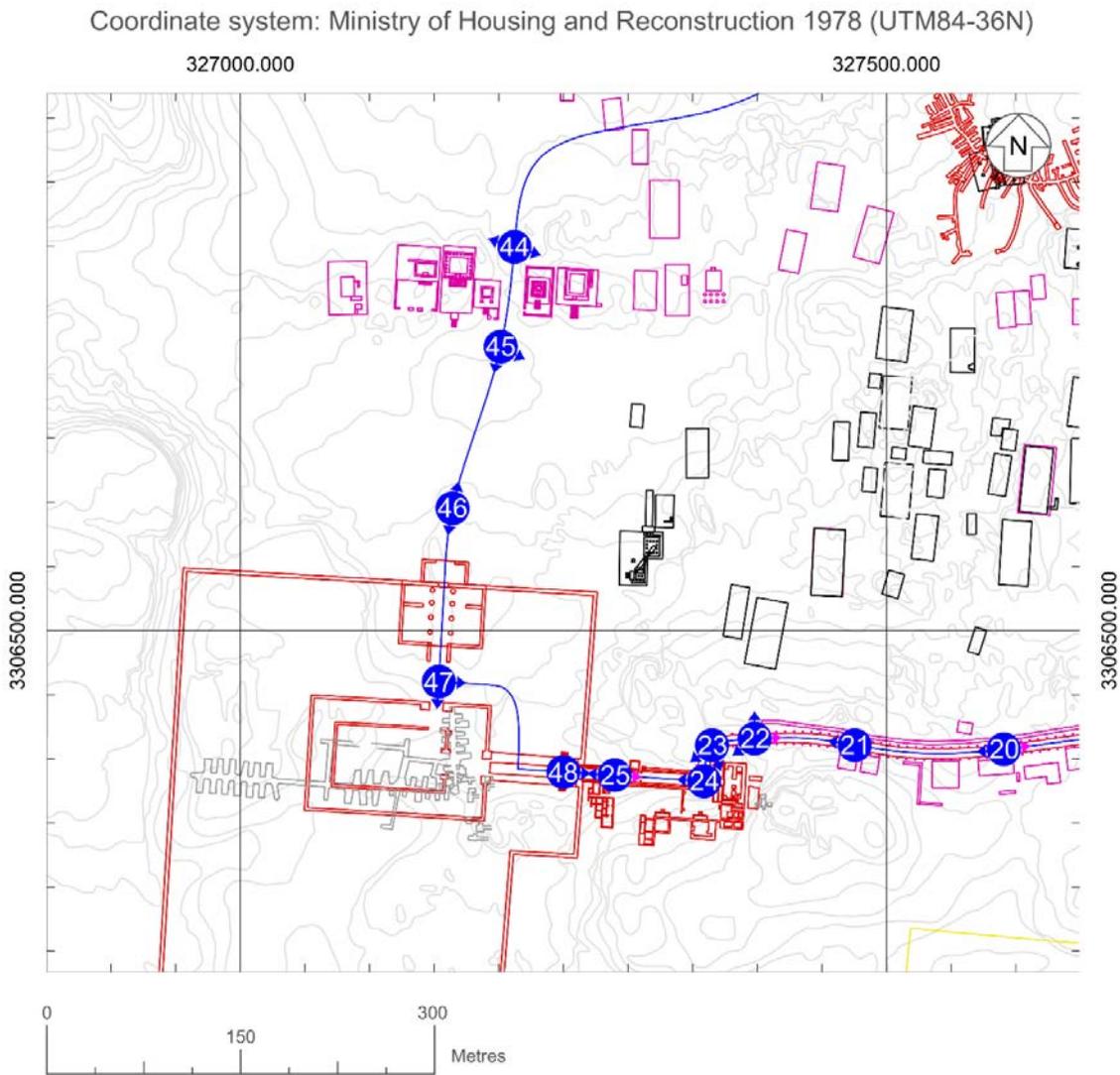


Figure 8.93. Map 10—The route to the Serapeum Precinct (source author).



Figure 8.94. **(45)**—Standing in the Wadi Valley Road facing south towards the north gate of the Serapeum enclosure (source author).

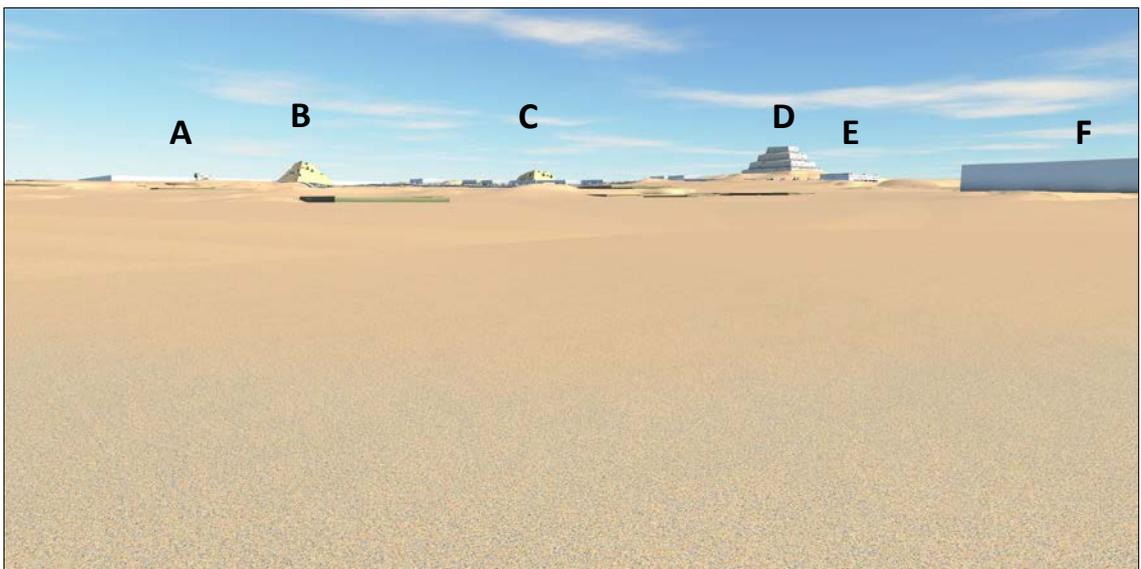


Figure 8.95. **(45)**—Standing in the Wadi Valley Road facing south-east. The Anubieion enclosure is just visible over the rise in the terrain (A). The ruined pyramids of Teti (B) and Userkaf (C) and the Step Pyramid of Djoser (D) are clearly visible against the skyline. The East Temple of Nectanebo II (E) and Serapeum Precinct are visible (F) (source author).

As you move towards the Serapeum, it feels as though you are enclosed by the surrounding landscape and monuments, the union of the natural and the man-made; the *gebel* to the west, the temples to the north, the Serapeum to the south. Towards the east the undulating terrain is scattered with old tombs and burial shafts and a steep escarpment confounding easy transition down to the cultivated floodplain below.

Turning to face north, back towards the way you have just come, you can view the temples and shrines that flank this side of the Serapeum (Figure 8.96). They are situated on a slight rise in the topography, giving them prominence. Another group of similarly aligned temples and shrines are to be found on the southern side of the Serapeum precinct, but they are not visible from this location.

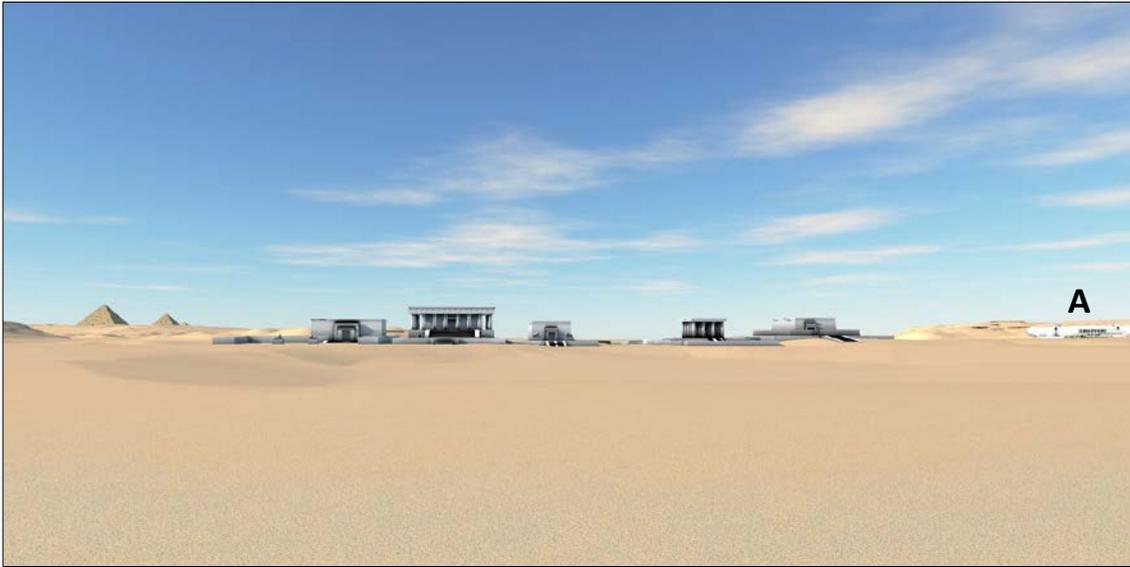


Figure 8.96. **(46)**—Standing beside the north gate of the Serapeum, facing north. The northern alignment of shrines and temples are visible on the rise in the terrain. The pyramids of Abusir are visible in the far distance. The main temple enclosure of the Sacred Animals is set against the wadi valley escarpment (A) (source author).

The impressive colonnaded entrance guides you into the compound of the Serapeum enclosure as you pass through the north gate (Figure 8.97). A settlement is situated close by,⁴⁵ where people are going about their daily lives and business, and you can immediately hear the noise of activity from this busy place. The *katachoi* are working and worshipping nearby in the many shrines and places of worship here. Merchants bring their wares for trade and exchange, and travellers and pilgrims can spend time in the dream chambers to incubate dreams for oracular prophecy.⁴⁶ The settlement does not extend west along with the enclosure, rather it is limited to the north- and south-eastern extents of the precinct area (Figure 8.98). Small houses and rooms with courtyards and corridors are built adjacent to one another, much like the other

⁴⁵ Macramallah 1940, 77. See also Smith 1975, 421.

⁴⁶ Thompson 2012, Chapter 7.

settlements of the Anubieion, and Bubastieion. The members of the cults and their families live and work here. The *katachoi* are mainly restricted to the shrines and temples, although some are required to conduct temple affairs outside of their immediate area of confinement.



Figure 8.97. **(46)**—Facing south towards the north gate of the Serapeum enclosure (source author).⁴⁷

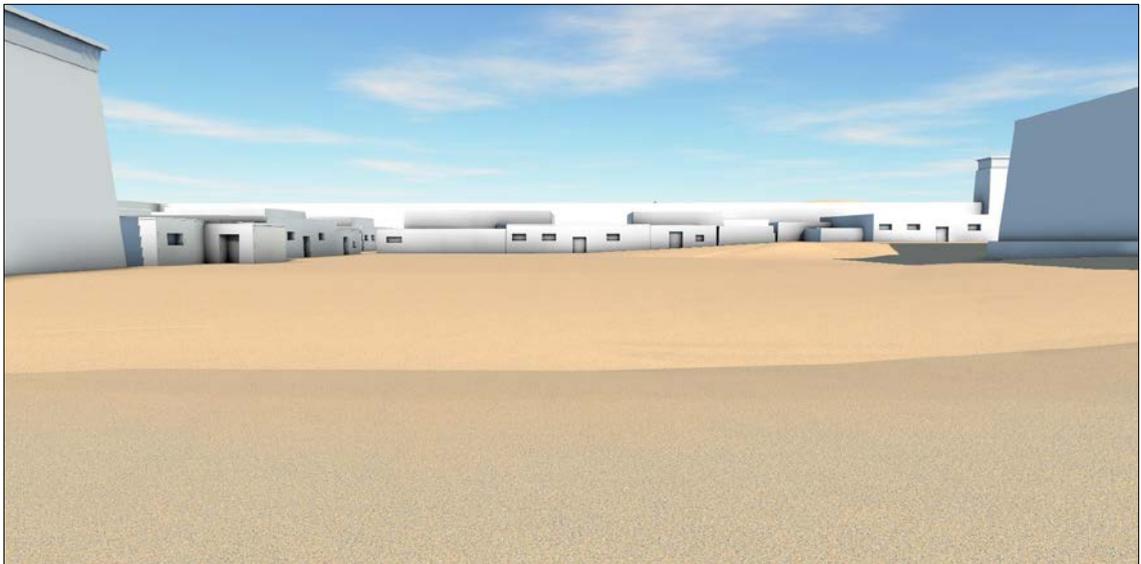


Figure 8.98. **(47)**—Standing to the south of the north gate, facing east. The sprawling settlement can be seen against the large enclosure walls. The pylon gate of leading from the dromos is visible to the right of the image (source author).

⁴⁷ See Chapter 5 for a discussion on the hypothetical reconstruction of this feature.

The main temple stands before you, in the middle of the great enclosure (Figure 8.99). It is surrounded by a tall wall which screens the interior from view. Pylon gateways provide access through the outer wall and, although you are not permitted entry to the temple proper, you can see another grand pylon gateway within. This permits access to the temple from its north side. This is an important point of entry, for this is the direction from which the bearers of the sarcophagus of the Apis bull arrive from their long journey up the wadi valley. The sarcophagus is pulled through the north gate of the enclosure, past the small settlement and into the temple compound. From there it is manoeuvred down into the subterranean catacombs and into its vault. The mummified Apis bull arrives along the Serapeum Way from the east, having been conveyed from Memphis with great performance and ceremony.

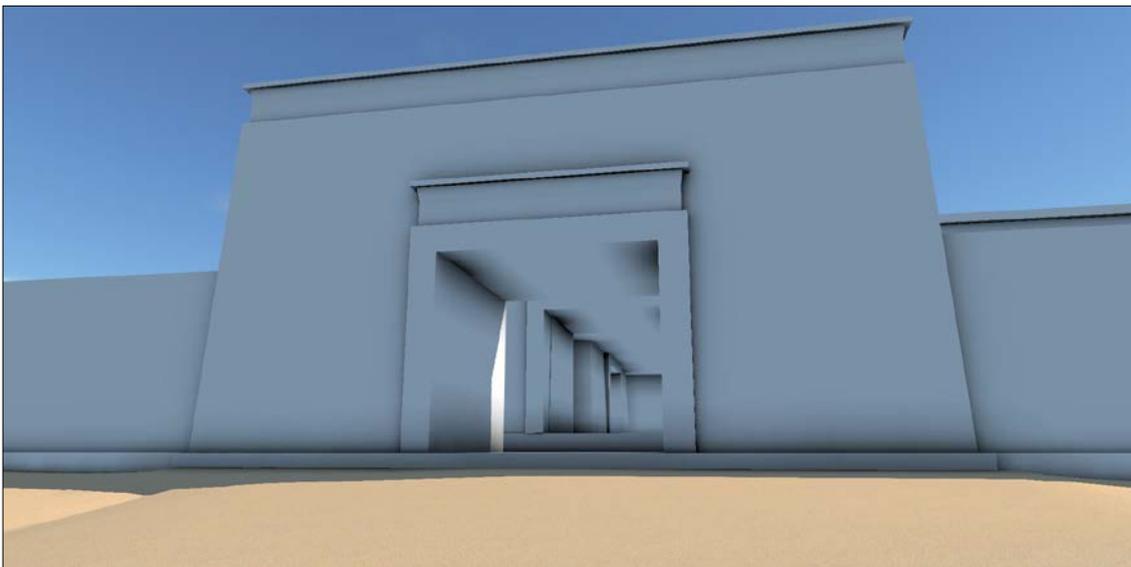


Figure 8.99. **(47)**—Standing before the northern entrance to the main Serapeum temple enclosure (source author).

Passing between the buildings of the crowded settlement, moving towards the east around the temple compound, you arrive at the end of the main dromos of the Serapeum, where it connects to the temple compound's eastern entrance (Figure 8.100). You have now arrived back at the place where you stood earlier, after walking along the Serapeum Way, and have completed a journey around the sacred animal landscape.

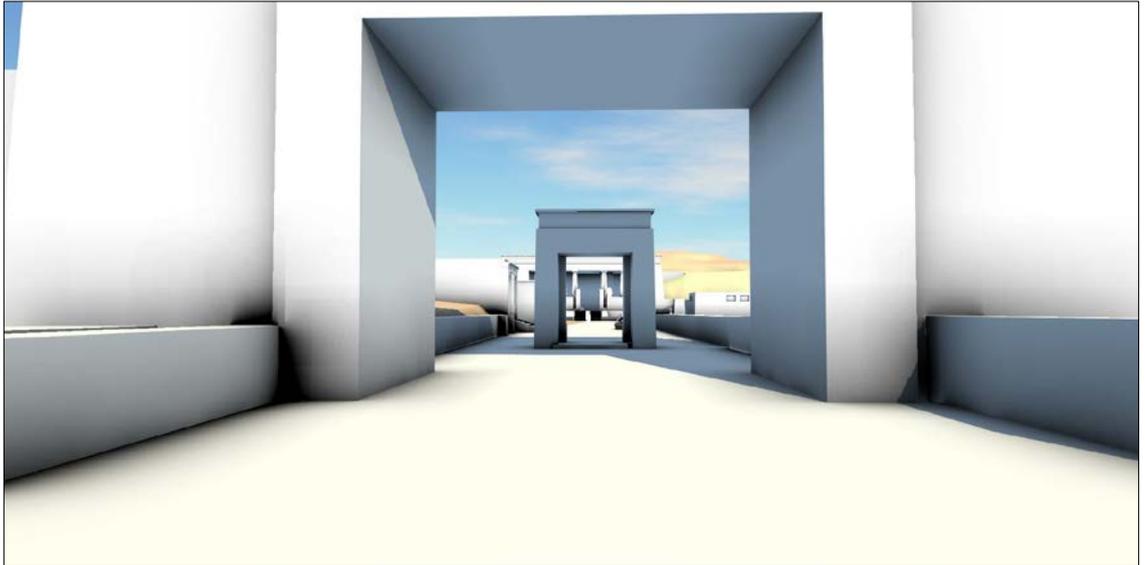


Figure 8.100. **(48)**—Standing before the Serapeum enclosure east gate, facing east towards the dromos and gate of Nectanebo I (source author).

CHAPTER 9

Discussion

Introduction

During investigation of the digital representation for the construction of the new narrative account, it became apparent that the LP/EP monuments occupied specific milieus of terrain and a visible and/or physical interconnection was evident, forming part of a networked sacred landscape. Within this landscape each monument functioned independently but also participated within a larger group. Historically the LP/EP monuments have been examined and viewed in isolation, but in doing so their interconnectedness is overlooked. The strategies behind the locations of the sacred monuments may have a foundation in the affordances provided by the topography and the entangled relationships between the people who lived and worked on and within the landscape. Monuments, landscape, affordances and entanglement—the enmeshment between these topics is such that they could not be discussed independently. They experience a symbiotic relationship where one offers cogency to another. Reflecting upon this enmeshment, the discussion is organised within the structure established by the narrative account. Doing so allows for an expressive discussion of the monuments and their place within the landscape to be positioned within a framework set by the previous chapter. Rather than examining each detail of the landscape raised in the narrative account, which would be not only cumbersome but also time-prohibitive, the discussion will focus on an examination of the main monumental features and pathways of the LP/EP sacred landscape, which are associated with the sacred animal cults—the Anubieion, Bubastieion, Serapeum Way and Serapeum Precinct, and the SAN and Wadi Valley Road.

Affordances and entanglement in a monumental landscape

The sacred animal monuments occupy locations from the central area towards the northern extent of the necropolis, where the arrangement of the temple complexes of the Bubastieion/Anubieion and Serapeum create a north-south divide across the North Saqqara funerary landscape. The LP/EP animal cult activities appear to have been focussed towards the north of this divide, with no known activity occurring to the south. The geology of the northern extent of the site appears to be more undulating and divided by wadis and escarpments up until the relatively flatter terrain of Abusir is reached. When compared against the north, the terrain of South Saqqara appears to present a less fragmented geology. The difference in topography between the north and south may have been a deciding factor towards the location of the sacred animal monuments.

The Bubastieion and Anubieion enclosures dominated the eastern escarpment. A sinuous ceremonial way extended westward from the Anubieion to the Serapeum Precinct which was flanked to the north and south by temples and shrines. To the north, set against the escarpment of a wadi valley, is the SAN, a nexus for subterranean animal catacombs. Proximity to a ceremonial routeway, and topography that offered certain affordances to the monument builders, represents a common feature of the sacred animal monuments.

Furthermore, a connection was often noted with tombs of the earlier elites and the affordances that they offered to both the networks of movement and the sacred monuments. For example, the processional route of the Serapeum Way provided a connection between the living land to the east and the afterlife to the west. Ancient decaying tombs were scattered to the north and south of the route. The weight of ancient history impressed into the landscape would have enriched the performance of movement along the ceremonial routeway. To the south of the sacred way, the monumental constructions of the Old Kingdom spread across the plateau. Like the Old Kingdom pyramids, the LP/EP sacred animal structures emphasised their monumentality: the imposing size of their construction; the topographic locations that they occupied (see Sullivan 2017, 1229); the acts of visual performance, the interplay between structure and topography. These monuments were constructed to be both functional and visually

impressive, and they extended order to the landscape in which they acted (Baines 2013, 23).

***Pr-bꜣsst nbt ꜥnh-tꜣwy*, the Bubastieion**

The great enclosures of the Bubastieion and Anubieion traverse the desert escarpment from the lower terraces of the cultivation up to the plateau, connecting the living with the dead, life to afterlife. They overshadow the escarpment, occupying approximately one quarter of its length.¹ Their size would have made them highly visible from a distance, enhanced by the escarpment upon which they were constructed. Whilst the enclosures remained separate, representing two distinct deities, they were also connected by way of a 30m long causeway that joined the Bubastieion north gate with the Anubieion south gate (Quibell 1907, III and PL.II). The gates and causeway were located approximately two thirds of the way up the escarpment and appear to have been intended for use from within the enclosures, rather than a means of external access.

Access to the Bubastieion was made via an approach from the south along the escarpment leading to the structure's south gate (Jeffreys and Smith 1988, 78; Thompson 2012, 18). Entry may have been achieved from the east, though whether a gateway ever existed in this direction remains conjecture.² Thompson (2012, 18) contends that there were several routes into the necropolis and Dodson (2016, 6) postulates that the principle route into the site was made from the north. Dodson's contention does not preclude a southern route from being an important means of access. The new narrative account presumes an approach to the necropolis from the direction of the ancient capital of Memphis, which is a credible assumption. The procession which conveyed the mummified Apis bull from the embalming house to its final resting place at the Serapeum began in Memphis (Thompson 2012, 185) and it is possible that a visitor or pilgrim would begin their journey to the necropolis from the same place. The location of the road from Memphis is archaeologically unknown and its route remains open to debate.

¹ When measured from the Unas valley temple to the northern extent.

² It is far from certain whether an eastern enclosure wall existed. Jeffreys and Smith (1988, 78–79) suggest that this may not have been the case, however, see Chapter 5 for a discussion on the historical maps.

That the southern route into the necropolis held significance may be supported by the location of the tombs of Bakenrenef and other officials (Bresciani 1978; El Naggat 1978). The tombs are situated about halfway along the length of the path, cut into the desert escarpment. Bakenrenef's tomb forecourt is accessed from the pathway through a pylon gateway that would be highly visible to those passing by. The location of this tomb is prominently situated, probably as a demonstration of prestige. The pathway continues towards the large south gate of the Bubastieion and may have directed a substantial amount of pedestrian traffic past the tomb (Figure 9.1).

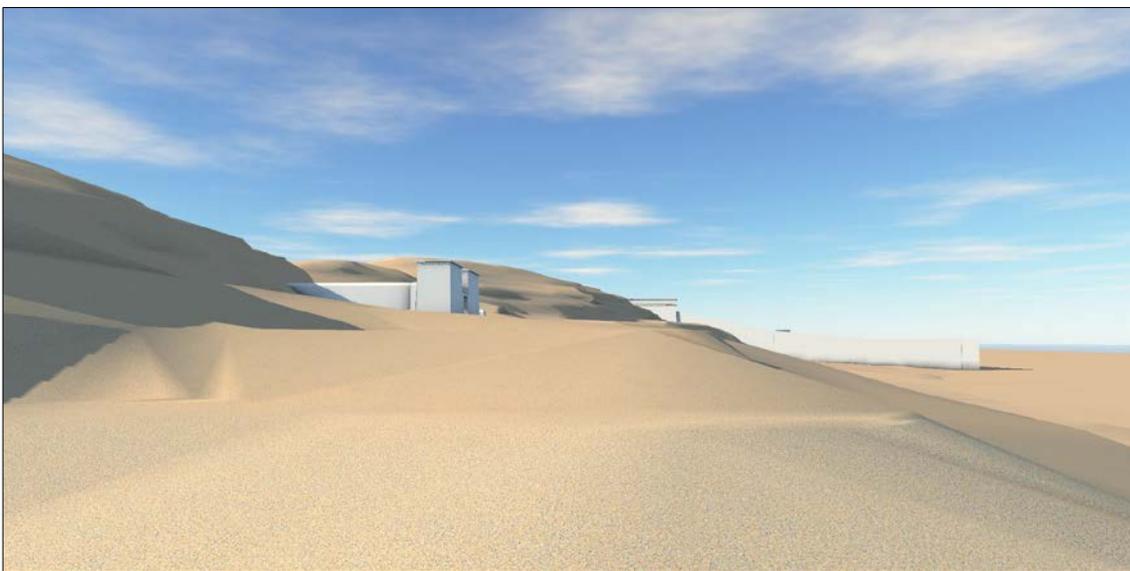


Figure 9.1. Approaching the tomb of Bakenrenef along the southern route into the necropolis, facing north. The Bubastieion is visible in the distance (source author).

The pathway towards the Bubastieion probably offered the affordance of conspicuous display to Bakenrenef's tomb architect, which may have provided a positive reason to situate the tomb at this location. The tomb, whose pylon gated forecourt presents a grand entrance, would appear to be at an awkward elevation up the escarpment if the pathway was not already extant. Situating the tomb beside a routeway would have been desirable for the human traffic such a location would provide. Passers-by may stop to admire the inscriptions and remember the tomb owner, perhaps even make a dedication to the gods.

Whether the pathway existed before the installation of the Bubastieion remains open to debate. The modern reuse of this pathway is a motor road leading up onto the plateau towards the main site carpark by the Djoser complex and, in so doing, the road bends to the west around an outcrop of the escarpment.

The digital terrain uses the surface of the modern motor road as the basis for the southern route, but it is probable that the ancient road surface would be situated at a lower elevation, beneath an accumulation of sand and debris. Examination of this area within the digital model does appear to indicate that the sand has been built-up here to accommodate the incline towards the plateau. Without targeted excavation, it is impossible to determine just how far below the current surface the ancient road might be. However, a continuation of what appears to be a possible original elevation of the pathway extends to the Bubastieion south gateway (Figure 9.2). Nevertheless, it is very probable that the modern road follows the route of the ancient one, as useful pathways tend to endure. From its position, one can postulate that the original pathway may have developed on a sanded terrace of the escarpment, which would have afforded a partially level surface along which to move. Over years of repetitive use this surface would have compacted and become engraved into the landscape. Through the entangled relationship of use between people and path this route has remained operational into modern times. Repetition of movement along the path imprints the route into the terrain and the consciousness, where it becomes fixed, compressed in sand and stone and remembered through action. The pathway becomes a semi-permanent feature within the landscape, enduring for as long as it is used.

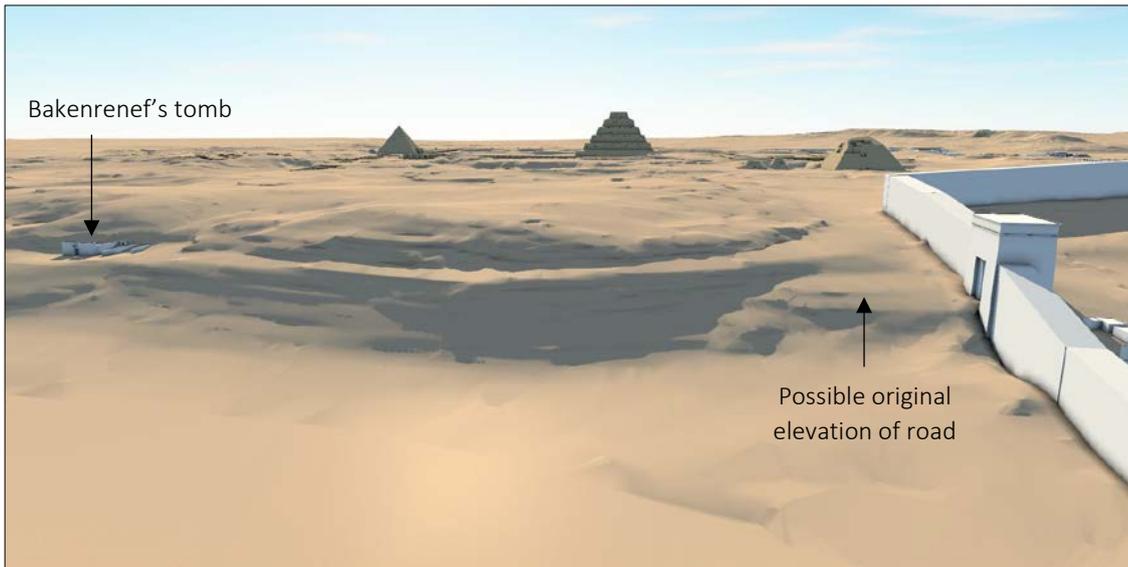


Figure 9.2. The southern road leading to the Bubastieion south gate. Facing east (source author).

It became apparent when moving along the southern approach towards the Bubastieion that the south gate was partially occluded by an eastward projection of the escarpment and a small rise in the terrain. The decorative top of the pylon gateway is visible at a distance, but the full impact of the size of the gateway is not revealed until the terrain impediments are passed.³ This act of visual performance is observed elsewhere in the necropolis, and this study has classified it as a ‘conceal and reveal’ mechanism. In this case, the partially concealed view of the gateway belies its size and when a trigger point is reached, after those following the route move past the rise in the terrain and negotiate the escarpment protrusion, the ‘reveal’ occurs, and an emotional response is engendered. For the first-time visitor, this response was probably one of awe at the size of the monument. This is a visual deception, constructed through the interplay between topography and monument, and one that is used to great effect.

The location of the tomb of Bakenrenef benefits from the ‘conceal and reveal’ mechanism. The Bubastieion provides a backdrop to the tomb when moving north along the route, without lessening the tomb’s prominence (Figure 9.3). Rather it affords the

³ The original height of the pylon gateway is unknown, as are the heights of the enclosure walls. However, the thickness of the walls can provide an indication of height. When compared against the Step Pyramid enclosure, whose walls were ca. 4.5m thick and around 10m in height, the Bubastieion and Anubieion walls were likely to have been at least the same height if not greater. The pylon gateway would have stood higher than the enclosure walls. See Chapter 5 for a discussion on the construction of the enclosures.

tomb significance through the spatial relationship with its approach. The Bubastieion pylon gateway is not revealed until after the tomb has been passed (Figure 9.4). Thus, focus remains on the tomb pylons and courtyard whilst the great enclosure awaits in the background.

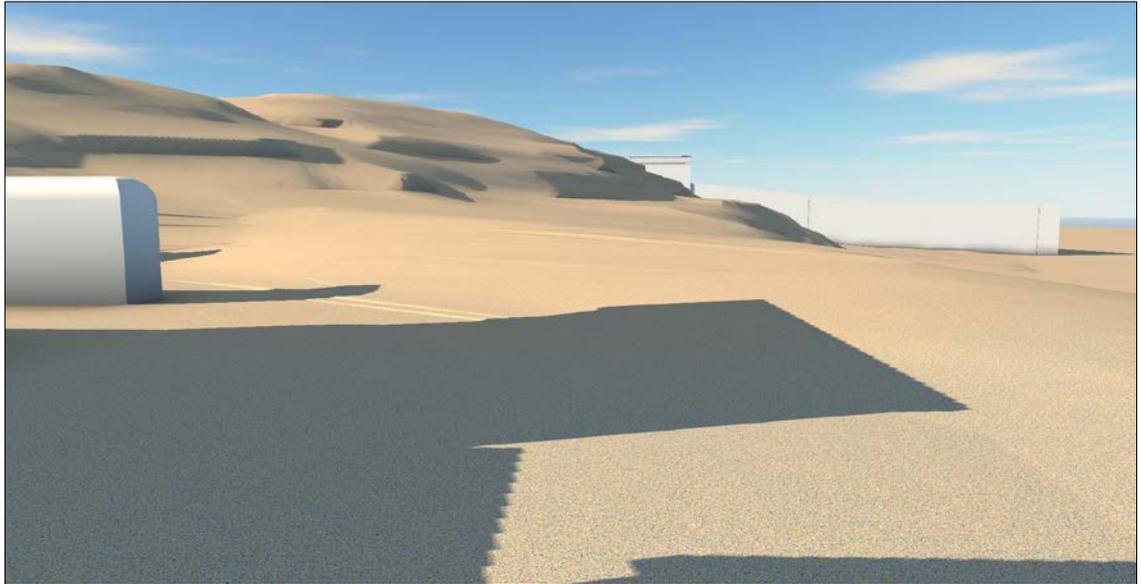


Figure 9.3. Standing next to the tomb of Bakenrenef on the path leading north towards the Bubastieion, facing north. The pylon gateway of the tomb casts its shadow across the path and the south pylon gate and enclosure wall of the Bubastieion are visible in the background. The Bubastieion gate is partially screened by the escarpment projection (source author).



Figure 9.4. After passing the tomb of Bakenrenef, ascending the rise in the terrain and negotiating the escarpment protrusion, the south gate of the Bubastieion is revealed (source author).

The narrative observes that when standing by the Bubastieion gateway (Figure 9.5) and looking up towards the plateau only the top tier of the Djoser Step Pyramid is visible (Figure 9.6). Proximity to the slope and the distance to the Step Pyramid from this location, which is around 760m, occludes all but the tallest features. The top tier has the appearance of a small mastaba tomb at the top of the sandy rise and is barely visible.

The narrative observes that when standing by the Bubastieion gateway (Figure 9.5) and looking up towards the plateau only the top tier of the Djoser Step Pyramid is visible (Figure 9.6). Proximity to the slope and the distance to the Step Pyramid from this location, which is around 760m, occludes all but the tallest features. The top tier has the appearance of a small mastaba tomb at the top of the sandy rise and is barely visible.



Figure 9.5. The Bubastieion south gate as viewed from the pathway leading up to it. A human figure has been inserted next to the gate for scale reference. The figure is 1.76m tall (source author).

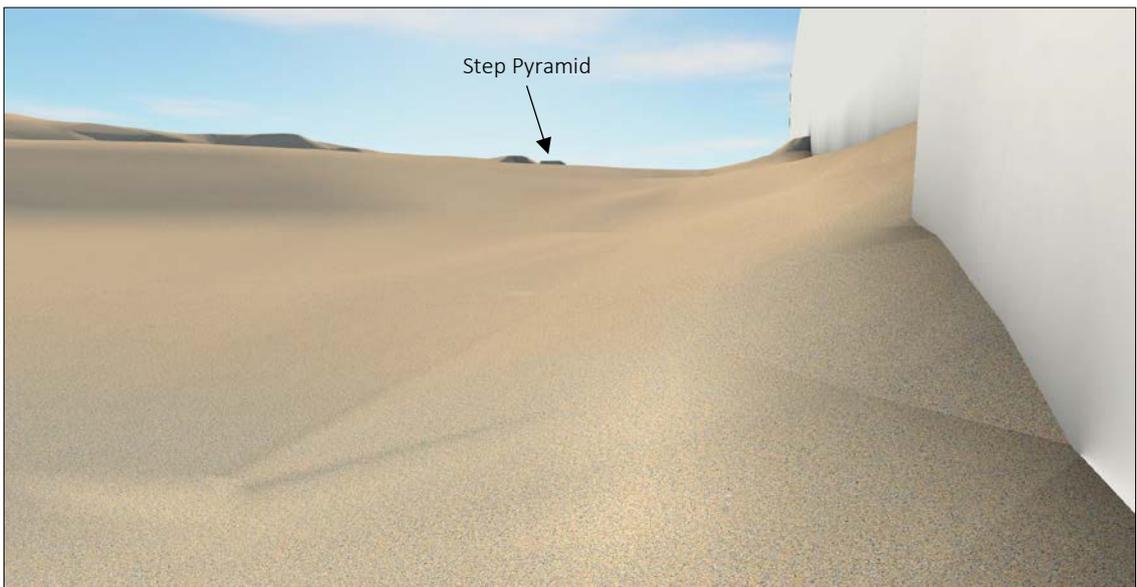


Figure 9.6. The top tier of the Step Pyramid is indicated at the top of the escarpment ridge. This view is towards the west from the south gate of the Bubastieion (source author).

The modern motor road turns westward, towards the necropolis, before meeting the Bubastieion south wall, and may follow an ancient route in this direction. It is possible that the area alongside the Bubastieion enclosure wall provided a path up to the necropolis, but it is not clear where the route of such a path might lead. If a visitor was heading north, perhaps to the Anubieion, travelling through the Bubastieion would likely provide a more accessible route. There was no west gate in the Bubastieion west

enclosure wall, so access from that direction would be impossible. The path leading to the south gate may have branched off towards the west, and account for the route of the modern motor road as discussed, and this route may have granted access towards the south-west and the pyramid of Unas and the Late Period shaft burials situated there (Barsanti 1900a; 1900b; 1900c; 1901; 1904; Saad 1947).

Sections of the southern enclosure wall and foundations of the south gate remain extant and are visible to modern visitors travelling along the motor road. It is likely that many of them are not aware of what they are observing as they pass by continuing their journey towards the car park by the Djoser complex. The poor state of the remains does little to illustrate the magnificence and complexity that the great enclosure of the Bubastieion must have once presented.

The central temple would have been the focus of activity in the enclosure (Thompson 2012, 19), and its location—atop a steep sided escarpment—would have made it visible from a distance. The view up the stairway illustrates the height of ascent required to access the temple platform when making a direct approach to the escarpment, and the construction of such a monumental stairway would have been a serious undertaking. A steeply ascending stairway was part necessity, to bridge the near 25m elevation of the escarpment and permit access to the temple platform, and part design choice to create an experience: climbing the stairs to ascend to the temple platform would have provoked both a physical and emotional response. There would be the physical challenge of ascending the many steps, and the emotion engendered upon reaching the top of the climb when the temple enclosure was brought into view and the lower terraces of the cultivation were left behind (Figure 9.7).

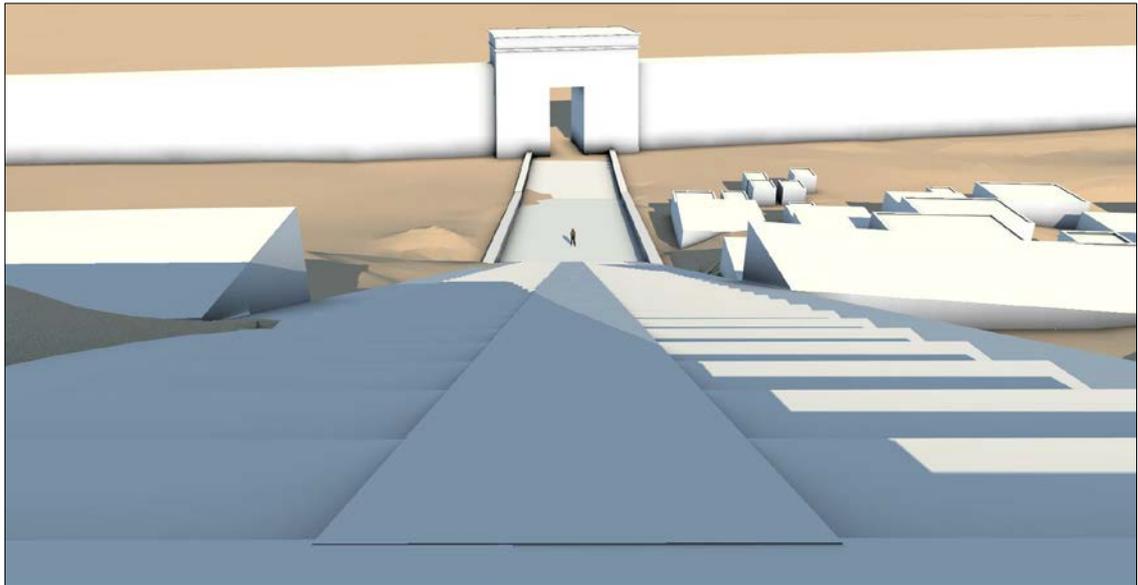


Figure 9.7. The view from the temple platform at the top of the main Bubastieion stairway. Buildings of the village are visible to the right of the image. The human figure at the base of the stairs is included for scale (source author).

The sandy platform at the edge of the escarpment afforded the temple builders with a location that was highly visible from a distance and yet screened the area from view when approaching from below until nearing the top of the steps. The area was both visually accessible and at the same time occluded dependent on location, and physically difficult to access. The absence of a gate within the western wall (see Jeffreys and Smith 1988, Fig. 1) suggests that access to the temple platform was not made from that direction, constraining the approach to the temple from the east (or south) and the north only. Approaching the temple platform from the north—from the causeway between the Anubieion and Bubastieion enclosures—offers a different visual experience than the approach from below. Entering the Bubastieion north gate grants immediate visual access to the temple enclosure and there is no suggestion of performance being contrived through the approach. This route appears far more functional than the east-west stairway approach.

The location of the central temple enclosure, at the edge of the escarpment in a dominant visual position that overlooks the lower terrain, appears to have been a measured decision by the architect(s). A convergence of affordances may provide an explanation for the location of the Bubastieion. The pathway leading from the south may have been

extant prior to construction. This would help to explain the location of a large pylon gateway partway up an escarpment. It is probable that the existing pathway was improved or enlarged to accommodate traffic to the newly built enclosure. The vestige of a wadi, or depression, appears located in the south-east corner of the escarpment, and this area was previously used by New Kingdom tomb builders. The flat plateau atop the escarpment provided a dominant and conspicuous position for the main temple, offering prominence and a view over the landscape below. The New Kingdom tombs in the face of the escarpment offered convenient rock-cut vaults, within which to inter mummified cats.

The main Bubastieion temple is centrally situated within the enclosure walls (Figure 9.8). This contrasts with the main temple of the Anubieion, which is offset to the south of its outer enclosure (Figure 9.9). This may suggest that the location of the Bubastieion enclosure, whilst contemporary in construction with the Anubieion enclosure (Jeffreys and Smith 1988, 79), was selected prior to that of the Anubieion. The layout within the Anubieion appears to be dictated by the Serapeum Way, an idea which is discussed below.

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

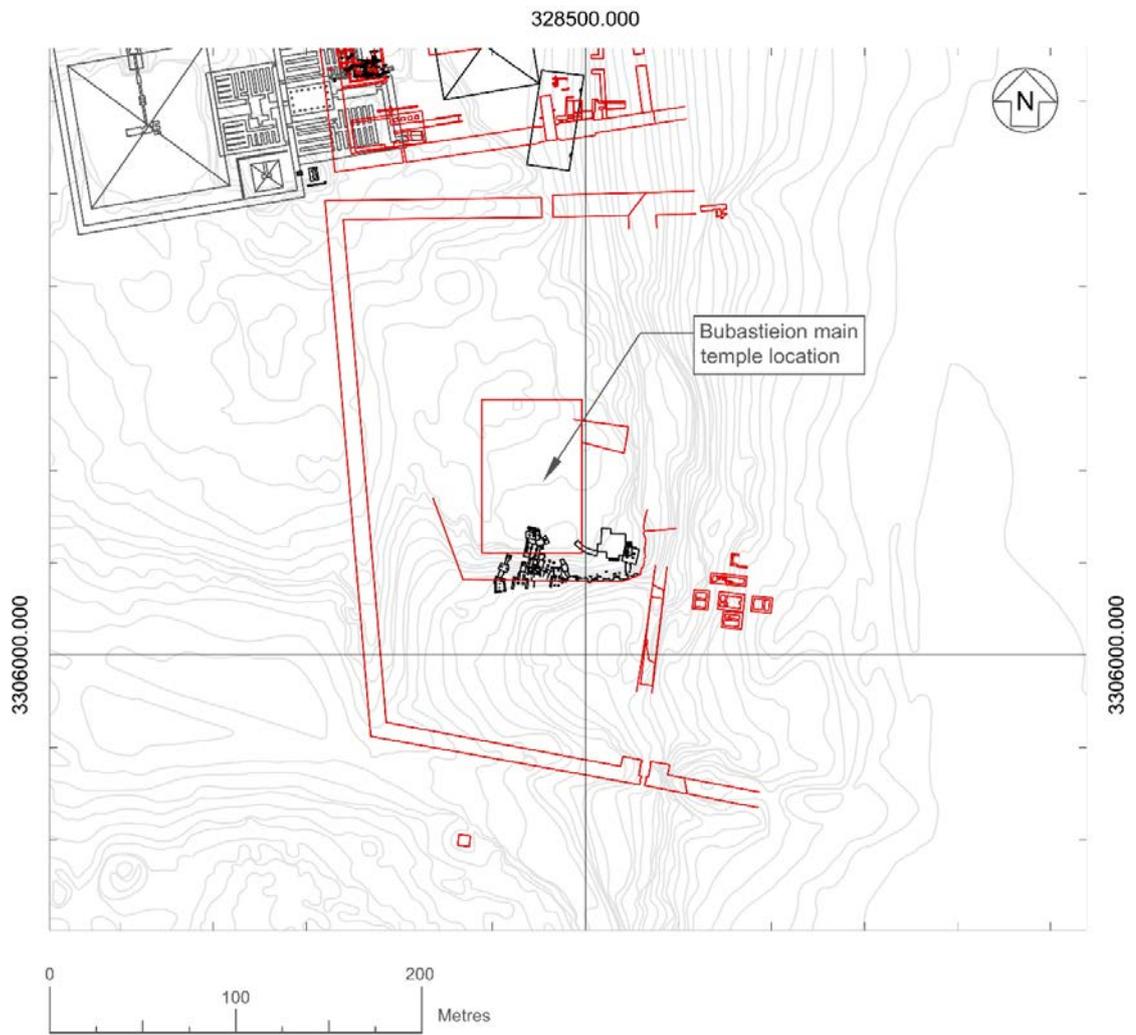


Figure 9.8. Location of the main temple within the Bubastieion enclosure (source author).

Coordinate system: Ministry of Housing and Reconstruction 1978 (UTM84-36N)

328500.000

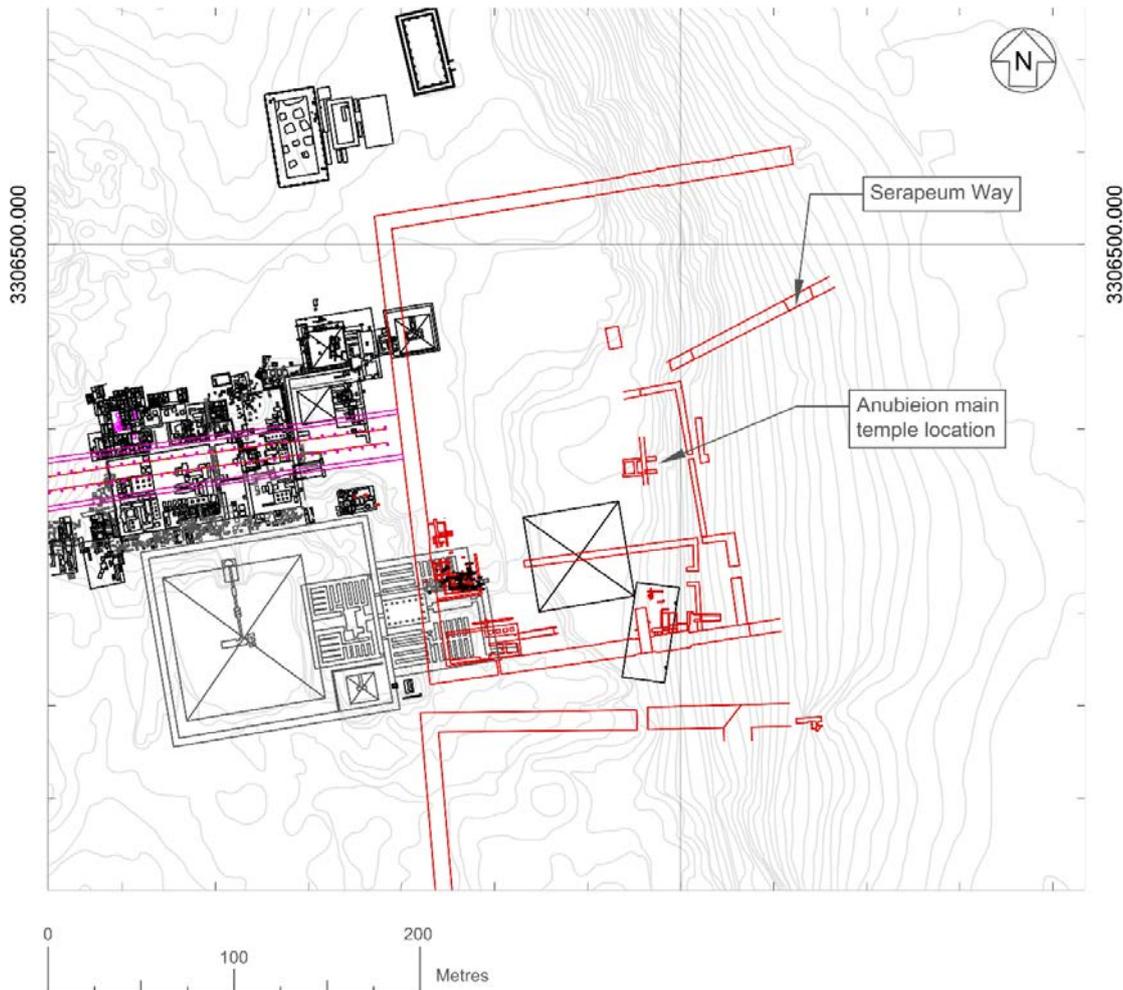


Figure 9.9. Location of the main temple within the Anubieion enclosure (source author).

***Pr-hn-īnp*, the Anubieion and *ꜥwy-n-ḥtp n n3 iwiw*, the Dog Catacombs**

The Bubastieion north gate exits into a space between the two enclosures, which is bounded and confined (Figure 9.10). The dominating enclosure walls define a view corridor to the east and west whilst screening the north and south. The view to the west is limited by the incline of the escarpment, but to the east a restricted aspect of the cultivation would have been visible, where the walls of the enclosures diverge. The approach to the Anubieion through its southern gate would not have offered the same visual spectacle as the Bubastieion southern approach. It was more likely that this connecting path was a functional means of access between the enclosures. However, Quibell records a paved path of uncertain extent entering from the south gate into the enclosure that may have been flanked by sphinxes (Quibell 1907, PL.III). Sphinx statues

bordering this route may imply that this pathway was of some ceremonial significance. The path entering the enclosure from the south gate may have been a short processional way leading to the small temple situated to the north. It may have also provided access to the Bes chambers, situated to the east of it. An association with the processional and ceremonial attributes of the Serapeum Way is implied by the flanking sphinxes which appear to be facing the path. Whereas the Serapeum Way appears to represent the significant approach to the Anubieion, this path into the structure represents a minor route.



Figure 9.10. Standing on the causeway between the Bubastieion and Anubieion, facing south towards the Bubastieion north gate. The figure is included for scale (1.76m). In the background, the enclosure of the Bubastieion central temple is visible (source author).

The internal layout of the Anubieion has only been partially established archaeologically (Jeffreys and Smith 1988, Fig.1) and more work is desperately needed.⁴ Based on the limited archaeological data the digital model depicts a conjectural representation. Such a conjectural depiction creates a tension between the digital representation and the unknown reality on the ground. This dichotomy must be acknowledged and considered when examining data from the representation. For example: the route negotiated through the Anubieion in the narrative account may not have been possible to achieve; and the extent of the settlement to the west of the enclosure (Jeffreys and Smith 1988,

⁴ For a brief history of work conducted at the site see Jeffreys and Smith (1988, 1–2).

25–30) is unknown but has been estimated for the model. The density of structures within the small town would affect where and how people were able to move around, as would the location of boundary walls that may have surrounded small shrines and temples, which have either left no trace or are yet to be excavated. It is very likely that there were routes tracing their way around and through the enclosure, just as there are ‘unofficial’ paths today at the necropolis that provide short-cuts between monuments for the guards and *gafirs*. Whether these postulated paths would have been known or used by visitors is unknown. An example of a pathway that probably existed, but which has left little to no evidence, extends north from the enclosure offering a route to the dog catacombs.

