

THE PETRA NATIONAL TRUST SITE PROJECTS

ARCHAEOLOGICAL SURVEY OF THE WĀDĪ MŪSĀ WATER SUPPLY AND WASTEWATER PROJECT AREA

by

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Introduction

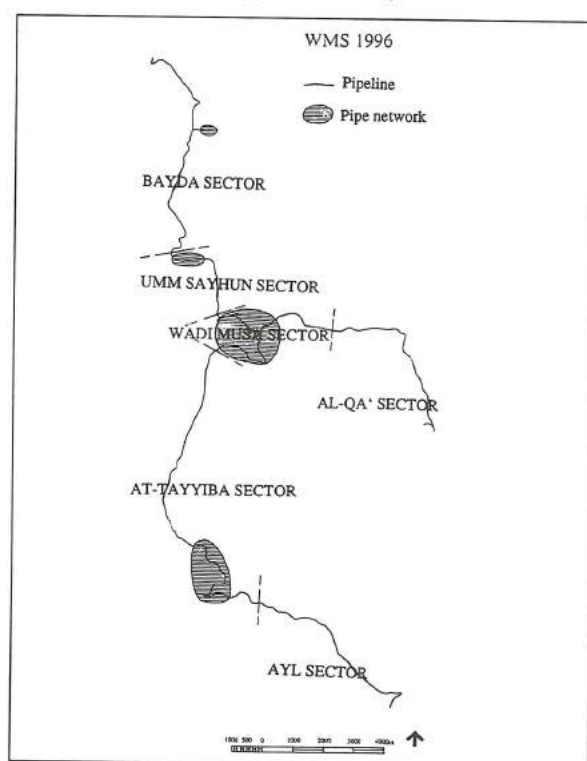
On 22 October 1996, the agreement for the "Archaeological Services for the Wadi Mousa Water Supply and Wastewater Project" was signed between Camp Dresser and McKee International Inc. (CDM) and the Petra National Trust (PNT)¹ as part of the environmental impact study of the region. Plans for the project were prepared by CDM in association with Associated Consulting Engineers (ACE), under contract from the Water Authority of Jordan with funding from USAID.

The field work was carried out on 23 October - 16 November 1996. The project site personnel were Khairieh 'Amr, Suleiman Farajat, Ahmed al-Momani and Hani Falahat of the Department of Antiquities of Jordan, along with Eng. Ma'an Al-Huneidi (Engineering Consultant) and Eng. Munther Kharouf (Project Engineer) of Middle East Consulting Engineers (MeeM).

Due to the extent of the area covered by the Wādī Mūsā Water Supply and Wastewater Project, and the relatively short time period assigned for the archaeological survey, it was decided to split the archaeological team into two groups working simultaneously at different sites whenever possible. This strategy implies that the sur-

vey could not use sequential numbers for the recorded archaeological sites. Thus it was decided to divide the area of the project into sectors, starting with Baydā in the north, then Umm Ṣayhūn, Wādī Mūsā, aṭ-Ṭayyiba, Ayl and al-Qā' (Fig. 1).

The archaeological survey was restricted



1. Archaeological Survey of the Wādī Mūsā Water Supply and Wastewater Project Area (WMS 1996): routes and sectors of the survey.

1. Tender named: *Wadi Mousa Water Supply and Wastewater Project, Stage II - Tender: CDM-002 Wadi Mousa Archaeological Studies*. The original report, dated 8 December 1996 ('Amr *et al.* 1996) was divided into three main sections: 1. The main stations (treatment plant, reservoirs and pump stations); 2. the routes between towns/ villages; and 3. inside towns/ villages. This division was dictated by the nature of engineering work to be carried out at the different locations and its consequences on existing archaeological remains. General recommendations and mitigation mea-

sures were given for each section, as well as specific recommendations for the vicinity of each archaeological site. Additionally, as the project covers varying terrain, it was found that different sectors within each section needed specific recommendations. These recommended mitigation measures are omitted from this paper. The original report also has much more extensive documentation of the sites in the form of photographs and drawings, many of which could not be included in this paper due to space constraints.

to the proposed route of pipelines and adjacent areas that may be affected by the movement of machinery, dumping or quarrying. Please note that where only one set of UTM coordinates are given for a site, they denote the approximate centre of that site. The Jordan Antiquities Database and Information System (JADIS, see Palumbo 1994a; Palumbo *et al.* 1995) was extensively consulted during the archaeological survey.

One outstanding result of the archaeological survey is the large number of flint sites discovered. The major Neolithic sites of Bayḍā, Ba'ja and Baṣṭa are in close proximity to the survey area (see for example Kirkbride 1966; Lindner 1986; Nissen *et al.* 1987; 1991; Byrd 1988; 1989; Gebel *et al.* 1988; Bienert and Gebel 1997), while several other Palaeolithic, Epipalaeolithic and Neolithic sites may be found in the area between the plateau and Wādī 'Arabah to the west (Gebel 1985; 1988; Schyle and Uerpman 1988). Although we realise the difficulty in dating flint sites using only a few artifacts, it was decided to only do small flint collections from the discovered sites in order not to deflate them, thus indicating their presence for future research.

Another noticeable result is the absence of Bronze Age sites. This may be due to our failure to identify the local pottery production, as no sherds readily identifiable as "Bronze Age" were noted at any of the sites. Some of the sherds identified in this report as Late Islamic do have Early Bronze Age forms. Their assignment to the Late Islamic is based on the ware, as well as the proliferation of identifiable Late Islamic material at the sites. This assignment was further confirmed by the finds from the excavation at Khirbat an-Nawāfla in 1997 (site Wadi Musa 9, 'Amr and al-Momani 1998), where identical pottery forms were recovered from Late Islamic contexts.

A final note is on the seemingly rare occurrence of "Roman" identifications. This is

due to the fact that the Nabataean tradition of pottery production continued well after the Roman annexation of the Nabataean kingdom. Even the "Classical" Nabataean pottery was produced in the second century AD, and the coarser wares of third century southern Jordan were also of a pure Nabataean character (see 'Amr 1994; Schmid 1995). Thus the term "Nabataean" in this report is a cultural as well as a chronological identification.

LIST OF SITES

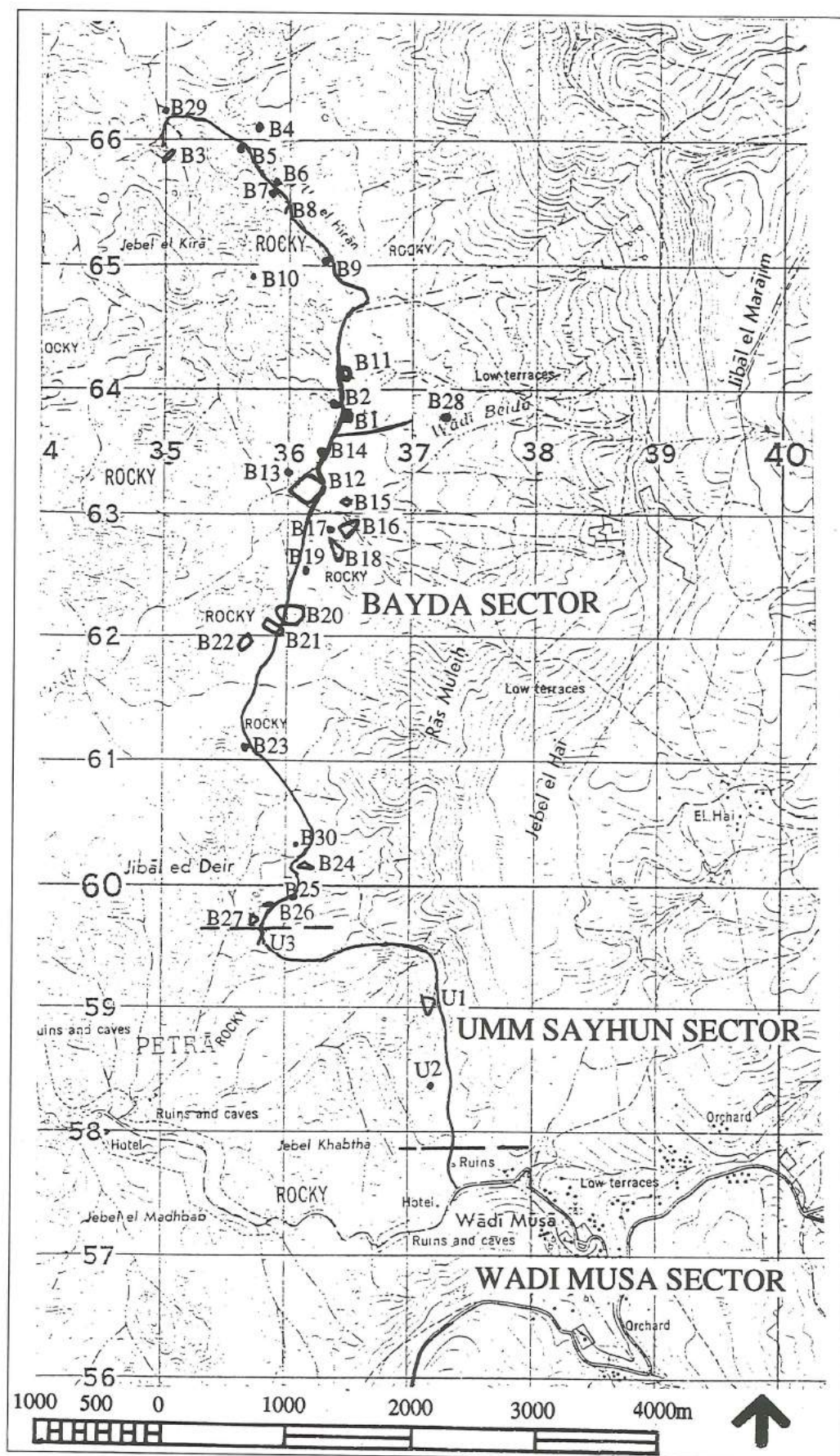
1. The Bayḍa Sector (Fig. 2)