Whilst no evidence for a gate in the northern wall of the enclosure was observed during field survey, this absence is not conclusive evidence that one did not exist in antiquity. The enclosure wall is depicted on the plan using a dotted-line (see Jeffreys and Smith 1988, Fig. 1), indicating a degree of uncertainty in the archaeological remains. Similarly, no western wall gate foundation or aperture is depicted, allowing the Serapeum Way to pass beyond the enclosure, which certainly existed. Jeffreys and Smith (1988, Fig. 62) propose at least two gateways in the northern wall as part of their axonometric reconstruction drawing. Indeed, a gate at the suggested location would be appropriate, enabling access to the dog catacombs from the base of the escarpment adjacent to the lower terraces of the cultivation. The modern approach to the catacombs arrives from the plateau above, whereby a descent is made via modern steps to a small house and garden area.⁵ The modern garden was constructed atop the area where a possible forecourt or garden would have been, in front of the entrance to the catacombs. If the access to the Dog Catacombs was not made from the plateau, then it must have been achieved from the lower terraces, and it follows that a pathway leading to the subterranean chambers must have existed. Examination of the terrain here does appear to suggest a possible level shelf along the lower extent of the escarpment, which may indicate a residual trace of the ancient path (Figure 9.11). Whether this postulated path

⁵ It is possible to reach the catacombs from the antiquities buildings below, via a precarious steep climb up the revetment wall and by traversing a path up the sandy escarpment. This route generally meets with the disapproval from the Egyptian site officials.

extended north beyond the Dog Catacombs is unclear. If so, this may have been a pathway used to travel around the escarpment towards the Lake of Pharaoh and the Wadi Valley Road. It is unlikely that this pathway would have been used for dragging the sarcophagus of the Apis bull, rather that may have been transported along some of the route by water, until it reached the area of Abusir (Smith 1981, 338). This route would have more likely been employed by people coming from Memphis towards Abusir and entering the necropolis via the Wadi Valley Road. The path is speculative, and no such trace has been observed archaeologically.

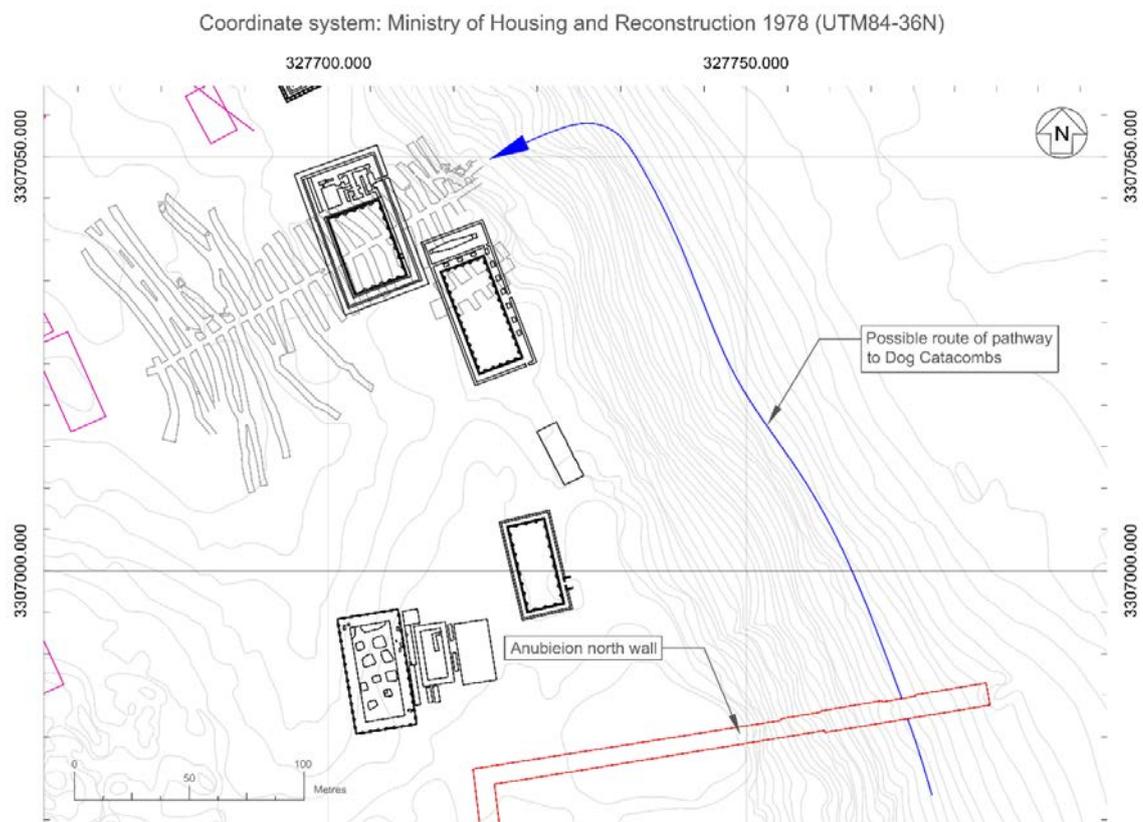


Figure 9.11. The possible route to the Dog Catacombs—exiting the Anubieion enclosure through the north wall—following the lower terrace at the base of the escarpment (source author).

It is unclear why the dog catacombs are detached from the Anubieion, being constructed over 250m to the north of the enclosure. Dissociation such as this is not unprecedented however. The North Ibis catacomb entrance is divorced from the main cluster of SAN structures by a promontory of bedrock, yet is still considered to be part of that wider group of features retaining a connection to the SAN MTE. A dromos providing a physical connection to the dog catacombs from a north gate, as proposed, would enable their

association. This does not answer the question of why they were constructed such a distance apart. The answer may be geological, perhaps the rock strata between their current location and the Anubieion enclosure was not good enough to support their construction. Alternatively, there may be a hitherto unknown feature in this location that did not permit construction. Without archaeological intervention at this location this question remains open to debate.

***Hft-hr*, the Serapeum Way**

The Anubieion was a symbolic eastern gateway to the Serapeum. This was a statement of significance and, whilst the monuments were over 1000m apart, a physical connection was continually manifest through the Serapeum Way. The ceremonial way approached the escarpment at an oblique angle, in contrast to its general east-west route across the plateau. The escarpment is steep at this location, hindering transit onto the plateau, and this was a route used for ceremonial procession and the performance of transporting the mummified Apis bull to its final resting place. An oblique approach to the steep side may have eased the difficulty of movement up the escarpment (Smith 1981, 333), just as the modern pathway traverses its way diagonally up the sandy slope, making walking to the top less arduous. The location and orientation of the ancient route is spatially close to the modern route up the escarpment (Figure 9.12) which leads to the *Qufti* village. Used daily by the site guards and local villagers to access the plateau, it is possible that the ancient route persisted in use and has slowly migrated north over time to accommodate the needs of movement.

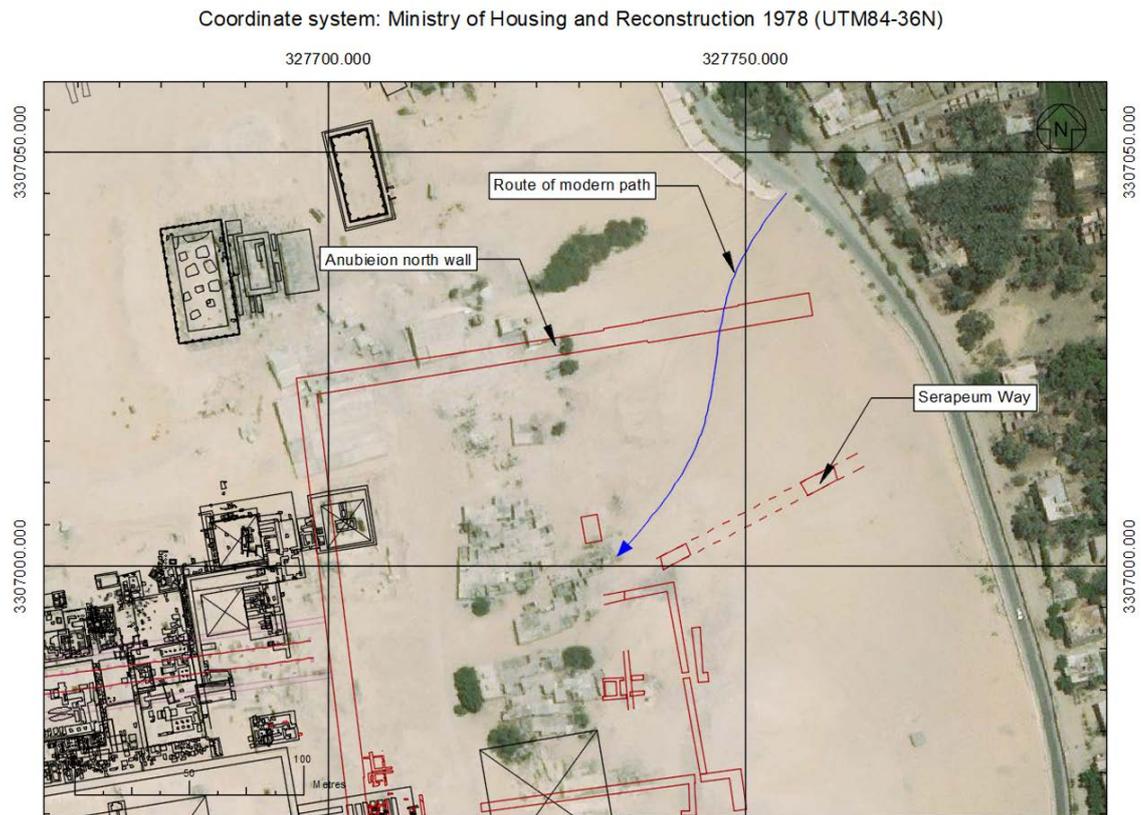


Figure 9.12. The route of the Serapeum Way and the modern path up the escarpment (source author).

The route of the Serapeum Way may predate construction of the Anubieion enclosure (Dodson 2016, 15; Smith 1981, 336) and, in conjunction with topographic affordances, may have influenced its arrangement. An established route prior to the construction of the Anubieion enclosure would explain why the main temple was not centrally located within the enclosure, like that of the Bubastieion. Rather it was offset towards the south. If the enclosure was constructed over a well-established pathway, then potential locations for the main temple along the upper terrace were limited. To locate the main temple close to the centre of the main enclosure would require its construction to the south of the ceremonial way, rather than the north, which would have farther offset its centrality. This suggestion, of course, is purely speculative and goes contrary to the views of Smith (1981, 337–338) who suggests that the sanctuaries may have been extant prior to the construction of the ceremonial way.

The ancient Egyptians could have modified the route of an existing pathway, yet an unwillingness to do so in this case may be explained through affordances and the cyclical relationship of entanglement. The pathway offers a route of movement, whether in a

ceremonial context or otherwise, and through use it becomes etched into the terrain upon which it is imposed. Repetition of use defines the pathway's existence and reinforces the affordance of transit that it provides. The pathway acts to constrain the fluidity of movement and enforces directionality and, over time, the cyclical reciprocity creates an embedded manifestation of movement within the landscape and the route becomes tradition, becoming enmeshed with ceremonial enactment and continuing the cycle.

The paved ceremonial path of the Serapeum Way, with its flanking sphinxes and boundary walls, asserts its permanence and connects the living land of the cultivation to the realm of the dead within the desert. It bisects the necropolis, passing over and through an already ancient landscape dense with history as it follows a route to the Serapeum Precinct. When moving along the Serapeum Way in the digital model, low mounds of sand distributed either side of the pathway are evident. Visiting Saqqara in the present and walking along the route of the Serapeum Way⁶ reflects this situation. The low mounds, complete with protruding mud-brick and casing stones are situated to the north and south of the sacred route (Figure 9.13). They are the decayed remnants of the Old Kingdom elite mastabas. Many remain partially visible, although this situation can change with the shifting sand. It is not possible to know how much or how many of these tombs were visible at any given time. Theoretically, the tombs cased in limestone may have weathered better than those of mud-brick and may have remained visible for longer. However, they were probably more prone to theft of their casing stone. Once the casing had been removed the mud-brick would have been exposed to weathering and decay. Tombs that occupied higher ground—ridges in the underlying bedrock for example—may have been less prone to sand accumulation and therefore remained more visible than those in shallow hollows, which tend to become subsumed by sand. It is important to try to understand the visibility of earlier tombs and structures as they may have been entangled with the enactment of the performance of procession.

⁶ The Serapeum Way is no longer visible, having been buried beneath years of sand accumulation. GPS data was required to determine the location of the sacred route.

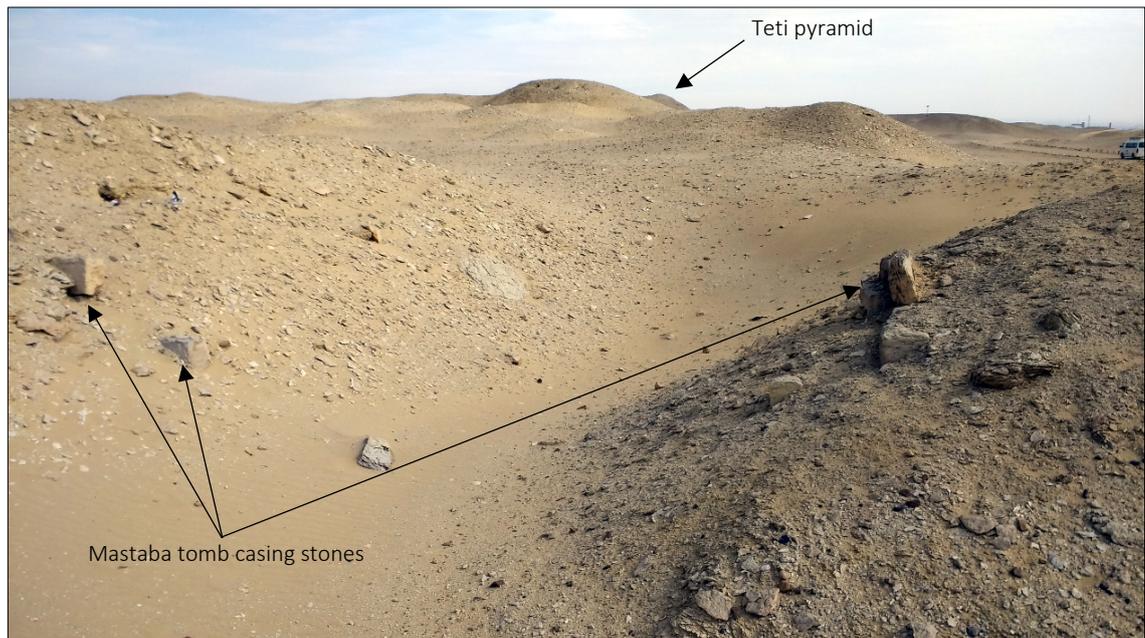


Figure 9.13. The sand covered tombs close to the route of the Serapeum Way, facing east. The remnants of Mastaba tombs can be seen jutting out from the sand. The mound in the bottom right of the image is stained dark brown from the decaying mud-brick. A modern motor road is visible in the top right of the image (photo author).

They offer raised mounds or platforms adjacent to the ceremonial way which afford an elevated position overlooking the route. On festival days the route of the Serapeum Way may have been lined with spectators, there to view the processions (Assman 1991, 108). These tomb platforms would have certainly afforded a better vantage point from which to observe the proceedings and through this activity, the ancient tombs would have been incorporated into the performance of procession. Their use as viewing platforms, by groups or individuals, would have woven their histories into the current events taking place during that time. Thus, ancient history enmeshes with current history in the making and offers new meaning to the disused and, perhaps, forgotten tombs. The affordance of observation that the tombs offer was likely never considered during their construction. This affordance is relational to, and dependent on, requirement and their location beside the Serapeum Way (Figures 9.14 and 9.15). Through use this relational affordance may have diminished. Over time and repeated use, the tomb super-structures may have suffered accelerated decay and ruin from numbers of people moving over and upon them. This would have diminished their effectivity as an elevated observation platform.

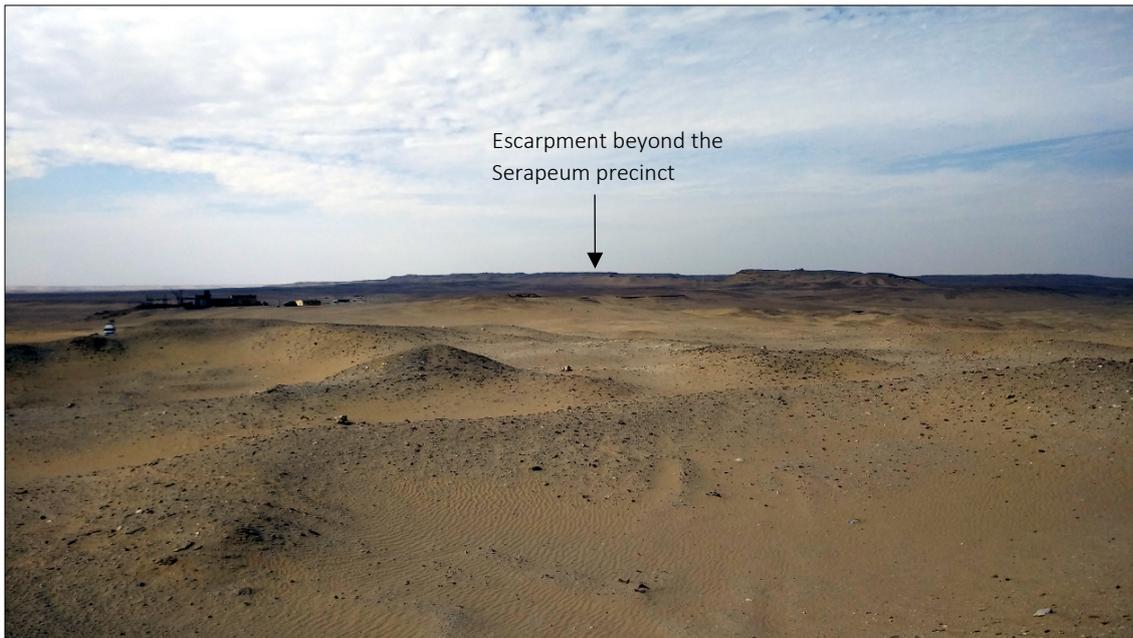


Figure 9.14. Standing on the location of the Serapeum Way, facing west. The escarpment that marks the western extent of the Serapeum Enclosure is visible as a ridge at the centre-back of the image. Decaying mud-brick mounds are visible to the left of the image (photo author).



Figure 9.15. Standing on the location of the Serapeum Way, facing east. The Teti pyramid is visible to the right of the telecommunications mast. Mounds of decaying mud-brick are visible to the right of the image (photo author).

The Serapeum Way was an important route of movement across the necropolis and its significance attracted the construction of LP/EP tombs and shrines (Nicholson 2016, 25)

in positions of prominence adjacent to the path at its western end. Some of these tombs, excavated by Mariette (1882, 11), had their facades orientated to face the sacred way, respecting its alignment. This may imply that being next to the sacred pathway would bestow importance on the tomb owner, but also that the tomb would remain visible and in the memory of those passing by, in the hopes of the tomb owner being remembered. Perhaps the architects of these tombs were aware of the ruined tombs that littered the landscape elsewhere and sought to guarantee the longevity of their constructions through a more immediate association with the sacred path. It is uncertain whether any of the sand covered tombs adjacent to the Serapeum Way were ever used in the way described, but it is a credible suggestion. In Chapter 6 it was argued for the likelihood of crowds observing and participating in the festival day processions and access to the necropolis. If this were indeed the case then spectators would have required a location from which to observe the proceedings, and these mounds would have offered such affordances.

The Serapeum Way maintained a connection between the Anubieion and the Serapeum Precinct. The ceremonial way was more than a transit route, it engaged in and enabled performance. A function of its relationship with the great enclosures was the performance of interplay between structure and topography. When exiting the Anubieion towards the Serapeum Precinct, the Anubieion quickly recedes from view (Figure 9.16) assuming one was to turn back towards the east. The Serapeum Enclosure is glimpsed throughout the journey along the pathway, it is both concealed and revealed by the undulating terrain (Figure 9.17). The alignment of northern shrines and temples are always visible along the route, being situated as they are farther to the north on a flat expanse of desert. The Serapeum Enclosure, however, is often obscured. It is situated at a lower elevation than the sacred way, in a shallow hollow that is part of the Abusir wadi. The interplay between the lower lying ground of the wadi with the Serapeum Precinct, and the raised ground which the Serapeum Way crossed, created the effect of revealing the impressive extent of the Serapeum Dromos and enclosure as travellers reached the western end of the path. The importance of the Wadi Valley Road has been established (Dodson 2016) and situating the Serapeum in the middle of this route was a statement

of significance. The affordance the topography offered for visual performance when approaching from the east may also have been a consideration.



Figure 9.16. View towards the Anubieion from the Serapeum Way. The ruin of the Teti pyramid is visible to the right of the image, the pylon of the Anubieion west gateway is visible at the end of the Serapeum Way (source author).

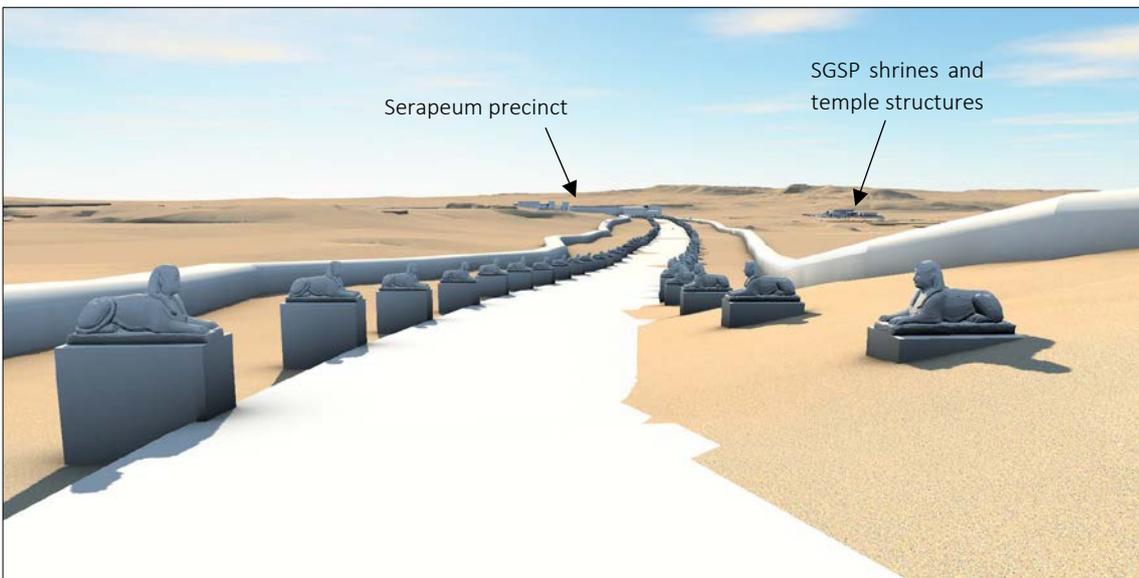


Figure 9.17. View towards the Serapeum Precinct from the same position on the Serapeum Way as the above figure. The Serapeum Precinct is just visible at the far end of the pathway. The northern group of shrines and temple structures indicated by the SGSP data are also visible (source author).

The act of 'conceal and reveal' in which the Serapeum Precinct participates is not reciprocated by the Anubieion, when moving from the Serapeum towards the east. The top of the Anubieion enclosure walls and western pylon gate are visible along much of the sacred way. The tombs adjacent to the western end of the path form a permeable boundary to the south and screen the features in that direction. As the end of the line of these tombs is approached the Anubieion enclosure is largely screened from view, reappearing after those tombs are passed (Figure 9.18). The enclosure (including the Bubastieion) stretches across the horizon beyond the ridge of sand and only disappears when nearing the Teti pyramid (Figure 9.19). Here then, the action of concealing and revealing takes place, closer to the monument. The Serapeum Way rises over a low mound of sand to traverse the infilled Teti North Cemetery and, as the top of the mound is reached, the Anubieion and its great pylon gateway is brought into view, signifying the termination of the sacred way on the plateau. The near constant visibility of the Anubieion during transit along the sacred way appears to imply that travel from the Serapeum Precinct was less meaningful in terms of performance symbolism and significance than when travelling towards it. The Apis bull was interred underneath the Serapeum temple, there to remain for eternity, and it was towards the Serapeum Precinct, towards the west, that the mummified bull was transported in ceremonial pomp and pageantry. This was the significant direction of travel along the sacred way, a situation that is reflected in the visual performance and spectacle that was offered to the traveller.

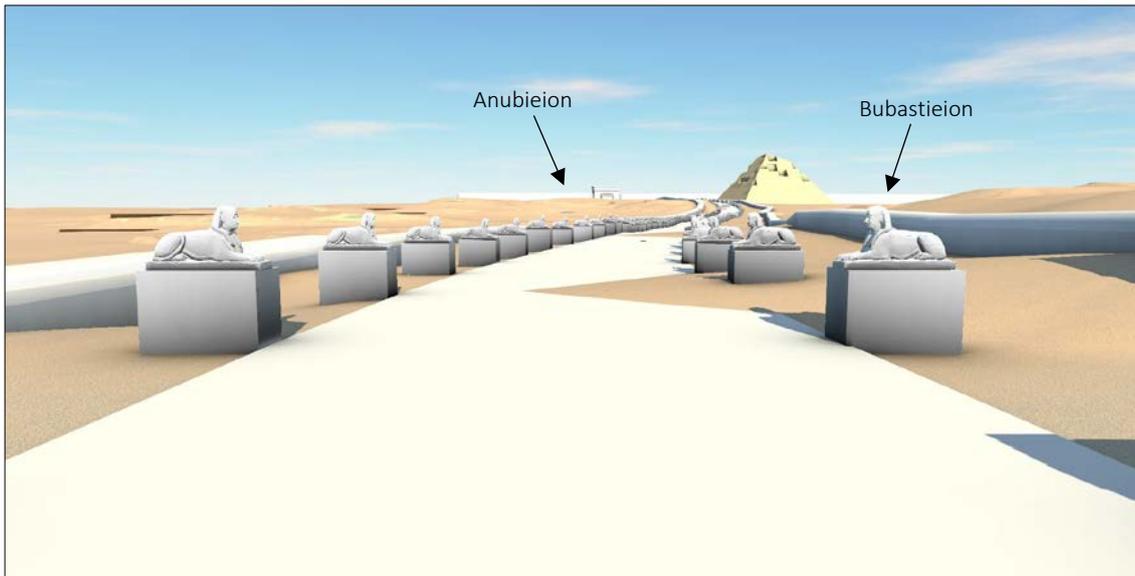


Figure 9.18. View along the Serapeum Way towards the Anubieion, facing east. The tombs which screen the south of the way have just been passed to the right of the image (out of view) (source author).

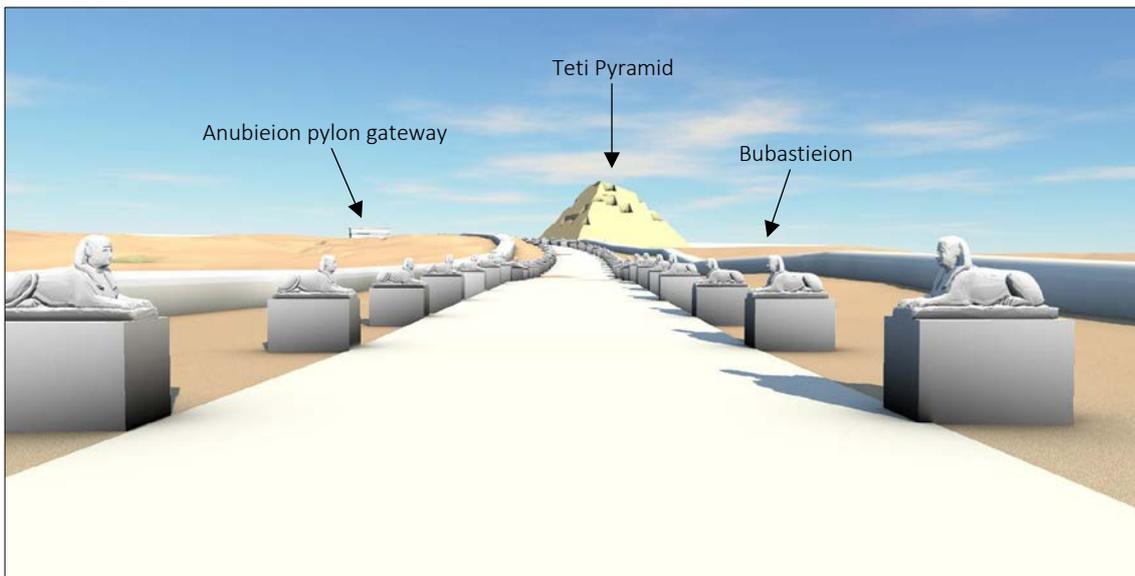


Figure 9.19. The approach to the low mound of sand which screens the Anubieion enclosure from view. Facing east (source author).

It was noted that the SAN MTE remained occluded for most of the distance of the Serapeum Way when travelling towards the Serapeum Precinct. It is only upon nearing the tombs to the south of the pathway at its western extent, that the terrain to the north slopes away to reveal the temple enclosure of the SAN. This effect is caused by the SAN's location within the wadi valley, adjacent to the eastern escarpment—being situated on low lying land it is hidden from the east. It was not possible to establish this as a significant

or constructed view-experience. The SAN MTE walls are distant and indistinct, at over 630m away, and present limited visual impact during movement along the sacred route (Figures 9.20 and 9.21). At this distance, heat-haze on the desert surface may have obscured the monumental feature completely.

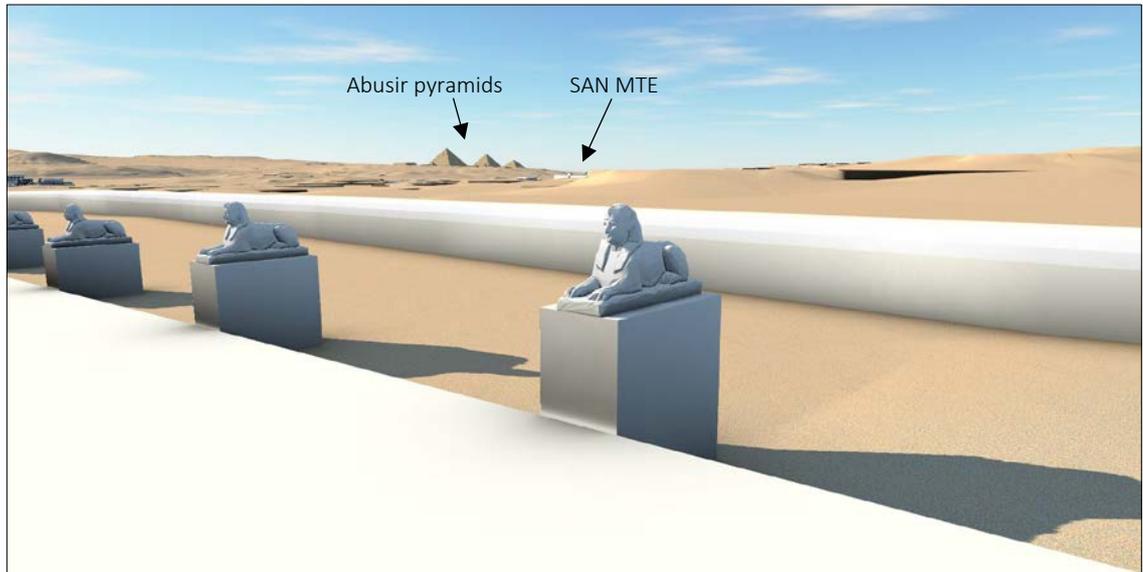


Figure 9.20. The view towards the SAN MTE from the Serapeum Way as its western extent is approached, facing north-west. The terrain has sloped away, and the SAN MTE is beginning to be revealed (source author).

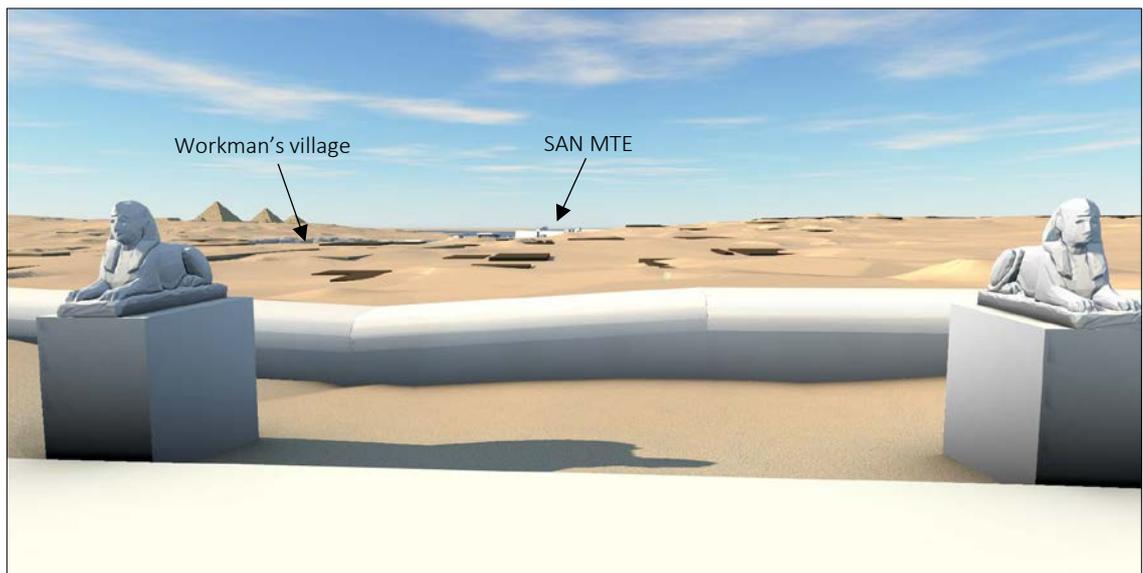


Figure 9.21. The view towards the SAN MTE approaching the western end of the route, facing north-north-west. The SAN MTE is less hidden and the small workman's village across the wadi valley is visible (source author).

The conjectural projection of the North-South Sacred Way, arriving from the SAN MTE south gate, may have joined the Serapeum Way towards its western end (Figure 9.22). It is interesting to consider that from farther east along the Serapeum Way travel towards the SAN MTE appears to not be possible and the monument remains hidden. When nearing the western end of the Serapeum Way, a route to the SAN MTE was likely and the monument was revealed, almost as if to announce its presence in readiness for the journey northward. This suggestion may attribute too much credit to the architects of the SAN, as this timely visual reveal may be nothing more than coincidence, but it is a point worth considering.



Figure 9.22. The view towards the SAN MTE and the Wadi Valley Road, facing north-north-west. This viewpoint is towards the western end of the Serapeum Way, just before the route turns south to enter the dromos. The boundary wall to the north of the ceremonial way does not extend this far along the route (source author).

***Hp-nb.s*, the wider area**

The possibility of a pathway leading north around the eastern escarpment promontory (Smith 1974, 69) remains hypothetical, although on the balance of probability it seems likely that such a route existed. As described above, this path would pass the Dog Catacombs and may continue around the promontory (Figure 9.23) towards the Lake of Pharaoh and the entrance to the Wadi Valley Road. As the northerly tip of the promontory

is passed (Figure 9.24), the Lake of Pharaoh is situated to the north and the wadi valley stretches south, leading into the necropolis (Figures 9.25 and 9.26).



Figure 9.23. The northern end of the escarpment promontory, facing south (source author).



Figure 9.24. The bedrock promontory screens everything to the north-west until it has been passed. Facing north (source author).



Figure 9.25. After rounding the escarpment promontory, the Lake of Pharaoh comes into view. Facing north-west. The Abusir pyramids are to the left of the image (source author).



Figure 9.26. The beginning of the Wadi Valley Road (marked by an arrow) leading south from the Lake of Pharaoh into the necropolis. Facing west (source author).

The substantial bedrock promontory screens the view towards the west and north-west until it has been negotiated, upon which the full extent of the Lake of Pharaoh becomes visible. The lake, with the Old Kingdom pyramids of Abusir as a background and bustling with Ibis birds (Smith 1974, 69), would have presented a remarkable scene to visitors (Nicholson 2016, 28) travelling towards the Wadi Valley Road (Figure 9.27). Whilst the extents of the lake have been determined by Earl (2011) from geological cores taken in

the field, it is unknown whether the lake and its boundaries were managed and altered by human action, or whether the shape of the lake was natural. Whatever the case may have been, the proximity of the lake to the escarpment promontory and the wadi valley afforded the cult of the Ibis with a breeding ground for the birds.

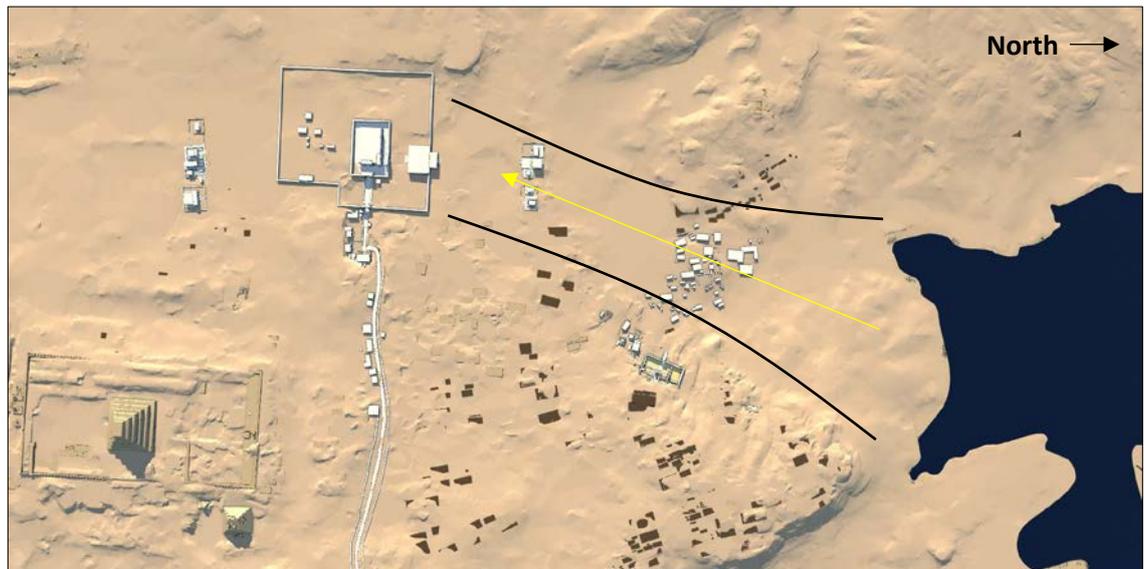


Figure 9.27. Overhead view of the necropolis with the Wadi Valley Road marked. The Lake of Pharaoh is clearly visible at right (north) with the Serapeum Enclosure at top (west) (source author).

The most northerly monument of the SAN yet known is the North Ibis garden and catacombs (Nicholson In preparation; In Press), which is only visible from the northern side of the wadi promontory. The garden is situated on a low shelf of the escarpment and remains indistinct until closely approached. The location of this installation is remarkable for its separation from the rest of the SAN complex, which lies to the south of the promontory. The reason for this dislocation has yet to be satisfactorily explained but may be nothing more than the affordance offered between the spatial relationship with this area and the lake, in addition to the topographic affordance offered by the bedrock promontory to house a large subterranean structure. The lakeside affordance does not translate to the South Ibis catacomb entrance, which is situated approximately 380m south-south-west. The South Ibis garden maintains a visible connection with the Lake of Pharaoh, which is observable from its entrance (Figure 9.28). The location of the South Ibis garden and catacombs is discussed further below.

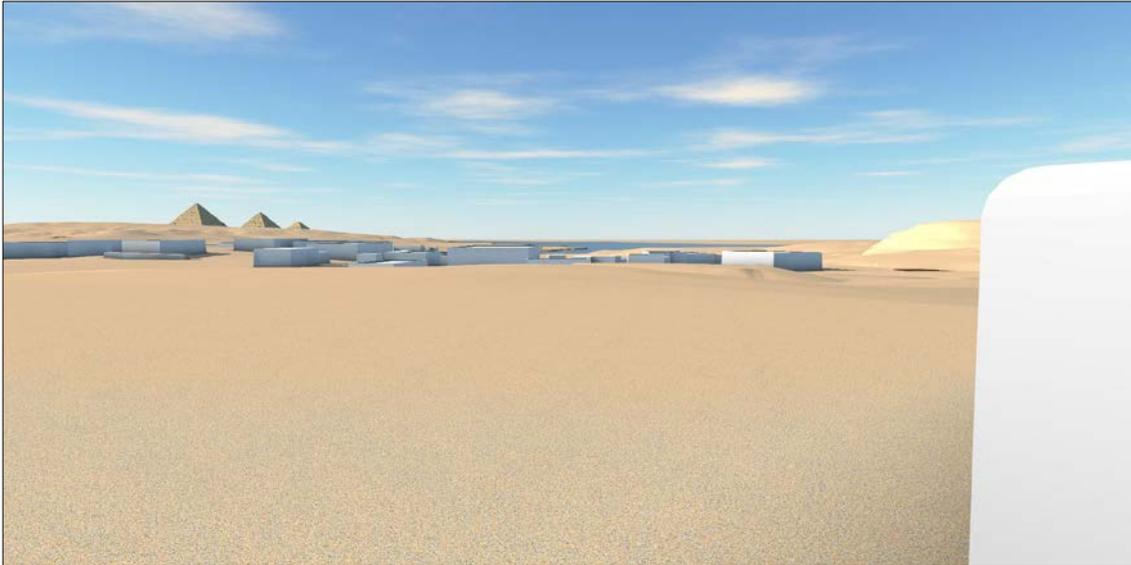


Figure 9.28. A view from the entrance to the South Ibis garden courtyard, facing north towards the wadi valley settlement and Lake of Pharaoh. The South Ibis garden wall is visible right of image (source author).

Rounding the promontory slowly reveals the workers village situated within the wadi valley, then, as progress is made further along the route, the Southern Dependencies (Martin 1981) appear (Figure 9.29). The SAN MTE however remains concealed until the northern periphery of the village is almost reached. The façade of the SAN MTE, dominating the eastern side of the wadi, is purposely revealed as movement is made further along the wadi road (Figure 9.30). The reveal mechanism was built around the topographic affordance that the bedrock promontory offered for screening the temple complex, which was installed against the escarpment behind the bedrock ridge. Moving south along the wadi road towards the necropolis was the significant direction of travel (Bárta and Vachalla 2001, 35–35; Malek 1997, 92; Reader 2004, 64)—leading towards the Serapeum Precinct. This directionality was used to create an interplay between terrain and structure which activated a visual performance, and travel towards the necropolis would involve participation in the spectacle of the sacred animal cults. A paved way possibly led east from the wadi road to the entrance ramp of the MTE (Smith *et al.* 2006, 109).

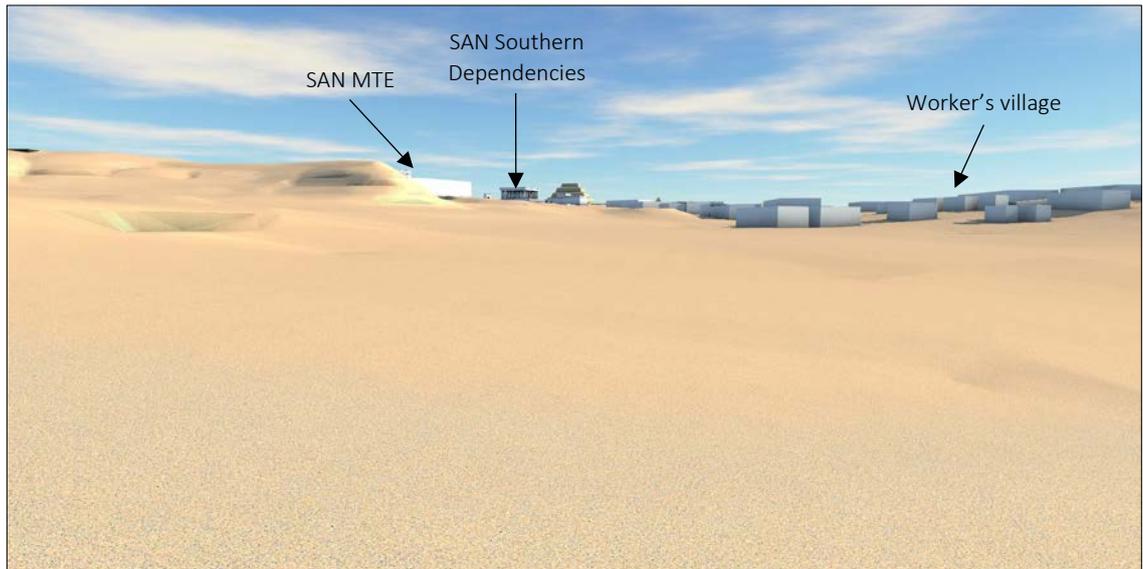


Figure 9.29. Standing in the wadi valley at the periphery of the village after rounding the escarpment promontory. The SAN MTE is partially revealed, and the reveal continues as the routeway is traversed. Facing south-south-east (source author).

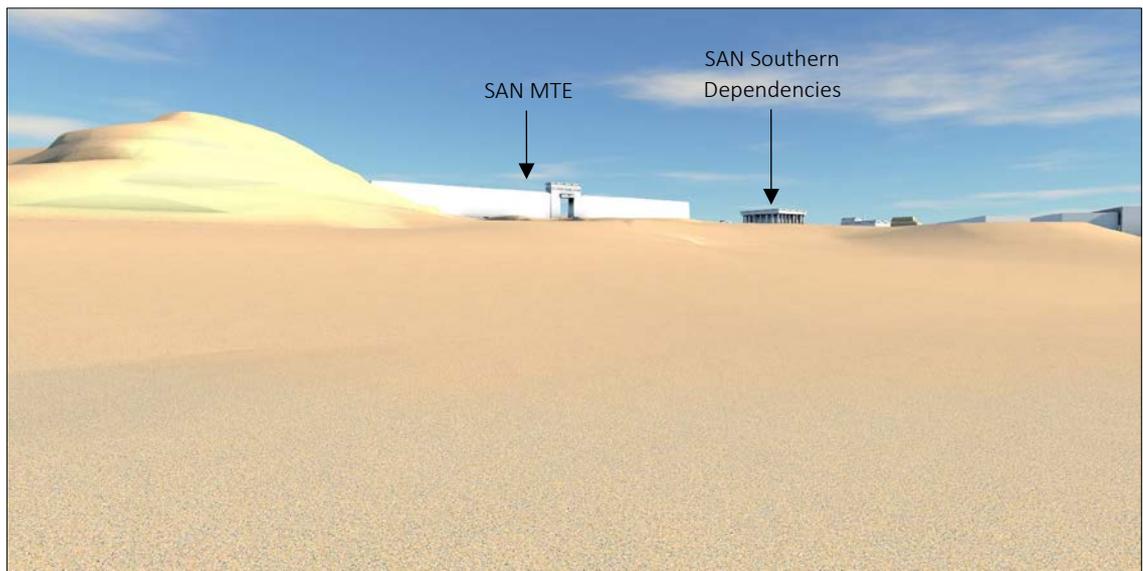


Figure 9.30. In the Wadi Valley Road facing the SAN MTE which has been revealed by passing the bedrock promontory. Facing east-south-east (source author).

***Hp-nb.s*, the Sacred Animal Necropolis⁷**

It is contended that the location of the SAN was established on the affordances offered by the wadi valley's topography and subsequent human use. The escarpment against which the MTE was constructed evinced rock-cut tomb vaults of the Old Kingdom and a partial terracing of the bedrock (Smith *et al.* 2006, 31). The pre-existing terraces would have afforded a foundation upon which to construct the large Late Period temple-enclosure, and the rock-cut tombs afforded ready-made vaults for use in the interment of mummified animals, which occurred with both the Mother of Apis and the baboons (Smith *et al.* 2006, 15). The location of the MTE adjacent to the escarpment meant that subterranean catacombs could be hewn into the rock and easily accommodate shrines and temples as part of the wider enclosure. These affordances imbued in the topography through human action were matched by the affordance of travel bestowed by the Wadi Valley Road, which offered a transit route onto the plateau. Construction of the MTE bordering the principle route into the necropolis (Dodson 2016, 6) expresses a statement of significance of the animal cults and their temples and shrines. This was a monumental structure that was made to be seen from the lower lying terrain of the wadi valley, standing against the steeply-sloping rock-face, and dominating the escarpment (Figure 9.31). The promontory of bedrock provided a screen for the MTE from the north, revealing the great structure through movement along the Wadi Valley Road.

⁷ For this discussion, the term Sacred Animal Necropolis (SAN) encompasses the monuments of the main temple enclosure (MTE), the north and south Ibis catacombs and gardens, and the southern dependencies. The wider area includes the wadi road, the probable workmen's village spanning the wadi, and the areas of tombs S3518 and AS33.

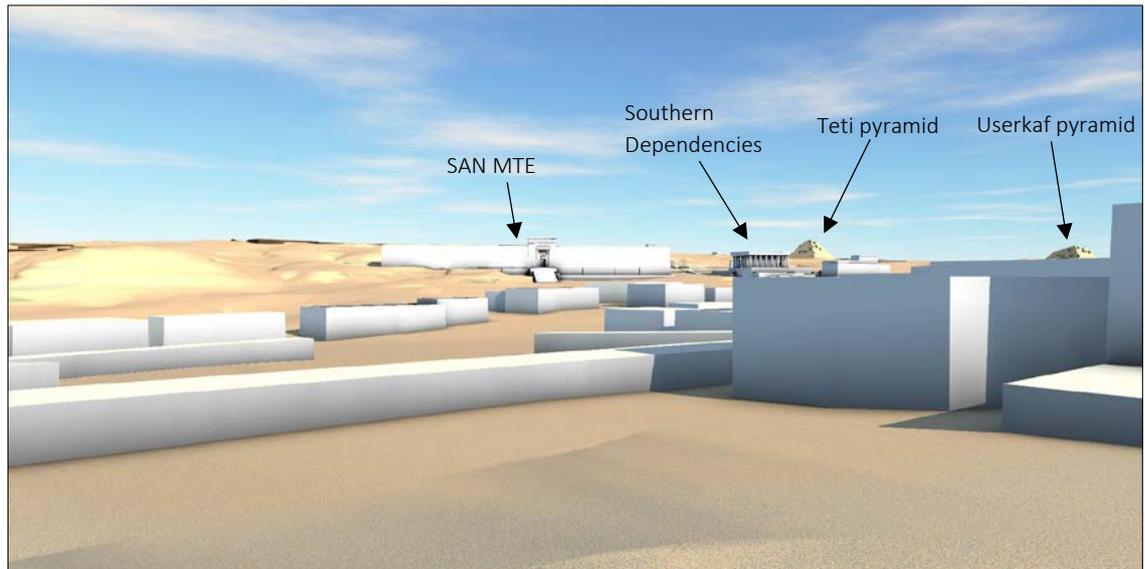


Figure 9.31. Looking towards the SAN from the worker's village spanning the Wadi Valley Road, facing east (source author).

The village spanning the wadi may have necessitated a traveller to progress along the route against the eastern side of the valley (Figure 9.32). Taking this approach would have brought them close to the MTE, which would have dominated their view to the east whilst concealing the escarpment and the sacred catacombs that lay within (Figure 9.33). The view towards the south was constrained by the worker's village to the west, and the Southern Dependencies to the south-east, creating a dictated view, partially revealing the destination of the route (Figure 9.34). The constrained view emphasised both the SAN MTE to the east and the Serapeum Precinct, whose north gate and temple enclosure pylons are visible over a ridge of sand to the south, and brought into focus these significant monuments along this ancient pathway.

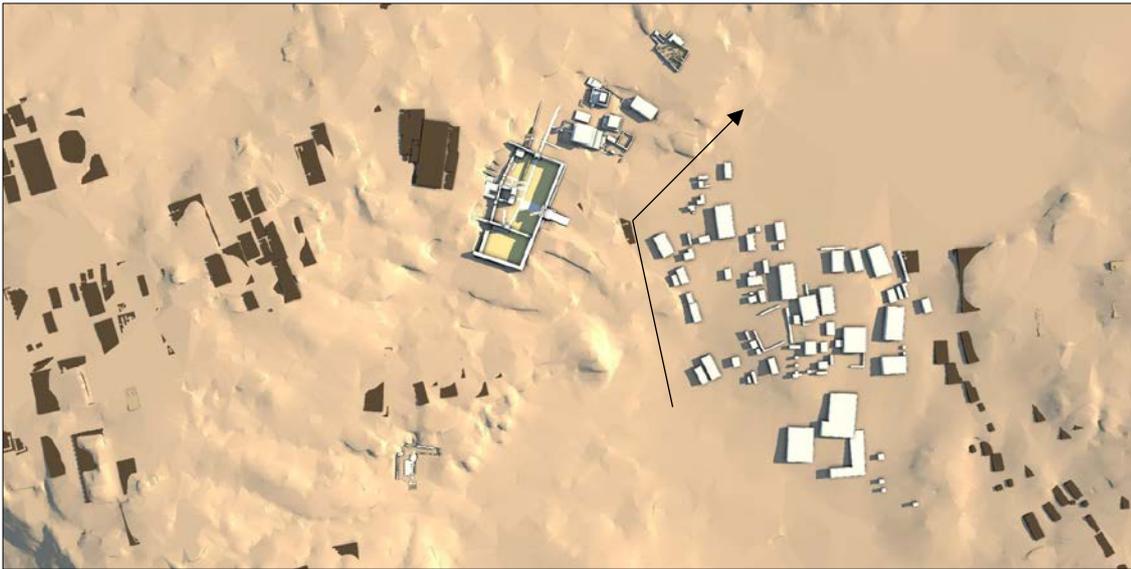


Figure 9.32. Overhead view of the Wadi Valley Road with the route against the escarpment highlighted (source author).

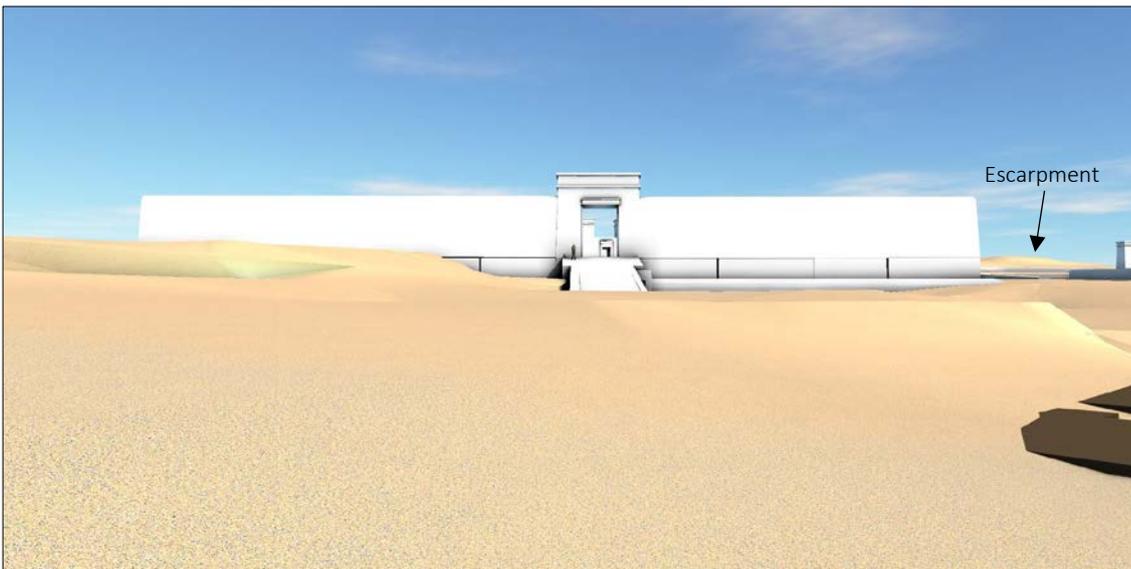


Figure 9.33. Looking east towards the SAN MTE which stands above the wadi road. The top of the escarpment is barely visible (source author).

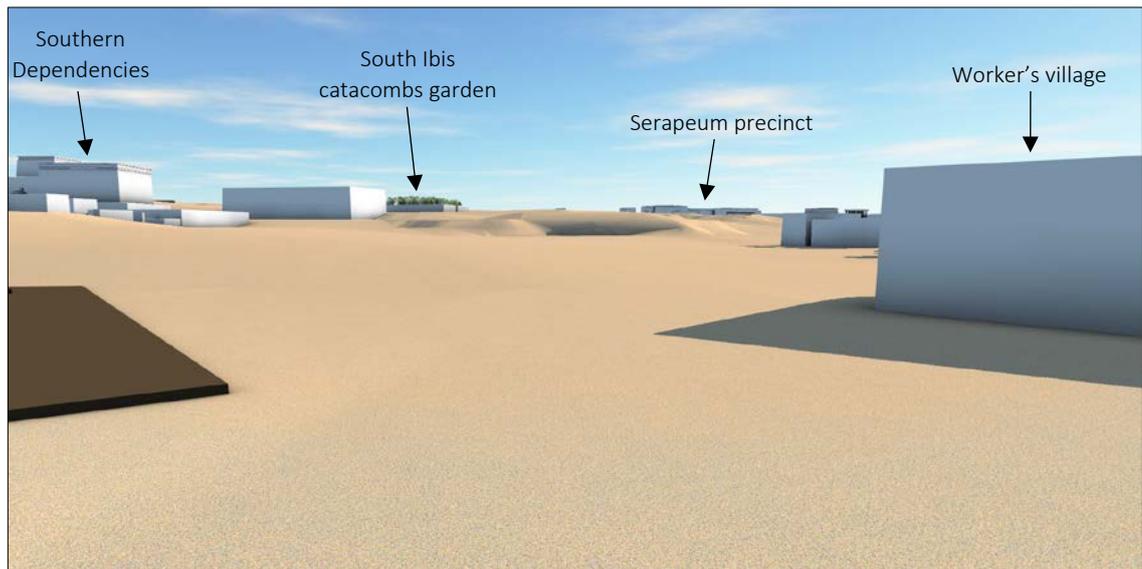


Figure 9.34. Looking south from the Wadi Valley Road towards the Serapeum Precinct. Denuded mud-brick of an unnumbered mastaba tomb is visible to the left of the image (source author).

The western gateway, situated atop the long entrance ramp, leads into the SAN MTE, where the act of concealment continued. Internal walls delimited precincts within the main enclosure. The Mother of Apis (Figure 9.35), the Baboons (Figure 9.36), and the Falcons (Figure 9.37) all had their defined areas, and each concealed the vaults and subterranean catacombs within which the mummified animals were deposited, where none but the priesthood of the cult were permitted. Standing at the western gateway into the enclosure a visitor would have been faced by a confusing number of gateways leading to restricted areas. Concealing these areas from general view would have maintained the secrecy of the cult activities, yet this form of concealment differs from the 'conceal and reveal' effect that was being played out in the landscape. Topographic concealment was used to engender an emotional response through the power of visual performance and spectacle. Whilst the concealment within the temple complex pertained to power through the restriction of knowledge.



Figure 9.35. View towards the east-north-east of the SAN MTE, facing the Northern Enclosure of the Mother of Apis (source author).

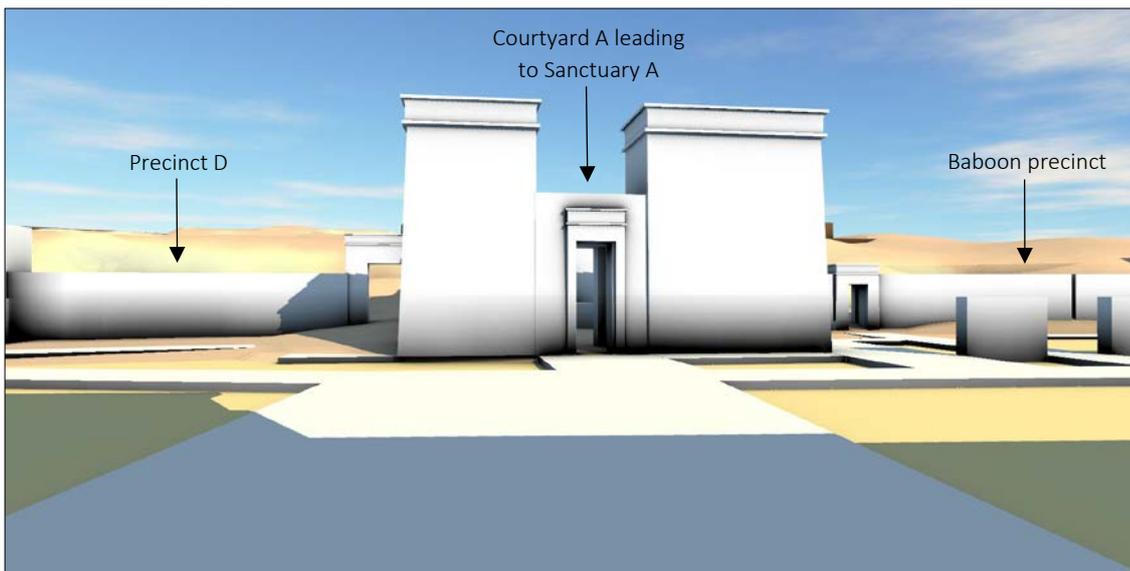


Figure 9.36. View into the interior of the MTE from the western gateway. Facing east (source author).

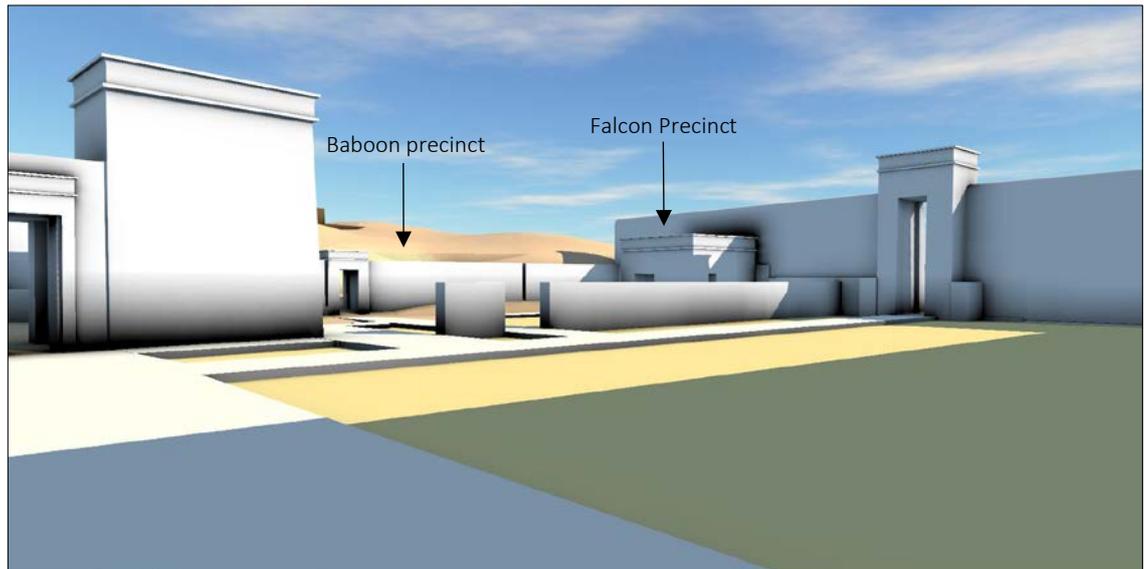


Figure 9.37. View towards the east-south-east of the SAN MTE, facing the Baboon Precinct and the Falcon Precinct (source author).

The view to the west from the MTE gateway overlooked the Wadi Valley Road and the worker's village (Figure 9.38). In the distance to the north-west were the pyramids of Abusir, and to the west a notable bedrock mound protruded from the desert surface. The Old Kingdom stepped feature which projected from the escarpment of the mound was visible from this location. It may have been the association of the stepped feature with the architectural style of Djoser's pyramid (Yoshimura *et al.* 2005, 364) which attracted reuse of the area during the LP/EP (Yoshimura and Takamiya 2000, 163). A large mastaba, now allocated the code S3518, is located on the plateau at the top of the escarpment, above and behind the SAN MTE (Figure 9.39). Several smaller mud-brick tombs were built around and against the large Old Kingdom structure. Prior to excavation, Emery noted that tomb S3518 held some significance, in that its orientation matched that of the pyramid and complex of Djoser. Upon excavation, a cache of anatomical *donaria*, dating to the Ptolemaic period and contemporary with others recovered from the baboon galleries, was discovered in the entrance to the corridor chapel (Emery 1970, 10). During the LP/EP the galleries of the baboon catacombs were carved into the bedrock beneath the tomb and were connected through its southern burial shaft. This was an important monument whose reuse in the LP/EP may further support the location of the SAN MTE as a significant choice.

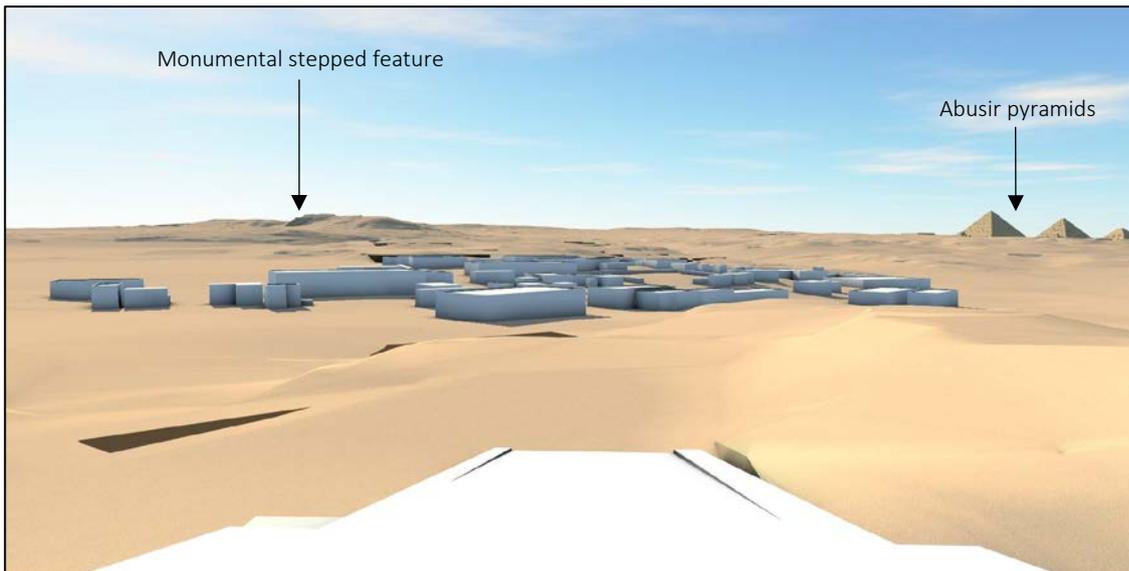


Figure 9.38. View towards the west from the SAN MTE western gateway. Looking across the wadi valley (source author).



Figure 9.39. View towards the east with the tomb S3518 visible on the plateau above the temple enclosure. The figure is included for scale (source author).

The owner of the unscribed tomb remains unknown. The corresponding orientation with the Djoser pyramid complex, the connection to Thoth through the baboon galleries below and the deposition of medical *donaria* suggest that this tomb was clearly important, which may have led to its reuse during the LP/EP. It may have been the affordance offered by this significant monument that added to the desirability of this place for the construction of the MTE and its animal catacombs. This area benefitted from

a convergence of affordances, both topographic and manufactured, that were exploited by the architects of the temple enclosure and further affirmed and entangled the importance of this location with the necropolis.

Standing atop mastaba S3518 the view around the necropolis would have been panoramic (see Chapter 8, Mov_8x). This view connected the area within the entire sacred animal landscape. The Anubieion and Bubastieion, the Serapeum Way and Serapeum Precinct, the South Ibis Catacombs and the Southern Dependencies, and the Lake of Pharaoh were all within view. Only the North Ibis Catacombs were hidden, screened by the bedrock promontory to the north. On the opposite side of the wadi valley was another large mastaba tomb dating to the late 2nd/early 3rd Dynasty—now numbered AS33. This tomb offered a symmetry to the wadi valley, with S3518 on the east bank and AS33 on the west. Both tombs dated to the Old Kingdom and were situated on raised ground above the wadi valley floor. Excavation undertaken by the Czech Institute (Bárta *et al.* 2010, 57–182) on mastaba AS33 uncovered many animal burials made within the mud-brick superstructure of the large tomb. The reuse dated from the Late Period onward and an array of species were deposited in pits cut into the upper surface of the tomb. Many of the depositions were of adult bulls, some of which displayed signs of burning, others were mummified (Bárta *et al.* 2010, 181). Here then, was a connection with the SAN animal catacombs. The western side of the wadi valley has yet to produce any animal catacombs or ceremonial structures relating to the animal cults, except for mastaba AS33. The western side of the wadi valley seemed disconnected from the eastern side, with the SAN MTE and other structures, but there was a connection.

When examining the symmetry offered by the location of the two tombs, an anomaly within the SGSP data in the Wadi Valley Road was noted. Between the buried tombs to the south and the probable settlement structures to the north there lies a corridor which transects the wadi valley (Figure 9.40). The corridor leads from the SAN Southern Dependencies towards mastaba AS33 and, except for a few anomalies at the eastern end, remains clear of probable structures. Also discovered close to AS33 was an incomplete wall with recessed niches towards its northern end. This feature whose orientation did not respect that of the tombs which it adjoined has been related to LP/EP activities in the

area (Bárta *et al.* 2010, 221) possibly relating to a processional nature.⁸ Indeed, the Czech excavators who work in this area have commented on the probable connections between LP/EP monuments across the necropolis by processional roads (Bárta *et al.* 2010, 221). It is contended that this corridor of empty space, demarcated by the structures either side of it, was a processional route from the SAN Southern Dependencies on the eastern side of the wadi valley across to mastaba AS33 on the west. This processional way may have been part of the performance relating to the deposition rites within the large mud-brick mastaba, as part of the sacred animal activity in the necropolis.

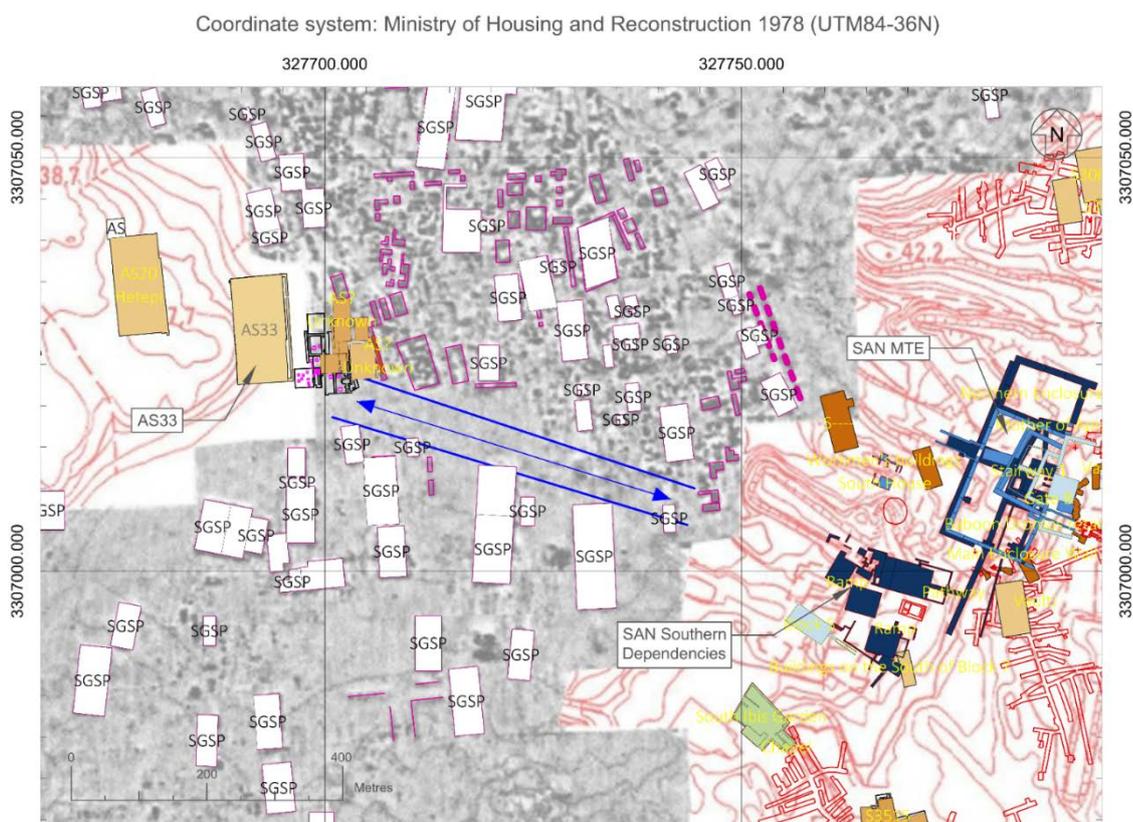


Figure 9.40. The SGSP survey data (within the grey areas) for the Wadi Valley Road. The corridor of empty space is indicated by the parallel blue lines. Probable structures highlighted by the SGSP data are shown as white polygons (source author).

Another panoramic view of the necropolis is offered when standing atop mastaba AS33 (see Chapter 8, Mov_8xi). Whilst this view is achieved from a lower elevation than from

⁸ The author was unable to georeference this feature with confidence from the data kindly provided by the Czech Institute, therefore beyond this note regarding its presence and possible LP/EP use, no further analysis was made.

S3518, it offers a similar experience to the view from that tomb. Mastaba S3518 is interconnected with AS33 through its visibility across the wadi valley, which is supported by the physical connection of the postulated processional route. The Anubieion and Bubastieion are visible over the plateau ridge, as are the tombs to the south of the Serapeum Way, which allow an observer to understand where the sacred route is within the landscape. The Serapeum Precinct can also be seen but is partially screened from view by the row of temples and shrines that occupied the location suggested by the SGSP survey data. The wadi valley stretches to the south leading to the Serapeum Precinct. The view to the north is unhindered, with the Lake of Pharaoh stretching across the wadi valley entrance. The low mound to the west with its stepped structure is barely visible due to the lower elevation. However, when moving towards AS33 the low mound is present against the skyline and presents a noticeable backdrop to the approach (Figure 9.41).

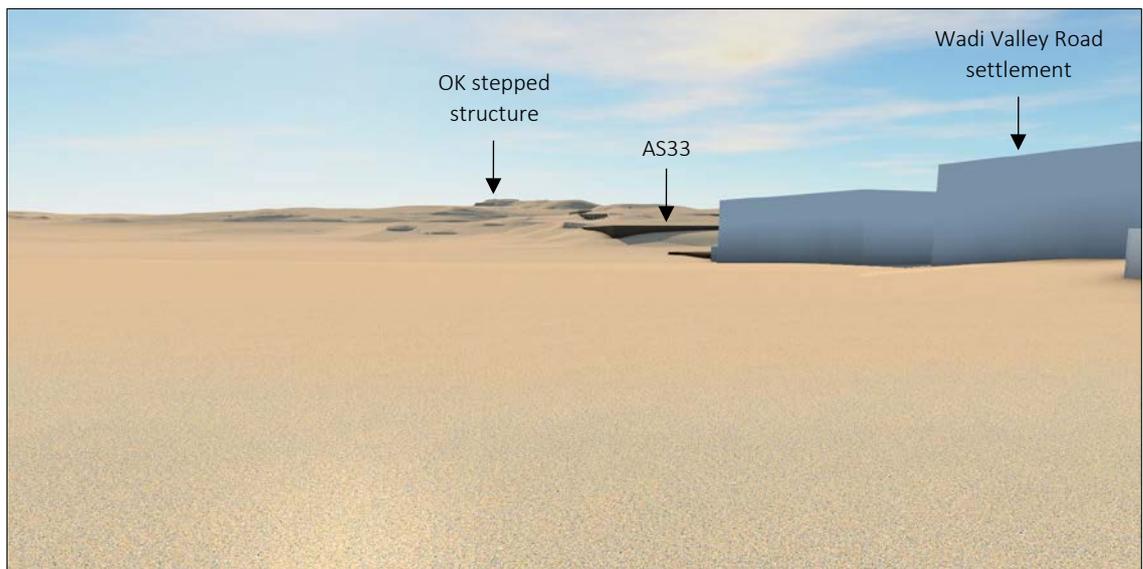


Figure 9.41. View towards AS33 from the east-west corridor. Facing west (source author).

Whether the mound bestowed a positive affordance on the processional route and the use of AS33 is open to debate. It is only during the approach to the mastaba that the mound is set against the skyline in such a way as to be noticeable, when standing atop AS33 the mound blends into the terrain and becomes more indistinct. It seems unlikely that the mound, which is located over 1km to the west of the wadi valley, had an immediate effect on the use of this location. However, there is limited evidence for LP

reuse of a mud-brick enclosure structure situated atop the mound which requires consideration in relation to the LP/EP network of monuments (Yoshimura and Takamiya 2000, 163). Work in this area of Saqqara is ongoing and is continually producing new data so the limited amount of information currently available will hopefully soon change.

The choice of AS33 for the LP/EP deposition of animal remains at first examination appears to be at odds with the location of the SAN MTE and animal catacombs, which are all situated along the eastern side of the wadi valley. There are several large tombs on the plateau above the SAN which may have provided a similar platform for deposition. However, the affordances offered by these tombs do not match those of AS33. The tombs behind the SAN predominantly date from the 4th Dynasty onwards and are set back from the escarpment. They are generally much smaller than S3518 and do not offer a similar affordance in their location, they are not easily seen from the Wadi Valley Road.⁹ Mastaba AS33 dates to the late 2nd/early 3rd Dynasty, has a palace façade exterior, is a similar size to S3518 and is set against the wadi escarpment. The conscious archaism of the Late Period brought a desire to create appropriate funerary monuments (Stammers 2009, 87) which, in addition to the affordances, may have encouraged the reuse of this excellent example of Old Kingdom funerary architecture. AS33 complements mastaba S3518, which was clearly a significant monument in this place, and benefits from being located opposite, on the western side of the wadi valley. The mirrored placement creates a symmetry within the landscape, and AS33 becomes entangled within the LP/EP sacred animal landscape through reuse. This, in turn, engenders an interconnectedness with the other sacred animal monuments.

The wadi valley and the route it offered into the necropolis would have been a significant contributor in the location and growth of the SAN. The affordances provided by the valley escarpment and the proximity to ancient tombs benefitted this complex sacred site. The association with the ancient routeway created an entangled relationship between the monuments, the Wadi Valley Road, and the topography at this end of the necropolis. The

⁹ A group of 3rd Dynasty tombs are situated along the promontory but only S3050 is of a similar size to S3518, and unlike AS33, this tomb is not close to the wadi valley edge.

SAN needed the wadi road to state its importance, and the wadi road trusted the SAN to continue its meaning through the foot traffic it provided. Here was a stretch of land which afforded transit into the necropolis, sloping up towards the higher ground, which forced ascent to the monuments, just as a ramp or stairway before a temple might. The valley, defined either side by escarpments, afforded the installation of a statement of significance: a temple complex to the animal cults positioned to overlook the southern route into the necropolis. The Wadi Valley Road, through its association with the Serapeum Precinct, would have bestowed importance to the SAN through the entangled relationship between pathway and human movement, and generated connection through networks of movement.

The connection between the SAN MTE and the Serapeum Precinct may have been further solidified by the North-South Sacred Way (Figure 9.42). This ceremonial route passed from the Northern Enclosure, the location of the Mother of Apis shrine and catacombs, across the MTE terrace and through the South Gate (Smith *et al.* 2006, 95). The route passed alongside the Southern Dependencies and offered access to these structures (Smith *et al.* 2006, 97), whilst also providing access to vaults in the escarpment to the east, which lay beyond a pillared wall (Figure 9.43). Assuming the North-South Sacred Way continued southwards and made a connection with the Serapeum Way, this would have created a reunion between the buried Mother of Apis and her child, the Apis bull. This reuniting of the sacred cows, although highly speculative, may have emboldened the significance of the SAN complex. The bond between the two monuments being strengthened by two sacred routes.

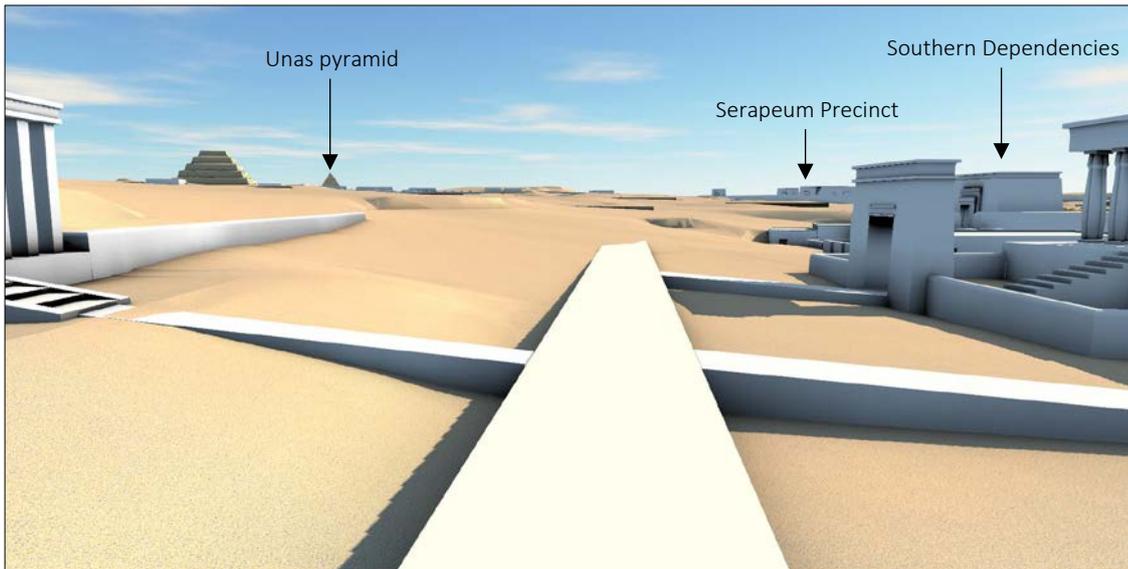


Figure 9.42. View south from the MTE south gate, along the North-South Sacred Way (source author).



Figure 9.43. View from the SAN MTE south gate towards a reconstruction of the pillared wall by the wadi valley's eastern escarpment. Facing south-east (source author).

The most southerly archaeologically confirmed monument of the SAN is the South Ibis garden and catacombs,¹⁰ located approximately 35m south-west of the Southern Dependencies on a low mound of bedrock. The catacombs are carved into the bedrock mound in an easterly direction and lie beneath tombs of the Old Kingdom cemetery (Martin 1981, 9). It remains unclear which of the Ibis catacombs was the earlier

¹⁰ The burial locations of the Rams and the Calves of Apis may have been located farther to the south (Smith 2017 pers. comm.) close to the postulated route of the North-South Sacred Way.

construction. Answering this question may provide more evidence towards a solution to the dislocation of the North Ibis catacombs as discussed earlier. Understanding the placement of the South Ibis group requires examination of the terrain at this location. The westerly projecting mound, into which the catacombs are cut, appears to provide a topographical counterpart to the northern promontory, within which the North Ibis catacombs are situated. This wide 'U' shape in the terrain, which is open to the west, frames the SAN MTE and Southern Dependencies to the north, south and east (Figure 9.44). However, as considered above, this area benefits from several affordances, not least this topographic setting which fixes the nucleus of the SAN in place. These affordances have converged to create a node of entanglement which through its cyclical comportment perpetuates use. The surrounding terrain behaves like an enclosure, creating a focal point on the SAN structures and declares their 'place'. It is postulated that the symmetry observed in the placement of these monuments is not a chance occurrence, rather it was a planned decision based on the affordances offered by both the topography and existing pathways of movement.

It remains to be seen how the yet un(re)discovered animal catacombs of the SAN may fit into this pattern of placement in relation to topographic and network affordances (Figure 9.45). Only time and future archaeological excavations may help answer that. If the pattern follows, it is likely that these burial vaults will be located spatially proximal to a sacred processional way, along a significant route of movement, perhaps where several affordances converge creating another node of entanglement and defining place.

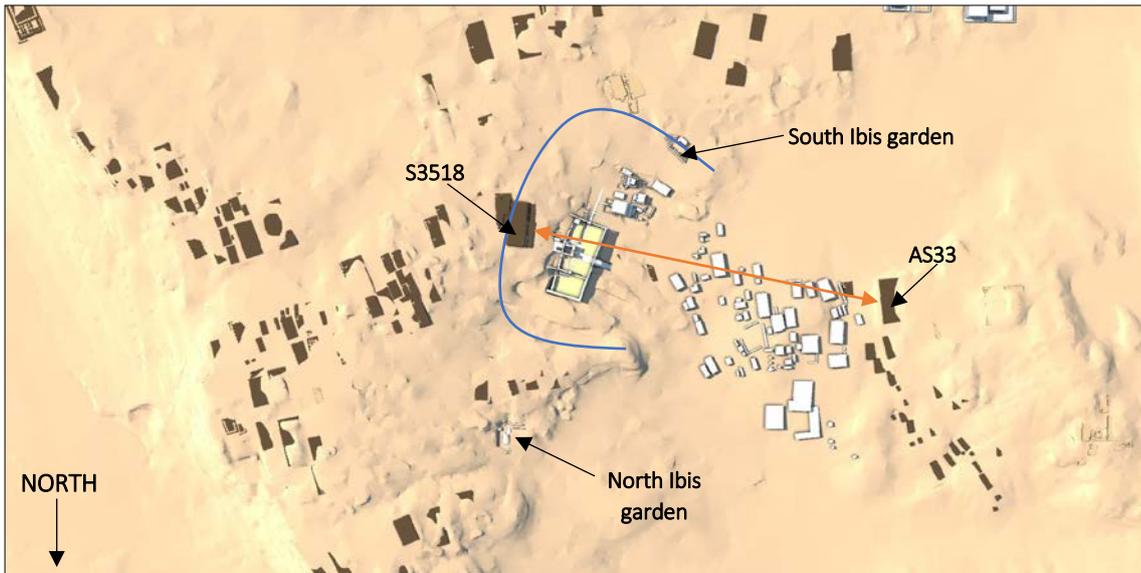


Figure 9.44. The wide ‘U’ shape created by the terrain surrounding the SAN indicated in blue. The locations of the North and South Ibis catacombs are indicated. The orange arrow indicates the intervisibility between mastabas S3518 and AS33 (source author).



Figure 9.45. Another possible bedrock surround located to the south of the central SAN, indicated by the blue line. The projected route of the North-South Sacred Way is indicated by the black arrow. The grey oval represents the area where Smith considers a possible location for the Rams catacombs (Smith 2017 pers. comm.) (source author).

***Pr-wsir-ḥp*, the Serapeum Precinct**

The approach to the Serapeum Precinct from the east has already been discussed above. This section will focus on the Serapeum Precinct in relation to the approach from the

north which was made along the Wadi Valley Road. As previously discussed, this route negotiated its way around the SAN worker's village and past the MTE. This was the route along which the great sarcophagus of the mummified Apis bull was transported on its journey to the hypogea beneath the Serapeum temple (Davies and Smith 2005, 3). The approach along the Wadi Valley Road arrives at the Serapeum Precinct by way of the row of temples and/or shrines determined by the work of the SGSP (Mathieson and Dittmer 2007). These structures, conjecturally represented in the digital model after Arnold (1999), are aligned east to west, with their façades facing south towards the Serapeum Enclosure. To the south of the Serapeum is another east-west alignment of similar structures, with their façades facing north (Figure 9.46).

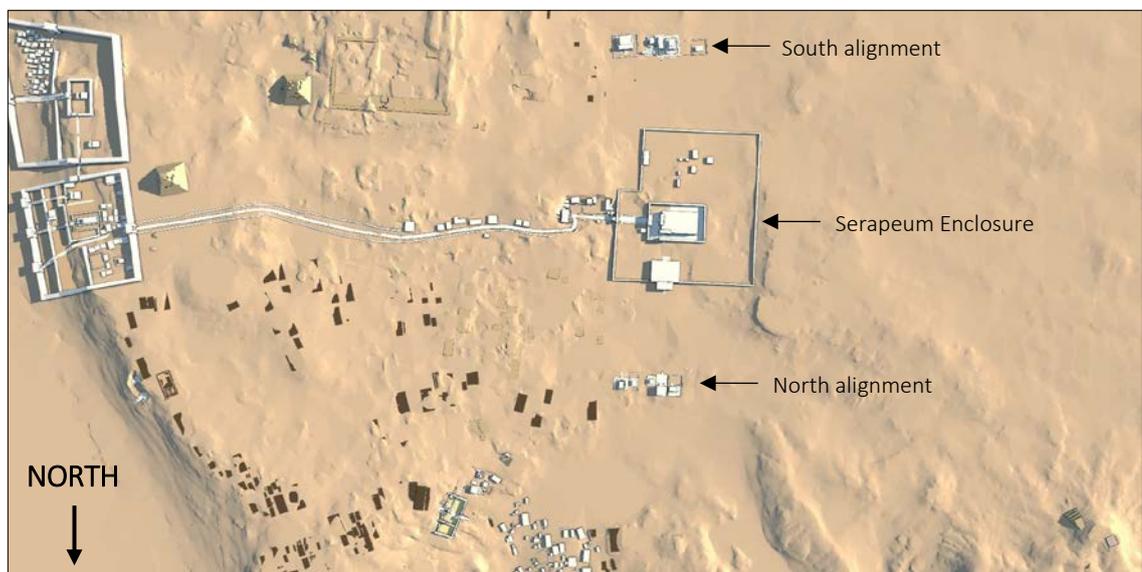


Figure 9.46. Aerial view of the Serapeum Precinct and the northern and southern temple alignments (source author).

The northern alignment of structures crosses the wadi valley, effectively obstructing the route at this location. The question arose of how movement was conducted along the route to the Serapeum north gate past this obstruction. Specifically, how was the Apis sarcophagus brought to the Serapeum? This question was considered in a conversation with Sue Davies and Harry Smith (2017 pers. comm.), and it was suggested that there appeared to be a space between the second and third structure from the east depicted in the SGSP data (Figure 9.47). This gap measures approximately 20m wide and may represent the pathway that led between the temples and onwards to the Serapeum north

gate. Whilst the SGSP data does depict some minor anomalies in this space, this suggestion provides a credible solution to continued movement along the route without a major detour (Figure 9.48), something that the sarcophagus bearers would have no doubt wished to avoid.



Figure 9.47. The SGSP data plot of the northern alignment of temples and shrines. The space that represents the probable pathway between the structures is indicated. The width of the gap is displayed in metres (source author).



Figure 9.48. Aerial view of the northern alignment of structures. The probable pathway between the second and third structures is indicated by the black arrow (source author).

The ‘conceal and reveal’ mechanism does not appear to be employed for the Serapeum Precinct when approaching from this direction. Whilst the monument is partially screened by the alignment of temples, the enclosure walls and pylons remain visible beyond the alignment on the approach past the wadi valley settlement. The pathway between the temple structures frames the north gate of the enclosure, which presents an impressive entrance from this direction (Figure 9.49). The configuration of the topography from this direction does not lend any affordances to constructing the visual spectacle of the reveal. The low-lying ground of the wadi valley climbs southwards along a gentle slope. There are no ridges, outcrops of bedrock, or sandy mounds with which to screen the approach. This may suggest that the priority of this approach may have been functional.

It is postulated that during the LP/EP the Wadi Valley Road approach to the Serapeum Precinct, whilst important, was a functional processional route, and that the significant approach to the temple complex was from the east, along the Serapeum Way. The approach to a monument and how this may engender a reaction can often be overlooked—beyond grand façades provoking emotional responses, the route navigated by a pathway often requires consideration. The Wadi Valley Road probably encouraged those visiting the SAN to continue towards the Serapeum Enclosure, but it was

predominantly the transit of the sarcophagus of the Apis bull for which this route retained its significance (Davies and Smith 2005, 3).



Figure 9.49. The Serapeum North Gate. Facing south (source author).

From immediately in front of the Serapeum North Gate the scene towards the east grants a view of the Serapeum Way stretching towards the Anubieion enclosure. Towards the north-east the SAN MTE is visible at the base of the escarpment. Whilst it is not possible to see the SAN from the Anubieion and Bubastieion, it appears that the significant monuments of the sacred animal landscape are interconnected either through a physical network of processional ways, or selective intervisibility. The intervisibility is topographically dependent, and the topography is used to constrain visibility and construct the ‘conceal and reveal’ spectacle.

Of note is the proximity of the main sacred animal structures to escarpments. The Anubieion and Bubastieion traverse the eastern escarpment of the desert, bridging the lower terraces of the cultivation with the upper plateau of the necropolis. The escarpment here, which extends for over 2km, appears to be raising the great enclosures up onto the plateau, carrying them into the necropolis, a journey which is continued by the Serapeum Way. The Serapeum Precinct is set against the western escarpment of the wadi valley, towards the western edge of the necropolis. The escarpment adds definition to the temple complex, drawing the eye towards it. The SAN monuments were

constructed against an escarpment which afforded a border around its northern, eastern and southern extents, also providing a setting that visually enhanced the appearance of the temple complex. Mastaba AS33, the symmetrical counterpart to mastaba S3518, was located on a low escarpment on the western bank of the wadi valley, an affordance from the Old Kingdom which through reuse was emmeshed into the sacred animal landscape. The location of these monuments in relation to escarpments and the affordances that they offered was not a coincidence, but a conscious choice, as part of a greater design. This pattern of design may explain why none of the sacred animal monuments are located towards the southern extent of the North Saqqara necropolis, where there are few, if any, significant escarpments that match those of the north.

CHAPTER 10

Conclusion

Purpose of the study

This study set out to investigate and gain a new perspective of the LP/EP monuments of North Saqqara through investigation of the topography they occupy, the affordances and entanglements they encountered, and their interconnectedness as part of a sacred landscape. The construction of the monuments and their associated cultic activities were undoubtedly influenced by ritual considerations, and whilst it was not the purpose of this thesis to investigate ancient Egyptian religious practice and belief, it was hoped that a new understanding of the monuments' place within the landscape would be achieved.

Through research and digitisation of historical maps, plans, and archival materials, the landscape was digitally reconstructed as both a GIS and 3D digital representation. The 3D representation offered a unique view of an historic landscape that is no longer wholly extant. Manipulation of the digital representation created views that permitted a thorough examination of the landscape. Offering this corporeal viewpoint for research assists in engaging the researcher within the environment, albeit a digital environment. Whilst this is not the same as "being there" (Tilley 2010, 26), the digital representation affords accessibility to a landscape whose archaeological activities stretch back thousands of years.

Contributions to knowledge

This study has made the following original contributions to the body of knowledge of LP/EP Saqqara:

- Perceived affordances offered by specific geological landforms and networks of movement rendered certain places desirable for the installation of sacred animal monuments.
- The convergence of affordances in specific locations lead to the production of nodes of entanglement, whose cyclical relationships perpetuated use and solidified place.
- The use of a ‘conceal and reveal’ mechanism was employed by the builders of the sacred animal monuments to create a defined visual performance when moving through the landscape.
- The location and use of the pre-existing east-west pathway across the plateau, which would become the Serapeum Way, both defined and constrained the location for the Anubieion enclosure.
- The existing landscape narratives regarding LP/EP Saqqara required revision based on their assessment against the digital landscape representation.

Practical considerations

Before undertaking this study, the feasibility of the project required determination. After considerable deliberation, it was decided that the construction of a new GIS of the North Saqqara necropolis, in addition to a 3D digital landscape representation, would be a difficult, but required undertaking. Various software packages were assessed and selected for use. A custom-made CAD workstation, powerful enough to cope with the computational requirements of the digital model, and a powerful laptop that would allow demonstration away from the desktop environment was purchased.

Aggregating the data for this project was an in-depth and lengthy process, as was the construction of the digital components, from the terrain through to the structure models. Due to the complexity of many of the structures construction proved time-consuming, often hampered by poor archaeological records. Limited information from many researchers regarding possible reconstructions of how the completed structure may have appeared did not simplify the task. Georeferencing structure plans was also a difficult process, often due to lack of information from archival reports. However, these

challenges were overcome and a reliable representation of the necropolis was achieved, which included all known monuments from the 1st Dynasty through to the Early Ptolemaic period. The process of degrading earlier monuments and determining which may have been visible during the LP/EP was not as scientific as hoped for, often being based on informed conjecture. The final LP/EP digital model depicts a credible representation of the necropolis landscape during this period and has proved its value as an epistemological tool through its use in the creation of a richly detailed mixed media narrative account of the landscape, that would otherwise have been impossible to achieve. The narrative account was used to direct analysis of the monuments and the landscape, which would test the veracity of the account.

The practicalities of producing this type of detailed research model cannot be understated. It is often difficult and time-consuming. The results, however, have justified the endeavour. It has been possible to answer some of the research questions which underpinned the direction of the project, to predict another possible location where more LP/EP sacred animal monuments may lie, and to explain why this may be so. A better understanding of the relationship between the monuments and the terrain has developed, tied directly into topographic affordances and entanglement through networks of movement. In short, new facets of the sacred animal landscape and its monuments have emerged as a direct result of the investigation of the digital model.

Generating data

A new way to understand the funerary landscape was to make a journey around that environment and experience the monuments from a corporeal perspective. Using the digital model as an epistemological tool allowed the creation of a new mixed media narrative journey around the LP/EP landscape, which was to form the basis for analysis. The narrative account offers a travelogue approach to a visit to the funerary site and uses exposition to showcase the sacred animal monuments in their setting within the landscape. It is hoped that everything described in the account would have been accessible as suggested, but it is possible that this was not always so. The written account was constructed based on analysis of the landscape model. The narrative was then used

to reflect upon movement within the landscape and relationships between the sacred monuments and the topography. The narrative account and the discussion were similarly structured to articulate a familiar framework of organisation.

Topography, affordances, and the ‘conceal and reveal’ mechanism

The topography of the Saqqara terrain was scrutinized within the digital representation. The terrain of South Saqqara appeared generally flatter and was permeated with less plateaus and escarpments, which differed substantially from North Saqqara. The terrain of the northern necropolis appears more undulating and riven with wadi valleys and escarpments. The latter features, it would appear, were the focus for the installation of the main sacred animal monuments—the Anubieion, Bubastieion, Serapeum Precinct and SAN, all of which maintained a relationship with this type of terrain. The use of escarpment elevations in the installation of sacred cult centres may be attributed, in part, to the visual impact that this arrangement of geological landform provides. The escarpment setting appears to afford superior visual significance to the monument through the juxtaposition of natural environment and artificial construction. Baines (2013, 44–45) suggests that natural formations provided a backdrop to human activity in Egyptian art, emphasising the focus of that activity and providing a canvas upon which activity was enacted, whilst Sullivan (2017, 1251) contends that visibility was important in the making and preservation of sacred space. The escarpments provided the canvas for the activities associated with the sacred animal cults at North Saqqara. Whilst the escarpments did not denote place, in and of themselves, they afforded place when combined with sacred structures. They anchored the sacred monuments in place, and offered familiarity between the monuments—a topographical correspondence communicating importance to an observer.

Escarpments and undulating terrain also assisted in the use of a visual performance mechanism designated the ‘conceal and reveal’. The employment of this topographic artifice permitted a monument to remain screened from view during approach and, when visual impact would engender an emotional response, the reveal would bring the

monument into focus. Promontories, escarpments and raised bedrock ridges/mounds were particularly employed for the task.

Escarpment formations appear to offer numerous affordances: screening, protection, visual impact, definition. This may be the reason that these landforms appear to have been desirable to the LP/EP architects at North Saqqara, and why the site of South Saqqara was eschewed for the construction of the sacred animal monuments. The application of the 'conceal and reveal' mechanism was reliant on the correct topographic affordances being available for exploitation, which at North Saqqara they were. In addition to the escarpments there were numerous lower lying areas of land, promontories and bedrock ridges, all which offered similar affordances. The convergence of affordances, i.e. where many potentialities were located spatially close to one another, is where the installation of sacred animal monuments are found. These locations not only emphasised the monuments, but offered other benefits.

Escarpments could be used to both delimit and enhance a monument. The escarpment upon which the Anubieion and Bubastieion are situated appears to lift the monumental enclosures up to the necropolis, guiding visitors and cult members alike to the sacred temples on the plateau terrace. The monumental enclosures connected the living land of the cultivation with the sacred land of the dead by traversing the steep escarpment which itself created a disconnect between these two aspects of existence. The escarpment afforded the enclosures high visibility at a distance, when approached from the east, emphasising their significance. Whereas the SAN was delimited by a natural geological enclosure comprising the escarpment and promontories into the Wadi Valley Road, which defined the placement of this temple complex. A similar situation was to be found at the Serapeum Precinct, situated within the wadi valley on low lying ground. Escarpment formations of the wadi valley delimited the eastern and western extents of the Serapeum dromos and enclosure, which spanned its width.

Each of the main sacred animal complexes appears to be positioned where a relationship with earlier tombs exists. The location of the Serapeum Precinct is predicated on the subterranean hypogea of the Apis bull, and in the wadi's eastern escarpment there were

earlier tomb vaults hewn into the rock-face. A similar situation was observed at the location of the SAN MTE. Rock-cut tomb vaults were carved into the escarpment face, which was also terraced at this location. Both the terraces and the tomb vaults afforded the SAN MTE builders with a premade level surface upon which to construct the temple enclosure, and ready-made burial chambers for sacred animal deposition. In the escarpment face under the main temple of the Bubastieion were several NK rock-cut tombs, some of which were reused for the deposition of sacred mummified cats.

The various geological landforms present at North Saqqara were employed in the interplay between terrain and monument to exploit the 'conceal and reveal' mechanism as a part of a visual performance. The approach to the Bubastieion south gate, for example, was made along a route set against the desert escarpment, which inclines slowly towards the great enclosure. The south gate would have been visible from a distance on the approach from Memphis, but was obscured when making a direct approach along the southern route by a rise in the terrain and a bedrock outcrop which projected into the pathway. This deception belied its true size and significance as an entrance to the necropolis. It was only after the bedrock outcrop was negotiated and a rise in the terrain ascended that the true size and nature of the gateway was revealed. The Serapeum Precinct and the SAN MTE benefitted from similar arrangements where topographic conditions were employed to create a visual spectacle. These acts of visual performance were accomplished only when approaching a monument from the significant direction, i.e. the direction in which procession would have occurred.

It appears that these affordances, both topographic and man-made may help provide an understanding of the installations of the sacred animal monuments and the position they occupy within the landscape. The convergence of affordances also appears to precede the emergence of another phenomenon, the node of entanglement.

Networks of movement and nodes of entanglement

In addition to topographic affordances, processional routeways provided networks of movement between monuments. These networks offered physical communication and

created a cohesion within the disparate complexes of the sacred animal funerary landscape. The pathways offered multiple uses from transit to the performance of procession and spectacle, and were intended to be encountered from a prescribed direction in relation to the location of a sacred monument. This dictated directionality of movement was constructed to engender an experience, often when employed with specific topographic affordances that were used to construct an interplay between the terrain and the monument.

Examination of the North Saqqara landscape would suggest that there was rarely a singular affordance at any given location, rather, many affordances were present and obtainable depending on situational and/or human requirements. When these affordances converged in a defined place and were exploited, a node of entanglement may be formed. The node comprises affordances and entanglement offered by topographic conditions, networks of movement, structures that defined place, and human requirement. The symbiotic relationship engendered by the entangled node perpetuated use and reuse and, over time, fixed place into the landscape. An interconnectedness existed between the monuments and the topography, communicated through networks of movement.

Networks of movement occurred between the main sacred animal monuments and their subsidiary features, uniting separate locations throughout the northern necropolis. Some provided primary access to sacred areas and acted as processional routeways, whilst others were secondary to the larger routes. The smaller pathways probably facilitated routine transit from one monument or area to another. The processional route of the Serapeum Way crossed the necropolis from east to west, communicating between life and the afterlife, a connection manifest in the landscape. In doing so, this ceremonial way passed amongst the ancient mastabas of earlier officials, which may have added the significance of ancestor biographies to the importance of the route. A similar situation was observed with the Wadi Valley Road, where ancient tombs were set either side of the valley. It must be noted however, that in a necropolis with such a density of burial features most paths would encounter previous tombs. Still, it does not diminish the importance that the earlier tombs conveyed to the sacred routes, though it is uncertain

whether some routes were chosen to benefit from their presence. In relation to the Wadi Valley Road, it is more likely that the route was chosen as a desirable place to locate one's tomb, and so a cyclical relationship was entered, whereby the importance of the road attracted tomb builders which increased the importance of the road.

The tombs adjacent to the Serapeum Way, through the affordance they may have provided towards the observation of the visual performances of procession, became entangled with the ceremonial route. Through this entanglement the tombs were conveyed from the past into the present, some of their former significance regained, no matter the years of decay they may have suffered. Again, a similar situation endured in the Wadi Valley Road, where large mastaba tombs either side of the valley were reused in the LP/EP as places of pilgrimage and for the burial of sacred animals. The importance of these networks of movement lies within their ability to communicate between the sacred animal monuments, often separated across expanses of terrain. Historicity of the networks imbues significance upon the routes, engendering an entangled symbiosis of use perpetuating use. Their roles in the performance of procession and ceremony strengthen the entangled relationship. The basic structure of the relationship is visualised in Figure 10.1 below.

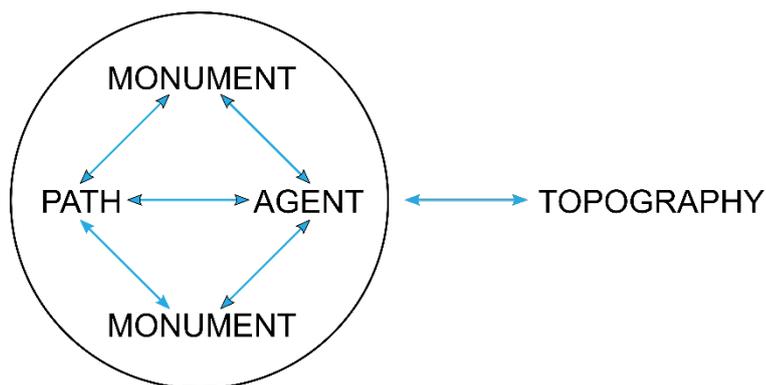


Figure 10.1. Basic structure of the entanglement relationship (source author).

The entangled relationship that coincides with the topography, upon which these actions take place, involves each of the components within the circle and modifies them, as they modify the topography. Transformations in topography through the imposition of

monuments and networks of movement may amend existing, and offer new, affordances. This entangled situation is continuous and subject to change.

Nodes of entanglement and networks of movement appear to possess an interdependent relationship. Where a network of movement leads, a node of entanglement may emerge. This production of nodes begins with the exploitation of affordances, where they converge and offer potentialities. The question arises: does an affordance lead to a network of movement which generates a node of entanglement, or does the affordance generate a node of entanglement which attracts a network of movement? At the North Saqqara necropolis, the convergence of affordances led to the installation of sacred monuments which necessitated the engagement with networks of movement, resulting in the emergence of nodes of entanglement. For example, a convergence of several affordances as described previously, led to the installation of the SAN MTE and subsidiary structures along the eastern boundary of the Wadi Valley Road. To accommodate access to the subsidiary structures and create direct communication with the Serapeum Precinct, a north-south connection was established. The monuments relied on the network for communication, and for the network to remain effective, it required use. A dynamic network brought activity to the monuments which brought activity to the network. This symbiosis supported the formation of a node of entanglement which maintained the interdependence, and this cyclical relationship perpetuated use, imposing new meanings on an ancient landscape.

Recommendations for future work

There are several possibilities for future work deriving from the digital data compiled and constructed through this study. Some recommendations are made below:

1. Investigate the possibilities for dissemination of the project's data, both as a functional GIS and the 3D digital representation. As a part of this approach it would be useful to adapt the 3D model to work within a games-engine environment, which would enable freedom of movement around the landscape without the need for expensive high-end software that might not be within the

availability of everyone. The benefit of allowing free movement within the landscape would be particularly suited to non-professionals who wish to better understand the necropolis, and LP/EP sacred animal monuments in Egypt, and permit the dissemination of information to a wider audience. For example, this type of easier-access research model could be applied within the education system as teaching tool to inspire the next generation of Archaeologists/Egyptologists, or used to communicate knowledge of the sacred landscape through an interactive environment to museum visitors.

2. Expand the digital representation terrain to include the river Nile and the Phchêt canal. Investigate the position of the Nile during the LP/EP to understand what affordances and/or constraints this may have offered the necropolis. Include LP/EP Memphis into the landscape representation. Doing so would offer a wider area for interpretation which would include the Ptah temple where the mummified Apis bull began its journey to the hypogea of the Serapeum.
3. A potential site with similar topographic conditions to the SAN MTE area was identified just to its south. It is at this location that Smith suggested that the tomb of the Rams may be located (Smith 2017 pers. comm.) which supports the suggestion that the topographic conditions may lend themselves to another sacred area in this place. This potentiality would benefit from investigation through archaeological intervention. Some work has already been undertaken in this area, when a stone platform was discovered that was presumed to date to the LP, but no further work progressed (Smith and Davies 1997, 118, see note 34). It would be germane to relocate and re-excavate this stone feature to determine its character and date. Additionally, the wider location around this feature would benefit from trial excavations to determine if there are more/related LP/EP monuments in spatial proximity.
4. A detailed investigation of the subterranean LP/EP features and their connection with the surface monuments and wider landscape would be advantageous. This was beyond the scope of this project but the data has been included in the GIS

and could be built into the 3D landscape representation without great difficulty. Understanding the subterranean burial complexes in relation to the terrain may afford new insights into their placement and offer suggestions for potential locations of undiscovered animal galleries.

5. A comprehensive map and guide to the North Saqqara necropolis is much needed for both archaeologists working in the field and the tourist industry alike. Through the application of the GIS this would be possible to achieve. The GIS can be employed to construct detailed maps for the area and its monuments, and the attribute database compiled during construction can be applied to provide useful information. For archaeologists, the maps could be made available electronically, as part of the GIS, through an online subscription service. This would allow updates and new data to be applied to the GIS, keeping it current and retaining its usefulness over time. For the tourist, they could be presented in print format as a part of a comprehensive guide to the necropolis. This guide could receive periodic updates through printed revisions. It would be possible to create detailed map pages for specific areas of the necropolis for sale to visitors which would enable them to understand the site that they are visiting.

Bibliography

Publications

Ago, F., Bresciani, E., and Giammarusti, A. (Eds). 2003. *The North Saqqara archaeological site: handbook for the environmental risk analysis*. Pisa: Università di Pisa.

Arnold, D. 1999. *Temples of the Last Pharaohs*. Oxford: Oxford University Press.

Arnold, D. 2003. *The Encyclopedia of Ancient Egyptian Architecture*. Cairo: American University in Cairo Press.

Assman, J. 1991. Das ägyptische Prozessionfest. In J. Assman and T. Sundermeier (Eds), *Das Fest und das Heilige: religiöse Kontrapunkte zur Alltagswelt*. Gütersloh: Gütersloher Verlagshaus G. Mohn. 105–122.

Baber, T. 2016. Ancient Corpses as Curiosities: Mummymania in the Age of Early Travel. *Journal of Ancient Egyptian Interconnections*, 8, 60–93.

Baines, J. 2013. *High Culture and Experience in Ancient Egypt*. Sheffield: Equinox Publishing Ltd.

Bard, K.A. 1999. *Encyclopedia of the Archaeology of Ancient Egypt*. London: Routledge.

Bard, K.A. 2015. *An introduction to the Archaeology of Ancient Egypt*. Chichester: John Wiley & Sons.

Bareš, L. 1999. *Abusir IV. The shaft tomb of Udjahorresnet at Abusir*. Prague: The Karolinum Press.

Bareš, L. 2008. *Abusir XVII: The shaft tomb of Iufaa*. Prague: Czech Institute of Egyptology, Faculty of the Arts, Charles University in Prague.

Bareš, L. 2011. *Abusir XXV: The shaft tomb of Menekhibnekau*. Prague: Czech Institute of Egyptology, Faculty of the Arts, Charles University in Prague.

Barrett, J.C., and Ko, I. 2009. A phenomenology of landscape. A crisis in British landscape archaeology? *Journal of Social Archaeology* 9 (3), 275–294.

Barsanti, A. 1900a. Tombeau de Petenisis. *Annales du Service des antiquités de l'Égypte* 1, 230–234.

Barsanti, A. 1900b. Les Tombeaux de Psammétique et de Setariban. *Annales du Service des antiquités de l'Égypte* 1, 161–166.

Barsanti, A. 1900c. Tombeau de Zannehibou. *Annales du Service des antiquités de l'Égypte* 1, 262–271.

Barsanti, A. 1901. Le Tombeau de Hikaoumsaf. *Annales du Service des antiquités de l'Égypte* 2, 69–78.

Barsanti, A. 1904. Tombeau de Péténéît. *Annales du Service des antiquités de l'Égypte* 4, 97–104.

Bárta, M., Černý, V., and Strouhal, E. 2001. *Abusir V. The cemeteries at Abusir South I*. Prague: Set Out.

Bárta, M. and Vachala, B. 2001. The Tomb of Hetepi at Abusir South. *Egyptian Archaeology* 19, 33–35.

Bárta, M., Bezděk, A., Černý, V., Ikram, S., Kočár, P., Křivánek, R., Kujanová, M., Pokorný, P., Reader, C., Sůvová, Z., Vlčková, P.M. 2009. *Abusir XIII. Abusir South 2. Tomb complex of the vizier Qar, his sons Qar Junior and Senedjemib, and Iykai*. Prague: Czech Institute of Egyptology, Faculty of the Arts, Charles University in Prague.

Bárta, M., Coppens, F. and Vymazalová, H., Kytnarová, K.A., Bezděk, A., Březinová, H., Cílek, V., Dvořák, M., Háva, J., Lang, M., Malá, P., Vlčková, P.M., Novák, J., Pokorná, A., Pokorný, P., Sůvová, Z., Varadzin, L. 2010. *Abusir XIX: Tomb of Hetepi (AS 20), Tombs AS 33–35 and AS 50–53*. Prague: Czech Institute of Egyptology, Faculty of the Arts, Charles University in Prague.

Bárta, M., Abe, Y., Kytnarová, K.A., Havelková, P., Hegrlík, L., Jirásková, L., Malá, P., Nakai, I., Novotný, V., Ogidani, E., Okoshi, A., Sůvová, Z., Uchinuma, M., Vymazalová, H. 2014. *Abusir XXIII. The tomb of the Sun Priest Neferinpu (AS 37)*. Prague: Czech Institute of Egyptology, Faculty of the Arts, Charles University in Prague.

Baudrillard, J. 1983. *Simulations*. New York: Semiotext[e]. Translated by Paul Foss, Paul Patton and Philip Beitchman.

Baudrillard, J. 1993. *Symbolic Exchange and Death*. London: Sage.

Bender, B. 1993. Introduction: Landscape - Meaning and Action. In B. Bender (Ed), *Landscape: politics and perspectives*. Providence: Berg. 1–17.

Bender, B. 2006. Place and Landscape. In C. Tilley, W. Keane, S. Kuechler, M. Rowlands and P. Spyer (Eds), *Handbook of Material Culture*. London: Sage. 303–314.

Box, G. E. P. and Draper, N. R. 1987. *Empirical Model-Building and Response Surfaces*. New York: John Wiley & Sons.

- Bresciani, E. 1978. L'Attività' Archaeologica in Egitto Dell'Università' di Pisa: Saqqara 1974–1977. *Egitto E Vicino Oriente* 1, 1–40.
- Bresciani, E. 2003. Memphis and the Saqqara Necropolis. In F. Ago, E. Bresciani, and A. Giammarusti (Eds), *The North Saqqara archaeological site: handbook for the environmental risk analysis*. Pisa: Università di Pisa. 61–73.
- Brown, K.M. 2010. *A pluralistic contextual approach for the interpretation of Egyptian archaeological sites*. Unpublished thesis.
- Brück, J. 1998. In the Footsteps of the Ancestors: A Critical Review of Christopher Tilley's "A Phenomenology of Landscape: Places, Paths, and Monuments." *Archaeological Review from Cambridge* 15 (1), 23–36.
- Brück, J. 2005. Experiencing the past? The development of a phenomenological archaeology in British prehistory. *Archaeological Dialogues* 12, 45–72.
- Buongarzone, R. 2003a. History of the Explorations. In E. Bresciani (Ed), *The North Saqqara Archaeological Site. Handbook for the environmental risk analysis*. Pisa: University of Pisa. 108–121.
- Buongarzone, R. 2003b. Archaeological Documentation and Egyptological Database. In E. Bresciani (Ed), *The North Saqqara Archaeological Site. Handbook for the environmental risk analysis*. Pisa: University of Pisa. 122–131.
- Burrough, P.A., McDonnell, R.A., and Lloyd, C.D. 1998. *Principles of Geographical Information Systems*. Oxford: Oxford University Press.
- Carlucci, R. 2003. Developing a New Cartography for the GIS System through the Archaeological Maps. In F. Ago, E. Bresciani, and A. Giammarusti (Eds), *The North Saqqara archaeological site: handbook for the environmental risk analysis*. Pisa: Università di Pisa. 236–257.
- Casey, E.S. 1996. How to get from Space to Place in a Fairly Short Stretch of Time. Phenomenological Prolegomena. In S. Feld, and K. Basso (Eds), *Senses of Place*. Santa Fe: School of American Research Press. 13–52.
- Chapman, H. 2006. *Landscape Archaeology and GIS*. Stroud: The History Press.
- Chemero, A. 2003. An outline of a theory of affordances. *Ecological Psychology* 15(2), 181–195.
- Cílek, V., Bárta, M., Lisá, L., Pokorná, A., Juříčková, L., Brůna, V., Mahmoud, A.M.A., Bajer, A., Novák, J. and Beneš, J. 2012. Diachronic development of the Lake of Abusir during the third millennium BC, Cairo, Egypt. *Quaternary International* 266, 14–24.

Conolly, J. and Lake, M. 2007. *Geographical Information Systems in Archaeology*. Cambridge: Cambridge University Press.

Coppens, F. 2009. *Abusir XX. Lesser Late Period Tombs at Abusir*. Prague: Czech Institute of Egyptology, Faculty of the Arts, Charles University in Prague.

Cosgrove, D.E. 1984. *Social Formation and Symbolic Landscape*. London: Croon Helm.

Couclelis, H. 1992. People manipulate objects (but cultivate fields): beyond the raster-vector debate in GIS. In A.U. Frank, I. Campari, and U. Formentini (Eds), *Theories and Methods of Spatio-Temporal Reasoning in Geographic Space*. Berlin: Springer-Verlag. 65–77.

Davenport, C and Voiculescu, I. 2014. *Mastering Autocad Civil 3D 2015: Autodesk Official Press*. Indianapolis, IN: John Wiley & Sons.

David, B. and Thomas, J. 2008. Landscape Archaeology: Introduction. In B. David and J. Thomas (Eds), *Handbook of Landscape Archaeology*. Walnut Creek, CA: Left Coast Press. 27–43.

Davies, S. 1998. Uncharted Saqqara : A Postscript. *The Journal of Egyptian Archaeology*, 84, 45–56.

Davies, S. 2006. *The Sacred Animal Necropolis at North Saqqara. The Mother of Apis and Baboon Catacombs. The Archaeological Report*. London: Egypt Exploration Society.

Davies, S. and Smith, H.S. 1997. Sacred Animal Temples at Saqqara. In S. Quirke (Ed), *The Temple in Ancient Egypt: new discoveries and recent research*. London: British Museum Press. 112–131.

Davies, S. and Smith, H.S. 2005. *The Sacred Animal Necropolis at North Saqqara. The Falcon Complex and Catacomb. The Archaeological Report*. London: Egypt Exploration Society.

de Bar, A. 1858. *L'illustration: Journal Universel*, 32. Paris : J.J. Dubochet.

de Morgan, J. 1897. *Carte de la nécropole Memphite, Dachour, Sakkarah, Abou-sir*. Paris.

Description. 1809–1826. *Description de l’Egypte*. Paris: Imperial Press.

Dodson, A. 2005. Bull Cults. In S. Ikram (Ed), *Divine Creatures. Animal Mummies in Ancient Egypt*. Cairo: The American University in Cairo Press. 72–105.

Dodson, A. 2016. Go west: on the ancient means of approach to the Saqqara Necropolis. In C. Price, R. Foreshaw, A. Chamberlain, and P.T. Nicholson (Eds), *Mummies, Magic and Medicine in Ancient Egypt. Multidisciplinary Essays for Rosalie David*. Manchester: Manchester University Press. 3–18.

- Dreyfus, H. and Kelly, S.D. 2007. Heterophenomenology: Heavy-handed sleight-of-hand. *Phenomenology and the Cognitive Sciences* 6(1-2), 45–55.
- Drummond, J.J. 2007. Phenomenology: Neither auto- nor hetero- be. *Phenomenology and the Cognitive Sciences* 6(1-2), 57–74.
- Duell, P. 1938. *The Mastaba of Mereruka. Part I*. Chicago: The University of Chicago Press.
- Earl, E. 2011. *The Ancient Lakes of Abusir*. Cambridge University Department of Earth Sciences: Unpublished Part III Independent Research Project.
- El-Khouli, A. 1973. Excavations East of the Serapeum at Saqqara. *The Journal of Egyptian Archaeology*, 59, 151–155.
- El-Khouli, A., and Kanawati, N. 1988. *Excavations at Saqqara II. North-west of Teti's Pyramid*. Sydney: Australian Centre for Egyptology.
- El Naggar, S. 1978. Etude Preliminaire du plan du Tombeau de Bocchoris a Saqqara. *Egitto E Vicino Oriente* 1, 41–59.
- Emery, W.B. 1958. *Excavations at Saqqara. Great Tombs of the First Dynasty, 3*. London: Egypt Exploration Society.
- Emery, W.B. 1965. Preliminary report on the excavations at North Saqqara, 1964–5, *Journal of Egyptian Archaeology* 51, 3–8.
- Emery, W.B. 1966. Preliminary report on the excavations at North Saqqara, 1965–6, *Journal of Egyptian Archaeology* 51, 3–8.
- Emery, W.B. 1967. Preliminary report on the excavations at North Saqqara, 1966–7, *Journal of Egyptian Archaeology* 51, 141–145.
- Emery, W.B. 1969. Preliminary report on the excavations at North Saqqara, 1968, *Journal of Egyptian Archaeology* 51, 31–35.
- Emery, W.B. 1970. Preliminary report on the excavations at North Saqqara, 1968–9, *Journal of Egyptian Archaeology* 56, 5–11.
- Emery, W.B. 1971. Preliminary report on the excavations at North Saqqara, 1969–70, *Journal of Egyptian Archaeology* 57, 3–13.
- Emery, W.B. 1972. *Archaic Egypt*. Harmondsworth: Penguin Books.
- Evans, C. 2004. Modelling Monuments and Excavations. In S, de Chadarevian and N, Hopwood (Eds), *Models. The Third Dimension of Science*. Stanford: Stanford University Press. 109–137.

Eve, S. 2014. *Dead Men's Eyes: Embodied GIS, Mixed Reality and Landscape Archaeology*. Oxford: Archaeopress. BAR British Series 600.

Feld, S. 1996. Waterfalls of Song: An Acoustemology of Place Resounding in Bosavi, Papua New Guinea. In S. Feld, and K. Basso (Eds), *Senses of Place*. Santa Fe: School of American Research Press. 91–135.

Feld, S. and Basso, K.H. 1996. Introduction. In S. Feld, and K. Basso (Eds), *Senses of Place*. Santa Fe: School of American Research Press. 3–11

Ferguson, H. 2001. Phenomenology and Social Theory. In G. Ritzer and B. Smart (Eds), *Handbook of social theory*. London: Sage. 232–248.

Firth, C.M. and Gunn, B. 1926. *Teti pyramid cemeteries. Volumes 1 and 2*. Le Caire: Imprimerie de l'Institut français d'archéologie orientale.

Fleming, A. 1999. Phenomenology and the Megaliths of Wales: A Dreaming Too Far? *Oxford Journal of Archaeology* 18 (2), 119–125.

Fleming, A. 2005. Megaliths and Post-Modernism: The Case of Wales. *Antiquity* 79, 921–932.

Freundschuh, S.M. and Egenhofer. M.J. 1997. Human conceptions of spaces: Implications for GIS. *Transactions in GIS* 2(4), 361–375.

Gaffney, V. and van Leusen, M. 1995. GIS, environment determinism and archaeology: a parallel text. In G. Lock, and Z. Stancic (Eds), *GIS in Archaeology: a European perspective*, 367–382. London: Taylor and Francis.

Goneim, M. Z. 1957. *Horus Sekhem-khet. The unfinished step pyramid at Saqqara*. Le Caire: Imprimerie de l'Institut Français d'Archéologie Orientale.

Gordon, I.E. 2004. *Theories of Visual Perception*. Hove: Taylor & Francis.

Gosling, J., Manti, P, and Nicholson, P.T. 2004. Discovery and conservation of a hoard of votive bronzes from the Sacred Animal Necropolis at North Saqqara. *PalArch* 2 (1), 1–12.

Giddy, L. 1992. *The Anubieion at Saqqâra II. The Cemeteries*. London: Egypt Exploration Society.

Gillings, M. 2012. Landscape Phenomenology, GIS and the Role of Affordance. *Journal of Archaeological Method and Theory* 19 (4), 601–611.

Gibson, J.J. 1979. *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin Company.

- Hamilton, S. and Whitehouse, R. 2006. Phenomenology in practice: towards a methodology for a 'subjective' approach. *European Journal of Archaeology* 9 (1), 31–71.
- Harvey, D. 1979. *Explanation in geography*. London: Arnold.
- Hicks, D. and Beaudry, M.C. 2010. *The Oxford Handbook of Material Culture Studies*. Oxford: Oxford University Press.
- Hodder, I. 2011. Human-thing entanglement: towards an integrated archaeological perspective. *Journal of the Royal Anthropological Institute* 17, 154–177.
- Hodder, I. 2012. *Entangled. An Archaeology of the Relationships between Humans and Things*. Chichester: Wiley-Blackwell.
- Howard, A. 2007. *Archaeological Surveying and Mapping. Recording and depicting the landscape*. London: Routledge.
- Imhof, E. 2007. *Cartographic Relief Presentation*. Redlands, California: ESRI Press.
- Ingold, T. 1992. Culture and the Perception of the Environment. In E. Croll, and D.J. Parkin (Eds), *Bush Base: Forest Farm: Culture, Environment, and Development*. London: Routledge. 39–56.
- Ingold, T. 1993. The Temporality of the Landscape. *World Archaeology* 25 (2), 152–174.
- Ingold, T. 2011. *Being alive: essays on movement, knowledge and description*. Oxon: Routledge.
- Jeffreys, D.G. 1985. *The Survey of Memphis I: The archaeological report*. London: Egypt Exploration Society.
- Jeffreys, D.G. and Smith, H.S. 1988. *The Anubieion at Saqqâra I. The Settlement and the Temple Precinct*. London: Egypt Exploration Society.
- Kahn, M. 1996. Your place and Mine: Sharing Emotional Landscapes in Wamira, Papua New Guinea. In S. Feld, and K. Basso (Eds), *Senses of Place*. Santa Fe: School of American Research Press. 137–166.
- Kanawati, N. 2006. *The Teti Cemetery at Saqqara, Volume VIII: The Tomb of Inumin*. Warminster: Aris and Phillips.
- Kanawati, N. 2010. *The Teti Cemetery at Saqqara, Volume IX: The Tomb of Remni*. Warminster: Aris and Phillips.
- Kanawati, N. and Abder-Raziq, M. 1998. *The Teti Cemetery at Saqqara. Volume III: The Tombs of Neferseshemre and Seankhuiptah*. Warminster: Aris and Phillips.

Kanawati, N. and Abder-Raziq, M. 1999. *The Teti Cemetery at Saqqara, Volume V: The Tomb of Hesi*. Warminster: Aris and Phillips.

Kanawati, N. and Abder-Raziq, M. 2000. *The Teti Cemetery at Saqqara, Volume VI: The Tomb of Nikausesi*. Warminster: Aris and Phillips.

Kanawati, N. and Abder-Raziq, M. 2001. *The Teti Cemetery at Saqqara, Volume VII: The Tombs of Shepsiptah, Mereri (Merinebti), Hefi and Others*. Warminster: Aris and Phillips.

Kanawati, N. and Abder-Raziq, M. 2004a. *Mereruka and His Family, Part I: The Tomb of Merytet*. Oxford: Aris and Phillips.

Kanawati, N. and Abder-Raziq, M. 2004b. *The Unis Cemetery at Saqqara. Volume II. The Tombs of Inefert and Ihy (reused by Idut)*. Warminster: Aris and Phillips.

Kanawati, N. and Abder-Raziq, M. 2008. *Mereruka and His Family, Part II: The Tomb of Waatetkhetor*. Oxford: Aris and Phillips.

Kanawati, N., El-Khouli, A., McFarlane, A., and Maksoud, N.V. 1984. *Excavations at Saqqara I. North-west of Teti's Pyramid*. Sydney: Australian Centre for Egyptology.

Kanawati, N. and Hassan, A. 1996. *The Teti Cemetery at Saqqara. Volume I: The Tombs of Nedjet-Em-Pet, Ka-Aper and Others*. Sydney: Australian Centre for Egyptology.

Kanawati, N. and Hassan, A. 1997. *The Teti Cemetery at Saqqara: Volume II: The Tomb of Ankhmahor*. Sydney: Australian Centre for Egyptology.

Kanawati, N., Woods, A., Shafik, S., and Alexakis, E. 2010. *Mereruka and His Family, Part III.1: The Tomb of Mereruka*. Oxford: Aris and Phillips.

Kanawati, N., Woods, A., Shafik, S., and Alexakis, E. 2011. *Mereruka and His Family, Part III.2: The Tomb of Mereruka*. Oxford: Aris and Phillips.

Kant, I. 1855. *The Critique of Reason*. London: Henry G. Bohn. Translated by J.M.D. Meiklejohn.

Kemp, B.J. 1995. How religious were the ancient Egyptians? *Cambridge Archaeological Journal* 5(1), 25-54.

Kemp, B.J. 2006. *Ancient Egypt. Anatomy of a Civilization*. London: Routledge.

Kessler, D. 1989. *Die Heiligen Tiere und der König. Teil 1, Beiträge zu Organisation, Kult und Theologie der spätzeitlichen Tierfriedhöfe*. Wiesbaden: Otto Harrassowitz.

- Kessler, D. 1998. Tanis and Thebes – The Political History of the Twenty-first to Thirtieth Dynasties, In R. Schulz and M. Seidel (Eds), *Egypt. The World of the Pharaohs*. Köln: Könnemann. 270–275.
- Kimerling, A.J. 1996. Geographic Information Systems and cartography. In R.W. Anson and F.J. Ormeling (Eds), *Basic Cartography: For Students and Technicians: 3*. London: Elsevier.
- Kotob, A.H., Helmy, M., Buongarzone, R., Carlucci, R., Giammarusti, A. and Morsilli, R.M.I. 2003. Atlas of New Cartography. In A. Ago, E. Bresciani and A. Giammarusti (Eds), *The North Saqqara Archaeological Site. Handbook for the environmental risk analysis*. Pisa: University of Pisa. 317–341.
- Lauer, J-P. 1976. *Saqqara. The Royal Cemetery of Memphis. Excavations and Discoveries since 1850*. London: Thames and Hudson.
- Lazzari, M. 2005. The Texture of Things: Objects, People, and the Landscape in Northwest Argentina (First Millennium A.D.). In L. Meskell (Ed), *Archaeologies of Materiality*. Oxford: Blackwell Publishing. 126–161.
- Legras, B. 2011. Les reclus grecs du Sarapieion de Memphis. Une enquête sur l'hellénisme égyptien. *Studia Hellenistica* 49. Leuven: Peeters Publishers.
- Lehner, M. 2008. *The Complete Pyramids*. London: Thames and Hudson.
- Lepsius, R. 1849. *Denkmäler aus Aegypten und Aethiopien*. Abth. I. Bl. 32, 33, 34.
- Llobera, M. 1996. Exploring the topography of mind: GIS, social space and archaeology. *Antiquity* 70. 612–622.
- Llobera, M. 2012. Life on a Pixel: Challenges in the Development of Digital Methods within an “Interpretive” Landscape Archaeology Framework. *Journal of Archaeological Method and Theory* 19 (4). 495–509.
- Lloyd, A.B. 1983. The Late Period, 664–323 BC. In B.G. Trigger, B.J. Kemp, D. O’Conor and A.B. Lloyd (Eds), *Ancient Egypt. A Social History*. Cambridge: Cambridge University Press. 279–348.
- Lloyd, A.B. 2000a. The Late Period (664–323 BC). In I. Shaw (Ed), *The Oxford History of Ancient Egypt*. Oxford: Oxford University Press. 369–394.
- Lloyd, A.B. 2000b. The Ptolemaic Period (332–30 BC). In I. Shaw (Ed), *The Oxford History of Ancient Egypt*. Oxford: Oxford University Press. 395–421.
- Longley, P.A., Goodchild, M.F., Maguire, D.J., and Rhind, D.W. 2011. *Geographic information systems & science*. Hoboken, NJ: Wiley.

Lombardo, T.J. 1987. *The Reciprocity of Perceiver and Environment*. Hillsdale, New Jersey: Lawrence Erlbaum Associates, Inc, Publishers.

Loret, V. 1899. Fouilles dans la Necropole Memphite. *Bulletin de l'Institut Egyptien*, Ser 10 iii. Alexandrie: Mourès et Perrin.

Lyotard, J-F. 1991. *Phenomenology*. Albany: State University of New York Press.

Macramallah, R. 1940. *Un Cimetière Archaïque de la Classe Moyenne du Peuple à Saqqarah*. Le Caire: Imprimerie Nationale.

Malek, J. 1997. The Temples at Memphis. Problems Highlighted by the EES Survey. In S.Quirke (Ed), *The temple in ancient Egypt: new discoveries and recent research*. London: British Museum Press. 90–101.

Malpas, J. 1999. *Place and Experience. A Philosophical Topography*. Cambridge University Press: Cambridge.

Maragioglio, V. and Rinaldi, C. 1962. *Notizie sulle piramidi di Zedefrà, Zedkara Isej, Teti*. Torino: Artale.

Mariette, A. 1856. *Choix de monuments et de dessins découverts ou exécutés pendant le déblaiement du Sérapeum de Memphis*. Paris: Gide et J. Baudry.

Mariette, A. 1882. *Le Sérapeum de Memphis*. Paris : Gide.

Mariette, A. 1889. *Les Mastaba de l'Ancien Empire*. Paris.

Martin, C.J. 2009. *Demotic papyri from the Memphite Necropolis in the collections of the National Museum of Antiquities in Leiden, the British Museum and the Hermitage Museum*. Turnhout: Brepols.

Martin, G.T. 1973. Excavations in the Sacred Animal Necropolis at North Saqqâra, 1971–2: Preliminary Report, *Journal of Egyptian Archaeology* 59, 5–15.

Martin, G.T. 1974. Excavations in the Sacred Animal Necropolis at North Saqqâra, 1972–3: Preliminary Report, *Journal of Egyptian Archaeology* 60, 15–29.

Martin, G.T. 1981. *The Sacred Animal Necropolis at North Saqqara. The Southern Dependencies of the Main Temple Complex*. London: Egypt Exploration Society.

Martin, G.T. 1991. *The Hidden Tombs of Memphis. New Discoveries from the Time of Tutankhamun and Ramesses the Great*. London: Thames and Hudson.

Mathieson, I., Bettles, E., Dittmer, J., and Reader, C. 1999. The National Museums of Scotland Saqqara Survey Project, Earth Sciences 1990–1998. *The Journal of Egyptian Archaeology*, 85, 21–43.

- Mathieson, I. and Dittmer, J. 2007. The Geophysical Survey of North Saqqara, 2001–7. *The Journal of Egyptian Archaeology*, 93, 79–93.
- Merleau-Ponty, M. 1962. *Phenomenology of Perception*. London: Routledge and Kegan Paul.
- Meskel, L. 1999. *Archaeologies of social life: Age, Sex, Class et cetera in Ancient Egypt*. Oxford: Blackwell.
- Meskel, L. 2003. *Embodied lives: figuring ancient Maya and Egyptian experience*. London: Routledge.
- Meskel, L. 2004. *Object worlds in ancient Egypt: material biographies past and present*. Oxford: Berg.
- Meskel, L. 2005. *Archaeologies of Materiality*. Oxford: Blackwell.
- Mills, S. 2014. *Auditory Archaeology. Understanding Sound and Hearing in the Past*. Walnut Creek, CA: Left Coast Press Inc.
- Minutoli, H.F. von. 1824. *Reise zum Tempel des Jupiter Ammon in der Libyschen Wüste und nach Ober Aegypten in den Jahren 1820 und 1821. Volume 1*. Berlin: August Rücker.
- Moran, D. *Introduction to Phenomenology*. London: Routledge.
- Murray, M, A. 1905. *Saqqara Mastabas. Part I*. London: Bernard Quaritch.
- Murray, M, A. 1937. *Saqqara Mastabas. Part II*. London: Bernard Quaritch.
- Navrátilová, H. 2007. *The Visitors' Graffiti of Dynasties XVIII and XIX in Abusir and Northern Saqqara*. Prague: Czech Institute of Egyptology.
- Nicholson, P.T. 1994. Preliminary Report on Work at the Sacred Animal Necropolis, North Saqqara, 1992, *Journal of Egyptian Archaeology* 80, 1–10.
- Nicholson, P.T. 2005. The Sacred Animal Necropolis at North Saqqara. The Cults and Their Catacombs. In S. Ikram (Ed), *Divine Creatures. Animal Mummies in Ancient Egypt*. Cairo: The American University in Cairo Press. 44–71.
- Nicholson, P.T. 2016. The Sacred Animal Necropolis at North Saqqara: Narrative of a Ritual Landscape. In C. Price, R. Foreshaw, A. Chamberlain, and P.T. Nicholson (Eds), *Mummies, Magic and Medicine in Ancient Egypt. Multidisciplinary Essays for Rosalie David*. Manchester: Manchester University Press. 19–31.
- Nicholson, P.T. In press. The North Ibis Catacomb at Saqqara. In S. Porcier, S. Ikram and S. Pasquali (Eds.) *Creatures of Earth, Water and Sky: Proceedings of the International Symposium of Animals in Ancient Egypt*. Amsterdam: Sidestone Press.

Nicholson, P.T. In preparation. *The Sacred Animal Necropolis at North Saqqara: The North Ibis Catacomb: The Archaeological Report*. London: Egypt Exploration Society.

Nicholson, P.T., Harrison, J., Ikram, S., Earl, E., and Qin, Y. 2013. Geoarchaeological and environmental work at the Sacred Animal Necropolis, North Saqqara, Egypt. *Studia Quaternaria* 30 (2), 83–89.

Nicholson, P.T., Ikram, S., and Mills, S. 2015. The Catacombs of Anubis at North Saqqara. *Antiquity* 89 (345), 645–661.

Nicholson, P.T. and Smith, H.S. 1996. An unexpected cache of bronzes. *Egyptian Archaeology* 9, 18.

Norman, D.A. 1999. Affordance, conventions, and design. *Interactions* 6 (3), 38–43.

Norman, D.A. 2013. *The Design of Everyday Things*. Cambridge, MA: MIT Press.

Popper, K.R. 1972. *Conjectures and Refutations: the growth, of scientific knowledge*. London: Routledge & K. Paul.

Porter, B. and Moss, R.L.B. 1981. *Topographical Bibliography of Ancient Egyptian Hieroglyphic Texts, Reliefs and Paintings. III². Memphis. Part 2 Saqqara to Dashur*. Oxford: Ashmolean Museum.

Quibell, J.E. 1907. *Excavations at Saqqara (1905–1906)*. Le Caire: Imprimerie de l'Institut français d'archéologie orientale.

Quibell, J.E. and Hayter, A.G.K. 1927. *Excavations at Saqqara: Teti pyramid, north side*. Le Caire: Imprimerie de l'Institut français d'archéologie orientale.

Raven, M. 2011. *The Memphite tomb of Horemheb: commander in chief of Tut'ankhamun. V, The forecourt and the area south of the tomb with some notes on the tomb of Tia*. Belgium: Brepols.

Ray, J.D. 1972. The House of Osorapis. In P.J. Ucko, R. Tringham and G.W. Dimbleby (Eds), *Man, settlement and urbanism*. Gloucester: Duckworth. 699–704.

Ray, J.D. 1976. *The Archive of Hor*. London: The Egypt Exploration Society.

Ray, J.D. 1978. The World of North Saqqara. *World Archaeology* 10, (2), 149–157.

Ray, J.D. 2001. *Reflections of Osiris. Lives from Ancient Egypt*. London: Profile Books.

Reader, C. 2004. On Pyramid Causeways. *The Journal of Egyptian Archaeology* 90, 63–71.

Reich, N.J. 1933. New Documents from the Serapeum of Memphis. *Mizraim* 1, 9–129.

Reisner, G.A. 1936. *The development of the Egyptian tomb down to the accession of Cheops*. Connecticut: Storrs-Mansfield.

- Rhoné, A. 1877. *L'Égypte à petites journées. Études et souvenirs*. Paris.
- Roy, J-M. 2007. Heterophenomenology and phenomenological skepticism. *Phenomenology and the Cognitive Sciences* 6(1-2), 1–20.
- Saad, Z. 1947. *Royal Excavations at Saqqara and Helwan (1941–1945)*. Le Caire: Institut Français d'Archéologie Égyptienne.
- Schama, S. 1995. *Landscape and Memory*. London: Harper Collins.
- Seidlmayer, S. 1998. 'The rise of the state to the second dynasty'. In R. Schultz and M. Seidel (Eds), *Egypt. The World of the Pharaohs*. Köln: Könemann. 24–39.
- Shaw, I. and Nicholson, P.T. 2008. *The Princeton Dictionary of Ancient Egypt*. Princeton: Princeton University Press.
- Smith, D.W. and Thomasson, A.L. 2005. *Phenomenology and philosophy of mind*. Oxford: Clarendon Press.
- Smith, H.S. 1972. Society and settlement in ancient Egypt. In P.J. Ucko, R. Tringham and G.W. Dimbleby (Eds), *Man, settlement and urbanism*. Gloucester: Duckworth. 705–719.
- Smith, H.S. 1974. *A visit to ancient Egypt: life at Memphis & Saqqara, c. 500–30 B.C.* Warminster: Aris & Phillips.
- Smith, H.S. 1975. Saqqara: Late Period, in W. Helck and E. Otto (Eds), *Lexikon der Ägyptologie*, V. Wiesbaden: Harrassowitz. 412–28.
- Smith, H.S. 1976. Preliminary Report on Excavations in the Sacred Animal Necropolis, Season 1974-1975, *Journal of Egyptian Archaeology* 62, 14–17.
- Smith, H.S. 1981. À l'ombre d'Auguste Mariette [avec un dépliant]. *Bulletin de l'Institute Français d'Archéologie Orientale* 81.1, 331–339.
- Smith, H.S., Davies, S., Frazer, K. 2006. *The Sacred Animal Necropolis. The Main Temple Complex. The Archaeological Report*. London: Egypt Exploration Society.
- Smith, H.S. and Jeffreys, D.G. 1977. The Sacred Animal Necropolis, North Saqqâra: 1975/6, *Journal of Egyptian Archaeology* 63, 20–28.
- Smith, W.M.S. 1936. Appendix C. Topography of the Old Kingdom cemetery at Saqqarah. In G.A.Reisner, *The development of the Egyptian tomb down to the accession of Cheops*. Connecticut: Storrs-Mansfield. 390–413.
- Snape, S. 2014. *The Complete Cities of Ancient Egypt*. London: Thames and Hudson.

- Sowada, K., Callaghan, T. and Bentley, P. 2000. *The Teti Cemetery at Saqqara. Volume IV: Minor Burials and Other Material*. Warminster: Aris and Phillips.
- Spalinger, A. 1998. The Limitations of Formal Ancient Egyptian Religion. *Journal of Near Eastern Studies* 57 (4), 241–260.
- Spencer, A.J. 1974. Researches on the topography of Saqqara. *Orientalia N.S.* 43, 1-11 + TAB.
- Stammers, M. 2009. *The Elite Late Period Egyptian Tombs of Memphis*. Oxford: Archaeopress. BAR International Series 1903.
- Sullivan, E. 2017. Seeking a Better View: Using 3D to Investigate Visibility in Historic Landscapes. *Journal of Archaeological Method and Theory* 24 (4), 1227–1255.
- Tawfik, S. 1990. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. *Mitteilungen des Deutschen Archäologischen Instituts* 47, 403–409.
- Taylor, J. 2000. The Third Intermediate Period (1069–664 BC). In I. Shaw (Ed), *The Oxford History of Ancient Egypt*. Oxford: Oxford University Press. 330–368.
- Thompson, D.J. 2012. *Memphis Under the Ptolemies. Second Edition*. Princeton: Princeton University Press.
- Thomas, J. 2004. *Archaeology and modernity*. London: Routledge.
- Thomas, J. 2008. Archaeology, landscape and dwelling. In B. David & J. Thomas (Eds), *Handbook of landscape archaeology*. Walnut Creek: Left Coast Press. 300–306.
- Tilley, C. 1994. *A phenomenology of landscape: places, paths, and monuments*. Oxford: Berg.
- Tilley, C. 2004. *The materiality of stone: explorations in landscape phenomenology*. Oxford: Berg.
- Tilley, C. 2006. Identity, Place, Landscape and Heritage. *Journal of Material Culture*, 11(1/2), 7–32.
- Tilley, C. 2010. *Interpreting landscapes: explorations in landscape phenomenology 3*. Walnut Creek: Left Coast Press.
- Tringham, R., Ashley, M. and Mills, S. 2007. *Senses of Places: Remediations from text to digital performance*. Online: <https://chimeraspider.wordpress.com/2007/09/19/remediated-places-final-draft/>. Accessed on 14/05/15.

- Tuan, Y. 2007. *Space and Place. The Perspective of Experience*. Minneapolis: University of Minnesota Press.
- Ucko, P. (Ed), 2003. *The Wisdom of Egypt: Changing Visions through the Ages*. London: UCL.
- Underwood and Underwood. 1911. *Travel within reach of all by the Underwood travel system*. New York.
- Vymazalová, H., Kytnarová, K.A., Beneš, J., Bezděk, A., Březinová, H., Pokorná, A., Sůvová, Z., Šuláková, H., Varadzin, L., Malá, P.Z. 2011. *Abusir XXII. The tomb of Kaiemtjenenet (AS38) and the surrounding structures (AS 57–60)*. Prague: Czech Institute of Egyptology, Faculty of the Arts, Charles University in Prague.
- Vyse, R.W.H. 1840a. *Operations carried out on the pyramids of Gizeh in 1837: with an account of a voyage into Upper Egypt, and an appendix. VOL. I*. London: James Fraser.
- Vyse, R.W.H. 1840b. *Operations carried out on the pyramids of Gizeh in 1837: with an account of a voyage into Upper Egypt, and an appendix. VOL II*. London: James Fraser.
- Vyse, R.W.H. 1842. *Appendix to Operations carried out on the pyramids of Gizeh in 1837, containing a survey by J.S.Perring Esq. Civil Engineer, of the pyramids at Abu Roash, and those to the southward, including those in the Faiyoum. VOL III*. London: John Weale.
- Wheatley, D. and Gillings, M. 2002. *Spatial Technology and Archaeology. The Archaeological Applications of GIS*. London: Taylor and Francis.
- Wheatley, D. 2004. Making space for an archaeology of place. *Internet archaeology* 15, <http://intarch.ac.uk/journal/issue15/10/toc.html>. Accessed on 14/05/15.
- Wilkinson, T. 2008. *Dictionary of Ancient Egypt*. London: Thames and Hudson.
- Williams, S. 2010. *Analysis of the possible location of an archaic monumental entrance to the larger northerly dog catacomb, situated at the eastern edge of the North Saqqara plateau*. Unpublished report.
- Williams, S. 2012. *Finding Saqqara. Cartographic accuracy in the survey history of the necropolis*. Unpublished dissertation.
- Williams, S. 2014. *Longford Rising Main Sewer, Gloucester. Archaeological Watching Brief*. Unpublished report.
- Worboys, M. and Duckham, M. 2004. *GIS: A Computing Perspective*. Boca Raton: CRC Press.
- Wruszczak, K. 2016. *Saqqara DEM analysis*. Unpublished report.

Young, A. 1998. Perceiving social and physical environments. In B. Cartledge (Ed), *Mind, Brain, and the Environment. The Linacre Lectures 1995-6*. Oxford: Oxford University Press. 72-106.

Yoshimura, S., Kawai, N., and Kashiwagi, H. 2005. A Sacred Hillside at Northwest Saqqara: A Preliminary Report on the Excavations 2001–2003. *Mitteilungen des Deutschen Archäologischen Instituts* 61, 361–402.

Yoshimura, S., and Takamiya, I.H. 2000. Waseda University excavations at North Saqqara from 1991 to 1999. In M. Bárta and J. Krejčí (Eds), *Abusir and Saqqara in the year 2000*. Prague: Academy of Sciences of the Czech Republic. 161–172.

Zahavi, D. 2007. Killing the straw man: Dennett and phenomenology. *Phenomenology and the Cognitive Sciences* 6(1–2), 21–43.

Zivie, A. 1983. *Les tombes de la falaise du Bubasteion à Saqqarah: tombes d'importants personnages, nécropole de chats, la falaise du Bubasteion est décidemment riche en enseignements et en surprises de toutes sortes*. Paris: Centre National de la Recherche Scientifique.

Zivie, A. 2009. *La tombe de Maïa. Mère nourricière du roi Toutânkhamon et grande du harem*. Toulouse: Caracara Edition.

Zivie, A. 2013. *La tombe de Thoutmes, directeur des peintres dans la place de Maât*. Toulouse: Caracara Edition.

Cartography

Cairo 1978. *Ministère de l'Habitat et de la Reconstruction* (MHR) Topographic Series 1:5000 Scale Sheet H:21.

Cairo 1978. *Ministère de l'Habitat et de la Reconstruction* (MHR) Topographic Series 1:5000 Scale Sheet H:22.

Cairo 1978. *Ministère de l'Habitat et de la Reconstruction* (MHR) Topographic Series 1:5000 Scale Sheet H:23.

Online

AutoCAD Civil 3D online help.

<http://help.autodesk.com/view/CIV3D/2015/ENU/?guid=GUID-FCCAF28A-506B-4773-9706-DD1F1F8CC933>. Accessed 27.04.15.

AutoCAD Map 3D online help.

<http://help.autodesk.com/view/MAP/2015/ENU/?guid=GUID-9418DA23-9260-4092-8D56-FE6429A9D667> .Accessed 22.04.15

Oxford English Dictionary. <http://www.oed.com/>. Accessed 20/03/2015.

Visualising a complex ritual landscape

Gaining a new perspective on the Late Period/Early Ptolemaic sacred landscape of North Saqqara through the application of digital technologies

Volume 2

Scott Andrew Williams

Thesis submitted to Cardiff University

School of History, Archaeology and Religion

in fulfilment of the degree of Doctor of Philosophy in Archaeology

May 2018

Appendix 1

Glossary and Abbreviations¹

Anubieion A LATE PERIOD enclosure with temple dedicated to Anubis. Situated on the desert escarpment west of the cultivation.

Apis Sacred bull representing the physical manifestation of Ptah.

ArcGIS GIS software for working with geographic data and maps.

AutoCad Civil 3D CAD software for civil infrastructure design.

AutoCad Map 3D CAD software which incorporates design and GIS data.

Baboon Catacombs Subterranean galleries where mummified baboons were interred. Part of the SACRED ANIMAL NECROPOLIS MAIN TEMPLE ENCLOSURE.

Batter Receding slope of a wall or exterior surface.

Baudrillardian After Jean Baudrillard, a French philosopher and sociologist.

Breaklines Affect interpolation of data which determines the shape of a model and can be used to define such features as ridges, pathways, streams.

Bubastieion A LATE PERIOD enclosure with temple dedicated to Bastet. Situated to the south of the ANUBIEION.

¹ Cross references are formatted in SMALL CAPS.

CAD Computer Aided Design. For software see AUTOCAD MAP 3D, AUTOCAD CIVIL 3D and INFRAWORKS.

Cat Catacombs Area of NEW KINGDOM rock-cut tombs within the Bubastieion enclosure wherein mummified cats are interred.

Contours Describe the structure of the ground surface through joining points of equal elevation (Howard 2007, 126).

Dog Catacombs Subterranean burial tunnels situated to the north of the ANUBIEION. Used to the deposit mummified dogs.

DGPS Differential Global Positioning Systems.

DEM Digital Elevation Model.

DTM Digital Terrain Model.

Falcon Catacombs Subterranean galleries where mummified hawks were interred. Part of the SACRED ANIMAL NECROPOLIS MAIN TEMPLE ENCLOSURE.

GCS Global Coordinate System

Georeference Situate data within geographic space with reference to a specific coordinate system (Wheatley and Gillings 2002, 26).

GIS Geographical Information System. For software see ARCGIS.

GPR Ground Penetrating Radar.

GPS Global Positioning Systems.

GRS Geodetic Reference System.

Infraworks Infrastructure planning and visualisation software.

Isoline See CONTOUR.

Lake of Pharaoh A body of water to the north of the Saqqara necropolis, which may have been partly seasonal. The presumed breeding area for the Ibis birds.

Late Period* (747–332 BC) The last pharaonic phase of ancient Egypt.

LP/EP LATE PERIOD/Early PTOLEMAIC PERIOD.

Main Temple Enclosure The central temple compound within the SACRED ANIMAL NECROPOLIS, wherein are situated the shrines and catacombs of the Mothers of Apis, Baboons, and Falcons. Abbreviated to MTE. See also SACRED ANIMAL NECROPOLIS.

Mastaba tomb Generally trapezoidal tomb structures constructed from mud brick and/or limestone.

MHR Ministère de l'Habitat et de la Reconstruction.

Mother of Apis The mother of the sacred Apis bull.

New Kingdom* (1550–1069 BC) Historical phases of pharaonic rule comprising the 18th to 20th Dynasties.

North Ibis Catacombs The northern group of subterranean galleries used to inter mummified Ibis birds.

OA Oxford Archaeology.

Old Kingdom* (2686–2181 BC) Historical phases of pharaonic rule comprising the 3rd to 6th Dynasties.

OSS Open Source Software—software that is generally frequently free of charge and developed by authors who make the code publicly available.

P&M Porter and Moss topographical bibliography.

Pastophoria Apartments for priests and servants.

Proprietary software Non-free software whose code is not freely available and under the terms of a license agreement may not be modified, adapted, copied or shared.

Ptolemaic Period* (332–30 BC) Period of governance of Hellenistic rulers. Also taken to include the Macedonian Period (332–305 BC) governed by Alexander the Great (332–323 BC), Phillip Arrhidaeus (323–317 BC) and Alexander IV (317–310 BC).

RMS Root Mean Square.

Rubber Sheeting Adjustment of a set of data in a non-uniform way, based on the movement of known control points to new locations.

Sacred Animal Necropolis The area towards the north of the Saqqara necropolis where numerous animal catacombs are located. Abbreviated to SAN. Includes the NORTH and SOUTH IBIS CATACOMBS, the SOUTHERN DEPENDENCIES, the NORTH-SOUTH SACRED WAY, and the WADI VALLEY ROAD. See also MAIN TEMPLE ENCLOSURE.

Saite Period* (664–525 BC) Term applied to the 26th Dynasty whose kings originated from Sais.

Serapeum Dromos Begins at the end of the SERAPEUM WAY and leads west to the SERAPEUM ENCLOSURE. Part of the wider SERAPEUM PRECINCT. Flanked by temples, shrines and PASTOPHORIA.

Serapeum Enclosure The walled enclosure at the western end of the SERAPEUM DROMOS. Encompasses the main temple and hypogea of the Apis bull.

Serapeum Precinct Situated at the western terminus of the SERAPEUM WAY, comprising the SERAPEUM DROMOS and the SERAPEUM ENCLOSURE, wherein the temple was situated.

Serapeum Way The sphinx-flanked sacred ceremonial route that passed from the lower terraces of the cultivation, through the ANUBIEION and continued across the desert to the hypogea of the Apis bulls beneath the main temple within the SERAPEUM ENCLOSURE.

SGSP Scottish Geophysical Survey Project.

South Ibis Catacombs The southern group of subterranean galleries used to inter mummified Ibis birds.

Southern Dependencies An area of shrines and temple platforms to the south of the MAIN TEMPLE ENCLOSURE. Access from the MAIN TEMPLE ENCLOSURE south gate via the NORTH-SOUTH SACRED WAY.

Spot Height Elevation Cartographically significant points that have a recorded elevation.

STRM Shuttle Radar Topographic Mission.

TIN Triangular Irregular Network.

UCL University College London.

UoP University of Pisa.

VRML Virtual Reality Mark-up Language.

Wadi Valley Road The principle access route into the necropolis (Dodson 2016, 6). Leads south into the necropolis from the LAKE OF PHARAOH.

* All chronology follows Shaw and Nicholson (2008: 350–352).

Egyptian place-names

ḥh-t3wy The Memphite necropolis.

ḥwy-n-ḥtp n 3st t3 mwt n Ḥp Subterranean burial galleries for the MOTHER OF APIS.

ḥwy-n-ḥtp n n3 iwiw DOG CATACOMBS.

ḥwy-n-ḥtp n n3 miw CAT CATACOMBS.

ḥwy-n-ḥtp n p3 ḥn BABOON CATACOMB.

ḥwy-n-ḥtp n p3 bik FALCON CATACOMBS.

ḥwy-n-ḥtp n p3 hb NORTH IBIS/SOUTH IBIS CATACOMBS.

Ḥftḥ SERAPEUM DROMOS.

Ḥft-ḥr SERAPEUM WAY.

Ḥp-nb.s The area of the SACRED ANIMAL NECROPOLIS.

P3 inḥy ḥr p3 hb p3 bik Courtyard of the Ibis and the Falcon. Within the SOUTHERN DEPENDENCIES.

P3 šī n Pr-ḥi LAKE OF PHARAOH.

Pr-B3stt BUBASTIEION.

Pr-hn-īnp ANUBIEION.

Pr-wḥb-nb.s Area within *Hḥ-nb.s*. possibly the catacombs of the Ibis and Hawks.

Pr-Ḥsir Abusir.

Pr-Ḥsir-Hḥ Area of the SERAPEUM PRECINCT.

Sbtt n 3st Compound of Isis. Northern Enclosure of the MAIN TEMPLE ENCLOSURE.

Appendix 2

GIS map book and attribute data

The following appendix presents a map book of the North Saqqara necropolis and catalogues the attribute data compiled during the construction of the GIS. The map book is presented as a collection of twelve sheets, each depicting a 1km grid square of the area. The GIS attribute tables following the map book relate to the features on the map.

The necropolis monuments were separated into groups defined by their attribute field requirements. The general archaeological features—mastaba tombs, pyramids, rock-cut tombs—required generic attribute fields to store the data, whereas the LP/EP monuments and the Sacred Animal Necropolis had specific field requirements which did not easily correspond. Therefore, to avoid producing a cumbersome attribute table, separate data tables were compiled.

Map book

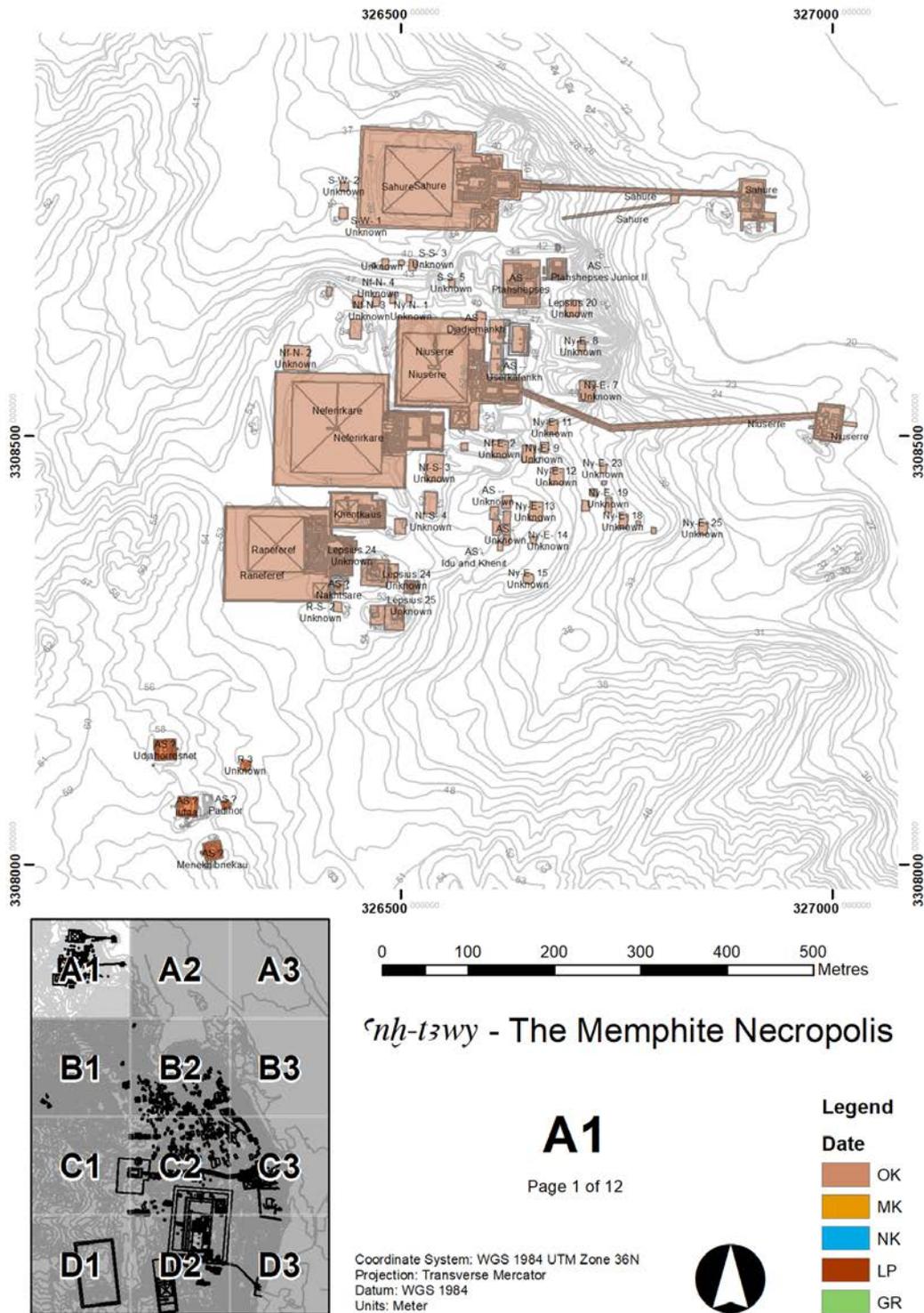


Figure A2.1. Map book sheet A1 (source author).

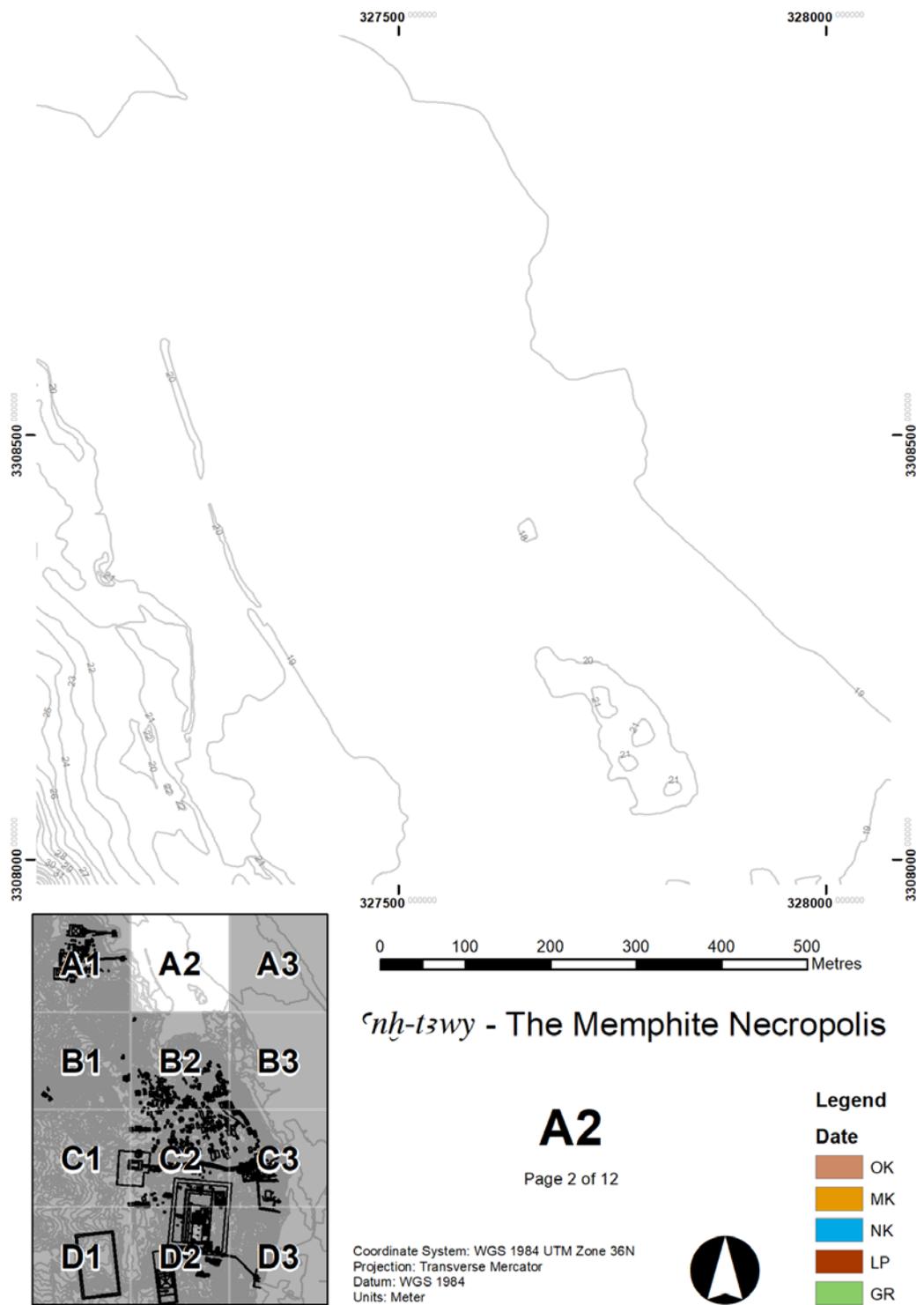


Figure A2.2. Map book sheet A2 (source author).

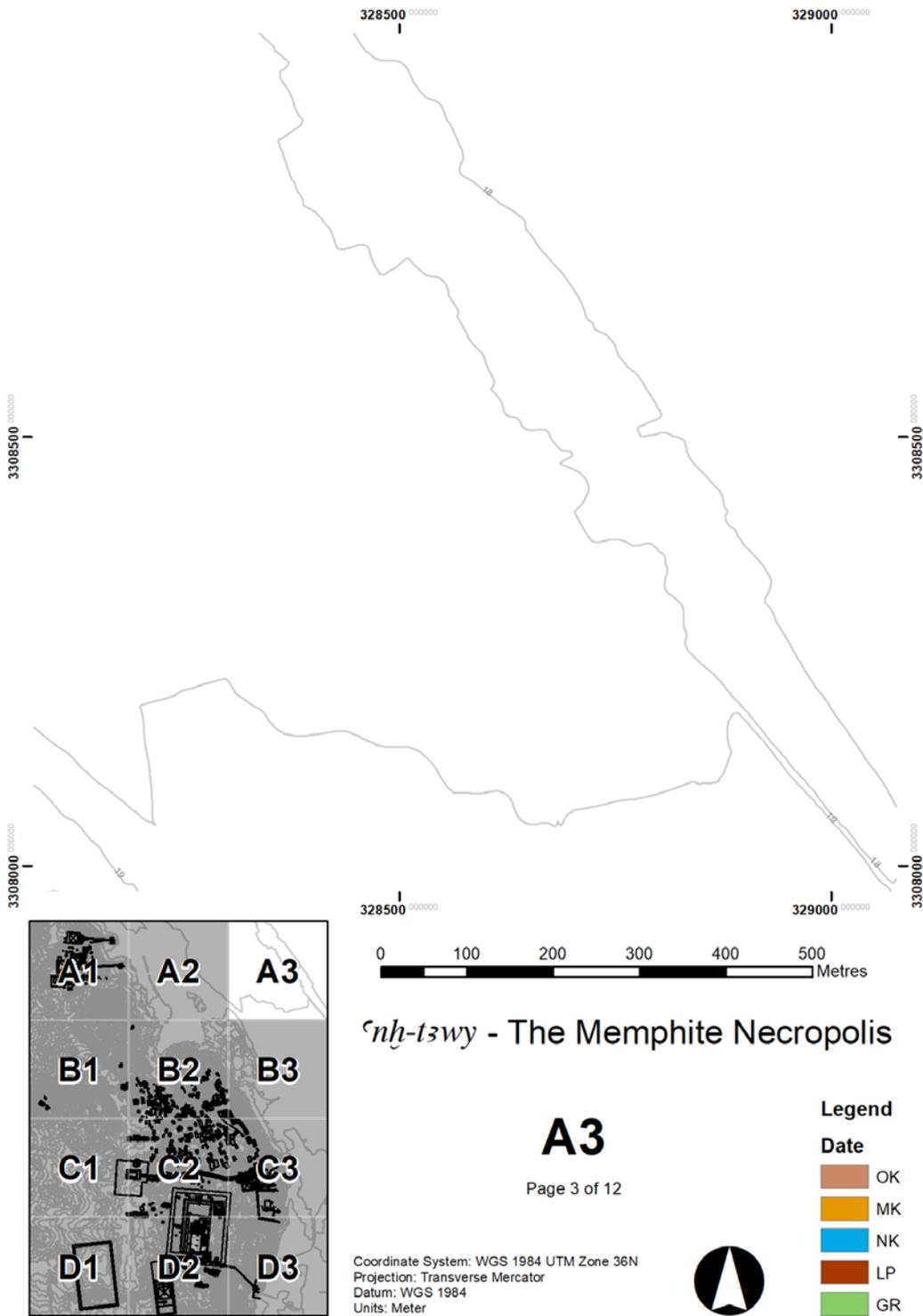


Figure A2.3. Map book sheet A3 (source author).

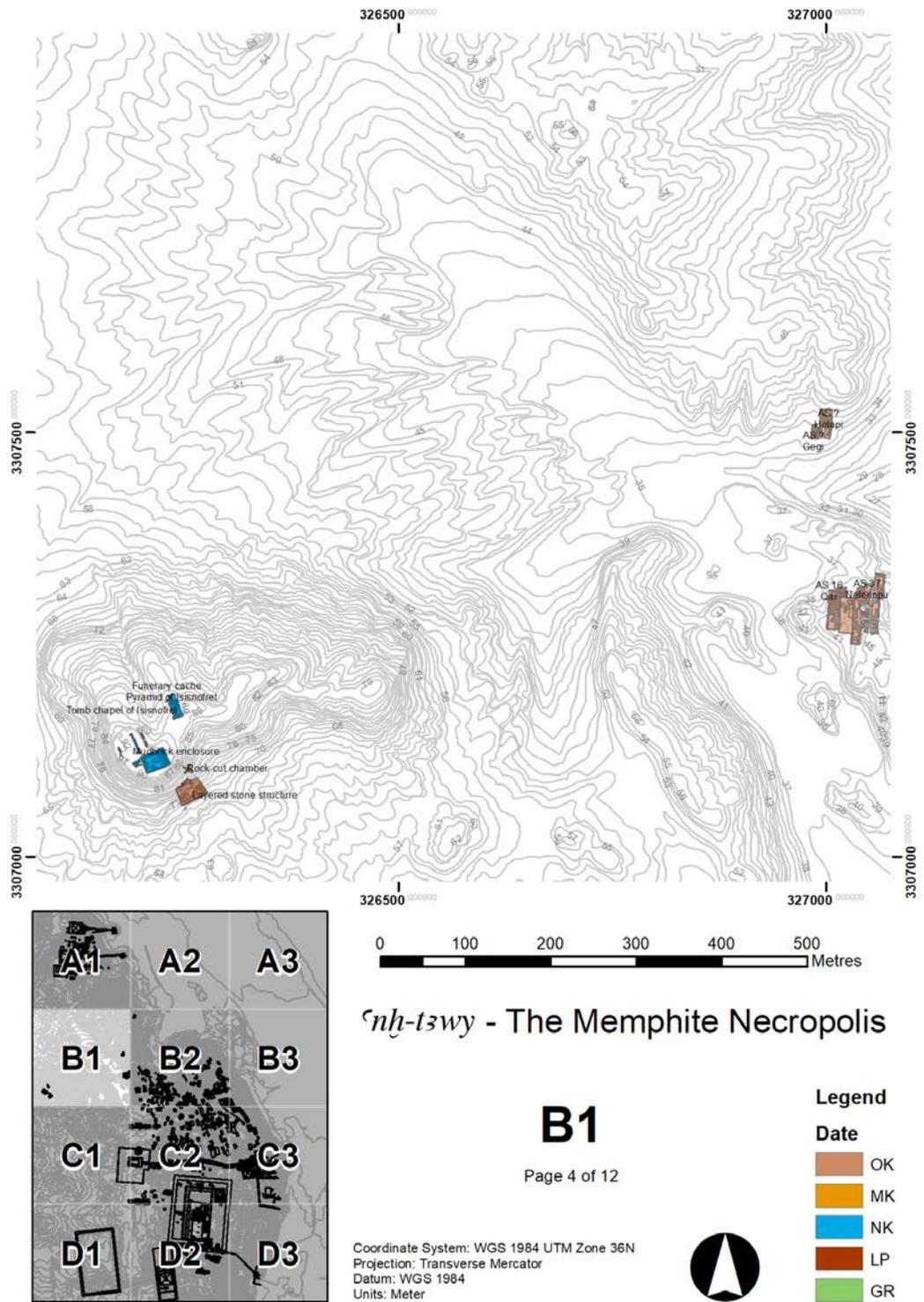


Figure A2.4. Map book sheet B1 (source author).

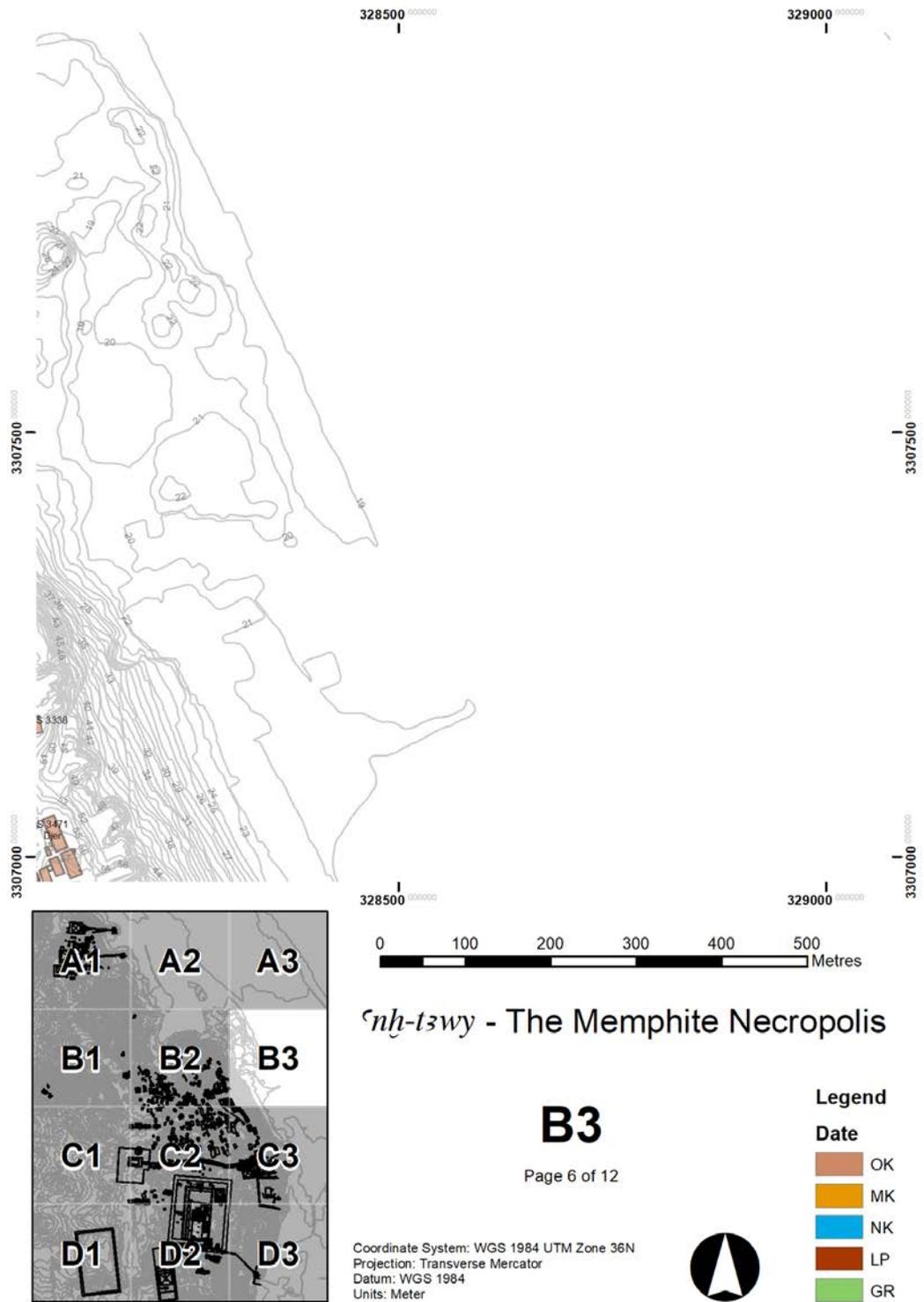


Figure A2.6. Map book sheet B3 (source author).

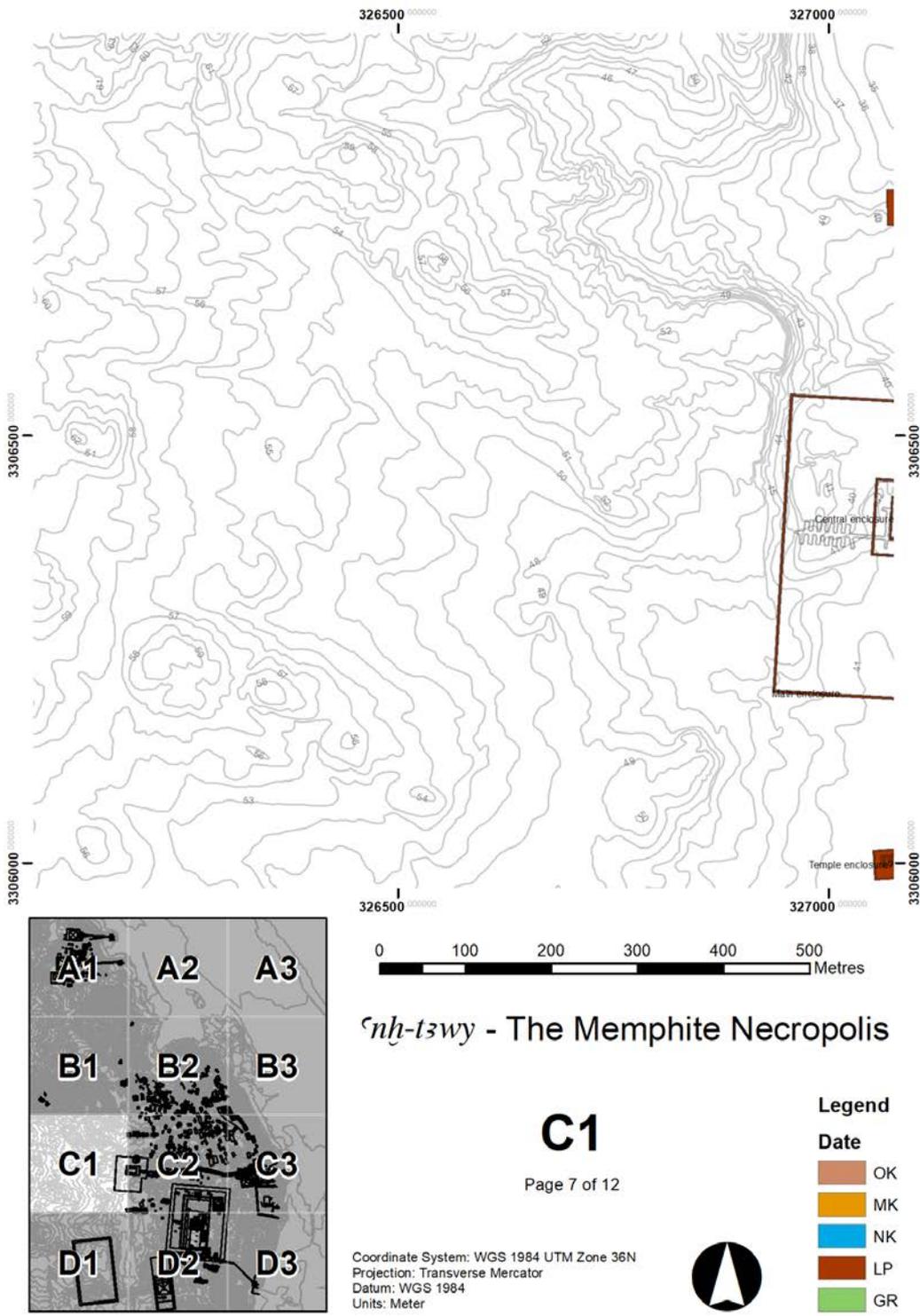


Figure A2.7. Map book sheet C1 (source author).

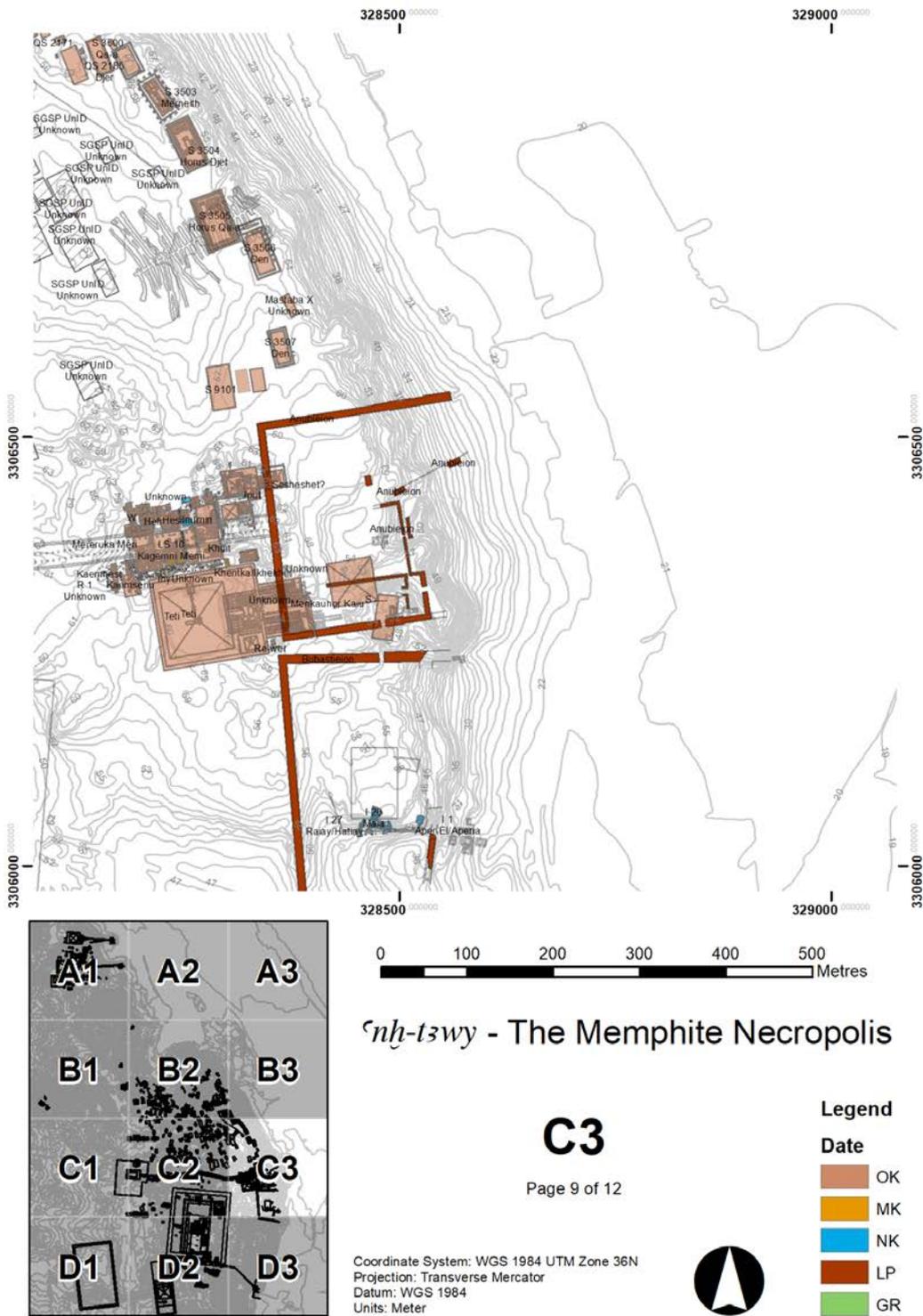


Figure A2.9. Map book sheet C3 (source author).

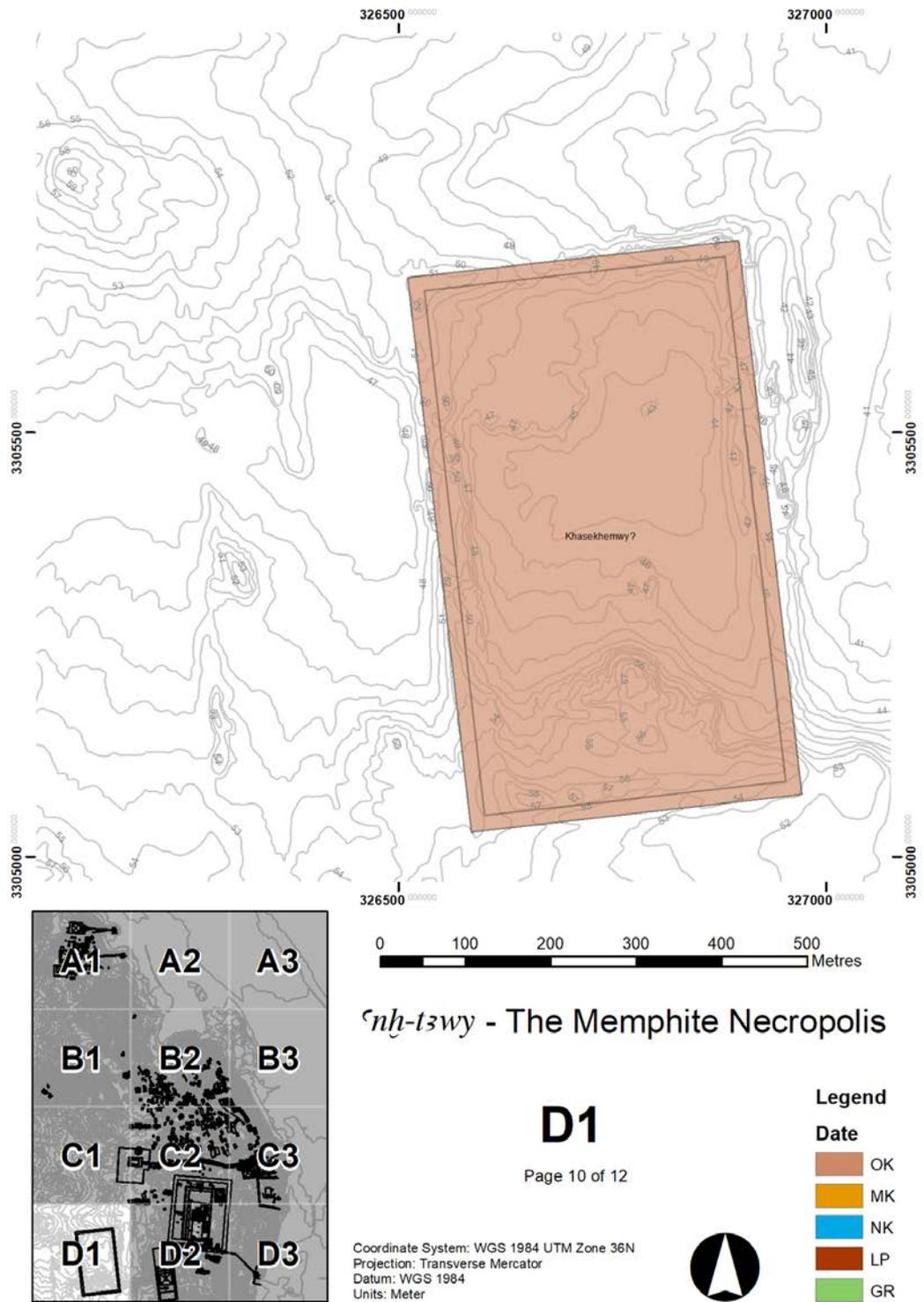


Figure A2.10. Map book sheet D1 (source author).

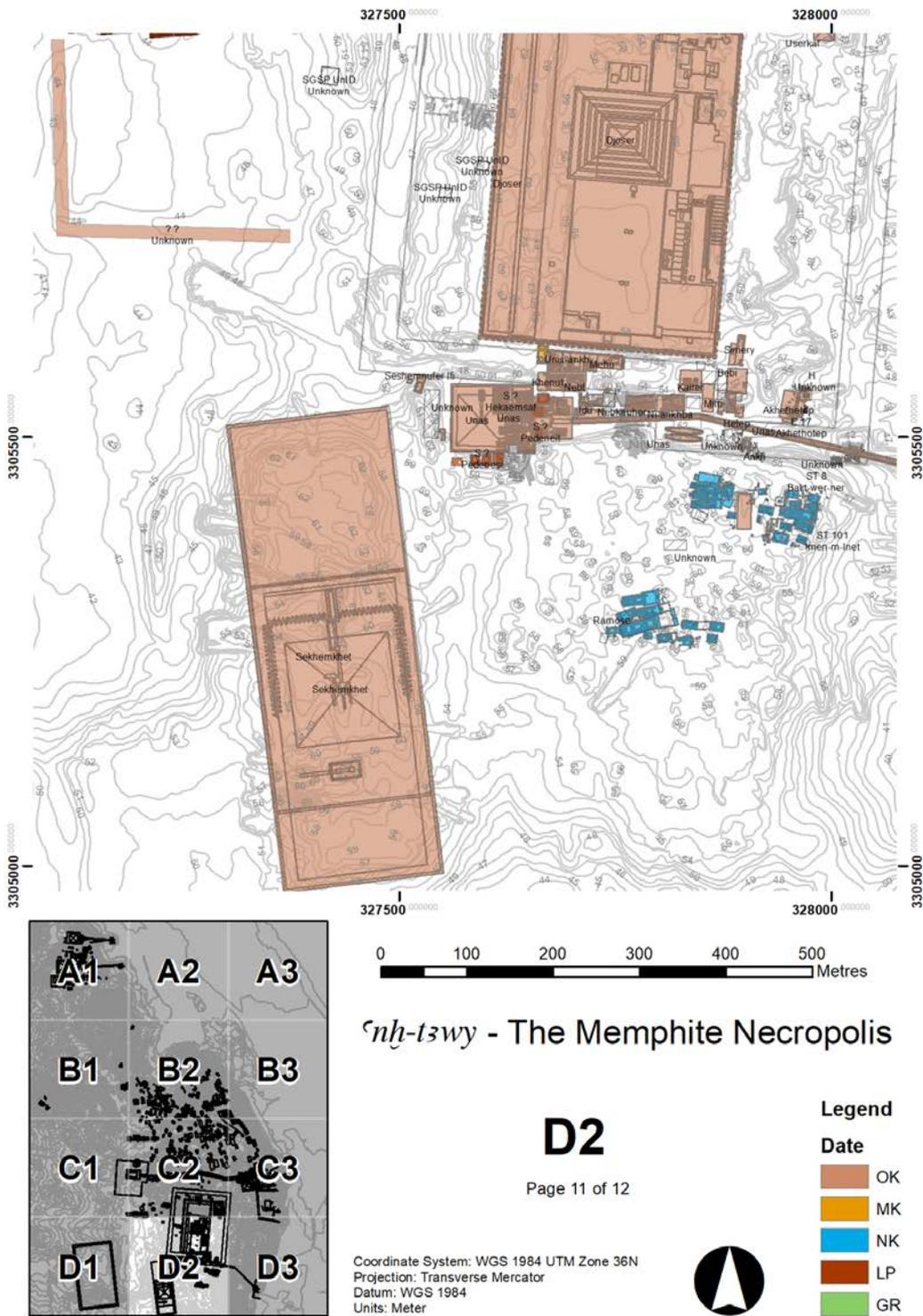


Figure A2.11. Map book sheet D2 (source author).

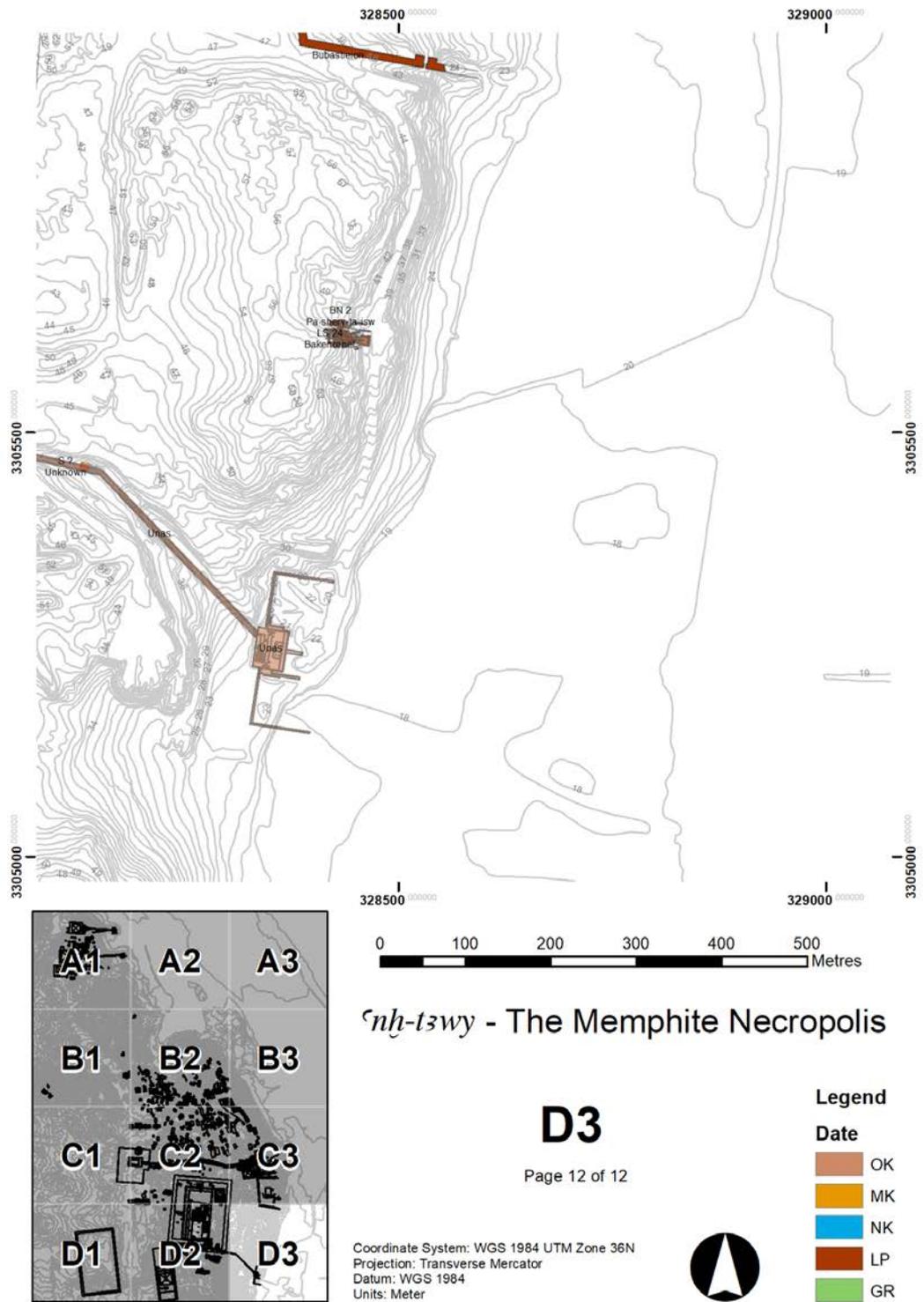


Figure A2.12. Map book sheet D3 (source author).

Attribute table codes for general archaeological features

Prefixes used within the table relate to the tomb numbering systems employed during excavation. Therefore, only the feature type abbreviations are given here.

Table A2.1. General archaeological features attribute table, type abbreviations.

Abbreviation	Description	Notes
MT	Mastaba tomb	
ST	Small tomb	Small tombs, not mastabas
PT	Private tomb	Tombs adjoining mastaba structures
OTH	Other	
RcT	Rock-cut tomb	
WALL	Wall feature	
ShT	Shaft tomb	Saite-Persian/Late Period structures
SShT	Small shaft tomb	Used on SGSP data transcription
ShB	Shaft burial	Mainly used on the de Morgan map plot
Sht/Pit	Shaft or pit burial	Used in the area north of Teti
PYR	Pyramid	
Enc	Enclosure	
CWay	Causeway	
VTemp	Valley temple	
CtYard	Courtyard	
Boat	Boat	
Temp	Temple	
Chpl	Chapel	
DevTmplT	Developed Temple Tomb	Reserved for high officials. See Martin Hidden Tombs Fig. 10
MemNKT	Memphite New Kingdom Tomb	
ChplT	Simple one room Chapel Tomb	Small variations of this model must occur

Attribute table codes for other structures and the Sacred Animal Necropolis

Table A2.2. Other structures and the Sacred Animal Necropolis attribute tables, prefix abbreviations.

Abbreviation	Description	Notes
<i>Other structures attribute table</i>		
SrAp	Serapeum	Features within the Serapeum Precinct
SGSP	Scottish Geophysical Survey Project	Used to identify SGSP data
Khaem	Khaemwaset	Used to identify the Khaemwaset monument excavation concession of Waseda University
<i>The Sacred Animal Necropolis attribute table</i>		

Abbreviation	Description	Notes
SAN	Sacred Animal Necropolis	Features within the Sacred Animal Necropolis Main Temple Enclosure
SD	Southern Dependencies	Area to the south of the SAN
SIG	South Ibis Garden	
NIG	North Ibis Garden	

Attribute table codes for subsurface features

Table A2.3. Subsurface features attribute table, prefix abbreviations.

Abbreviation	Description	Notes
Dog	Dog Catacombs	Used for both the larger and smaller galleries
Ibis	Ibis Catacombs	Used for both the North and South Ibis galleries
Apis	Mother of Apis	
Baboon	Baboon Catacombs	
Hawk	Falcon Catacombs	

General archaeological features

Table A2.4. General archaeological features attribute data.

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
1	QS	2171	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	
2	QS	2173	ST		3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	p163
3	QS	2114	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	
4	QS	2115	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	
5	QS	2172	ST		2nd/3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	p161
6	QS	2149	MT		2nd/3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Quibell, Excavations 1912-1914	p22
7	QS	2185	MT	Djer	1st Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	Archaic period tomb
8	QS	2105	MT		1st Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	
9	QS	2199 2	ST		3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	p163
10	S	3500	MT	Qa-a	1st Dynasty	GT V3 Pl.1; Pl.114	Emery. Great Tombs	Volume 3
11	QS	2103	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	
12	S	3471	MT	Djer	1st Dynasty	GT V1 Pl.1; Pl.2	Emery. Great Tombs	Volume 1
13	S	3503	MT	Merneith	1st Dynasty	GT V3 Pl.1; V2 Pl.2	Emery. Great Tombs	Volume 2
14	S	3504	MT	Horus Djet	1st Dynasty	GT V3 Pl.1; V2 Pl.1	Emery. Great Tombs	Volume 2
15	S	3505	MT	Horus Qa-a	1st Dynasty	GT V3 Pl.1; Pl.2	Emery. Great Tombs	Volume 3
16	S	3506	MT	Den	1st Dynasty	GT V3 Pl.1; Pl.40	Emery. Great Tombs	Volume 3
17	Mastaba	X	MT	Unknown	1st Dynasty	GT V1 Pl.1; Pl.43	Emery. Great Tombs	Volume 1
18	QS	2101	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	p146
19	QS	2309	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	p160
20	QS	2317	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	p163
21	QS	2347	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Quibell, Excavations 1912-1914	p36; Helck Lex. V 387-388 dates to II/III
22	QS	2346	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Quibell, Excavations 1912-1914	p36
23	QS	2331	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Quibell, Excavations 1912-1914	p35
24	QS	2315	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	p143
25	QS	2305	MT		4th Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	p171
26	QS	2304	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Quibell, Excavations 1912-1914	PL I; Reisner. Dev. Fig 154 Chapel
27	QS	2306	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL I	Quibell, Excavations 1912-1914	PL I; Reisner. Dev. Fig 155 Chapel
28	QS	2337	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	Reisner, Dev. p141
29	QS	2322	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	Reisner, Dev. p141
30	QS	2313	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	Volume 3
31	QS	2307	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	Reisner, Dev. p252 Fig 139; Fig 133 Chapel
32	QS	2302	MT	Ruaben	2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Reisner. Development	Reisner, Dev. p138; Fig 130, 131 Chapels
33	QS	2166	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Quibell, Excavations 1912-1914	Reisner, Dev. p33
34	QS	2329	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Quibell, Excavations 1912-1914	Dating not certain
35	QS	2327	MT/ST		2nd Dynasty	Quibell, Excavations 1912-1914 PL I	Quibell, Excavations 1912-1914	Dating not certain
36	S	3507	MT	Den	1st Dynasty	GT V3 Pl.1; Pl.85	Emery. Great Tombs	Volume 3
37	S	3121	MT		1st Dynasty	Fig.67, p116	Emery. Great Tombs	Volume 1
38	S	3120	MT		1st Dynasty	Fig.67a, p121	Emery. Great Tombs	Volume 1
39	S	3338	MT		1st Dynasty	Fig.69, p125	Emery. Great Tombs	Volume 1
40	S	3357	MT	Horus Aha	1st Dynasty	Fig.10, p13	Emery. Great Tombs	Volume 1; also V2 p171, Pl.LX, LXI-LXIII for Model Estate and boat grave
41	S	3310	MT		Undated	Pl.LX	Emery. Great Tombs	Not really discussed in volume; size unknown
42	S	3308	MT		2nd/3rd Dynasty	Pl.LX	Emery. Great Tombs	Not really discussed in volume; actual date unknown, dated by chapel niches
43	S	2401	MT		2nd Dynasty	Spencer 1974, Tab 1; UoP map	Helck Lex. V 387-388	Position loosely based on Spencer 74 plan and satellite image
44	S	2400	MT		2nd Dynasty	Spencer 1974, Tab 1; UoP map	Helck Lex. V 387-388	Position loosely based on Spencer 74 plan and satellite image
45	QS	3031	MT		2nd Dynasty	Emery JEA 1970, Pl.XVIII; Helck Lex. V 387-388	Reisner. Development	Reisner Dev. Fig.137, p251 chapel niche

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
46	FS	3030	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Helck Lex. V 387-388	Reisner. Development	p160
47	S	3034	MT		2nd Dynasty	Helck Lex. V 387-388	Unpublished?	Positioned using satellite image and Helck plan
48	S	3032	MT		Undated	UoP map	Unpublished?	Position uncertain
49	FS	3035	MT	Horus Den/Udimu	1st Dynasty	Fig.46, p65	Reisner. Development	p64
50	S	3477	MT		2nd Dynasty	Helck Lex. V 387-388	Helck Lex. V 399	Position based on Helck map
51	FS	3043	MT		3rd Dynasty	Fig.72, p156	Reisner. Development	Some numbering confusion, also numbered S3036
52	FS	3036	MT	Den	1st Dynasty	Fig.47, p66	Reisner. Development	p65
53	FS	3041	MT		1st Dynasty	Fig.48, p66	Reisner. Development	p66
54	FS	3038	MT	Anedjib	1st Dynasty	Pl.21	Emery. Great Tombs	GT Volume 1. Reisner Dev. p66
55	S	3111	MT	Den or Azab or Sabu	1st Dynasty	Pl.36	Emery. Great Tombs	GT Volume 1. Also P+M map XLV
56	FS	3040	MT		3rd Dynasty	Fig.77, p164	Reisner. Development	p163
57	FS	3039	MT		3rd Dynasty	-	Reisner. Development	Drawn after Reisner dimensions p188
58	FS	3044	MT		3rd Dynasty	Fig.78, p168	Reisner. Development	p167
59	FS	3042	MT		2nd Dynasty	Fig.67, p144	Reisner. Development	p144
60	QS	2427	PT		6th Dynasty	Quibell, Excavations 1912-1914 PL II	Quibell, Excavations 1912-1914	p40
61	QS	2494	MT		6th Dynasty	Quibell, Excavations 1912-1914 PL II	Quibell, Excavations 1912-1914	Not discussed in text, date based on association with QS2427
62	QS	2490	MT		6th Dynasty	Quibell, Excavations 1912-1914 PL II	Quibell, Excavations 1912-1914	Not discussed in text, date based on association with QS2427
63	QS	2407	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Reisner. Development; Quibell, Excavations 1912-1914	Quibell AM, p38; Reisner Dev. p157
64	QS	2498	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL II	Reisner. Development; Quibell, Excavations 1912-1914	Reisner Dev. p139; Quibell AM, p44
65	QS	2422	PT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Quibell, Excavations 1912-1914	Quibell AM, p39
66	QS	2406	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL II	Reisner. Development; Quibell, Excavations 1912-1914	Reisner Dev. p143; Quibell AM, p38
67	QS	2496	PT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Quibell, Excavations 1912-1914	Shown in plan only, dated by spatial association, therefore date uncertain
68	QS	2437	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Reisner. Development; Quibell, Excavations 1912-1914	Reisner Dev. p160; Quibell AM, p40
69	QS	2408	OTH		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Quibell, Excavations 1912-1914	p39. Long gallery, possible storage unit
70	QS	2452	MT		2nd Dynasty	Quibell, Excavations 1912-1914 PL II	Reisner. Development; Quibell, Excavations 1912-1914	Reisner Dev. p143; Quibell AM, p41
71	QS	2464	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Quibell, Excavations 1912-1914	p42
72	QS	2446	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Reisner. Development; Quibell, Excavations 1912-1914	Reisner Dev. p143; Fig. 146 chapel niche; Quibell AM, p41
73	QS	2451	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Unpublished?	Dated by association with 2446
74	QS	2445	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Reisner. Development; Quibell, Excavations 1912-1914	Reisner Dev. p162; Quibell AM, p41
75	QS	2443	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Unpublished?	Dated by spatial association
76	QS	2442	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Quibell, Excavations 1912-1914	p41
77	QS	2440	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Reisner. Development	Mentioned briefly on p266
78	QS	2429	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Reisner. Development	p159
79	QS	2416	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Reisner. Development	p162
80	QS	2413	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Unpublished?	Dated by spatial association
81	QS	2411	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Unpublished?	Dated by spatial association
82	QS	2412	MT		3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Unpublished?	Dated by spatial association
83	QS	2405	MT	Hesy-Ra	3rd Dynasty	Quibell, Excavations 1912-1914 PL II	Reisner. Development; Quibell, Excavations 1911-1912 and 1912-1914	Reisner Dev. p158; Quibell AM 1912-1913, p38
84	S	9101	MT		1st Dynasty	GM Fig. 2	G. Attinger Miscellen 1996	A Preliminary Report on a New Archaic Mastaba at Saqqara - M. Youssef
85	-	-	MT		2nd Dynasty	Drawn from Satellite imagery	Unpublished?	Discussed personally with M. Youssef
86	-	-	MT		2nd/3rd Dynasty	Drawn from Satellite imagery	Unpublished?	Discussed personally with M. Youssef. Not fully excavated, conjectural date
87	FS	3020	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Helck Lex. V 387-388	Reisner. Development	p165
88	FS	3018	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Helck Lex. V 387-388	Reisner. Development	p165
89	FS	3017	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Helck Lex. V 387-388	Reisner. Development	p165
90	FS	3019	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p166. Superstructure conjectural, no longer extant, based on typical 3rd Dyn tomb
91	FS	3021	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII	Reisner. Development	p155 mentioned briefly, not in detail
92	FS	3022	ST		2nd/3rd Dynasty	Smith 1936	Reisner. Development	p191. Dimensions from Reisner, location from Smith
93	FS	3003	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p165

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
94	FS	3004	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p166
95	FS	3009	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p170 mentioned briefly, not in detail
96	S	3013	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Unpublished?	Date based on spatial association
97	S	3007	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p166
98	S	3002	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p166
99	S	3001	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p165
100	S	3008	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p167
101	S	3005	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p165
102	S	3011	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p165
103	S	3010	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p166
104	S	3012	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Unpublished?	Date based on spatial association
105	-	-	OTH		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Unpublished?	Date based on spatial association, poss. chapel for 3003/3004
106	S	3050	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936; Martin JEA 1974 Fig.7	Martin JEA 1974	Excavations in the Sacred Animal Necropolis at North Saqq ǃóra, 1972-3: Preliminary Report
107	QS	3053	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p163
108	S	3063	MT		3rd Dynasty	Helck Lex. V 387-388; Smith 1936, not labelled	Smith in Reisner. Development	Mentioned briefly in Smith p385-386. Position based on Helck and Smith plan.
109	S	3054	MT		3rd Dynasty	Helck Lex. V 387-388; Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p166
110	S	3058	MT		3rd Dynasty	Helck Lex. V 387-388; Smith 1936	Smith in Reisner. Development	Mentioned briefly in Smith p386
111	S	3060	MT		3rd Dynasty	Helck Lex. V 387-388; Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p254
112	S	3061	MT		3rd Dynasty	Helck Lex. V 387-388; Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	Appendix B, p386 mentioned briefly
113	S	3059	MT		3rd Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	Appendix B, p386 mentioned briefly
114	S	3070	MT		4th Dynasty	Helck Lex. V 387-388; Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p168
115	S	3071	MT		4th Dynasty	Helck Lex. V 387-388; Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p168
116	S	3072	MT		4th Dynasty	Helck Lex. V 387-388; Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p168
117	S	3519	MT		Undated	Martin JEA 1974 Fig.1	Martin JEA 1974	Excavations in the Sacred Animal Necropolis at North Saqq ǃóra, 1972-3: Preliminary Report
118	S	3074	MT		4th Dynasty	Helck Lex. V 387-388; Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p204
119	S	3073	MT	Khabausokar (south) & Hathorneferhotep (north)	4th Dynasty	Helck Lex. V 387-388; Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p203; plan in Abusir XIX p54, Fig.2.7.1
120	S	3076	MT	Akhet-hetep	4th Dynasty	Helck Lex. V 387-388; Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p204
121	AS	33	MT		2nd/3rd Dynasty	Abusir XIX Fig. 3.1	Barta. Abusir XIX	Late Period cattle burials (male, mainly juvenile) within superstructure
122	AS	20	MT	Hetepi	3rd Dynasty	Abusir XIX Fig. 2.1	Barta. Abusir XIX	
123	FS	3075	MT		4th Dynasty	Helck Lex. V 387-388; Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	p204
124	-	-	MT	Ity	4th Dynasty	Abusir V Fig. 1.2	Barta. Abusir V	Tomb number not known
125	-	-	MT	Kaaper	5th Dynasty	Abusir V Fig. 4.1	Barta. Abusir V	Tomb number not known
126	Tomb	2	ST		5th Dynasty	Abusir V Fig. 4.1	Barta. Abusir V	
127	S	3518	MT		3rd Dynasty	Martin JEA 1974 Fig.9	Martin JEA 1974	Excavations in the Sacred Animal Necropolis at North Saqq ǃóra, 1972-3: Preliminary Report
128	FS	3077	MT		4th Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	Reisner p204
129	FS	3078	MT		4th Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	Reisner p204. Cruciform chapel from 3077. See Firth Annales XXXI p42
130	S	3517	MT		4th Dynasty	Emery JEA 1970, Pl.XVIII; Spencer 1974	Unpublished?	Large mastaba tomb, not really discussed in Reisner Dev.
131	FS	3081	MT		4th Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	Reisner Dev. p205
132	FS	3080	MT		4th Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	Reisner Dev. p205
133	FS	3079	MT		4th Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	Reisner Dev. p205
134	FS	3079-81	OTR		4th Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936	Reisner. Development	Subsidiary structures associated with mastabas 3079-81. Unknown function, may represent other tombs
135	S	30--	MT		Undated	Emery JEA 1970, Pl.XVIII; Smith 1936; Spencer 1974	Unpublished?	Unknown mastaba tomb, labelled as 30--
136	FS	30--	MT		Undated	Emery JEA 1970, Pl.XVIII; Smith 1936; Spencer 1974	Unpublished?	Unknown mastaba tomb, labelled as 30--
137	LS	6	MT	Methen	4th Dynasty	Emery JEA 1970, Pl.XVIII; Smith 1936; Spencer 1974	Lepsius. Denkmaller	Textbande 1, p144; Also P+M p493
138	S	3536	MT		3rd Dynasty	JEA 1977 Fig.1; Helck Lex. V 387-388;	Smith and Jeffreys JEA 1977 V63	The Sacred Animal Necropolis, North Saqq ǃóra: 1975/6

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
139	S	3520	MT	Ipy?	OK	Martin Plate 1; Davies Fig.6	Martin SAN 1981; Davies 2006 Mother of Apis	Neither plan shows full extent of mastaba. See Smith in Reisner, p398, may be no.9 (B4) on plan belonging to Ipy
140	G	2	RcT		OK	Fig.6	Davies 2006 Mother of Apis	p45
141	S	3518-20	MT		OK	Fig.1	Emery JEA 1967	p146. These tombs are likely shown in error, they are removed from later plans and their numbers used elsewhere
142	S	3509	MT	HetepKa	5th Dynasty	Plate 3	Martin 1979	The Tomb of Hetepka
143	S	3508	MT	Sehy?	5th Dynasty	Martin 1979 Plate 3; P+M Plate XLV	Porter and Moss PII Saqqara to Dashur	Martin 1979 The Tomb of Hetepka; P+M p447
144	S	3510	MT	Kasinebef?	5th Dynasty	Martin 1979 Plate 3; P+M Plate XLV	Porter and Moss PII Saqqara to Dashur	Martin 1979 The Tomb of Hetepka; P+M p448
145	S	3511	MT	Kaihap	5th Dynasty	Martin 1979 Plate 3; P+M Plate XLV	Porter and Moss PII Saqqara to Dashur	Martin 1979 The Tomb of Hetepka; P+M p448
146	S	3513	MT	Itisen	5th Dynasty	Martin 1979 Plate 3; P+M Plate XLV	Porter and Moss PII Saqqara to Dashur	Martin 1979 The Tomb of Hetepka; P+M p448
147	S	3514	MT	Khertnef?	5th Dynasty	Martin 1979 Plate 3; P+M Plate XLV	Porter and Moss PII Saqqara to Dashur	Martin 1979 The Tomb of Hetepka; P+M p448
148	S	3515	MT		5th/6th Dynasty	Martin 1979 Plate 3; P+M Plate XLV	Porter and Moss PII Saqqara to Dashur	Martin 1979 The Tomb of Hetepka; P+M p448
149	S	----	MT		OK	Plate XI	Emery JEA 1969	Preliminary Report on the Excavations at North Saqqara, 1968
150	S	----	MT		OK	1969 Fig.1; 1970 Plate XVIII	Emery JEA 1969; 1970	Probably OK. Preliminary Report on the Excavations at North Saqqara, 1968; and 1968-9
151	S	3522	MT		3rd Dynasty	JEA 1974 Fig.1,2 and 5	Martin JEA 1974	Also in Martin SAN volume 1981
152	S	----	MT		OK	Fig.1	Jeffreys and Smith 1988. The Anubieion at Saqqara I	Possibly 2nd Dyn. based on niches
153	S	3525	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
154	S	3524	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
155	S	3523	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
156	S	3512	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
157	S	3530	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
158	S	3529	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
159	S	3528	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
160	S	3533	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
161	S	3532	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
162	S	3531	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
163	S	3526	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
164	S	3527	MT		OK	Martin JEA 1974 Fig.9	Unpublished?	p26
165	S	3535	MT		OK	Smith and Davies SAN 2006 Fig.8	Unpublished?	Main Temple Complex volume. Full extent of superstructure unknown - denuded to NW
166	Vault	D	RcT		OK	Fig.b	Smith and Davies SAN 2006	Main Temple Complex volume, 3.3.iii
167	Vault	A	RcT		OK	Fig.b	Smith and Davies SAN 2006	Main Temple Complex volume, 3.3.ii
168	Vault	B	RcT		OK	Fig.b	Smith and Davies SAN 2006	Main Temple Complex volume, 3.3.v
169	Vault	E	RcT		OK	Smith and Davies SAN 2006 Fig.b	Davies SAN 2006	The Mother of Apis and Baboon Catacombs vol. Section 6
170	Vault	J	RcT		OK	Fig.8	Smith and Davies SAN 2006	Main Temple Complex volume, 3.3.v. Not excavated
171	Vault	P	RcT		OK	Fig.8	Smith and Davies SAN 2006	Main Temple Complex volume, 3.3.v. Becomes Falcon catacomb gallery 4/2
172	Vault	O	RcT		OK	Fig.8	Smith and Davies SAN 2006	Main Temple Complex volume, 3.3.v.
173	S	----	MT		Undated	UoP Handbook. Atlas of New Cartography	Unpublished?	p328. Superstructure is visible on satellite photos
174	E	3	MT	Sabuw/Thety	6th Dynasty	Smith 1936	Reisner. Development	Also P+M p460; Smith no. 47
175	E	2	MT	Ptahshepses	6th Dynasty	Smith 1936	Reisner. Development	Also P+M p460; Smith no. 38
176	E	1	MT	Sabuw/Ibeby	6th Dynasty	Smith 1936	Reisner. Development	Also P+M p460; Smith no. 37
177	C	8	MT	Kaaper	5th Dynasty	Smith 1936	Reisner. Development	Also P+M p459; Smith no. 36
178	C	21	MT	Kay	5th/6th Dynasty	Smith 1936	Reisner. Development	Also P+M p463; Smith no. 45
179	C	9	MT	Ptahshepses	5th Dynasty	Smith 1936	Reisner. Development	Also P+M p464; Smith no. 50
180	D	28	MT	Senezem-ib	5th Dynasty	Smith 1936	Reisner. Development	Also P+M p463; Smith no. 46
181	C	10	MT	Ptahshepses	5th Dynasty	Smith 1936	Reisner. Development	Also P+M p464; Smith no. 49
182	C	1	MT	Ptahshepses	5th Dynasty	Smith 1936	Reisner. Development	Also P+M p464; Smith no. 48
183	C	20	MT	Kai, son of Mesehti	5th Dynasty	Smith 1936	Reisner. Development	Also P+M p458; Smith no. 35
184	-	-	MT		4th/5th Dynasty	Smith 1936; P+M Pl. XLVI	Porter and Moss	Unnumbered tomb, mentioned in Smith (Reisner Dev) p401

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
185	C	6	MT	Ptah-hetep	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p462; Smith no. 41
186	C	7	MT	Ptah-hetep-deshet	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p462; Smith no. 42
187	C	17	MT	Inti	6th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p462; Smith no. 43
188	C	5	MT	Ranefer	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p461; Smith no. 40
189	C	16	MT	Sabu	5th/6th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p461; Smith no. 39
190	E	4	MT	Nefershesemptah	6th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p453; Smith no. 16
191	C	22	MT	Remeryptah	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p465; Smith no. 51
192	-	-	MT	Ka-em-hest	OK	Smith 1936; P+M Pl. XLVI	Reisner. Development; Murray. Saqqara Mastabas	See Murray Saqqara Mastabas I, p5
193	C	23	MT	Sabu-kem	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p463; Smith no. 44
194	C	19	MT	Sekhemka	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p465; Smith no. 54
195	D	15	MT	Mer-hetep or Sopduhotp	5th Dynasty	Smith 1936; P+M Pl. XLVI and XLIX	Reisner. Development	Also P+M p481; Smith no. 69. Owner, second name taken from P+M
196	D	17	MT	Ny-rna'at-ra	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p480; Smith no. 65
197	D	19	MT	Kai	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p479; Smith no. 63
198	D	15	MT	Soped-Hotep	5th Dynasty	Modified MHR1978 map with SGSP data overlay	Reisner. Development	Tomb position from map provided by Dr Adel Okasha Khafagy, uncertain if correct
199	D	22	PT	Ty/Ti/Thiy	5th Dynasty	Mariette 1889. Mastabas. p331-334. Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p468; Smith no. 60
200	-	-	MT		Undated	Smith 1936	Unpublished?	Unknown tomb
201	D	21	MT	Neferherentah	5th Dynasty	Mariette 1889 Mastabas. p236. Smith 1936; P+M Pl. XLVI	Mariette 1889 Mastabas. Reisner. Development	Also P+M p478; Smith no. 61
202	D	20	MT	Werirni	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p478; Smith no. 62
203	D	32	MT	Zed-shepsesy-puw/Shepsipuzad	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p458; Smith no. 31; size unknown
204	QS	920	MT	Unknown	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development; Quibell Saqqara (1907-1908)	Also P+M p499; size and exact location unknown; located in GIS based on SGSP data, may not be correct
205	-	-	MT	Unknown	Undated	Smith 1936; P+M Pl. XLVI	Unpublished?	Tomb on Smith plan, not recorded in text or given a number
207	D	8	MT	Isesi-ankh	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p489; Smith no. 85; Also numbered S 910; location from UoP cartography
208	QS	916	MT	Ptah-ma-kheru	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p498; Exact position unknown; current location from UoP cartography
209	D	6	MT	Khenu	5th/6th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p488; Smith no. 83; location from UoP cartography
210	D	7	MT	Kaemthenet	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p489; Smith no. 84; location from UoP cartography
211	QS	915	MT	Nikauhor	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p489; location from UoP cartography
212	D	2	MT	Kaemremeth/Kaemrehu	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p485; Smith no. 79; also numbered QS 905; location from UoP cartography
213	D	1	MT	Weser-neter/Neteruser	5th/6th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p485; Smith no. 78; also numbered QS 901; location from UoP cartography
214	D	11	MT	Tepemankh II	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p483; Smith no. 76; location from UoP cartography
215	C	18	MT	Thenti	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p482; Smith no. 72; location from UoP cartography
216	D	13	MT	Shepsesy/Shepsi	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p482; Smith no. 73; location from UoP cartography
217	D	12	MT	Ni-ankh-sekhmet	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p482; Smith no. 74; location from UoP cartography
218	D	10	MT	Tepemankh I	5th/6th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p483; Smith no. 75; location from UoP cartography
219	D	9	MT	Meruka	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p484; Smith no. 77; location from UoP cartography
220	D	70	MT	Pehenuwka/Pehnuika	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p491; also numbered Lepsius L15; location from UoP cartography
221	D	3	MT	Re-emka	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p487; Smith no. 80; location from UoP cartography
222	D	4	MT	Ankhiris	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p488; Smith no. 81; location from UoP cartography
223	D	5	MT	Meresankh	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p488; Smith no. 82; location from UoP cartography
224	QS	906	MT	Khenuw/Nekhensu	6th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p496; location from UoP cartography
225	QS	909	MT?	Hekenuw-nebty/Heknunebti	5th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p496; Exact position uncertain; location from UoP cartography
226	QS	911	MT?	Akhet-hem/Hemakhti	5th/6th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p496; Exact position uncertain; location from UoP cartography
227	QS	904	MT?	Unknown	OK	Smith 1936; P+M Pl. XLVI	Reisner. Development	Exact position uncertain; location from UoP cartography

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
228	QS	912	MT?	Hor-wer/Harwer	5th/6th Dynasty	Smith 1936; P+M Pl. XLVI	Reisner. Development	Also P+M p496; Exact position uncertain; location from UoP cartography
229	-	-	MT?	Unknown	Undated	UoP Handbook. Atlas of New Cartography	Unpublished?	p328. Superstructure is visible on satellite photos
230	AS	?	PT	Unknown	Undated	Abusir XIX Fig. 2.1	Barta. Abusir XIX	Full extent to north not shown on plan, possibly unexcavated
231	AS	34	MT	Iymery	5th Dynasty	Fig. 4.1.1	Barta. Abusir XIX	Wall section to west of tomb probably relates to structure. !Geolocation uncertain!
232	AS	35	MT	Unknown	5th Dynasty	Fig. 4.1.1	Barta. Abusir XIX	!Geolocation uncertain!
233	AS	53	PT	Unknown	5th Dynasty	Fig. 4.1.1	Barta. Abusir XIX	Full extent unknown, partially denuded. !Geolocation uncertain!
234	AS	52	MT	Unknown	5th Dynasty	Fig. 4.1.1	Barta. Abusir XIX	!Geolocation uncertain!
235	AS	51	MT	Unknown	5th Dynasty	Fig. 4.1.1	Barta. Abusir XIX	!Geolocation uncertain!
237	AS	50	MT	Unknown	4th Dynasty	Fig. 4.1.1	Barta. Abusir XIX	!Geolocation uncertain!
238	AS	?	MT	Unknown	5th Dynasty	Fig. 4.1.1	Barta. Abusir XIX	Two probable tombs, extents unknown, not discussed in publication, prob not excavated. !Geolocation uncertain!
239	AS	?	WALL	Unknown	LP	Fig. 4.1.1	Barta. Abusir XIX	Section of wall with niched recesses, may relate to features further east
240	AS	16	MT	Qar	6th Dynasty	Fig. 5.2.2	Abusir XIII. Abusir South 2	Mastaba KK situated to the east, not discussed in publication
241	AS	22	MT	Inti	6th Dynasty	Fig. 5.2.2	Abusir XIII. Abusir South 2	Complete dimensions not shown on figure, estimated from satellite photo
242	AS	17	PT	Qar Junior	6th Dynasty	Fig. 6.2.8a	Abusir XIII. Abusir South 2	Later inclusion into main mastaba which necessitates a rebuild in the northern extent
243	AS	18	PT	Senedjemib	6th Dynasty	Fig. 6.2.8b	Abusir XIII. Abusir South 2	Northern part of a single extension to the main mastaba of Qar
244	AS	18	PT	Iykai	6th Dynasty	Fig. 6.2.8c	Abusir XIII. Abusir South 2	Southern part of a single extension to the main mastaba of Qar
245	AS	?	MT	Hetepi	5th Dynasty	Fig. 3.1	Abusir V. The Cemeteries at Abusir South	Part of a larger tomb complex. Geo-location uncertain, awaiting correspondence from M.Barta
246	AS	?	MT	Rahotep and Isehiseneb	5th Dynasty	Fig. 3.1	Abusir V. The Cemeteries at Abusir South	Built against tomb of Hetepi
247	AS	?	MT	Fetekty and Mety	5th Dynasty	Fig. 3.1	Abusir V. The Cemeteries at Abusir South	Part of a larger tomb complex. Geo-location uncertain, awaiting correspondence from M.Barta
248	AS	?	PT	Unknown	5th Dynasty	Fig. 3.1	Abusir V. The Cemeteries at Abusir South	Tomb I. Geo-location uncertain, awaiting correspondence from M.Barta
249	AS	?	PT	Gegi	5th Dynasty	Fig. 3.1	Abusir V. The Cemeteries at Abusir South	Tomb II. Full extent to south not shown on plan (absent or unexcavated)
250	AS	?	PT	Unknown	5th Dynasty	Fig. 3.1	Abusir V. The Cemeteries at Abusir South	Tomb III. Full extent to south not shown on plan (absent or unexcavated)
251	AS	?	PT	Unknown	5th Dynasty	Fig. 3.1	Abusir V. The Cemeteries at Abusir South	Tomb IV. Full extent to south not shown on plan (absent or unexcavated)
252	AS	?	MT	Unknown	4th Dynasty	Fig. 2.2	Abusir V. The Cemeteries at Abusir South	Lake of Abusir Tomb I. Geo-location uncertain, awaiting correspondence from M.Barta
253	AS	?	PT	Shedu	5th Dynasty	Fig. 2.2	Abusir V. The Cemeteries at Abusir South	Lake of Abusir Tomb II. Geo-location uncertain, awaiting correspondence from M.Barta
254	AS	?	PT	Unknown	5th Dynasty	Fig. 2.2	Abusir V. The Cemeteries at Abusir South	Lake of Abusir Tomb III. Geo-location uncertain, awaiting correspondence from M.Barta
255	AS	?	MT	Unknown	5th Dynasty	Fig. 2.2	Abusir V. The Cemeteries at Abusir South	Lake of Abusir Tomb IV. Geo-location uncertain, awaiting correspondence from M.Barta
256	AS	?	PT	Unknown	5th Dynasty	Fig. 2.2	Abusir V. The Cemeteries at Abusir South	Lake of Abusir Tomb V. Geo-location uncertain, awaiting correspondence from M.Barta
257	AS	?	PT	Unknown	5th Dynasty	Fig. 2.2	Abusir V. The Cemeteries at Abusir South	Lake of Abusir Tomb VI. Geo-location uncertain, awaiting correspondence from M.Barta
258	AS	?	ShT	Udjahorresnet	26th/27th Dynasty	Fig. 2	Baref 1999. Abusir IV. The shaft tomb of Udjahorresnet at Abusir.	See also Fig. 1 in Abusir XX. Lesser Late Period Tombs at Abusir.
259	R	3	ShT	Unknown	26th/27th Dynasty	Fig. 16	Coppens 2009. Abusir XX. Lesser Late Period Tombs at Abusir.	See also Fig. 1
260	AS	?	ShT	Padihor	26th/27th Dynasty	Fig. 2	Coppens 2009. Abusir XX. Lesser Late Period Tombs at Abusir.	Scale on Fig. 2 is incorrect, when drawn the tomb is twice as large. This has been corrected. See also Fig. 1
261	AS	?	ShT	Iufaa	26th/27th Dynasty	Fig. 1	Baref 2008. Abusir XVII : the shaft tomb of Iufaa.	Awaiting Iufaa publication for more details
262	AS	?	ShT	Menekhibnekau	26th/27th Dynasty	Fig. 1	Baref 2011. Abusir XXV : the shaft tomb of Menekhibnekau.	Publication consulted at the Sackler Library
263	S	?	ShT	Amentefnakht	26th/27th Dynasty	Stammers. Map 8	Stammers 2009. The Elite Later Period Egyptian Tombs of Memphis. Also SAAD in Ann. Serv. xli (1942), pp. 382-91, with view, plan and????ShT	Also P+M p650. Annales unavailable, Stammers used in place
264	S	?	ShT	Hekaemsaf	26th/27th Dynasty	BARSANTI in Ann. Serv. v (1904), figs. 1-4	Stammers 2009. The Elite Later Period Egyptian Tombs of Memphis. BARSANTI in Ann. Serv. v (1904), figs. 1-4 on pp. 70- 2.	Also P+M p650. Geolocation based on Stammers Map 8

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
265	S	?	ShT	Pedeneit	26th/27th Dynasty	BARSANTI in Ann. Serv. ii (1901), figs. 1- 4.	Stammers 2009. The Elite Later Period Egyptian Tombs of Memphis. BARSANTI in Ann. Serv. ii (1901), pp. 97-1 04, with plan and sectio????	Also P+M p649. Geolocation based on Stammers Map 8
266	S	?	ShT	Pedenesi	26th/27th Dynasty	BARSANTI in Ann. Serv. i (1900), figs. 1-4	Stammers 2009. The Elite Later Period Egyptian Tombs of Memphis. BARSANTI in Ann. Serv. i (1900), figs. 1-4 on pp. 230-3.	Also P+M p649. Geolocation based on Stammers Map 7, not entirely accurate
267	S	?	ShT	Psammethek	26th/27th Dynasty	BARSANTI in Ann. Serv. i (1900), figs. 1-3	Stammers 2009. The Elite Later Period Egyptian Tombs of Memphis. BARSANTI in Ann. Serv. i (1900), figs. 1-3 on pp. 161-3.	Also P+M p649. Geolocation based on Stammers Map 7, not entirely accurate
268	S	?	ShT	Thenenhebu	26th/27th Dynasty	BARSANTI in Ann. Serv. i (1900), figs. 1-4	Stammers 2009. The Elite Later Period Egyptian Tombs of Memphis. BARSANTI in Ann. Serv. i (1900), figs. 1-4 on pp. 263, 26s	Also P+M p648. Geolocation based on Stammers Map 7, not entirely accurate
269	S	?	ShT	Unknown	26th/27th Dynasty	Unknown	Unknown	Position and size drawn from satellite photo
270	-	-	PYR	Djoser	3rd Dynasty	p85, 93	Lehner 2008. The Complete Pyramids	Djoser Step Pyramid enclosure. Geolocated using satellite photo
271	-	-	PYR	Djoser	3rd Dynasty	p85	Lehner 2008. The Complete Pyramids	Djoser Step Pyramid.
272	-	-	PYR	Sekhemkhet	3rd Dynasty	p94-95	Lehner 2008. The Complete Pyramids	Sekhemkhet pyramid enclosure. Geolocated using satellite photo
273	-	-	PYR	Sekhemkhet	3rd Dynasty	p94-95	Lehner 2008. The Complete Pyramids	Sekhemkhet pyramid. Geolocated using satellite photo
274	-	-	Enc	Userkaf	5th Dynasty	p140-141	Lehner 2008. The Complete Pyramids	Userkaf pyramid enclosure
275	-	-	PYR	Userkaf	5th Dynasty	p140-141	Lehner 2008. The Complete Pyramids	Userkaf pyramid
276	-	-	PYR	Userkaf	5th Dynasty	p140-141	Lehner 2008. The Complete Pyramids	Queens pyramid
277	-	-	Enc	Teti	6th Dynasty	p156-157	Lehner 2008. The Complete Pyramids	Teti pyramid enclosure
278	-	-	PYR	Teti	6th Dynasty	p156-157	Lehner 2008. The Complete Pyramids	Teti pyramid
279	-	-	Enc	Unas	5th Dynasty	p154-156	Lehner 2008. The Complete Pyramids	Unas pyramid enclosure
280	-	-	PYR	Unas	5th Dynasty	p154-156	Lehner 2008. The Complete Pyramids	Unas pyramid
281	-	-	CWay	Unas	5th Dynasty	p154-156	Lehner 2008. The Complete Pyramids	Unas causeway
282	-	-	VTmp	Unas	5th Dynasty	p154-156	Lehner 2008. The Complete Pyramids	Unas valley temple. Plan based on Lehner and satellite photo
283	-	-	Enc	Khasekhemwy?	3rd Dynasty	-	-	Gisir el Mudir enclosure. Size and position based on satellite photo
284	SGSP	UnID	MT	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7. Plan also provided by Dr Adel Khafagy MoA Egypt
285	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
286	SGSP	UnID	PT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
287	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
288	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
289	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
290	SGSP	UnID	PT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
291	SGSP	UnID	MT	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
292	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
293	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
294	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
295	SGSP	UnID	PT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
296	SGSP	UnID	PT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
297	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
298	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
299	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
300	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
301	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
302	SGSP	UnID	PT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
303	SGSP	UnID	PT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
304	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
305	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
306	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
307	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
308	SGSP	UnID	PT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
309	SGSP	UnID	PT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7
310	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara, 2001-7

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
464	SGSP	UnID	SShT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
465	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
466	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
467	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
468	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
469	SGSP	UnID	PT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
470	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
471	SGSP	UnID	?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
472	SGSP	UnID	?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
473	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
474	SGSP	UnID	SShT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
475	SGSP	UnID	SShT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
476	SGSP	UnID	SShT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
477	SGSP	UnID	SShT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
478	SGSP	UnID	?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
479	SGSP	UnID	ShT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
480	SGSP	UnID	?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
481	SGSP	UnID	?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	The Geophysical Survey of North Saqqara
482	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	.Possible external wall? The Geophysical Survey of North Saqqara
483	SGSP	UnID	MT?	Unknown	Undated	Fig. 1	Mathieson 2007. JEA 93.	Indistinct outline, possible tomb. The Geophysical Survey of North Saqqara
484	?	?	Enc	Unknown	3rd Dynasty	Based on MHR1978 and satellite image	Unknown	Unexcavated feature, unknown extents
485	AS	31	MT	Anonymous	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	A new Old Kingdom rock-cut tomb from Abusir and its Abusir-Saqqara context, in Strudwick, N., Strudwick, H., eds., Old Kingdom, new ???Fig. 1.1
486	AS	40	PT	Unknown	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Unknown publication for this tomb
487	AS	31	CtYard	Anonymous	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	A new Old Kingdom rock-cut tomb from Abusir and its Abusir-Saqqara context, in Strudwick, N., Strudwick, H., eds., Old Kingdom, new ???????
488	AS	36	MT	Ptahhetep	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Unknown publication for this tomb
489	AS	65	MT	Neferherptah	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Dul -i-ko-v, Odler, M., Havelkov -i, P. 2011. Archeologick -c v -czkum hrobky I -kare Neferherptaha, PES 8, 90Ç016
490	AS	68	CtYard	Various	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Vymazalov -i, H., Dul -i-ko-v, V. 2012. Sheretneby, a king0Ç0s daughter from Abusir South. Preliminary report of the 2012 spring season, A????1252
491	AS	68a	RcT	Duaptah	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Vymazalov -i, H., Dul -i-ko-v, V. 2012. Sheretneby, a king0Ç0s daughter from Abusir South. Preliminary report of the 2012 spring season, A????
492	AS	68b	RcT	Shepesuptah	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Vymazalov -i, H., Dul -i-ko-v, V. 2012. Sheretneby, a king0Ç0s daughter from Abusir South. Preliminary report of the 2012 spring season, A????1252
493	AS	68c	RcT	Sheretneby/Iti	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Vymazalov -i, H., Dul -i-ko-v, V. 2012. Sheretneby, a king0Ç0s daughter from Abusir South. Preliminary report of the 2012 spring season, A????1252
494	AS	68d	RcT	Nefer	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Vymazalov -i, H., Dul -i-ko-v, V. 2012. Sheretneby, a king0Ç0s daughter from Abusir South. Preliminary report of the 2012 spring season, A????1252
495	AS	67	MT	Nefershepses	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Unpublished
496	AS	67	CtYard	Nefershepses	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Courtyard and corridor of the mastaba, not sure what structure if any exists to the east
497	AS	39	MT	Shepseskafankh	6th Dynasty	Fig. 1.1: Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Abusir 2014. Report of the Czech Institute of Egyptology, Charles University, Prague, unpublished report for the Egyptian Ministry f????1252	
498	AS	37	MT	Neferinpu	6th Dynasty	Fig. 1.1	Barta et al 2014. The Tomb of the Sun Priest Neferinpu	
499	AS	38	MT	Kaiemtjenenet	6th Dynasty	Fig. 1.1: Barta et al 2014. The Tomb of the Sun Priest Neferinpu	Abusir XXII. The tomb of Kaiemtjenenet (AS 38) and the surrounding structures (AS 570Ç060), Prague: Czech Institute of Egyptology, Fac????38	
500	-	-	PYR	lput	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Firth and Gunn plan incomplete, some information taken from UoP cart. until a better plan is obtained
501	-	-	Enc	lput	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Pyramid enclosure, some plan information taken from UoP cart.

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
502	-	-	MT	Kaemsenu	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Mastaba appears to have multiple phases, not included here
503	Burial	240	Sht/Pit	Unknown	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	11m deep grave shaft, male skeleton
504	Burial	241	Sht/Pit	Unknown	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	9.75m deep grave shaft, male skeleton
505	Burial	242	Sht/Pit	Unknown	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	11m deep grave shaft, male skeleton
506	Burial	243	Sht/Pit	Unknown	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	6m deep grave shaft, male skeleton
507	Burial	244	Sht/Pit	Unknown	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	No information
508	Burial	245	Sht/Pit	Unknown	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	No information
509	Burial	248	Sht/Pit	Unknown	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	No information
510	Burial	249	Sht/Pit	Unknown	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	No information
511	HMK	40	Sht/Pit	Seneny	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	See P+M p543
512	LS	10	MT	Kagemni Memi	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	See also P+M p521
513			MT	Meryteti Meri	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	See also P+M p536. Son of Mereruka
514			MT	Wa'tetkhet-hor	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	See also P+M p534. Wife of Mereruka
515			MT	Mereruka Meri	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	See also P+M p525
516			MT	Unknown	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	No details of ownership on Firth and Gunn map or P+M maps
517			MT	Unknown	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	No details of ownership on Firth and Gunn map or P+M maps
518			MT	'Ankhma'hor Sesi	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	See also P+M p512
519			MT	Nefersheshemre' Sheshi	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	See also P+M p511
520	Burial	233	Sht/Pit	Unknown	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	p34
521	Burial	33	Sht/Pit	Unknown	6th-9th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	No.33 in P+M, not included in text
522	Burial	64	Sht/Pit	Unknown	6th-9th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Not featured in P+M, position unclear from F+G map, may be incorrect
523	Burial	76-78	Sht/Pit	Unknown	6th-9th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Not featured in P+M
524	Burial	81	Sht/Pit	Herimeru	6th-9th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Not featured in P+M
525	Burial	146	Sht/Pit	Unknown	6th-9th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Not featured in P+M
526	Burial	213	Sht/Pit	Unknown	6th-9th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Not featured in P+M
527	Burial	225	Sht/Pit	Unknown	6th-9th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p540
528	Burial	227	Sht/Pit	Ptahhemet	6th-9th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p540
529			Chpl	Khenu [II] Themi	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p537
530			Chpl	Kanenefui Khenu [I]	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p537
531			MT	Thethu	6th Dynasty	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p537
532	HMK	140	Sht/Pit	Teti-hirmaa-neferuptah and Sit-wernu	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p538
533	HMK	125	ST	Nebi	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p538
534	HMK	120	Sht/Pit	Sethu	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p538
535	Burial	47	Sht/Pit	Thai	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p538
536	HMK	69	Sht/Pit	Ipihirsesenbef	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p538
537	HMK	30	ST	Gemniemhet Gemni	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p538
538	HMK	37	Sht/Pit	Duauhotp	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p539
539			ST	Sitinteti	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p539
540	HMK	26	Sht/Pit	Ipi'ankhu	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p540

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
541	HMK	6	ST	Khuit-khnum	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p540
542			MT	Sekwaskhet	MK	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p548
543	S	2757	Sht/Pit	Usermut and Inpuemhet	MK	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p549
544			MT	Hetep	MK	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p550
545			MT	Ihy	MK	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	see P+M p551
546			WALL	Unknown	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Very little information on this feature
547	Burial	30	Sht/Pit	Unknown	MK	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Child skeleton
548	Burial	41	Sht/Pit	Unknown	MK	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Deep shaft, reused OK pit
549	Burial	118	Sht/Pit	Unknown	MK	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Child skeleton
550	Burial	129	Sht/Pit	Unknown	MK	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Confusion in text over 129a, b, and c, as 129 has it's own position on the map
551	Burial	129a	Sht/Pit	Unknown	MK	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Confusion in text over 129a, b, and c, as 129 has it's own position on the map
552	Burial	206	Sht/Pit	Unknown	MK	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Child skeleton
553	HMK	5	Sht/Pit	Imhotep	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	Intrusive burial in Thethu mastaba; Reused Dyn 6 head-rest
554	Burial	250	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
555	Burial	252	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
556	Burial	251	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
557	Burial	239	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
558	Burial	238	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
559	Burial	237	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
560	Burial	236	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
561	Burial	235	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
562	Burial	223	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
563	Burial	222	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
564	Burial	221	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
565	Burial	220	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
566	Burial	219	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
567	Burial	214	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
568	Burial	232	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
569	Burial	230	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
570	Burial	231	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
571	Burial	218	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
572	Burial	224	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
573	Burial	226	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
574	Burial	228	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
575	Burial	229	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
576	Burial	217	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
577	Burial	223	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
578	Burial	211	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
579	Burial	210	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
580	Burial	215	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
581	Burial	216	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
582	Burial	209	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
583	Burial	208	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
584	Burial	207	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
585	Burial	205	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
586	Burial	204	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
587	Burial	202	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
588	Burial	203	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
589	Burial	201	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
590	Burial	212	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
591	Burial	12	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
592	Burial	13	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
593	Burial	7	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
594	Burial	3	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
595	Burial	29	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
596	Burial	4	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
597	Burial	5	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
598	Burial	10	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
599	Burial	11	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
600	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
601	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
602	Burial	1	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
603	Burial	2	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
604	Burial	18	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
605	Burial	16	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
606	Burial	17	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
607	Burial	32	Sht/Pit	Unknown	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
608	Burial	21	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
609	Burial	20	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
610	Burial	31	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
611	Burial	22	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
612	Burial	33	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
613	Burial	28	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
614	Burial	19	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
615	Burial	23	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
616	Burial	24	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
617	Burial	25	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
618	Burial	-	Sht/Pit	Unknown	1st Intermediate	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
619	Burial	34	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
620	Burial	36	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
621	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
622	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
623	Burial	82	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
624	Burial	84	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
625	Burial	85	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
626	Burial	90	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
627	Burial	90a	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
628	Burial	81a	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
629	Burial	87	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
630	Burial	38	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
631	Burial	39	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
632	Burial	42	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
633	Burial	29	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
634	Burial	86	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
635	Burial	86a	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
636	Burial	86b	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
738	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
739	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
740	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
741	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
742	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
743	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
744	Burial	46	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
745	Burial	45	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
746	Burial	44	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
747	Burial	42	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
748	Burial	34	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
749	Burial	35	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
750	Burial	32	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
751	Burial	22	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
752	Burial	21	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
753	Burial	20	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
754	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
755	Burial	16	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
756	Burial	15	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
757	Burial	13	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
758	Burial	-	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
759	Burial	10	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
760	Burial	9	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
761	Burial	6	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
762	Burial	8	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
763	Burial	7	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
764	Burial	1	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
765	Burial	2	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
766	Burial	109	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
767	Burial	111	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
768	Burial	107	Sht/Pit	Unknown	Undated	Fig. 3	Firth and Gunn 1926. Teti Pyramid Cemeteries	
769			PYR	Sahure	5th Dynasty	Plan p.70	Verner 1994. Forgotten Pharaohs, Lost Pyramids	Geolocated using satellite photography
770			Enc	Sahure	5th Dynasty	Plan p.70	Verner 1994. Forgotten Pharaohs, Lost Pyramids	Geolocated using satellite photography
771			CWay	Sahure	5th Dynasty	Plan p.70	Verner 1994. Forgotten Pharaohs, Lost Pyramids	Geolocated using satellite photography
772			VTemp	Sahure	5th Dynasty	Plan p.70	Verner 1994. Forgotten Pharaohs, Lost Pyramids	Geolocated using satellite photography
773			CWay	Sahure	5th Dynasty	Plan p.70	Verner 1994. Forgotten Pharaohs, Lost Pyramids; probably associated with the causeway	Geolocated using satellite photography
774			Enc	Khentkaus	5th Dynasty	Fig. 75	Verner 2001. Abusir III. The Pyramid Complex of Khentkaus	Geolocated using satellite photography
775			PYR	Khentkaus	5th Dynasty	Fig. 75	Verner 2001. Abusir III. The Pyramid Complex of Khentkaus	Geolocated using satellite photography
776			Enc	Raneferef	5th Dynasty	Plan p.134	Verner 1994. Forgotten Pharaohs, Lost Pyramids; extent of enclosure has been projected	Geolocated using satellite photography
777			PYR	Raneferef	5th Dynasty	Plan p.134	Verner 1994. Forgotten Pharaohs, Lost Pyramids	Geolocated using satellite photography
778			Enc	Niuserre	5th Dynasty	Plan p149	Lehner 1997. The Complete Pyramids	Geolocated using satellite photography
779			PYR	Niuserre	5th Dynasty	Plan p149	Lehner 1997. The Complete Pyramids	Geolocated using satellite photography
780			CWay	Niuserre	5th Dynasty	Plan p149	Lehner 1997. The Complete Pyramids	Geolocated using satellite photography
781			VTemp	Niuserre	5th Dynasty	Plan p149	Lehner 1997. The Complete Pyramids	Geolocated using satellite photography
782			Enc	Neferirkare	5th Dynasty	Plan p145	Lehner 1997. The Complete Pyramids	Geolocated using satellite photography
783			PYR	Neferirkare	5th Dynasty	Plan p145	Lehner 1997. The Complete Pyramids	Geolocated using satellite photography
784	AS	--	MT	Ptahshepses	5th Dynasty	Fig. 3.2;	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated using satellite photography
785	AS	--	MT	Userkafankh	5th Dynasty	Fig. 3.2;	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated using satellite photography

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
786	AS	--	CtYard	Userkafankh	5th Dynasty	Fig. 3.2;	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated using satellite photography
787	AS	--	MT	Anonymous	5th Dynasty	Fig. 3.2;	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated using satellite photography
788	AS	--	MT	Djadjemankh	5th Dynasty	Fig. 3.2;	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated using satellite photography
789	AS	--	MT	Djadjemankh	5th Dynasty	Fig. 3.2;	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated using satellite photography
790	AS	--	MT	Anonymous	5th Dynasty	Fig. 3.2;	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated using satellite photography
791	AS	--	MT	Mastaba of the Princesses	5th Dynasty	Fig. 3.2;	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated using satellite photography
792	AS	--	Enc	Mastaba of the Princesses	5th Dynasty	Fig. 3.2;	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated using satellite photography
793	AS	--	MT	Ptahshepses Junior II	5th Dynasty	Fig. 2	Ägypten und Levante : Zeitschrift für ägyptische Archäologie und deren Nachbargebiete. Barta 2000 v10, pp45-66	Geolocated using satellite photography
794	Lepsius	20	MT	Unknown	OK	Fig. 3.2; also Map of the Pyramids of Abousir (Perring 1837)	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses; Vyse and Perring 1837. The Pyramids of Gizeh vol III	Geolocated using satellite photography
795	S-W-	2	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
796	S-W-	1	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
797	S-S-	1	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
798	S-S-	2	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
799	S-S-	3	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
800	-	-	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
801	S-S-	5	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
802	Nf-N-	1	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
803	Nf-N-	4	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
804	Nf-N-	5	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
805	Nf-N-	3	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
806	Nf-N-	2	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
807	Ny-N-	1	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
808	Ny-N-	2	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
809	Ny-E-	6	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
810	Ny-E-	8	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
811	Ny-E-	7	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
812	Ny-E-	11	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
813	Ny-E-	10	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
814	Ny-E-	9	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
815	Ny-E-	12	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
816	Ny-E-	13	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
817	Ny-E-	14	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
818	Ny-E-	15	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
819	Ny-E-	16	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
820	Ny-E-	17	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
821	Ny-E-	22	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
822	Ny-E-	23	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
823	Ny-E-	19	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
824	Ny-E-	18	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
825	Ny-E-	20	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
826	Ny-E-	21	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
827	Ny-E-	25	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
828	Nf-E-	2	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
829	Nf-E-	1	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
830	Nf-S-	3	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
831	Nf-S-	4	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
832	Nf-S-	5	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
833	Lepsius	24	PYR?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated using satellite photography
834	AS	--	MT	Nebtyemneferes	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
835	AS	--	Enc/WALL	Nebtyemneferes	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
836	R-S-	2	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
837	Lepsius	25	MT	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
838	Lepsius	25	MT	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
839	AS	--	?	Unknown	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
840	AS	--	MT	Hadjetnebu	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
841	AS	--	MT	Mernefu	OK	Fig. 3.1	Krejci 2009. Abusir XI The Architecture of the Mastaba of Ptahshepses	Geolocated from relational position on schematic plan
842			MT	Kaemhest	OK	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	P+M date IV-V Dynasty
843			PT?	Unknown	OK/MK	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Date of feature determined by map legend.
844			MT	Khentka/Ikhekhi	6th Dynasty	Plates III + IV	James 1953. The Mastaba of Khentika called Ikhekhi	P+M p508
845			Temp	Amenemonet	1st Intermediate	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	Type of structure uncertain from plan
846			PT?	Thay	1st Intermediate	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	Partial structure remains
847			PT?	Mosi	NK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	Partial structure remains? P+M dated to Ramesses II 19th Dyn

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
848			PYR	Khuit	6th Dynasty	Tav 10	Maragioglio 1962. Notizie sulle piramidi di Zedfr ꜥꜣ, Zedkara Isefi, Teti	Khuit enclosure size/position does not match with Loret Bulletin plan. Uncertain features on Loret plan overlaying enclosure. South ??????
849			Enc	Khuit	6th Dynasty	Tav 10	Maragioglio 1962. Notizie sulle piramidi di Zedfr ꜥꜣ, Zedkara Isefi, Teti	Khuit enclosure size/position does not match with Loret Bulletin plan. Uncertain features on Loret plan overlaying enclosure. South ????
850	AS	?	MT	Nakhtsare	OK	Fig 3.1	Krejci. Abusir XII. Minor Tombs in the Royal Necropolis I	Located as best as possible, position not clear on the overall schematic plan.
851	AS	?	Enc	Nakhtsare	OK	Fig 3.1	Krejci. Abusir XII. Minor Tombs in the Royal Necropolis I	As ID850. Extents of enclosure are uncertain on plan
852	Q/94	7	Burial	Unknown	?	Fig 3.1	Krejci. Abusir XII. Minor Tombs in the Royal Necropolis I	
853	Q/94	9	Burial	Unknown	?	Fig 3.1	Krejci. Abusir XII. Minor Tombs in the Royal Necropolis I	
854	Q/94	11	Burial	Unknown	?	Fig 3.1	Krejci. Abusir XII. Minor Tombs in the Royal Necropolis I	
855	Q/94	37	Burial	Unknown	?	Fig 3.1	Krejci. Abusir XII. Minor Tombs in the Royal Necropolis I	
856	Q/94	38	Burial	Unknown	?	Fig 3.1	Krejci. Abusir XII. Minor Tombs in the Royal Necropolis I	
857	Lepsius	24	Enc	Unknown	OK	Fig 3.1	Krejci. Abusir XII. Minor Tombs in the Royal Necropolis I	Geolocated using satellite photography
858	AS	-	MT	Khekeretnebtj	OK	Fig. 1	Ägypten und Levante : Zeitschrift für ägyptische Archäologie und deren Nachbargebiete. Barta 2000 v10, pp45-66	Geolocated using satellite photography and relative position on plan
859	AS	-	MT	Idu and Khenit	OK	Fig. 1	Ägypten und Levante : Zeitschrift für ägyptische Archäologie und deren Nachbargebiete. Barta 2000 v10, pp45-66	Geolocated using satellite photography and relative position on plan
860	AS	-	MT	Unknown	OK	Fig. 1	Ägypten und Levante : Zeitschrift für ägyptische Archäologie und deren Nachbargebiete. Barta 2000 v10, pp45-66	Geolocated using satellite photography and relative position on plan
861	AS	-	MT	Unknown	OK	Fig. 1	Ägypten und Levante : Zeitschrift für ägyptische Archäologie und deren Nachbargebiete. Barta 2000 v10, pp45-66	Geolocated using satellite photography and relative position on plan
862	AS	--	Enc	Ptahshepses Junior II	5th Dynasty	Fig. 2	Ägypten und Levante : Zeitschrift für ägyptische Archäologie und deren Nachbargebiete. Barta 2000 v10, pp45-66	Geolocated using satellite photography
863			MT	Sheshseshet Idut	6th Dynasty	Pl. II	Macramallah 1935. Le Mastaba d'Idout	Geolocated using satellite photography
864	D	64	MT	Ptahhotep II and Akhtihotep	5th Dynasty	Smith 1936; P+M Pl. XLVI; Lauer Saqqara 1976	Reisner. Development	Also P+M p598
865			PT	Thefu	5th Dynasty	Fig. 7	Hasan 1975. Mastabas of Princess ?emet-R? and others	Also P+M Map LVIII
866	D	63	MT	Iteti-Aknhris	6th Dynasty	P.357	Mariette 1889. Les mastabas de l'ancien empire: fragment du dernier ouvrage de A. Mariette	Mariette plan differs from P+M and UoP plans
867			MT	Thefu	6th Dynasty	Fig. 8	Hasan 1975. Mastabas of Princess ?emet-R? and others	
868	D	62	MT	Ptahhotep I	5th Dynasty	Fig. 12	Hasan 1975. Mastabas of Ny-?ankh-Pepy and others.	See also Mariette Mastabas pp351-356, and Murray Saqqara Mastabas pp.11-18
869	D	65	MT	Hemtre' Hemi	6th Dynasty	Fig. 1	Hasan 1975. Mastabas of Princess ?emet-R? and others	Also Mariette Mastabas p.360
870			MT	Akhtihotep Ipi-Uzau	6th Dynasty	P+M Map LVIII	Hasan 1975. Mastabas of Princess ?emet-R? and others	
871			MT	Mereri	6th Dynasty	Fig. 16 and 19	Hasan 1975. Mastabas of Princess ?emet-R? and others	
872			MT	Ptahhotep Iyni-Ankh	5th Dynasty	Fig. 30	Hasan 1975. Mastabas of Ny-?ankh-Pepy and others.	Late 5th/Early 6th dynasty
873			MT	Mehu	6th Dynasty	Hussein Ann. Serv. XLII, Fig. 114; also HASSAN, The Mastaba of Neb-Kaw-Her, Pl. 1	Saad 1940. Ann. Serv XL pp.687-90	Discrepancy between Hussein plan and that of Lauer (Saqqara). Internal features in Lauer are too big.
874			MT	Unis-ankh	5th Dynasty	HOLSCHER (U.) and MUNRO, Studien zur alt-ägyptischen Kultur, 3 (1975). Plan p.126; also HASSAN, The Mastaba of Neb-Kaw-Her, Pl. 1	Saad 1940. Ann. Serv XL pp.687	Part of the complex as Idut and Inefert but dated earlier than both
875			MT	Iyefert	6th Dynasty	HOLSCHER (U.) and MUNRO, Studien zur alt-ägyptischen Kultur, 3 (1975). Plan p.126; also HASSAN, The Mastaba of Neb-Kaw-Her, Pl. 1	Saad 1940. Ann. Serv XL pp.686-7	
876			MT	Unas-Haishtef Haishtef	MK	HOLSCHER (U.) and MUNRO, Studien zur alt-ägyptischen Kultur, 3 (1975). Plan p.126	SAAD in Ann. Serv. XL (1940), pp. 685-6	Built over Neferseshemtah mastaba
877			MT	Neferseshemtah	5th Dynasty	HOLSCHER (U.) and MUNRO, Studien zur alt-ägyptischen Kultur, 3 (1975). Plan p.126	HOLSCHER (U.) and MUNRO, Studien zur alt-ägyptischen Kultur, 3 (1975), pp. 115-17	Northern extent of tomb unclear due to exclusion from plan and having been overbuilt by Unas_haishtef Haishtef
878	Installation	X	MT	Unknown	5th/6th Dynasty	HOLSCHER (U.) and MUNRO, Studien zur alt-ägyptischen Kultur, 3 (1975). Plan p.126	HOLSCHER (U.) and MUNRO, Studien zur alt-ägyptischen Kultur, 3 (1975), pp. 118-20	Tentatively dated by association, publication does mention dating
879			MT	Nebt	5th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her, Pl. 1	Saad 1940. Ann. Serv XL pp. 683-4	Very similar to later tomb of Khenu which adjoins to west
880			MT	Khenut	5th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her, Pl. 1; also JACQUET-GORDON, Domaines, fig.158 on p.396	Saad 1940. Ann. Serv XL pp. 684-5	Adjoins tomb of Nebt to east, western extent uncertain, not included on plan
881			RcT	Herimeru Merery	6th Dynasty	HASSAN. Mastabas of Princess Hemet-R' and others. Figs. 36 and 43	HASSAN. Mastabas of Princess Hemet-R' and others. pp 69-81	Exact position uncertain; located using plans and satellite image
882			MT	Ni'ankh-pah	6th Dynasty	JACQUET-GORDON, Domaines, fig.164 on p.404; also HASSAN. The Mastaba of Neb-Kaw-Her, Pl. 1	See P+M p.627	Extent of this tomb is not clear from plan; adjoins that of Ptahshepses Impy to west

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
883			MT	Ptahshepses Impy	6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	See P+M p.626	Extent of tomb to south is not clear, my about the Unas causeway as shown in GIS
884			MT	Idu	6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	Probably 6th Dyn. based on structural association with Khenu. Could also be MK
885			MT	Khenu	6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	See P+M p.625	Extent of tomb uncertain from plan, shape is conjectural
886			MT	Isi	6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	See P+M p.626	Extent of tomb uncertain from plan, shape is conjectural
887			MT	Ni'ankh-pepi	6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	Probably 6th Dyn. Extent of tomb is uncertain from plan.
888			MT	Kheneni	Undated	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	Cannot find information on this person or their tomb
889			MT	Iy	6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1 (partial), also P+M map LXI for location	See P+M p.625	Limited information on this tomb
890			RcT	Iyehor	6th Dynasty	HASSAN. Mastabas of Princess Hemet-R' and others. Figs. 32 and 35	HASSAN. Mastabas of Princess Hemet-R' and others. pp 59-67	Located by satellite image
891			RcT	Ni'ankh-pepy & Ni-ankh-meryre'	6th Dynasty	HASSAN. Mastabas of Ny-'ankh-Pepy and Others. Fig.1	HASSAN. Mastabas of Ny-'ankh-Pepy and Others. pp.1-23	Located by satellite image
892			MT	Nebkauhor	6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	HASSAN. The Mastaba of Neb-Kaw-Her. Figs.1 and 23	External shape derived from satellite photo, more trapezoid than shown on plan
893			MT	Ni-ankhba	6th Dynasty	HASSAN. Mastabas of Princess Hemet-R' and others. Fig.25	HASSAN. Mastabas of Princess Hemet-R' and others. pp.41-8	External shape derived from satellite photo, more trapezoid than shown on plan
894			Boat	Unas	5th Dynasty			Drawn from satellite photo
895			MT	Kairer	5th/6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	LAUER in Ann. Serv. xxxvii (1937), pp. 107-9	Hassan plan shows internal line on tomb drawing, this has been left out
896			MT	Mitri	5th/6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	See P+M p.632	External shape derived from satellite photo, more rectangular than shown on plan
897			MT	Pehnufer	6th Dynasty	HASSAN. Mastabas of Princess Hemet-R' and others. Fig.26	HASSAN. Mastabas of Princess Hemet-R' and others. pp.49-51	
898			MT	Bebi	5th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	HASSAN in Ann. Serv. xxxviii (1938), pp. 505-6	
899			MT	Hetep	5th Dynasty	HASSAN. Mastabas of Princess Hemet-R' and others. Fig.28	HASSAN. Mastabas of Princess Hemet-R' and others. pp.53-8	North-east extent shown as dashed line on plan, probably no longer extant
900			MT	Ra'khuf	6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	HASSAN in Ann. Serv. xxxviii (1938), p. 506 [3]	Northern extent uncertain
901			MT	Unknown	Undated	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	
902			MT	Unknown	Undated	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	
903			MT	Unknown	Undated	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	
904			MT	Unknown	Undated	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	
905			MT	Unknown	Undated	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	
906			RcT?	Unknown	Undated	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	
907			MT	Unknown	Undated	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	May represent parts of the surrounding tombs, boundaries are unclear
908			MT	Nikauptah	6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	LAUER in Ann. Serv. xxxvii (1937), p. 109	Located by satellite photo
909			MT	Simery	6th Dynasty	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	LAUER in Ann. Serv. xxxvii (1937), p. 109	Located by satellite photo
910			MT?	Unknown	Undated	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	Superstructure appears to be built against a rock outcrop - tomb is probably rock-cut
911			MT?	Unknown	Undated	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	
912			MT?	Unknown	Undated	HASSAN. The Mastaba of Neb-Kaw-Her. Pl.1	Unknown	
913			RcT	Akhtihotp	5th/6th Dynasty	ZAYED. Ann Serv LV (1958). Pl 1	ZAYED. Ann Serv LV (1958). pp.129-137	Director of warb-priests of Sekhmet of the Great House
914			RcT	Ni'ankhre'	5th Dynasty	ZAYED. Ann Serv LV (1958). Pl 1	See P+M p.638	
915			Sht/Pit	Unknown	Undated	ZAYED. Ann Serv LV (1958). Pl 1	Unknown	
916			RcT	Unknown	Undated	ZAYED. Ann Serv LV (1958). Pl 1	Unknown	
917			RcT	Irukaptah Khenu	6th Dynasty	ZAYED. Ann Serv LV (1958). Pl 1	DE RACHEWILTZ	
918			RcT	Unknown	Undated	ZAYED. Ann Serv LV (1958). Pl 1	Unknown	
919			RcT	Unknown	Undated	ZAYED. Ann Serv LV (1958). Pl 1	Unknown	
920			RcT	Unknown	Undated	ZAYED. Ann Serv LV (1958). Pl 1	Unknown	
921			Unknown	Neferherenptah	5th Dynasty	Unknown	Unknown	Size and exact position of tomb unknown; included here for completeness
922			RcT	Unknown	Undated	ZAYED. Ann Serv LV (1958). Pl 1	Unknown	
923			RcT	Ptahshepses	Undated	ZAYED. Ann Serv LV (1958). Pl 1	Unknown	Probably of a similar date to the other rock-cut tombs in this cluster
924			RcT	Bou-nefer	Undated	ZAYED. Ann Serv LV (1958). Pl 1	Unknown	
925			RcT	Ankh	Undated	ZAYED. Ann Serv LV (1958). Pl 1	Unknown	Relationship to tomb chapel to east uncertain
926			MT?	Unknown	Undated	Unknown	Unknown	Drawn from satellite photo

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
927			RcT	Nefer and Kahay	5th Dynasty	MOUSSA and ALTENMULLER. The Tomb of Nefer and Ka-hay. Fig.2	MOUSSA and ALTENMULLER. The Tomb of Nefer and Ka-hay	Exact position of this cluster uncertain.General location on MOUSSA plan Fig.1. Located relative to Ni'ankh-khnum plan
928			RcT	Ankhirptah	5th Dynasty	MOUSSA and ALTENMULLER. The Tomb of Nefer and Ka-hay. Fig.2	MOUSSA and ALTENMULLER. The Tomb of Nefer and Ka-hay. p.10 [a-c]	Exact position of this cluster uncertain.General location on MOUSSA plan Fig.1. Located relative to Ni'ankh-khnum plan
929			RcT	Kai'ankh	5th Dynasty	MOUSSA and ALTENMULLER. The Tomb of Nefer and Ka-hay. Fig.2	MOUSSA and ALTENMULLER. The Tomb of Nefer and Ka-hay. p.10 [d]	Exact position of this cluster uncertain.General location on MOUSSA plan Fig.1. Located relative to Ni'ankh-khnum plan
930			RcT	Unknown	5th Dynasty	MOUSSA and ALTENMULLER. The Tomb of Nefer and Ka-hay. Fig.2	Unknown	Dated to 5th Dyn by association with others in this cluster. May be incorrect
931			RcT	Unknown	5th Dynasty	MOUSSA and ALTENMULLER. The Tomb of Nefer and Ka-hay. Fig.2	Unknown	Dated to 5th Dyn by association with others in this cluster. May be incorrect
932			MT/RcT	Ni'ankh-khnum & Khnemhotp	5th Dynasty	MOUSSA and ALTENMULLER. Das Grab des Nianchchnum und Chnumhotep. Abb.1 and 2	MOUSSA and ALTENMULLER. Das Grab des Nianchchnum und Chnumhotep	
933			RcT	Unknown	Undated	MOUSSA and ALTENMULLER. Das Grab des Nianchchnum und Chnumhotep. Abb.1 and 2	Unknown	Probably dates to OK
934			RcT	Unknown	Undated	MOUSSA and ALTENMULLER. Das Grab des Nianchchnum und Chnumhotep. Abb.1 and 2	Unknown	Probably dates to OK
935			RcT	Unknown	Undated	MOUSSA and ALTENMULLER. Das Grab des Nianchchnum und Chnumhotep. Abb.1 and 2	Unknown	Probably dates to OK
936			RcT	Unknown	Undated	MOUSSA and ALTENMULLER. Das Grab des Nianchchnum und Chnumhotep. Abb.1 and 2	Unknown	Probably dates to OK
937			RcT	Unknown	Undated	MOUSSA and ALTENMULLER. Das Grab des Nianchchnum und Chnumhotep. Abb.1 and 2	Unknown	Probably dates to OK
938			RcT	Irenkaptah	5th Dynasty	MOUSSA and JUNGE. Two Tombs of Craftsmen. Fig.1	MOUSSA and JUNGE. Two Tombs of Craftsmen. pp. 31-46	
939			RcT	Neferseshemptah and Sekhentiu	5th Dynasty	MOUSSA and JUNGE. Two Tombs of Craftsmen. Fig.1	MOUSSA and JUNGE. Two Tombs of Craftsmen. pp. 13-27	
940			DevTmpIT	Maya and Meryt	NK	MARTIN. JEA 74. Fig.1; RAVEN. The Memphite Tomb of Horemheb. Fig. 1.3	MARTIN. 2012. The Tomb of Maya and Meryt, I	Also see Martin JEA 74. 1988
941			DevTmpIT	Meryneith	NK	RAVEN. 2014. The tomb of Meryneith at Saqqara. Fig. 111.3	RAVEN. 2014. The tomb of Meryneith at Saqqara	Size of structure does not match between Raaven publications. Scale of structure on principle plan is smaller than on general plan????1252
942			PYR	Meryneith	NK	RAVEN. 2014. The tomb of Meryneith at Saqqara. Fig. 111.3	RAVEN. 2014. The tomb of Meryneith at Saqqara	Pyramid of Meryneith tomb
943			MemNKT	Ptahemwia	NK	Accessed online: http://www.saqqara.nl/excavations/tombs/ptahemwia/superstructure	M.J. Raven, The tomb of Ptahemwia: Akhenaten's ÔÇÿroyal butler, clean of hands', Minerva 18.5 (2007), 11-13.	
944			MemNKT	Sethnakht	NK	Accessed online: http://www.saqqara.nl/excavations/tombs/sethnakht/superstructure	M.J. Raven, H.M. Hays, B.G. Aston, R. Cappers, B. Deslandes and L. Hor Hïckov Hï, Preliminary report on the Leiden excavations at Saqqar????1252	
945			PT	Anonymous	NK	Accessed online: http://www.saqqara.nl/excavations/tombs/nn/superstructure	M.J. Raven, B.G. Aston, L. Hor Hïckov Hï, D. Picchi, and A. Bleeker, Preliminary report on the Leiden excavations at Saqqara, season 201????1252	Tomb of anonymous official
946			PYR	Anonymous	NK	Accessed online: http://www.saqqara.nl/excavations/tombs/nn/superstructure	M.J. Raven, B.G. Aston, L. Hor Hïckov Hï, D. Picchi, and A. Bleeker, Preliminary report on the Leiden excavations at Saqqara, season 201??????	Pyramid of anonymous official
947			ChpIT and ShT	Tatia	NK	Accessed online: http://www.saqqara.nl/excavations/tombs/tatia/superstructure	M.J. Raven, H.M. Hays et al., Preliminary Report on the Leiden Excavations at Saqqara, Season 2009: the tombs of Khay II and Tatia,????1252	
948			MemNKT	Pay	NK	Accessed online: http://www.saqqara.nl/excavations/tombs/pay--raia/superstructure	Raven, M.J., et al., The Tomb of Pay and Ra'ia at Saqqara (Leiden and London, 2005).	Plan shown with extended south-east corner on Pisa maps
949			ST	Unknown	NK			Unknown owner, probably dates to NK by association
950			PT	Iniuia	NK	Accessed online: http://www.saqqara.nl/excavations/tombs/iniuia/superstructure	Schneider, H.D., The Tomb of Iniuia in the New Kingdom necropolis of Memphis at Saqqara (Turnhout 2012)	
952			MemNKT	Pabes	NK	Martin. Hidden Tombs. Fig. 91	Martin, G.T., et al., The Tombs of Three Memphite Officials, Ramose, Kha'y and Pabes (London, 2001).	Size of tomb on plan does not fit exactly between the tombs of Horemheb and Ramose
953			PT	Khay	NK	Martin. Hidden Tombs. Fig. 89	Martin, G.T. et al., The Tombs of Three Memphite Officials, Ramose, Kha'y and Pabes (London, 2001).	Overlies tomb of Ramose
954			MemNKT	Paser	NK	Martin. Hidden Tombs. Fig. 79	Martin, G.T., et al., The Tomb-chapels of Paser and Ra'ia at Saqqara (London, 1985).	Adjoins Horemheb. Surrounded by later tomb shafts.
955			PT?	Amenmose?	Undated	Martin. Hidden Tombs. Fig. 79	Unknown	Shown in part on the Paser plan. Appears to predate Paser tomb
956			ChpIT	Ra'ia	NK	Martin. Hidden Tombs. Fig. 81	Martin, G.T., et al., The Tomb-chapels of Paser and Ra'ia at Saqqara (London, 1985).	
957			DevTmpIT	Horemheb	NK	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.1	Raven, M.J., V. Verschoor, M. Vugts and R. van Walsem. The Memphite Tomb of Horemheb, Commander-in-Chief of Tutankhamun, V: The Fore??????	

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
958			ShT	Nennamediamen?	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	Shown as shaft A on plan
959			ShT	Yrdjedy	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	Superstructure not extant
960			ShT	Pamershenut?	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	Superstructure not extant
961			DevTmpIT	Tia and Tia	NK	Martin. Hidden Tombs. Fig. 64	Martin, G.T., et al., The Tomb of Tia and Tia, a Royal Monument of the Ramesside Period in the Memphite Necropolis (London, 1997).	
962			MemNKT	Ramose	NK	Martin. 1987. JEA 73. Fig.1	Martin, G.T. et al., The Tombs of Three Memphite Officials, Ramose, Kha'y and Pabes (London, 2001).	
963			ShT	Neferabu	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
964			ShT	Sementawy and Pena'a	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
965			ShT	Unknown	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
966			ShT	Unknown	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
967			ShT	Unknown	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
968			ShT	Unknown	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
969			ShT	Unknown	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
970			ShT	Unknown	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
971			ShT	Unknown	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
972			ShT	Unknown	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
973			ShT	Unknown	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
974			?	Unknown	Undated	Raven. 2011. The Memphite Tomb of Horemheb. Fig. 1.2	Unknown	
975			ShT	Unknown	Undated	Martin. Hidden Tombs. Fig. 79	Unknown	Labelled as B
976			ShT	Unknown	Undated	Martin. Hidden Tombs. Fig. 79	Unknown	Labelled as C
977			ShT	Unknown	Undated	Martin. Hidden Tombs. Fig. 79	Unknown	Labelled as D
978			ShT	Unknown	Undated	Martin. Hidden Tombs. Fig. 79	Unknown	Labelled as F
979			?	Unknown	Undated	Drawn and located from satellite image	Unknown	This feature has an obvious enclosure but uncertain as to what the actual structure is
980			?	Unknown	Undated	Drawn and located from satellite image	Unknown	
981	ST	6	MemNKT	Djehouty-m-Heb	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Information accessed online: http://saqqara.farch.cu.edu.eg/List_of_tombs.html . 05/09/16
982	ST	7	MemNKT	Neb-mehyt	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Information accessed online: http://saqqara.farch.cu.edu.eg/List_of_tombs.html . 05/09/16
983	ST	5	MemNKT	Ta-sa-Hewy	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Information accessed online: http://saqqara.farch.cu.edu.eg/List_of_tombs.html . 05/09/16
984	ST	8	DevTmpIT	Bakt-wer-ner	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Information accessed online: http://saqqara.farch.cu.edu.eg/List_of_tombs.html . 05/09/16
985	ST	1	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Date not certain. Not included with OK tombs in publication so assumed to be OK.
986	ST	2	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Date not certain. Not included with OK tombs in publication so assumed to be OK.
987	ST	3	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Date not certain. Not included with OK tombs in publication so assumed to be OK.
988	ST	4	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Date not certain. Not included with OK tombs in publication so assumed to be OK.
989	ST	0	DevTmpIT	Nefer Renpet	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Not clearly labelled on the publication plan
990	ST	9	DevTmpIT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Incomplete plan; not fully excavated?
991	ST	101	DevTmpIT	Imen-m-Inet	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	My translation of the name may be incorrect
992	ST	102	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
993	ST	103	DevTmpIT	Nefer-hetep	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
994	ST	104	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
995	ST	105	DevTmpIT	Ia-nefer	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
996	ST	106	MemNKT?	Kha-m-ipet?	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
997	ST	107	DevTmpIT	Rames-sw-nakht?	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
998	ST	?	Unknown	Unknown	Undated	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Unclear as to what this feature relates to, certainly post-dates ST107
999	ST	108	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1000	ST	201	DevTmpIT	Sewener	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1001	ST	202	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1002	ST	203	DevTmpIT	User-maat-ra-nakht	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1003	ST	204	MemNKT?	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Partial tomb plan, not fully excavated?
1004	ST	205	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1005	ST	206	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1006	ST	207	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1007	ST	208	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1008	ST	209/210	Unknown	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1009	ST	211	DevTmpIT	Tjay-djed-enef-Ra-mes-sw-nakht	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1010	ST	212	Unknown	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1011	ST	213	MemNKT?	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1012	ST	214	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1013	ST	215	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1014	ST	216	ShT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1015	ST	217	DevTmpIT	Neb-nefer	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1016	ST	218	DevTmpIT	Mehu	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1017	ST	219	DevTmpIT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1018	ST	220	DevTmpIT	Unknown	NK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	Only shown as partially excavated on plan, north-side of structure recreated using the south-side
1019	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1020	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1021	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1022	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1023	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1024	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1025	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1026	ST	?	ShT and ?	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
1027	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1028	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1029	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1030	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1031	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1032	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1033	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1034	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1035	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1036	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1037	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1038	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1039	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1040	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1041	ST	?	ShT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1042	ST	?	RcT	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1043	ST	?	RcT?	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1044	ST	?	RcT?	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1045	ST	?	RcT?	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1046	ST	?	ShT and Enc?	Unknown	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1047	ST	?	MT	Men-nefer	OK	Fig. 1	Tawfik S. Recently Excavated Ramesside Tombs at Saqqara. 1. Architecture. MDAIK 47. pp. 403-409. 1990.	
1048			MT	Uzahateti Neferseshemtah Sheshi	6th Dynasty	Loret - Fouille dans la necropole Memphite; also Capart Rue de Tombeaux. Planche LXXIV	Loret. 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1049			MT	Ka-aper	OK	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Kanawati plans of this feature do not match each other!
1050			MT	Inumin	OK	Pl. 69	Kanawati. The Teti Cemetery at Saqqara. Vol. VIII. The Tomb of Inumin	
1051			Enc	Unknown	NK	Pl. 68	Kanawati. The Teti Cemetery at Saqqara. Vol. VIII. The Tomb of Inumin	Not shown in full on Kanawati plan
1052			MT	Nedjet-em-pet	OK	Pl. 36	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	
1053			Path	-	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Serapeum Way
1054			Wall	-	OK/MK	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Wall extending from the Mereruka Mastaba
1055	R	248	PT	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Small tomb intrusive to Mereruka Mastaba?
1056	R	247	PT	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Small tomb intrusive to Mereruka Mastaba?
1057			PT?	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Small tomb unnumbered and undated
1058		250	PT?	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Numbered but not dated
1059	R	245	PT?	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R245
1060	R	246	PT?	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R246

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
1153	S	18	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1154	S	16	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1155	S	17	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1156	S	6	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1157		2615	ShT	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1158			Chpl	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Probably associated with shaft 2615
1159			ShT	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1160			Grave?	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1161			ShT	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1162		52; 53; 03	Grave	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1163	R	241	PT?	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R241
1164	R	380	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R380
1165	R	381	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R381
1166	R	382/230	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R382/230
1167	R	238	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R238
1168	R	237	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R237
1169			ShT	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1170	R	232	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R232
1171	R	233	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R233
1172	R	236	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R236
1173	R	242	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R242
1174	R	234	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R234
1175	R	231	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R231
1176	R	230	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R230
1177	R	228	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R228
1178	R	227	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R227
1179	R	225	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R225
1180	R	226	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R226
1181	R	228	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R228
1182	R	223	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R223
1183	R	222	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R222
1184	R	224	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of tomb R224
1185	R	221	ShT/Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Position of three tombs
1186			ShT/Grave	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Unknown feature
1187			ShT/Grave	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	Unknown feature

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
1225	S	110	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1226	S	104	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1227	S	109	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1228	S	103	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1229	S	131	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1230	S	102	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1231	S	130	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1232	S	200	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1233	S	127	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1234	S	101	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1235	S	190	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1236	S	188	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1237	S	198	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1238	S	189	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1239	S	197	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1240	S	192	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1241	S	204	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1242	S	207	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1243		132	Grave	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1244		118	Grave	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1245			Grave	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1246			Grave	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1247	S	17	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1248	S	203	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1249			Grave	Unknown	Undated	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1250	R	180	Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1251	R	182	Grave	Unknown	Roman	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1252	S	144	Grave	Unknown	LP	Plan of excavations West of the Mastaba of Mereruka	Quibell and Hayter 1927. Teti Pyramid North Side	
1255			MT	Desi	6th Dynasty	Plate I	Davies, El-Khouli, Lloyd and Spencer. Saqqara Tombs I. Mastabas of Mereri and Wernu 1984.	See also Droiton, Ann. Serv 1943, Plate XLVII
1256			MT	'Ankh	6th Dynasty	Plate I	Davies, El-Khouli, Lloyd and Spencer. Saqqara Tombs I. Mastabas of Mereri and Wernu 1984.	Dated by surrounding tombs, no description in P+M
1257			MT	Meru Tetisonb	6th Dynasty	Plate I	Davies, El-Khouli, Lloyd and Spencer. Saqqara Tombs I. Mastabas of Mereri and Wernu 1984.	Name from P+M
1258			MT	Semdent	6th Dynasty	Plate I	Davies, El-Khouli, Lloyd and Spencer. Saqqara Tombs I. Mastabas of Mereri and Wernu 1984.	
1259			MT	Ihyemsaf	6th Dynasty	Plate I	Davies, El-Khouli, Lloyd and Spencer. Saqqara Tombs I. Mastabas of Mereri and Wernu 1984.	Probably 6th Dyn, dated by spatial association
1260	Mastaba	B	MT	Unknown	6th Dynasty	Plate I	Davies, El-Khouli, Lloyd and Spencer. Saqqara Tombs I. Mastabas of Mereri and Wernu 1984.	Labelled 'B'. Probably 6th Dyn, dated by spatial association
1261	Mastaba	A	MT	Unknown	6th Dynasty	Plate I	Davies, El-Khouli, Lloyd and Spencer. Saqqara Tombs I. Mastabas of Mereri and Wernu 1984.	Labelled 'A'. Probably 6th Dyn, dated by spatial association
1262			MT	Unknown	OK	Plate I	Davies, El-Khouli, Lloyd and Spencer. Saqqara Tombs I. Mastabas of Mereri and Wernu 1984.	Labelled 'H'. Probably 6th Dyn, dated by spatial association
1263			MT	Khui	6th Dynasty	Plate I	Davies, El-Khouli, Lloyd and Spencer. Saqqara Tombs I. Mastabas of Mereri and Wernu 1984.	See also Droiton, Ann. Serv 1943, Plate XLVII
1264			MT	Tjetetu	6th Dynasty	Plate I	Kanawati & El-Khouli. Excavations at Saqqara. North-west of Teti's Pyramid. Vol II	Named Thetut in P+M
1265			MT	Memi	6th Dynasty	Plate I	Kanawati & El-Khouli. Excavations at Saqqara. North-west of Teti's Pyramid. Vol II	
1266			MT	Tjetji	6th Dynasty	Plate I	Kanawati & El-Khouli. Excavations at Saqqara. North-west of Teti's Pyramid. Vol II	
1267			MT	Irenakhti	6th Dynasty	Plate I	Kanawati & El-Khouli. Excavations at Saqqara. North-west of Teti's Pyramid. Vol II	
1268			PT?	Iries	6th Dynasty	Plate I	Kanawati & El-Khouli. Excavations at Saqqara. North-west of Teti's Pyramid. Vol II	Date attributed by spatial association - may be later

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
1269			MT	Mehi	6th Dynasty	Plate I	Kanawati & El-Khouli. Excavations at Saqqara. North-west of Teti's Pyramid. Vol II	
1270			MT	Desi	6th Dynasty	Plate I	Kanawati & El-Khouli. Excavations at Saqqara. North-west of Teti's Pyramid. Vol II	
1271			PT?	Unknown	OK	Plate I	Kanawati & El-Khouli. Excavations at Saqqara. North-west of Teti's Pyramid. Vol II	Unlabelled on plan
1272			MT	Iri/Tetiseneb	6th Dynasty	Plate I	Kanawati & El-Khouli. Excavations at Saqqara. North-west of Teti's Pyramid. Vol II	
1273	Mastaba	C	MT	Unknown	6th Dynasty	Plate I	Kanawati & El-Khouli. Excavations at Saqqara. North-west of Teti's Pyramid. Vol II	Date attributed by spatial association
1275			MT	Nikauisesi	6th Dynasty	Plate 39	Kanawati & Abder-Raziq. The Teti Cemetery at Saqqara Vol VI - The Tomb of Nikauisesi	
1276			MT	Hesi	6th Dynasty	Plate 47	Kanawati & Abder-Raziq. The Teti Cemetery at Saqqara Vol V - The Tomb of Hesi	
1277			MT	Ptahshepses	6th Dynasty	Plate 2	Quibell and Hayter 1927. Teti Pyramid North Side	Uncertain whether features to the east in the vicinity of Nedjet-em-pet are also connected with Ptahsheses tomb. Also named Shepsipu??????
1278	S	2733	PT	Unknown	OK	Plate 2	Quibell and Hayter 1927. Teti Pyramid North Side	Full extent of structure not clear from plan
1279	S	2730	PT	Ipuia	NK	Plate 2	Quibell and Hayter 1927. Teti Pyramid North Side	Also called Apuia, partial feature to the north may also belong to this tomb
1280	S	2736	PT	Ipuia	NK	Plate 2	Quibell and Hayter 1927. Teti Pyramid North Side	Unclear if structural elements projecting south are actually part of this tomb
1281	S	2734	Unknown	Gemni?	LP	Plate 2	Quibell and Hayter 1927. Teti Pyramid North Side	Difficult to determine exactly what this feature is as it is only represented by a single block on the plan. P+M dates to LP p547
1282			Unknown	Unknown	LP	Plate 2	Quibell and Hayter 1927. Teti Pyramid North Side	Unclear what this structure represents
1283			Unknown	Unknown	OK	Plate 2	Quibell and Hayter 1927. Teti Pyramid North Side	Paved area, possibly a forecourt for a now lost structure?
1284	S	2757	PT?	Usermut and Inpuemhet Inpu	MK	Plate 2	Quibell and Hayter 1927. Teti Pyramid North Side	Fragmentary structure
1285			Unknown	Unknown	Undated	Plate 2	Quibell and Hayter 1927. Teti Pyramid North Side	Difficult to understand the association of this fragmentary structure and surrounding features
1287	S	2735	PT	Huy	NK	Plate 2	Quibell and Hayter 1927. Teti Pyramid North Side	Fragmentary feature, not clear from plan if any other features belong to this structure. Also labelled LS12
1288			Unknown	Unknown	Undated	Plate 2	Quibell and Hayter 1927. Teti Pyramid North Side	May relate to S2730, Tomb of Ipuia. Plan phasing does not make sense!
1289			ShT	Unknown	Undated	Pl. 36	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Tomb shafts
1290	95/	51	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Rectangular coffin
1291	95/	57	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Rectangular coffin
1292	95/	58	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin
1293	95/	59	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin
1294	95/	56	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin
1295	95/	55	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin
1296	95/	54	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin
1297	95/	66	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin
1298	95/	64	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin
1299	95/	65	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin
1300	95/	63	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin
1301	95/	62	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin
1302	95/	61	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin
1303	94/	9	Burial	Unknown	Undated	The Teti Cemetery at Saqqara. Vol. IV. Pl. 2	Kanawati. The Teti Cemetery at Saqqara. Vol. I. The Tombs of Nedjet-em-pet, Ka-aper and others	Coffin

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
1468		106	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1469		107	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1470		108	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1471		109	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1472		110	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1473		111	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1474		112	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1475		113	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1476		114	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1477		64	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1478		115	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1479		116	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1480		117	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1481		118	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1482		119	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1483		120	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1484		121	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1485		122	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1486		123	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1487		124	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1488		125	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1489		59	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1490		60	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1491		58	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1492		57	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1493		56	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1494		128	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1495		129	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1496		126	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1497		127	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1498		130	ShT	Unknown	OK	p100. Fouilles dan la Necropole Memphite	Loret 1899. Bulletin de l'Institut Egyptien. Ser 10 iii	
1499			ShT	Unknown	LP	Plate IV	James 1953. The Mastaba of Khentika called Ikhekhi	
1500			ShT	Unknown	LP	Plate IV	James 1953. The Mastaba of Khentika called Ikhekhi	
1501			ShT	Unknown	LP	Plate IV	James 1953. The Mastaba of Khentika called Ikhekhi	
1502			ShT	Unknown	LP	Plate IV	James 1953. The Mastaba of Khentika called Ikhekhi	
1503			ShT	Unknown	OK	Plate IV	James 1953. The Mastaba of Khentika called Ikhekhi	
1504	Shaft	B	ShT	Ikhekhi family members?	OK	Plate IV	James 1953. The Mastaba of Khentika called Ikhekhi	
1505	Shaft	A	ShT	Ikhekhi family members?	OK	Plate IV	James 1953. The Mastaba of Khentika called Ikhekhi	
1506			Unknown	Unknown	Undated	UoP cartography	Unknown	Unknown structure displayed on the UoP cart., has been added for completeness
1507			MT	Wernu	6th Dynasty	Plate I	Davies, El-Khouli, Lloyd and Spencer. Saqqara Tombs I. Mastabas of Mereri and Wernu 1984.	Southern extents of tomb unclear
1508			MT	Mereri	6th Dynasty	Plate I	Davies, El-Khouli, Lloyd and Spencer. Saqqara Tombs I. Mastabas of Mereri and Wernu 1984.	Southern extents of tomb unclear
1509			Unknown	Hefi	OK	Plate 41	Kanawati & Abder-Raziq. Mereruka and his Family. Part I. The Tomb of Meryteti	Dated based on spatial association
1510			MT	Ishfi	6th Dynasty	Plate I	Kanawati & El-Khouli. Excavations at Saqqara. North-west of Teti's Pyramid. Vol II	
1511			MT	Remni	OK	Plate 41	Kanawati & Abder-Raziq. Mereruka and his Family. Part I. The Tomb of Meryteti	Dated based on spatial association
1512			MT	Qar	OK	Plate 41	Kanawati & Abder-Raziq. Mereruka and his Family. Part I. The Tomb of Meryteti	Dated based on spatial association

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
1513			MT	W	OK	Plate 41	Kanawati & Abder-Raziq. Mereruka and his Family. Part I. The Tomb of Meryteti	Dated based on spatial association
1514			MT	Iri/Ptahhetep	OK	Plate 41	Kanawati & Abder-Raziq. Mereruka and his Family. Part I. The Tomb of Meryteti	Dated based on spatial association
1515			MT	Unknown	OK	Plate 41	Kanawati & Abder-Raziq. Mereruka and his Family. Part I. The Tomb of Meryteti	Dated based on spatial association
1516			MT	Unknown	OK	Plate 41	Kanawati & Abder-Raziq. Mereruka and his Family. Part I. The Tomb of Meryteti	Dated based on spatial association
1517			MT	Mereri (Merynebti)	OK	Plate 41	Kanawati & Abder-Raziq. Mereruka and his Family. Part I. The Tomb of Meryteti	Dated based on spatial association
1518			MT	Seankhhuipthah	OK	Plate 41	Kanawati & Abder-Raziq. Mereruka and his Family. Part I. The Tomb of Meryteti	Dated based on spatial association
1519			MT	Unknown	OK	Plate 41	Kanawati & Abder-Raziq. Mereruka and his Family. Part I. The Tomb of Meryteti	Dated based on spatial association. No plan shown, labelled in plan key
1520			MT	Teti-ankh-km	OK	Fig. 2	Hawass 2010. Perspectives on Ancient Egypt. The Excavation of the Headless Pyramid, Lepsius XXIX	External structures may not relate to the mastaba, this is unclear from the plan, although they do abut the tomb
1521			PYR	Sesheshet?	OK	Fig. 2	Hawass 2010. Perspectives on Ancient Egypt. The Excavation of the Headless Pyramid, Lepsius XXIX	Eastern part of external wall is conjectural, based on alignment and satellite image. See also http://news.nationalgeographic.com/ne?????
1522	BN	2	RcT	Pa-shery-ta-isw	LP	Fig. 3	El Naggar 1978. Etude Preliminaire du Plan du Tombeau de Bocchoris a Saqqara. Egitto E Vicino Oriente I	External walls assumed to relate to tomb and date to the same. Bresciani's transliteration of name is slightly ambiguous, uses a j????1252
1523	BN	1	RcT	Hapimen?	LP	Fig. 3	El Naggar 1978. Etude Preliminaire du Plan du Tombeau de Bocchoris a Saqqara. Egitto E Vicino Oriente I	See also Bresciani 1978 L'ATTIVITA' ARCHEOLOGICA IN EGITTO DELL'UNIVERSITA' DI PISA: SAQQARA 1974 - 1977. See Stammers 2009, p.125 f????RcT
1524	LS	24	RcT	Bakenrenef	LP	Fig. 7. Page 54 Epoque Saite	El Naggar 1978. Etude Preliminaire du Plan du Tombeau de Bocchoris a Saqqara. Egitto E Vicino Oriente I	Plan of the tomb during the Saite period
1525	LS	24	RcT	Bakenrenef	LP	Figs 2 and 3. See also El Naggar 1978 Fig. 5	Bresciani et al 1983. La galleria di Padineit, Visir di Nectanebo I: Tomba di Boccori.	26th Dynasty galleries
1526	LS	24	RcT	Bakenrenef	LP	Figs 2 and 3. See also El Naggar 1978 Fig. 7	Bresciani et al 1983. La galleria di Padineit, Visir di Nectanebo I: Tomba di Boccori.	27th Dynasty galleries
1527	LS	24	RcT	Bakenrenef	LP	Fig 1. See also El Naggar 1978 Fig. 8	Bresciani 1978 L'ATTIVITA' ARCHEOLOGICA IN EGITTO DELL'UNIVERSITA' DI PISA: SAQQARA 1974 - 1977	Post 30th Dynasty modifications
1528	BS	1	RcT	Unknown	Undated	Fig 2.	Bresciani et al 1983. La galleria di Padineit, Visir di Nectanebo I: Tomba di Boccori.	Probably dates to the LP like BN 1 and 2, appears to have a similar entrance construction
1529			RcT	Unknown	Undated	Fig 2.	Bresciani et al 1983. La galleria di Padineit, Visir di Nectanebo I: Tomba di Boccori.	Shown as dashed-outline on the plan, this rock-cut vault is not discussed. It is unclear whether this relates to Bakenrenef or tomb ???????
1530	I	1	RcT	Aper-El/Aperia	NK	Pl.1	Zivie 2009. La Tombe de Maia	
1531	I	3	RcT	Resh	NK	Pl.1	Zivie 2009. La Tombe de Maia	
1532	I	2	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	Extent of tomb unclear
1533	I	5	RcT	Mery-Sekhmet	NK	Pl.1	Zivie 2009. La Tombe de Maia	Extent of tomb unclear
1534	I	6	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	Extent of tomb unclear
1535	I	7	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	Extent of tomb unclear
1536	I	8	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	Extent of tomb unclear
1537	I	9	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	Extent of tomb unclear
1538	I	10	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	Extent of tomb unclear
1539	I	11	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	Extent of tomb unclear, external features presumed to relate to tomb
1540	I	12	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	Extent of tomb unclear
1541	I	13	RcT	Seth(esh)	NK	Pl.1	Zivie 2009. La Tombe de Maia	
1542	I	15	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	Internal space of tomb is unclear
1543	I	14	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	This represents a marker for this tomb, dimensions not shown on plan
1544	I	16	RcT	Netcherouymes	NK	Pl.1	Zivie 2009. La Tombe de Maia	
1545	I	17	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	This represents a marker for this tomb, dimensions not shown on plan
1546	I	18	RcT	Unknown	NK	Pl.1	Zivie 2009. La Tombe de Maia	Internal extent not shown on plan, marked out for convenience
1547	I	19	RcT	Tombe dite ""des artistes""	NK	Pl.1	Zivie 2009. La Tombe de Maia	
1548	I	21	RcT	Pen-Renout	NK	Pl.1	Zivie 2009. La Tombe de Maia	
1549	I	27	RcT	Raiay/Hatiay	NK	Pl.1	Zivie 2009. La Tombe de Maia	
1550	I	20	RcT	Maia	NK	Pl.1	Zivie 2009. La Tombe de Maia	Upper level
1551	I	20	RcT	Maia	NK	Pl.1	Zivie 2009. La Tombe de Maia	Lower levels

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
1552	ll	4	RcT	Mery-Ra (Sennefer?)	NK	Pl.1	Zivie 2009. La Tombe de Maia	This represents a marker for this tomb, dimensions not shown on plan
1553	sh	AQT	ShT	Sekhmet-em-heb(t)?	NK	Pl. 3	Giddy 1992. Anubieion at Saqqara II	
1554	sh	?	ShT	Unknown	NK/TIP	Pl. 3	Giddy 1992. Anubieion at Saqqara II	
1555	sh	ASQ	ShT	Unknown	NK/TIP	Pl. 3	Giddy 1992. Anubieion at Saqqara II	
1556	sh	BEU	ShT	Unknown	NK/TIP	Pl. 3	Giddy 1992. Anubieion at Saqqara II	
1557	sh	ASN	ShT	Unknown	NK/TIP	Pl. 3	Giddy 1992. Anubieion at Saqqara II	
1558			Chpl	Unknown	NK	Pl. 3	Giddy 1992. Anubieion at Saqqara II	Partial tomb chapels?
1559			Chpl	Unknown	NK	Pl. 3	Giddy 1992. Anubieion at Saqqara II	Columns from tomb chapel
1560		BBR	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1561		BBH	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1562		BBJ	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1563		BBI	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1564		BLR	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1565		BWA	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1566		BWB	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1567		BLY	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1568		BLQ	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1569		BLW	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1570		BLX	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1571		BNI	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1572		BLV	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1573		BLU	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1574		BLS	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1575		BND	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1576		BMT	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1577		BMU	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1578		BBB	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1579		BWJ	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1580		BWL	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1581		BWM	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1582		BWK	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1583		BLB	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1584		BLA	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1585		BWS	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1586		BWN	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1587		BOC	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1588		BIU	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1589		BLZ	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1590		BBW	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1591		BBV	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1592		BWC	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1593		BBA	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1594		BWD	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1595		BWO	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1596		BWH	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1597		BWG	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1598		BWF	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1599		BWI	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1600		BWE	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1601		BBM	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1602		BLK	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
1603		BLE	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1604		BIX	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1605		BOB	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1606		BLD	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1607		BLO	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1608		BOX	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1609		BOY	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1610		BOZ	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1611		BIB	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1612		BIC	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1613		BBF	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1614		BBZ	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1615		BLL	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1616		BLN	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1617		BBQ	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1618		BBS	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1619		BBT	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1620		BBU	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1621		BLI	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1622		BLG	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1623		BLH	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1624		BIT	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1625		BIV	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1626		BIW	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1627		BBG	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1628		BBK	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1629		BLM	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1630		BBL	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1631		BOK	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1632		BIR	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1633		BBP	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1634		BBY	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1635		BOO	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1636		BLC	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1637		BOS	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1638		BOE	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1639		BOG	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1640		BIK	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1641		BOJ	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1642		BOL	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1643		BON	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1644		BOW	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1645		BIG	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1646		BOQ	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1647		BOU	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1648		BOT	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1649		BII	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1650		BIJ	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1651		BOV	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	
1652		BIY	Burial	Unknown	LP	Pl. 34	Giddy 1992. Anubieion at Saqqara II	

FeatId	Prefix	Number	Type	Tomb_owner	Date	Plan	Pub_ref	Notes
1653			PYR	Menkauhor Kaiu	5th Dynasty	Figs. 1 and 2	Hawass 2010. The Excavation of the Headless Pyramid, Lepsius XXIX, in Perspective on Ancient Egypt. Studies in Honour of Edward Brov????PYR	Precise position in relation to subsurface structure is uncertain, publication plans are not very accurate
1654			MT	Esbanebbed	LP	Plan 2	Lacher-Raschdorf 2014. Das Grab des Konigs Ninetjer in Saqqara	26th Dynasty
1655			MT	Mery-Isesi	6th Dynasty	Plan 2	Lacher-Raschdorf 2014. Das Grab des Konigs Ninetjer in Saqqara	see also Lauer Ann. Serv. XXXVII pp110-11
1656			MT	Seshemnufer Ifi	6th Dynasty	Plan 2	Lacher-Raschdorf 2014. Das Grab des Konigs Ninetjer in Saqqara	Not in P+M. Date from Lacher-Raschdorf - late 6th Dynasty
1657			MT?	Chentkaus	6th Dynasty	Plan 2	Lacher-Raschdorf 2014. Das Grab des Konigs Ninetjer in Saqqara	Not in P+M. Date from Lacher-Raschdorf
1658			MT?	Unknown	Undated	Plan 2	Lacher-Raschdorf 2014. Das Grab des Konigs Ninetjer in Saqqara	Unsure if this feature is a very large mastaba tomb or something else
1659			MT	Akhethetep	6th Dynasty	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	The main mastaba
1660	E	17	MT	Akhethotep	6th Dynasty	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Identified by Mariette, see Mastabas pp. 421-30
1661		J	MT	Akhethetep?	6th Dynasty	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Part of the larger funerary complex
1662	H	1	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba H
1663	H	2	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba H
1664	H	3	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba H
1665	H	4	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba H
1666	H	5	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba H
1667	H	6	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba H
1668	H	7	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba H
1669	Q	1	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba H
1670	Q	2	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba H
1671	Q	3	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba H
1672	Q	4	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba H
1673	H		MT	Unknown	OK	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	
1674	Q		MT	Unknown	OK	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	
1675	F	7	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into Akhethetep mastaba
1676	F	17	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into Akhethetep mastaba
1677	J	1	ShT	Unknown	LP	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Cut into mastaba J, may date to OK and is reused in LP. Also Coptic material recovered from shaft
1678	N	1	ShT	Unknown	OK	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	OK tomb recut and reused in the LP for communal burials
1679	M	1	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1680	M	2	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1681	M	3	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1682	M	4	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1683	M	5	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1684	M	6	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1685	M	7	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1686	M	8	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1687	M	9	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1688	M	10	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1689	M	11	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1690	M	12	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1691	M	13	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1692	M	14	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1693	M	15	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1694	M	16	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1695	M	17	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1696	M	18	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1697	M	19	ShT	Unknown	Undated	XXXVI Fig. 2	Ziegler 2013. Fouilles du Louvre A Saqqara II	Can't find any information on this tomb in Fouilles 1 or 2
1698			MT	Re-wer	6th Dynasty	Fig. 2	el Fikey 1980. The Tomb of the Vizier Re-Wer at Saqqara	

Other structures attribute table

Table A2.5. Other structures attribute data.

FeatId	Prefix	Feature	Phase/Period	Date	Area name	Plan reference	Publication reference	Notes
1	SrAp	Palace district	Unknown	LP	Serapeum Precinct	Kessler 1989. Abb. 5	Mariette 1882. Le Sérapeum de Memphis	Also Lauer 1976. Saqqara pp21-28
2	SrAp	Philosopher's Hemicycle	Unknown	GR	Serapeum Precinct	Kessler 1989. Abb. 5	Mariette 1882. Le Sérapeum de Memphis	Philosopher's Hemicycle. Also see Kamil 1978. Saqqara
3	SrAp	Pastophoria district	Unknown	LP	Serapeum Precinct	Kessler 1989. Abb. 5	Mariette 1882. Le Sérapeum de Memphis	Also Lauer 1976. Saqqara pp21-28
4	SrAp	East temple of Nectanebo II	Unknown	LP	Serapeum Precinct	Kessler 1989. Abb. 5	Mariette 1882. Le Sérapeum de Memphis	East Temple of Nectanebo II. 30th Dynasty. Structures located using the Hemicycle and satellite photo
5	SrAp	Doorway and Lion Statues of Nectanebo I	Unknown	LP	Serapeum Precinct	Kessler 1989. Abb. 5	Unknown	Pylon?
6	SrAp	Greek temple	Unknown	GR	Serapeum Precinct	Kessler 1989. Abb. 5	Unknown	Dedicated to Serapis
7	SrAp	Egyptian sanctuary	Unknown	LP	Serapeum Precinct	Kessler 1989. Abb. 5	Unknown	With Apis statue
8	SrAp	Dromos	Unknown	LP	Serapeum Precinct	Kessler 1989. Abb. 5	Mariette 1882. Le Sérapeum de Memphis	With Dionysian and Egyptian statues
9	SrAp	Portico?	Unknown	LP	Serapeum Precinct	Rhone 1884. L'Égypte à petites journées	Unknown	p216
10	SrAp	North Gate	Unknown	LP	Serapeum Precinct	Rhone 1884. L'Égypte à petites journées	Unknown	Geolocation of plan not definite, based on Rhone, de Morgan and Kessler, located on Hemicycle
11	SrAp	Central enclosure	Unknown	LP	Serapeum Precinct	Rhone 1884. L'Égypte à petites journées	Unknown	This feature may have better plans elsewhere. Unsure of feature name
12	SrAp	Main enclosure	Unknown	LP	Serapeum Precinct	Rhone 1884. L'Égypte à petites journées	Unknown	Also shown on de Morgan 1897. Dimensions differ from Rhone.
13	SGSP	Temple Site 1	Unknown	LP	Serapeum Precinct	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
14	SGSP	Probable temple	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
15	SGSP	Probable temple	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
16	SGSP	Temple platform?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
17	SGSP	Temple?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
18	SGSP	Temple?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
19	SGSP	Temple platform?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
20	SGSP	Temple?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
21	SGSP	Probable temple	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
22	SGSP	Temple?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
23	SGSP	Temple enclosure?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
24	SGSP	Temple enclosure?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
25	SGSP	?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
26	SGSP	Probable temple	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
27	SGSP	Probable temple	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
28	SGSP	Temple buildings?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
29	SGSP	Probable temple	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
30	SGSP	Temple enclosure?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
31	SGSP	Temple enclosure?	Unexcavated	LP	Serapeum North	Fig. 1, Fig. 10	Mathieson and Dittmer 2007	The Geophysical Survey of North Saqqara
32	Khaem	Mudbrick enclosure	18th Dynasty	NK	Khaemwaset monument	AS2000 Fig. 2	Yoshimura and Kawai 2003. Egyptian Archaeology 23. Abusir and Saqqara 2000 p161-172	Probable LP reuse AS2000 p167
33	Khaem	Khaemwaset stone monumnet	19th Dynasty	NK	Khaemwaset monument	AS2000 Fig. 2	Yoshimura and Kawai 2003. Egyptian Archaeology 23. Abusir and Saqqara 2000 p161-172	Mainly constructed from OK building blocks
34	Khaem	Mudbrick house	19th Dynasty	NK	Khaemwaset monument	AS2000 Fig. 2	Yoshimura. Abusir and Saqqara 2000 p161-172	Probably associated with the stone monument
35	Khaem	Limestone pavement	18th Dynasty	LP	Khaemwaset monument	AS2000 Fig. 2	Yoshimura. Abusir and Saqqara 2000 p167	Associated with the platform and mudbrick structure of Amenhotep II, LP reuse.
36	Khaem	Pyramid of Isisnofret	19th Dynasty	NK	Khaemwaset monument	Fig. 2	Kawai 2010. The Tomb of Isisnofret at Northwest Saqqara. in AS2010	Pyramid overlies burial chamber to north of temple
37	Khaem	Burial chamber of Isisnofret	19th Dynasty	NK	Khaemwaset monument	Fig. 2	Kawai 2010. The Tomb of Isisnofret at Northwest Saqqara. in AS2010	
38	Khaem	Burial shaft	19th Dynasty	NK	Khaemwaset monument	Fig. 2	Kawai 2010. The Tomb of Isisnofret at Northwest Saqqara. in AS2010	
39	Khaem	Tomb chapel of Isisnofret	19th Dynasty	NK	Khaemwaset monument	Fig. 2	Kawai 2010. The Tomb of Isisnofret at Northwest Saqqara. in AS2010	

FeatId	Prefix	Feature	Phase/Period	Date	Area name	Plan reference	Publication reference	Notes
40	Khaem	Funerary cache	19th Dynasty	NK	Khaemwaset monument	Fig. 2	Kawai 2010. The Tomb of Isisnofret at Northwest Saqqara. in AS2010	Belonging to Isisnofret
41	Khaem	Tomb forecourt	3rd/4th Dynasty	MK	Khaemwaset monument	Fig. 5. Abb. 3	Yoshimura, Kawai and Kashiwagi 2005. MDAIK Band 61	Entrance to subterranean tomb chambers associated with layered stone structure
42	Khaem	Tomb chambers	3rd/4th Dynasty	OK	Khaemwaset monument	Fig. 5. Abb. 3	Yoshimura, Kawai and Kashiwagi 2005. MDAIK Band 61	Subterranean tomb chambers accessed via forecourt
43	Khaem	Layered stone structure	3rd/4th Dynasty	OK	Khaemwaset monument	Fig. 4. Abb. 3.	Yoshimura, Kawai and Kashiwagi 2005. MDAIK Band 61. also A new early Old Kingdom layered stone structure in OKAA 2006	Stepped structure similar to Djoser pyramid construction. Similar stone used as Djoser and Sekhemkhet
44	Khaem	Chamber forecourt	Unknown	MK	Khaemwaset monument	MDAIK Fig. 20	Yoshimura and Kawai 2003. Egyptian Archaeology 23. Yoshimura, Kawai and Kashiwagi 2005. MDAIK Band 61	Circular holes in forecourt floor, unknown use
45	Khaem	Rock-cut chamber	Unknown	MK	Khaemwaset monument	MDAIK Fig. 20	Yoshimura and Kawai 2003. Egyptian Archaeology 23. Yoshimura, Kawai and Kashiwagi 2005. MDAIK Band 61	Cache of Lion and human statues discovered within
46		Anubieion	Various	LP	Anubieion	Fig. 1	Jeffreys and Smith 1988. The Anubieion at Saqqara I	External and major internal wall features from the Jeffreys volume
47		Bubastieion	Various	LP	Bubastieion	Fig. 1	Jeffreys and Smith 1988. The Anubieion at Saqqara I	External and major internal wall features from the Jeffreys volume
48		Anubieion	Various	LP	Anubieion	Fig. 1	Jeffreys and Smith 1988. The Anubieion at Saqqara I	
49		Anubieion	Various	LP	Anubieion	Fig. 1	Jeffreys and Smith 1988. The Anubieion at Saqqara I	
50		Anubieion	Various	LP	Anubieion	Fig. 1	Jeffreys and Smith 1988. The Anubieion at Saqqara I	

Sacred Animal Necropolis attribute table

Table A2.6. Sacred Animal Necropolis attribute data.

FeatId	Prefix	Feature	Phase	Area name	Plan reference	Publication reference	Notes
1	SAN	Gatekeepers Lodge	2bc-3	Main Temple Enclosure	Figures 3 and 7	Smith and Davies 2006. SAN Main Temple Complex	Generally omitted from the main plans
2	SAN	Buttress	2bc-3	Main Temple Enclosure	Figures 3 and 7	Smith and Davies 2006. SAN Main Temple Complex	Support for Terrace III
3	SAN	Structure Z	2bc-3	Main Temple Enclosure	Fig. 3	Smith and Davies 2006. SAN Main Temple Complex	Feature of unknown purpose
4	SAN	Main Enclosure South Wall	2bc-3	Main Temple Enclosure	Figures b, 3 and 7	Smith and Davies 2006. SAN Main Temple Complex	
5	SAN	South Gate	2bc-3	Main Temple Enclosure	Figures b, 3 and 7	Smith and Davies 2006. SAN Main Temple Complex	
6	SAN	Buttress	2bc-3	Main Temple Enclosure	Figures b, 3 and 7	Smith and Davies 2006. SAN Main Temple Complex	North-western buttress
7	SAN	Main Access Ramp	2bc-3	Main Temple Enclosure	Figures b, 3 and 7	Smith and Davies 2006. SAN Main Temple Complex	Also in Davies 2006. SAN The Mother of Apis and Baboon Catacombs
8	SAN	East-west Sacred Way	2bc-3	Main Temple Enclosure	Fig. 3	Smith and Davies 2006. SAN Main Temple Complex	
9	SAN	North-south Sacred Way	2bc-3	Main Temple Enclosure and Southern Dependencies	Fig. 3	Smith and Davies 2006. SAN Main Temple Complex	Extends beyond the MTE to the SD and probably continues south to the Serapaeum
10	SAN	Buttress	2bc-3	Northern Enclosure	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Support for Northern Enclosure
11	SAN	Buttress	2bc-3	Northern Enclosure	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Support within the Northern Enclosure for Terrace III
12	SAN	Northern Enclosure external wall	2bc-3	Northern Enclosure	Figures b, 3 and 5	Smith and Davies 2006. SAN Main Temple Complex	
13	SAN	Ramp	2bc-3	Northern Enclosure	Figures b, 3 and 5	Smith and Davies 2006. SAN Main Temple Complex	Multi-phase ramp to access the Mother of Apis catacombs
14	SAN	North Causeway	2bc-3	Main Temple Enclosure	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Access from Causeway D to the Northern Enclosure
15	SAN	Causeway D	2bc-3	Main Temple Enclosure	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Access to Precinct D
16	SAN	Causeway B	2bc-3	Main Temple Enclosure	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Access to Sanctuary B
17	SAN	Baboon Causeway	2bc-3	Main Temple Enclosure	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Access to Baboon Precinct
18	SAN	Screen Wall	2bc-3	Main Temple Enclosure/Falcon Precinct	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Screens off the Falcon Precinct and sanctuary
19	SAN	Baboon Chapel and chamber	2bc-3	Main Temple Enclosure/Baboon Dromos wall	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Set within the wall of the Baboon Precinct
20	SAN	Falcon Sanctuary	2bc-3	Falcon Precinct	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Set against the outer wall of the MTE within the area of the Falcon Precinct
21	SAN	Falcon Causeway	2bc-3	Falcon Precinct	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Access to the Falcon Sanctuary

FeatId	Prefix	Feature	Phase	Area name	Plan reference	Publication reference	Notes
22	SAN	Pathway	2bc-3	Main Temple Enclosure	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Access to Sanctuary A through Courtyard A and access to Causeway B in front of Pylon A
23	SAN	Pathway	2bc-3	Main Temple Enclosure/Falcon Precinct	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Short length of path joining Causeway B and Baboon Causeway
24	SAN	Courtyard A walls and doors	2bc-3	Courtyard A	Figures b and 3	Smith and Davies 2006. SAN Main Temple Complex	Rear walls of Courtyard A
25	SAN	Pylon A	2bc-3	Courtyard A	Figures b, 3 and 12	Smith and Davies 2006. SAN Main Temple Complex	Attached to the front of the courtyard walls, shown as a separate structural feature for the purpose of labeling
26	SAN	Portico to Sanctuary A	2bc-3	Courtyard A	Figures b, 3 and 12	Smith and Davies 2006. SAN Main Temple Complex	Stairs in front of portico not shown
27	SAN/SD	Pillared Wall	2bc-3	Sector 9	Fig. 8	Smith and Davies 2006. SAN Main Temple Complex	Screens mastaba S3536 from view of the N-S Sacred Way
28	SAN	Precinct D wall	1	Precinct D	Fig. 1	Smith and Davies 2006. SAN Main Temple Complex	Surrounds Precinct D to the north
29	SAN	Gate D	1	Precinct D	Fig. 1	Smith and Davies 2006. SAN Main Temple Complex	Entrance to Precinct D
30	SAN	Sanctuary A	1	Main Temple Enclosure	Fig. 1	Smith and Davies 2006. SAN Main Temple Complex	Serviced Vault A
31	SAN	Gate B	1	Precinct B	Fig. 1	Smith and Davies 2006. SAN Main Temple Complex	Entrance to Precinct B
32	SAN	Putative Precinct B wall	1	Precinct B	Fig. 1	Smith and Davies 2006. SAN Main Temple Complex	No evidence for this wall was discovered, but may have been removed by later phases
33	SAN	Terrace 1 retaining wall	1	Terrace I	Fig. 1	Smith and Davies 2006. SAN Main Temple Complex	Southern wall is conjectural, but must exist in some form. 2.35m wide at base, 1.95m wide at top
34	SAN	Stairway retaining walls	1	Terrace I	Fig. 1	Smith and Davies 2006. SAN Main Temple Complex	Plan is partly conjectural
35	SAN	Stairway 1	1	Terrace I	Fig. 1	Smith and Davies 2006. SAN Main Temple Complex	Leads up to Terrace I from the lower western terrace
36	SAN	Main Access Ramp walls	2a	Main Temple Enclosure	Fig. 2	Smith and Davies 2006. SAN Main Temple Complex	Retaining walls for ramp fill
37	SAN	Brick stairway	2a	Northern Enclosure	Fig. 2	Smith and Davies 2006. SAN Main Temple Complex	Earlier access to the MoA catacombs
38	SAN	Mother of Apis Gate	2a	Northern Enclosure/MoA Dromos	Fig. 2	Smith and Davies 2006. SAN Main Temple Complex	Plinths for the MoA gate, covered by later phase access ramp
39	SAN	Sanctuary B	2a	Baboon Precinct	Fig. 2	Smith and Davies 2006. SAN Main Temple Complex	Separated from the main precinct by the dromos walls
40	SAN	Baboon Gate	2a	Baboon Precinct	Fig. 2	Smith and Davies 2006. SAN Main Temple Complex	Entrance to the Baboon Dromos and (possibly) precinct
41	SAN	Structure X	2a	Terrace II	Fig. 2	Smith and Davies 2006. SAN Main Temple Complex	Southern wall never discovered, projected on the plan, not without issues. Unclear if this was a portico or something else
42	SAN	Terrace 2 retaining walls	2a	Terrace II	Fig. 2	Smith and Davies 2006. SAN Main Temple Complex	Southern retaining wall not fully excavated, project towards Baboon Gate. Not without issues, on current alignment cannot support putative southern side of Structure X
43	SAN	Terrace 2 buttress	2a	Terrace II	Fig. 2	Smith and Davies 2006. SAN Main Temple Complex	Chamfered buttress supporting Terrace II retaining walls
44	SAN	Access ramp	2a	Terrace II	Fig. 2	Smith and Davies 2006. SAN Main Temple Complex	Ramp leading up to Terrace II
45	SAN	Baboon Dromos retaining walls	2a	Baboon Precinct	Fig. 2	Smith and Davies 2006. SAN Main Temple Complex	Dromos walls to retain the precinct fill
46	SAN	Main Enclosure Wall	2a	Main Temple Enclosure	Fig. 2	Smith and Davies 2006. SAN Main Temple Complex	Main wall of the Temple Enclosure, altered by later phases of work
47	SIG	Garden Walls	?	South Ibis Garden/Sector 7	Martin: Plate 1 and 2a; Emery Plate XVIII	Martin 1981 SAN. The Southern Dependencies; Emery 1970.	Composite drawing, no single plan shows all of the features
48	SIG	Chapel	?	South Ibis Garden/Sector 7	Martin: Plate 1 and 2a; Emery Plate XVIII	Martin 1981 SAN. The Southern Dependencies; Emery 1970.	Composite drawing, no single plan shows all of the features
49	SIG	Watchman's Hut	?	South Ibis Garden/Sector 7	Martin: Plate 1 and 2a; Emery Plate XVIII	Martin 1981 SAN. The Southern Dependencies; Emery 1970.	Composite drawing, no single plan shows all of the features
50	SIG	Entrance stairway	?	South Ibis Garden/Sector 7	Martin: Plate 1 and 2a; Emery Plate XVIII	Martin 1981 SAN. The Southern Dependencies; Emery 1970.	Composite drawing, no single plan shows all of the features
51	SD	Block 4	2bc-3	Southern Dependencies/Sector 7	Plate 1A; Fig. 5	Martin 1981 SAN. The Southern Dependencies;	Probable platform for peripteral shrine. Proposed phasing uncertain, no strat relationship with SAN MTE
52	SD	Block 1	2bc-3	Southern Dependencies/Sector 7	Plate 1A; Fig. 3 and Fi. 31	Martin 1981 SAN. The Southern Dependencies;	Probable platform for peripteral shrine. Proposed phasing uncertain.
53	SD	Block 1 Courtyard	2bc-3	Southern Dependencies/Sector 7/Block 1	Plate 1A; Fig. 3 and Fi. 31	Martin 1981 SAN. The Southern Dependencies;	Courtyard drawn as shown on axonometric projection p83
54	SD	Ramp	2bc-3	Southern Dependencies/Sector 7/Block 1	Plate 1A; Fig. 3 and Fi. 31	Martin 1981 SAN. The Southern Dependencies;	Access ramp onto platform

FeatId	Prefix	Feature	Phase	Area name	Plan reference	Publication reference	Notes
55	SD	Pathway	2bc-3	Southern Dependencies/Sector 7/Block 1	Plate 1A; Fig. 3 and Fi. 31	Martin 1981 SAN. The Southern Dependencies;	Access to Block 1 from the N-S Sacred Way
56	SD	Block 2	2bc-3	Southern Dependencies/Sector 7	Plate 1A; Fig. 4	Martin 1981 SAN. The Southern Dependencies;	Includes partial walls unconnected to the main block feature
57	SD	Block 3	2bc-3	Southern Dependencies/Sector 7	Plate 1A; Fig. 4	Martin 1981 SAN. The Southern Dependencies;	Courtyard of the Ibis and the Falcon - sunken courtyard feature. With small walled feature to the northern side
58	SD	Ramp	2bc-3	Southern Dependencies/Sector 7/Block 3	Plate 1A; Fig. 4	Martin 1981 SAN. The Southern Dependencies;	Access ramp to block 3
59	SD	Block 5	1	Southern Dependencies/Sector 7	Plate 1A; Fig. 6	Martin 1981 SAN. The Southern Dependencies;	Shown as part of SAN MTE Phase 1. Possible foreign cult-temple p35 Carian?
60	SD	Block 5 pathway	1	Southern Dependencies/Sector 7/Block 5	Plate 1A; Fig. 6	Martin 1981 SAN. The Southern Dependencies;	Part walled pathway from the east leading to Block 5; wall may continue to east
61	SD	Block 7	2bc-3	Southern Dependencies/Sector 7	Plate 1A; Fig. 23	Martin 1981 SAN. The Southern Dependencies;	Probable platform for peripteral shrine.
62	SD	Ramp	2bc-3	Southern Dependencies/Sector 7/Block 7	Plate 1A; Fig. 23	Martin 1981 SAN. The Southern Dependencies;	Access to the platform
63	SD	Buildings on the South of Block 7	2bc-3	Southern Dependencies/Sector 7/Block 7	Plate 1A; Fig. 23	Martin 1981 SAN. The Southern Dependencies;	Domestic or administrative buildings attached to the terrace of Block 7
64	SD	Walls associated with Block 7 and Southern Buildings	2bc-3	Southern Dependencies/Sector 7/Block 7	Plate 1A; Fig. 23	Martin 1981 SAN. The Southern Dependencies;	
65	SD	Block 8	2bc-3	Southern Dependencies/Sector 7	Plate 1A; Fig. 29, 30 and 31	Martin 1981 SAN. The Southern Dependencies;	Possible gatekeepers structure associated with Block 1 and the N-S Sacred Way
66	SIG	South Ibis Garden	?	South Ibis Garden/Sector 7	Martin: Plate 1 and 2a; Emery Plate XVIII	Martin 1981 SAN. The Southern Dependencies; Emery 1970.	Central area of the garden
67	SAN	South House	2a	Sector 4	Martin 1974 JEA Excavations at North Saqqara. Figs. 10 and 11	Smith and Davies 2006. SAN Main Temple Complex. P72	Bovid effigy (H6-248 [2066]) discovered within. Probably associated with workmen's structures within MTE
68	SAN	Workmen's buildings	2a	Sector 4	Martin 1974 JEA Excavations at North Saqqara. Figs. 10 and 11	Smith and Davies 2006. SAN Main Temple Complex. P73	Wall and chamber, probably part of a larger building which remains unexcavated to the northern extent
69	SAN	Workmen's buildings, unmortared spur walls	2a	Sector 4	Martin 1974 JEA Excavations at North Saqqara. Figs. 10 and 11	Smith and Davies 2006. SAN Main Temple Complex. P73	Extent of walls to south remains uncertain
70	NIG	Raised garden bed plinths and wall	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	
71	NIG	Plinth?	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	
72	NIG	Ramp	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Access to garden area from the western pathway
73	NIG	Low garden walls	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Retaining walls for the garden beds
74	NIG	Raised garden bed	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Raised area for planting?
75	NIG	Statue plinth	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Plinth for Bes statue
76	NIG	Statue plinth	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Plinth for Bes statue
77	NIG	Eastern external wall	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Eastern wall of the garden
78	NIG	Paved area and pathway	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Pathway leading towards the catacombs
79	NIG	Southern external walls	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Southern garden walls against the cliff face. Walls probably continue west
80	NIG	Pathway	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Pathway leading to OK tomb
81	NIG	OK tomb chamber	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	OK tomb chamber
82	NIG	Threshold stones	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Threshold stones at the entrance to the catacomb stairway
83	NIG	Mudbrick walls	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Mudbrick walls lining the stairway to the dromos
84	NIG	Barrel-vaulted roof	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Remaining section of roof over dromos stairway
85	NIG	Raised garden bed	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	Contained evidence of probable tree hollows

FeatId	Prefix	Feature	Phase	Area name	Plan reference	Publication reference	Notes
86	NIG	Support walls lining entrance	?	North Ibis Garden	Unpublished plan of North Ibis Garden	Nicholson In preparation	

Subsurface structures attribute table

Table A2.7. Subsurface structures attribute data.

FeatId	Prefix	Feature	Date	Publication reference	Plan reference	Notes
1	Dog	Dog Catacombs - Large	LP	Nicholson <i>et al.</i> 2015	Fig. 3	Location based on field survey and satellite photo
2	Dog	Dog Catacombs - Small	LP	de Morgan 1897	Page 10	Location based on relative position to larger catacomb on de Morgan map
3	Ibis	South Ibis catacombs	LP	Martin 1981	Plate 2A	Location based on entrance position on satellite photo
4	Ibis	North Ibis catacombs	LP	Nicholson In preparation	Unpublished plan	Location based on entrance position on satellite photo
5	Apis	Mother of Apis catacombs	LP	Davies 2006	Fig. 5	Location based on entrance position on satellite photo
6	Baboon	Baboon catacombs	LP	Davies 2006	Fig. 13	Location based on entrance position on satellite photo
7	Hawk	Falcon Galleries	LP	Davies and Smith 2005	Fig. 5	Location based on entrance position on satellite photo

Appendix 3

Gazetteer of impediments

The following appendix catalogues the impediments encountered whilst digitising contour data on the MHR1978 maps sheets H:21 and H:22 to construct the digital terrain. Map sheet H:23 was added later and was digitised in less detail, any minor issues encountered during this process were not recorded as the terrain was outside of the main study area.

Towards the southern area of the map, to the east of the Djoser pyramid (centred on 327999.590, 3305630.433), the print was very faint in places, appearing as if it had been abraded from the paper. In addition, the lower area of the map representing the southern part of the north necropolis—within the polygonal area numbered 26 below—suffered from a ghosting effect of the print, whereby a contour line, for example, displayed a fainter version of the same line at an offset distance. A piece of the map has an obvious tear in the upper layers of the paper (centred on 328508.514, 3307055.529), where it appears that adhesive tape or some other-such medium had been applied and then removed. Several other areas of concern were identified where contour lines that are closely situated blend into a single homogeneous mass. It is unclear whether this is a result of the resolution at which the map was scanned, or the original print quality of the map and condition of the paper.

Discontinuous contours

There are several locations where contour lines are discontinuous on the map sheets, either through annotative marks covering the contour lines, the condition of the scanned sheet, or because they have not been transcribed. Annotative marks, such as contour elevation values, generally only obscure a short length of contour line, and as such it is a trivial matter to reconstruct the projection of the line through the annotation. This can be more problematic where a contour line describes a curve, but generally there are

adjacent contours which can be used to infer orientation. In most of the areas where the condition of the map sheet was degraded it was possible to follow the contour lines, which in many instances showed on the sheet as a faint light grey mark, when viewed at a large scale (highly zoomed in). Where this was not possible, the University of Pisa (UoP) new cartography (Kotob *et al.* 2003, 319–341) was used as the best available second option (the first being the original MHR1978 sheet) to guide where the contours should follow. The UoP map squares were georeferenced and rubber sheeted through the same process described above to gain the highest level of accuracy in their geolocation and reduce distortion. Where transcription of the contour lines was absent, it can probably be assumed that this was due to the detail on the aerial photographs being either unclear or too complicated, and that the non-inclusion of these areas would not have an adverse effect on the overall usefulness of the final product. In these instances, the contour lines were projected as best as possible using adjacent contours to infer orientation, and equidistant spacing was plotted between the projected contour lines.

Non-contour lines

There are a series of lines on the MHR1978 map sheets which do not appear to represent contours (Figure A3.1). Their non-conformity to the rules governing contours has been established through their intersection with the contour lines wherever they meet. It is unclear exactly what these lines represent; they are drawn as an even black line without annotation; the lines are not included in the legend symbology; on the H:21 sheet they appear to surround areas that the legend describes as *broussailles* (scrub/undergrowth/brushwood) in at least three locations, but they do not bound similar areas on the H:22 sheet.

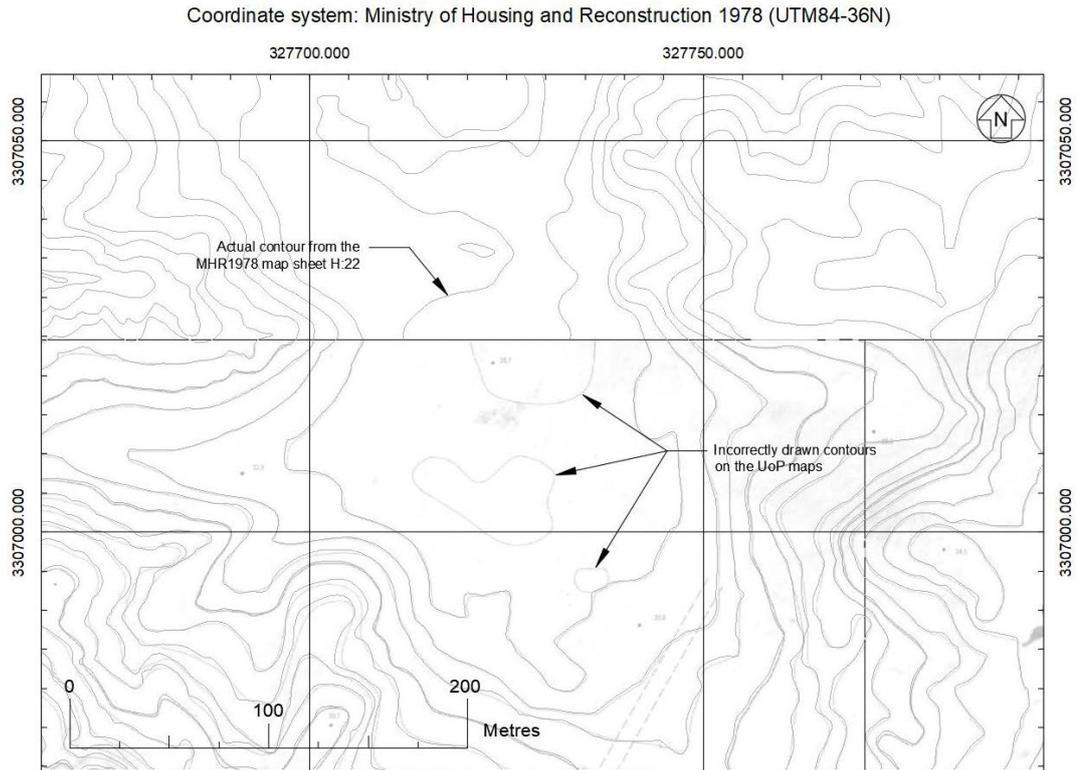


Figure A3.1. Non-contour lines digitized as contours on the UoP map sheets (source author).

The UoP Atlas of New Cartography (Kotob *et al.* 2003, 319–341) has at least three of these lines incorrectly digitised as contours. It should also be remarked that contour lines in difficult regions, such as rocky, highly dissected, areas of dunes, to name a few examples, are often simplified during survey and plotting (Imhof 2007, 24) for reasons of clarity.

Detail of areas of the map that caused issues or concerns during the digitisation of isolines. Numbers relate to the blocks on the map (Figure A3.2).

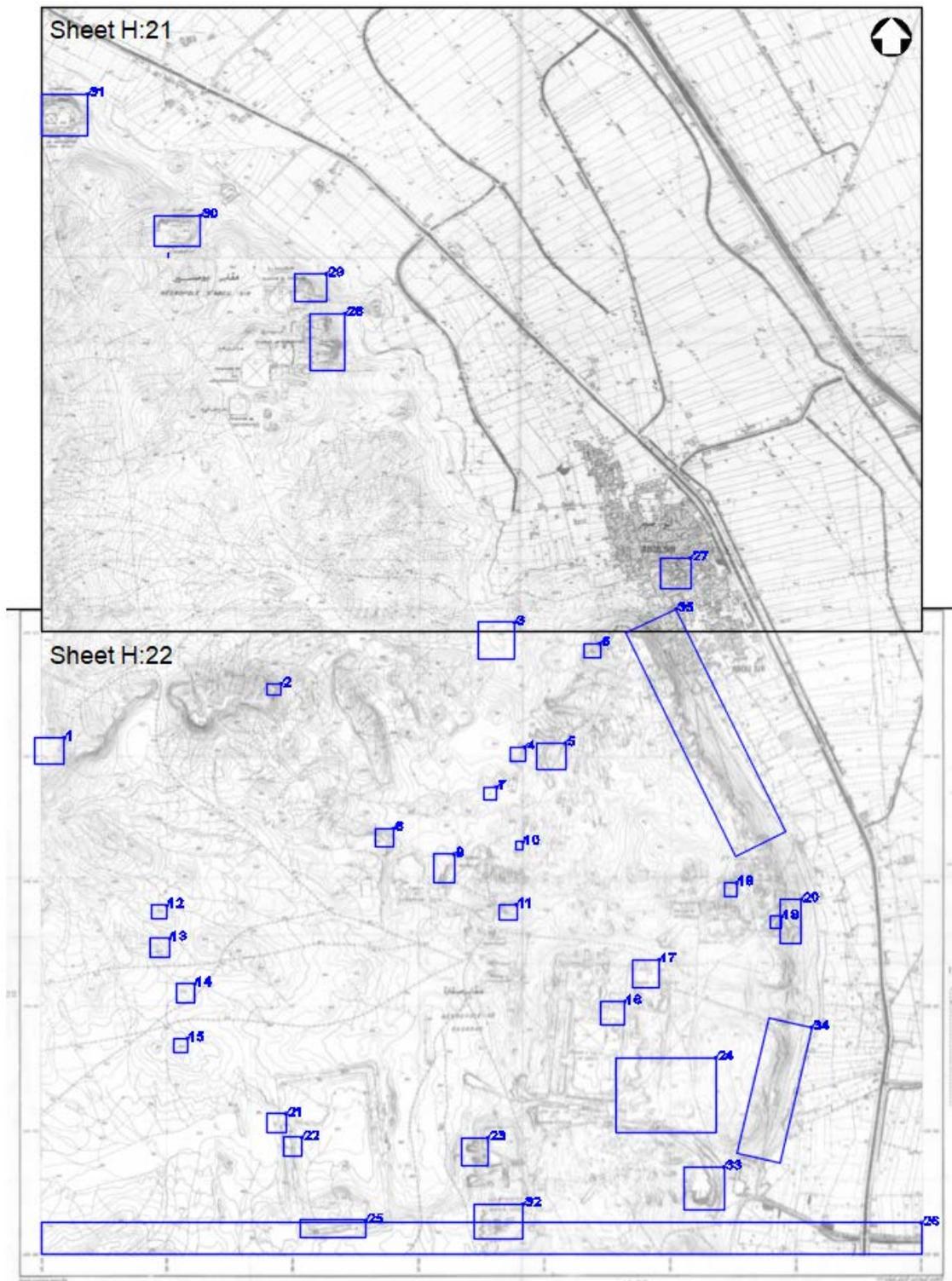


Figure A3.2. Areas on the MHR1978 map sheets 21 and 22 where issues with contours were encountered (source author).

1. *Complication*—Isolines do not extend to the edge of the map
Action—Isolines projected to the edge of the map based on direction/orientation¹

2. *Complication*—Isolines so close together as to blend into a single pixelated mass
Action—Detailed close-up examination provides some indication to the placement of the isolines and reference to the UoP study was also made to offer some clarity

3. *Complication*—What appear to be isolines are drawn on the map; however, these lines do not respect other isolines, often crossing over them. Confusingly, some appear to follow the contours of the landscape in places and deviate from it in others.
Action—In this instance reference to Sheet H21 provided the solution as to which were the correct isolines to digitise. This issue permeates the UoP Atlas of New Cartography where these non-isolines have often been digitised, creating a false representation of the landscape. It is currently unclear what these non-isolines represent.

4. *Complication*—Erroneous isoline between the 34m and 35m contours
Action—The isoline was omitted from digitisation. The UoP study have included the isoline, creating an enclosed contour at this area which doesn't really make sense between the 34m and 35m contours at this proximity

5. *Complication*—Erroneous isoline between the 39m and 40m contours
Action—The isoline was omitted from digitisation. Also omitted from UoP cartography

6. *Complication*—Breaklines obscuring isolines
Action—Careful examination determined the course of the isolines for plotting, reference made to the UoP cartography for clarification

¹ Obtaining map sheet G22 would allow the isolines to be matched between the sheets.

7. *Complication*—Unclear whether this contour between the 37m and 38m isolines should be 37m or 36m.

Action—The arrow pointing into the isoline has been assumed to indicate a decrease in altitude, and this has been implemented throughout the digitisation process. In this case, an altitude of 36m did not make any sense between the 37m and 38m isolines, so an elevation of 37m was used.

8. *Complication*—Discontinuous isolines. Three isolines around an incline do not join up together

Action—The isolines have been projected taking into account the morphology of the complete isolines either side. This was the best fit solution available

9. *Complication*—Non-isoline crossing multiple isolines

Action—Non-isoline was discounted. Again, it is unclear what this line represents. The author and PTN discussed the possibility that these lines were boundaries for areas that may be inaccessible but from PTN's recollection these boundaries don't exist on the ground.

10. *Complication*—Isoline within the 41m isoline which should have an elevation of 42m. Another isoline also within the 41m contour has a declination arrow and is of a greater thickness denoting a major contour (i.e. 5m, 10m etc.) and should therefore have an elevation of 40m, which puts a 40m contour next to a 42m contour without a 41m contour between them

Action—An elevation of 42m was used as this is the correct elevation for the contour

11. *Complication*—A short length of isoline partially obscured by a spot height value

Action—Isoline projected based on the adjacent isoline

12. *Complication*—A short length of isoline partially obscured by a spot height value

Action—Isoline projected based on the adjacent isoline

13. *Complication*—A short length of isoline partially obscured by a spot height value
Action—Isoline projected
14. *Complication*—Isoline with an elevation of 56m has a spot height of 57.0m within it without a 57m contour
Action—**Unresolved**. Spot height of 57m digitised, no additional contour added
15. *Complication*—A short length of isoline partially obscured by a spot height value
Action—Isoline projected
16. *Complication*—57m Isoline is discontinuous at this location
Action—Isoline was projected based on orientation and morphology of the 58m isoline until the next segment of the 57m isoline was encountered. Uop cartography was referenced and it appears a similar approach was taken
17. *Complication*—51m, 52m and 53m isolines discontinuous around the Userkaf Pyramid
Action—500m² of Uop cartography (p.334) was scanned, georeferenced and rubber sheeted and the isolines digitised. It is unclear where the UoP team obtained these isolines
18. *Complications*—It is unclear whether two contours with declination arrows between the 56m and 57m isolines should have an elevation value of 56m as suggested by the declination arrows
Action—After consideration it was assumed that these contours represented flat areas between the 56m and 57m incline, therefore an elevation of 56m was used
19. *Complication*—Erroneous lines between the contours, some appear to represent a structure and others are less clear as to their purpose. They confuse the clarity of the isolines

Action—Careful consideration of this area led to discounting the lines that represented the structure, and reference to the UoP cartography provided some clarity on the position of the isolines to be digitised

20. *Complication*— Discontinuous isolines.

Action—The isolines have been projected taking into account the morphology of the complete isolines either side. This was the best fit solution available

21. *Complication*—Breaklines obscuring isolines

Action—Careful examination determined the course of the isolines for plotting, reference made to the UoP cartography (p.321) for clarification

22. *Complication*—A short length of isoline partially obscured by a spot height value

Action—Isoline projected

23. *Complication*—Several isolines so close together as to blend into a single pixelated mass

Action—Detailed close-up examination provides some indication to the placement of the isolines and reference to the UoP study was also made to offer some clarity. This area represents spoil tips of archaeological excavations, and as such are intended to be removed from the landscape model

24. *Complication*—Poor quality of the MRH map at this location resulting in missing isolines

Action—500m² of Uop cartography (p.337) was scanned, georeferenced and rubber sheeted and the isolines digitised.

25. *Complication*—Short lengths of isoline partially obscured by a spot height value

Action—Isolines projected

26. *Complication*—Poor quality of the MRH map at this location resulting in blurred or indistinct isolines offset from the actual isoline

Action—Faded or indistinct isolines discounted in favour of the darker printed isoline

27. *Complication*—Modern buildings obscuring isolines

Action—Close (high zoom) inspection of isolines revealed correct position

28. *Complication*—Breaklines obscuring isolines

Action—Careful examination determined the course of the isolines for plotting

29. *Complication*—Breaklines obscuring isolines

Action—Careful examination determined the course of the isolines for plotting

30. *Complication*—Breaklines obscuring isolines

Action—Careful examination determined the course of the isolines for plotting

31. *Complication*—Breaklines obscuring isolines

Action—Careful examination determined the course of the isolines for plotting

32. *Complication*—Congestion of breaklines and isolines in an area of blurred and indistinct isolines

Action—Detailed examination determined the course of the isolines for plotting

33. *Complication*—Congestion of breaklines and isolines in an area of blurred and indistinct isolines

Action—Detailed examination determined the course of the isolines for plotting

34. *Complication*—Congestion of breaklines and isolines in an area of blurred and indistinct isolines

Action—Detailed examination determined the course of the isolines for plotting

35. *Complication*—Confusion of isolines appearing to cross over each other

Action—Detailed examination determined the course of the isolines for plotting

Appendix 4

Map transformations

Rubbersheeting data for the transformations of the MHR1978 map sheets H:21, H:22, and H:23.

MHR1978 map sheet H:21

Table A4.1. MHR1978 map sheet H:21 transformation data.

POINTS	Easting	Northing		Transformed Easting	Transformed Northing		E-diff	N-diff
{1}	325499.4455	3307497.839	26	325500	3307500	0	0.554510167	2.16093135
{2}	325999.4672	3307498.892	26	326000	3307500	0	0.532770306	1.10827492
{3}	326500.1494	3307499.638	26	326500	3307500	0	-0.149400548	0.36234492
{4}	327000.7318	3307500.863	26	327000	3307500	0	-0.731832844	-0.86336726
{5}	327500.4085	3307502.426	26	327500	3307500	0	-0.408531207	-2.42564307
{6}	328000.2443	3307502.821	26	328000	3307500	0	-0.244272134	-2.8206876
{7}	328500.1312	3307502.693	26	328500	3307500	0	-0.13123016	-2.69298438
{8}	329000.2851	3307502.606	26	329000	3307500	0	-0.28505622	-2.60585976
{9}	325498.3349	3307998.401	26	325500	3308000	0	1.665112491	1.59893239
{10}	325998.3998	3307999.518	26	326000	3308000	0	1.600242442	0.48182761
{11}	326498.8151	3308000.087	26	326500	3308000	0	1.184939622	-0.08746617
{12}	326999.2331	3308000.985	26	327000	3308000	0	0.766941165	-0.98496915
{13}	327498.9232	3308002.414	26	327500	3308000	0	1.076764619	-2.41357429
{14}	327999.4005	3308003.064	26	328000	3308000	0	0.599462155	-3.06402526
{15}	328499.3522	3308003.054	26	328500	3308000	0	0.647808849	-3.05447735
{16}	328999.6435	3308003.054	26	329000	3308000	0	0.356505317	-3.05447735
{17}	325498.1273	3308500.201	26	325500	3308500	0	1.872676517	-0.20071363
{18}	325997.9253	3308500.825	26	326000	3308500	0	2.074674503	-0.82490786
{19}	326498.0145	3308501.605	26	326500	3308500	0	1.985543724	-1.60544902
{20}	326998.5834	3308502.357	26	327000	3308500	0	1.416589612	-2.35734646
{21}	327498.3598	3308503.053	26	327500	3308500	0	1.640152691	-3.05314997
{22}	327998.7859	3308503.884	26	328000	3308500	0	1.214067324	-3.88381763
{23}	328499.0799	3308504.266	26	328500	3308500	0	0.920068156	-4.26573379
{24}	328999.5276	3308504.446	26	329000	3308500	0	0.472417695	-4.44595048
{25}	325497.3698	3309000.763	26	325500	3309000	0	2.630150432	-0.76271259

POINTS	Easting	Northing		Transformed Easting	Transformed Northing		E-Diff	N-Diff
{7}	328497.9613	3305004.335	61	328500	3305000	0	2.038704483	-4.3351743
{8}	328997.0068	3305005.289	61	329000	3305000	0	2.993168459	-5.28883176
{9}	325500.7375	3305506.849	61	325500	3305500	0	-0.737495649	-6.84944775
{10}	325999.9568	3305506.329	61	326000	3305500	0	0.043183549	-6.32913305
{11}	326498.4815	3305505.722	61	326500	3305500	0	1.518532171	-5.72235206
{12}	326997.8741	3305506.156	61	327000	3305500	0	2.125896278	-6.15594764
{13}	327498.0478	3305506.589	61	327500	3305500	0	1.952168261	-6.5892904
{14}	327999.0886	3305505.636	61	328000	3305500	0	0.911395106	-5.63563294
{15}	328497.788	3305504.075	61	328500	3305500	0	2.212019573	-4.07494167
{16}	328996.0524	3305504.769	61	329000	3305500	0	3.947575674	-4.7686946
{17}	325500.8244	3306005.896	61	325500	3306000	0	-0.824388038	-5.89596783
{18}	326000.0432	3306005.376	61	326000	3306000	0	-0.043239152	-5.37565313
{19}	326498.6553	3306005.202	61	326500	3306000	0	1.344747392	-5.20221489
{20}	326998.2212	3306005.202	61	327000	3306000	0	1.77879641	-5.20221489
{21}	327498.2211	3306005.462	61	327500	3306000	0	1.778853171	-5.46237224
{22}	327999.6095	3306004.942	61	328000	3306000	0	0.39051046	-4.94205755
{23}	328498.1351	3306004.162	61	328500	3306000	0	1.864919705	-4.16183832
{24}	328996.6597	3306004.162	61	329000	3306000	0	3.340268327	-4.16183832
{25}	325500.304	3306503.555	61	325500	3306500	0	-0.30397308	-3.55472922
{26}	325999.783	3306503.728	61	326000	3306500	0	0.216968327	-3.72816745
{27}	326498.7421	3306503.815	61	326500	3306500	0	1.257855003	-3.81488657
{28}	326998.3081	3306503.641	61	327000	3306500	0	1.691904021	-3.64144834
{29}	327498.5682	3306503.728	61	327500	3306500	0	1.431753303	-3.72816745
{30}	327999.3493	3306503.555	61	328000	3306500	0	0.650717938	-3.55472922
{31}	328498.3084	3306502.861	61	328500	3306500	0	1.691604615	-2.86122911
{32}	328997.4408	3306502.167	61	329000	3306500	0	2.559176201	-2.16747618
{33}	325499.9569	3307001.994	61	325500	3307000	0	0.043126788	-1.99421548
{34}	325999.6961	3307002.081	61	326000	3307000	0	0.303860716	-2.08068178
{35}	326498.6553	3307002.341	61	326500	3307000	0	1.344747392	-2.34083913
{36}	326999.0023	3307002.081	61	327000	3307000	0	0.997704285	-2.08068178
{37}	327499.0887	3307002.081	61	327500	3307000	0	0.911338345	-2.08068178
{38}	327999.6959	3307001.734	61	328000	3307000	0	0.304087759	-1.73405813
{39}	328499.2628	3307001.647	61	328500	3307000	0	0.7371974	-1.64733902
{40}	328998.7423	3307000.954	61	329000	3307000	0	1.257669118	-0.95358609
{41}	325500	3307500	0	325500	3307500	0	0	0
{42}	325999.6097	3307500.867	61	326000	3307500	0	0.390283417	-0.86704451
{43}	326499.0888	3307501.04	61	326500	3307500	0	0.911224824	-1.04048274
{44}	326999.5227	3307501.04	61	327000	3307500	0	0.477289327	-1.04048274
{45}	327499.3493	3307501.04	61	327500	3307500	0	0.650661178	-1.04048274
{46}	327999.8697	3307501.04	61	328000	3307500	0	0.130302981	-1.04048274

POINTS	Easting	Northing		Transformed Easting	Transformed Northing		E-Diff	N-Diff
{47}	328500.0434	3307501.127	61	328500	3307500	0	-0.043425037	-1.12720186
{48}	329000	3307500	0	329000	3307500	0	0	0
					Average		1.004714529	-3.848930074
					Min		-0.824388038	-7.70205032
					Max		3.947575674	0

MHR1978 map sheet H:23

Table A4.3. MHR1978 map sheet H:23 transformation data.

POINTS	Easting	Northing		Transformed Easting	Transformed Northing		E-Diff	N-Diff
{1}	325496.8441	3302505.773	0	325500	3302500	22	3.155886149	-5.77319097
{2}	325998.9106	3302503.809	0	326000	3302500	22	1.08943482	-3.80878971
{3}	326499.3016	3302502.484	0	326500	3302500	22	0.69843547	-2.4844
{4}	326999.7736	3302502.93	0	327000	3302500	22	0.226434624	-2.92995377
{5}	327501.0449	3302503.747	0	327500	3302500	22	-1.044923081	-3.74743167
{6}	328002.182	3302502.657	0	328000	3302500	22	-2.181988834	-2.65714649
{7}	328502.8629	3302502.112	0	328500	3302500	22	-2.862888272	-2.11247588
{8}	329001.7276	3302503.702	0	329000	3302500	22	-1.727648925	-3.70212111
{9}	325498.4556	3303005.928	0	325500	3303000	22	1.544382719	-5.92806577
{10}	325999.8655	3303004.838	0	326000	3303000	22	0.134469825	-4.83778059
{11}	326500.1819	3303003.476	0	326500	3303000	22	-0.181922885	-3.47563209
{12}	326999.9548	3303003.612	0	327000	3303000	22	0.04524707	-3.61156375
{13}	327501.3625	3303004.111	0	327500	3303000	22	-1.362534206	-4.1109238
{14}	328002.4101	3303003.612	0	328000	3303000	22	-2.410071991	-3.61156375
{15}	328502.0443	3303003.429	0	328500	3303000	22	-2.044346847	-3.42937757
{16}	329000.8174	3303004.565	0	329000	3303000	22	-0.817447914	-4.5649733
{17}	325499.272	3303504.657	0	325500	3303500	22	0.727972914	-4.65660212
{18}	326000.5455	3303503.93	0	326000	3303500	22	-0.54551641	-3.92974534
{19}	326501.544	3303502.657	0	326500	3303500	22	-1.544026974	-2.65727397
{20}	327000.1828	3303502.657	0	327000	3303500	22	-0.182836088	-2.65727397
{21}	327501.0897	3303502.749	0	327500	3303500	22	-1.089687065	-2.74883905
{22}	328002.182	3303502.794	0	328000	3303500	22	-2.181988834	-2.7941496
{23}	328501.1363	3303502.749	0	328500	3303500	22	-1.136277455	-2.74883905
{24}	329000.5915	3303503.975	0	329000	3303500	22	-0.591496375	-3.97505589
{25}	325499.3637	3304003.565	0	325500	3304000	22	0.636313327	-3.56543672
{26}	326001.0464	3304002.793	0	326000	3304000	22	-1.046446709	-2.79326938
{27}	326500.9536	3304002.656	0	326500	3304000	22	-0.953568707	-2.65639375
{28}	327000.5921	3304001.884	0	327000	3304000	22	-0.5921068	-1.88422641
{29}	327500.7273	3304001.884	0	327500	3304000	22	-0.727311955	-1.88422641

POINTS	Easting	Northing		Transformed Easting	Transformed Northing		E-Diff	N-Diff
{30}	328000.8178	3304002.43	0	328000	3304000	22	-0.817753126	-2.42984098
{31}	328500.5437	3304002.748	0	328500	3304000	22	-0.543687569	-2.74795882
{32}	329000.3634	3304003.065	0	329000	3304000	22	-0.363413217	-3.06513269
{33}	325499.4085	3304502.112	0	325500	3304500	22	0.591549343	-2.11178689
{34}	326000.6819	3304501.567	0	326000	3304500	22	-0.681939981	-1.56711628
{35}	326500.5443	3304500.976	0	326500	3304500	22	-0.544297994	-0.97619115
{36}	327000.4557	3304500.658	0	327000	3304500	22	-0.455683229	-0.65807331
{37}	327500.4992	3304500.613	0	327500	3304500	22	-0.499228798	-0.61276276
{38}	327999.8649	3304501.112	0	328000	3304500	22	0.135080251	-1.11212281
{39}	328499.772	3304501.794	0	328500	3304500	22	0.227958252	-1.79366905
{40}	328999.7282	3304501.748	0	329000	3304500	22	0.271809034	-1.74835849
{41}	325500	3305000	22	325500	3305000	22	0	0
{42}	326000.9633	3304999.675	0	326000	3305000	22	-0.963313595	0.32547953
{43}	326501.2861	3304999.105	0	326500	3305000	22	-1.28610116	0.89469335
{44}	327001.2401	3304998.647	0	327000	3305000	22	-1.240118761	1.3534627
{45}	327500.9192	3304998.647	0	327500	3305000	22	-0.919157602	1.3534627
{46}	327999.8777	3304999.051	0	328000	3305000	22	0.122290541	0.9494436
{47}	328499.7699	3304999.609	0	328500	3305000	22	0.230089871	0.39061345
{48}	328999.8625	3304999.839	0	329000	3305000	22	0.137517081	0.16122878
					Average		-0.490934585	-2.356903146
					Min		-2.862888272	-5.92806577
					Max		3.155886149	1.3534627

Appendix 5

Map contour amendments

This appendix records the amendments made to the MHR1978 map contours for sheets H:21 and H:22, to remove unwanted modern archaeological spoil deposits from the terrain record.

The numbers in the attribute table below relate to the areas depicted on the maps which follow.

Table A5.1. GIS attribute data for the map contour amendment areas.

Number	Completed	Comments
1	Yes	
2	Yes	
3	Yes	
4	Yes	
5	Yes	
6	Yes	
7	Yes	
8	Yes	
9	Yes	
10	Yes	
11	Yes	
12	Yes	
13	Yes	
14	Yes	
15	Yes	
16	Yes	
17	Yes	
18	Yes	
19	Yes	
20	Yes	
21	Yes	

Number	Completed	Comments
22	Yes	Had to remove contours representing Anubieion walls, they were confusing the other contours, difficult area to determine underlying surface
23	Yes	
24	Yes	
25	Yes	
26	Yes	Excavation debris to the north of the Djoser complex - unsure how much of this to reduce. Policy adopted - if it is easy to remove then it has been removed, else left as is
27	Yes	
28	Yes	
29	Yes	Possibly debris from Mariette's investigations of the Serapeum. Not easy to discern the underlying surface.
30	Yes	
31	No	Sekhemkhet spoil? Left as is
32	Yes	Sekhemkhet spoil
33	No	Sekhemkhet excavations - left as is
34	Yes	Sekhemkhet spoil
35	Yes	Sekhemkhet spoil
36	Yes	Spoil from Horemheb excavations
37	Yes	
38	Yes	Apa Jeramais and Neferenpet excavation spoil?
39	Yes	
40	Yes	Extensive spoil pile
41	Yes	Area of Akhethetep excavations, removed two spoil tips
42	Yes	Bakenrenef excavations
43	Yes	
44	Yes	
45	No	Bubastieion wall depicted by the contours - left as is
46	Yes	Flattened area by removing higher elevations
47	No	Not sure how to deal with this area - uncertain if disturbance represents spoil from excavations or intrusions in antiquity - left alone
48	Yes	
49	Yes	Removed debris from the Userkaf excavations? Area of presumed robbed shafts to the east has been left intact
50	Yes	Remnants of Decauville track line
51	Yes	Easy to remove spoil evidence here
52	Yes	Excavation spoil
53	Yes	Djoser excavation spoil? or spoil from mastaba excavations to south of Djoser
54	Yes	Removed an odd-looking hump in the area of the Anubieion to flatten out the surface
55	Yes	Probable spoil heap from North Ibis garden excavation
56	Yes	Abusir pyramid excavation spoil

Number	Completed	Comments
57	Yes	Abusir pyramid excavation spoil
58	Yes	Abusir pyramid excavation spoil
59	Yes	Abusir pyramid excavation spoil
60	Yes	Abusir pyramid excavation spoil

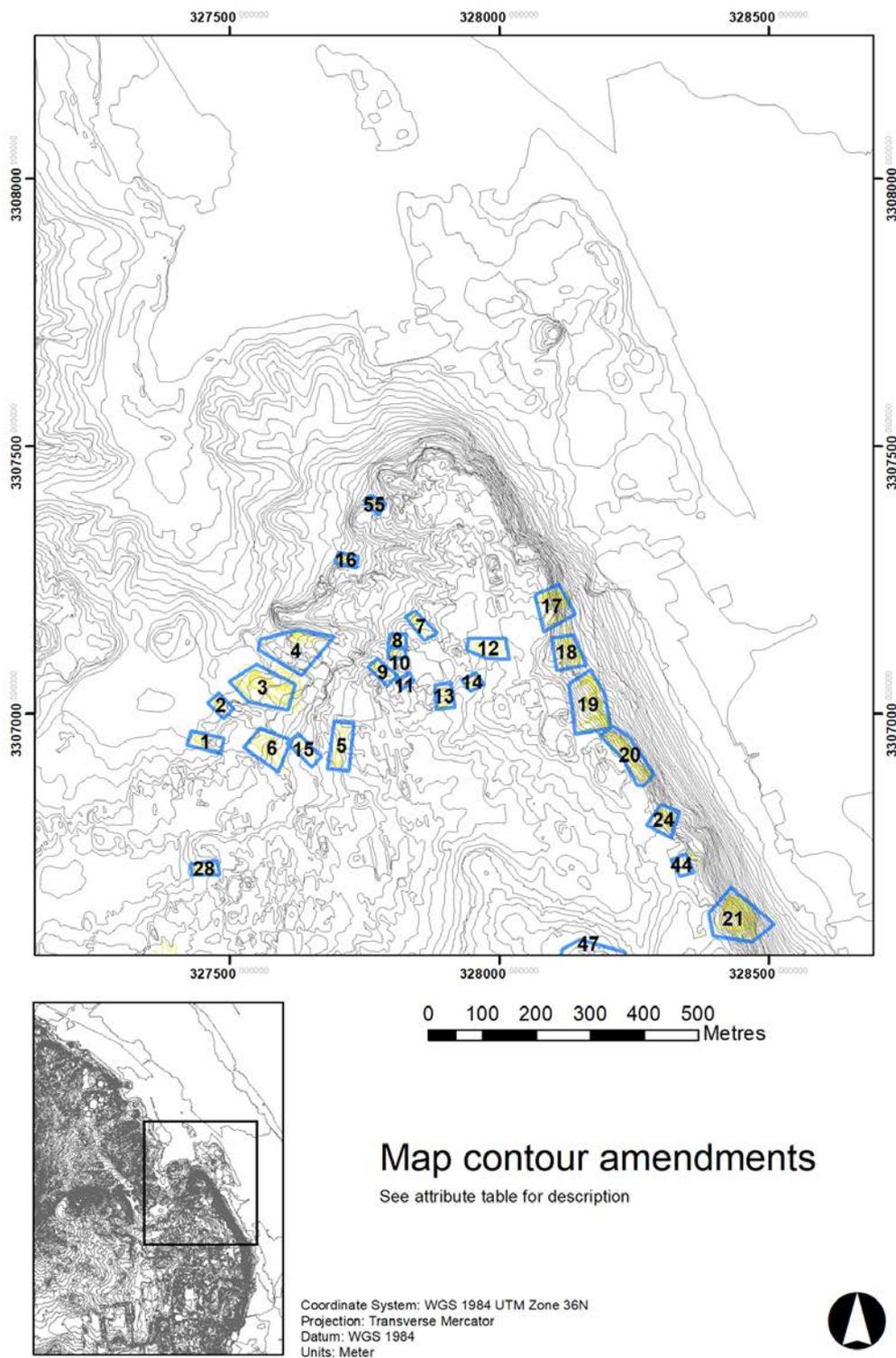


Figure A5.1. MHR1978 map contour amendments. The yellow lines within the amendment areas represent the unmodified map contours digitised from the MHR1978 map sheets, whilst the grey lines represent the amended contours (source author).

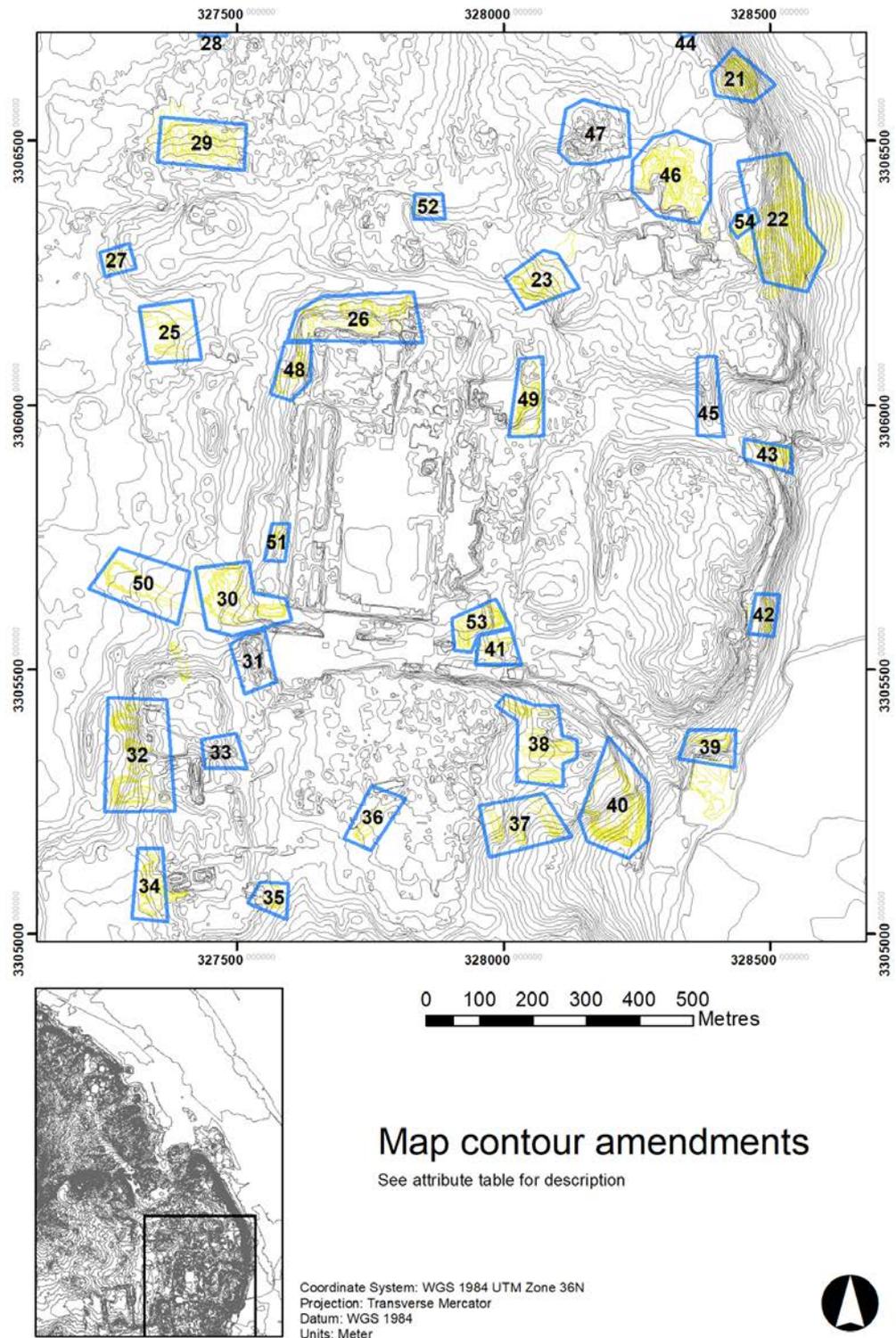


Figure A5.2. MHR1978 map contour amendments. The yellow lines within the amendment areas represent the unmodified map contours digitised from the MHR1978 map sheets, whilst the grey lines represent the amended contours (source author).

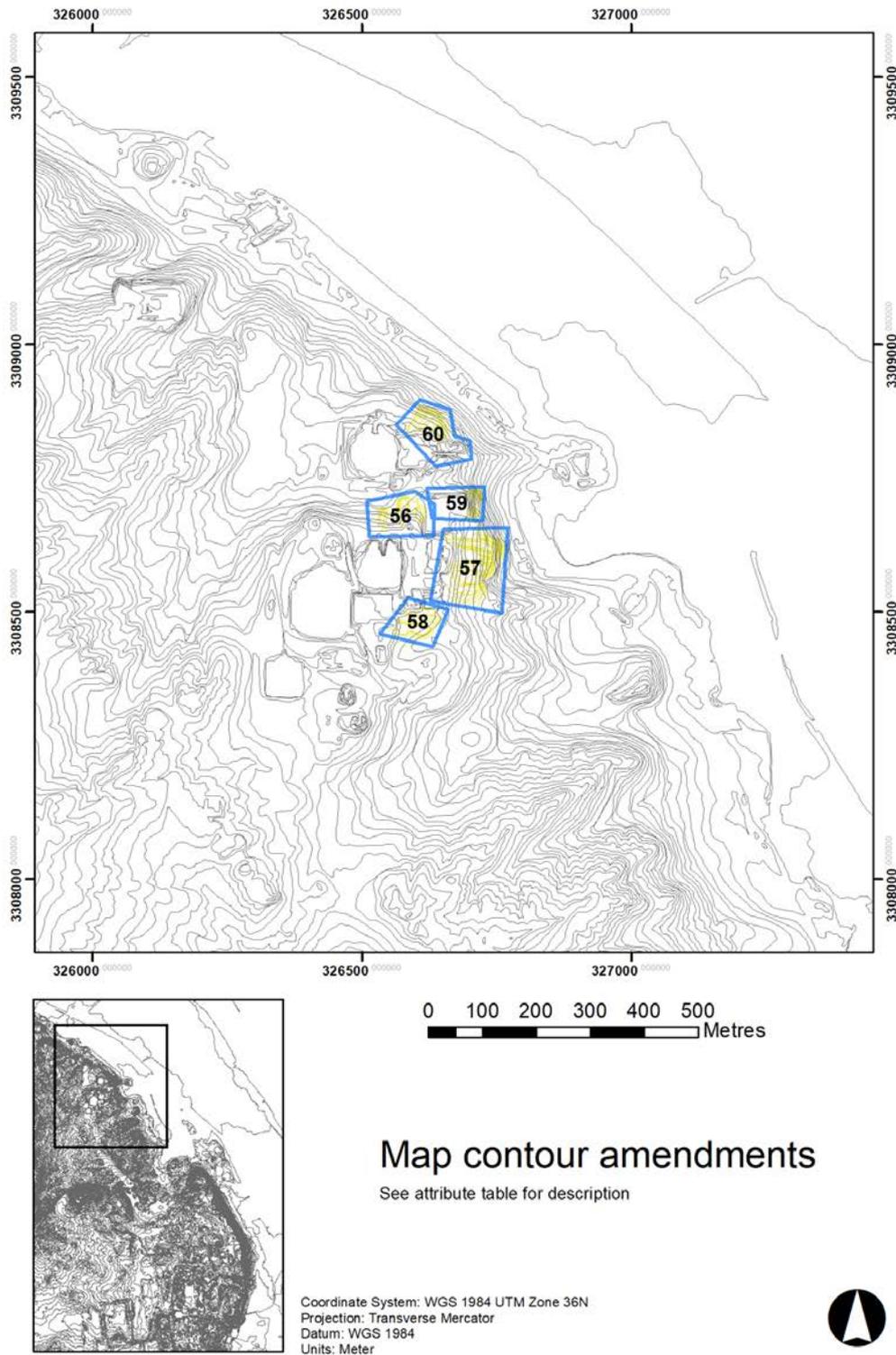


Figure A5.3. MHR1978 map contour amendments. The yellow lines within the amendment areas represent the unmodified map contours digitised from the MHR1978 map sheets, whilst the grey lines represent the amended contours (source author).