The Bayḍa sector encompasses the whole area from Siq Umm al-Ḥirān (the proposed location for the wastewater treatment plant) to Umm Ṣayḥūn (through Bayḍa). This is dictated by the nature of the area, which is characterized by sandstone outcrops and intensive agricultural use (both modern and ancient). Much of this area – that to the west of the main road – is also within the boundaries of the Petra National Park. Additionally, there are numerous agricultural terraces along the route that were noted but not recorded in this survey. It is important to keep in mind that this area was a major agricultural suburb of Petra, and on a main caravan route, therefore the whole area is actually a large archaeological site. The recorded archaeological sites during this survey merely represent the main outstanding features along the proposed route for the pipelines.

Bayda 1

UTM coordinates: 736435E; 3363715N - 736497E; 3363721N-736440E; 3363754N. Altitude: 1077.2 - 1087.9m.

A low hill of sandy soil and sandstone outcrops in the east. Characterized by the concentration of stones on the surface, including slopes. A dense scatter of flint tools and pottery sherds was noted at the surface, but no wall lines other than a few remnants



2. WMS 1996: Recorded archaeological sites in the Baydā and Umm Şayhūn sectors (ref. map Jordan 1:50,000 Petra 3050I K737).

of thin terrace walls at the west edge. One robbers pit in the northwestern section revealed stones that seem to form a wall. The site is also cut by the modern road at its western edge.

Dating: Neolithic; Nabataean, Roman, Late Roman/Early Byzantine (first to fourth centuries AD).

Bayda 2

UTM coordinates: 736388E; 3363867N - 736351E; 3363832N.

Altitude: 1075.6 - 1078.8m.

A complex area of rock-cut installations on the east face of sandstone outcrops. Including a wine press, staircases, several square cuts, niches and a facade with a partially buried entrance. No pottery sherds or flint tools were noted at the site.

Dating: Nabataean.

Bayda 3

UTM coordinates: 735084E; 3365798N - 735017E; 3365820N-734983E; 3365767N.

Altitude: 1042.5 - 1049.5m.

Agricultural terrace walls built of unhewn medium-sized field stones. Several terraces form series along side wadis. One terrace wall in the north had been added to (butressed) during several phases, resulting in a substantially wide wall. Some sections of the walls are damaged by water courses. A few Nabataean pottery body sherds were noted at the site.

Dating: Nabataean (?), reused in modern times.

Bayda 4

UTM coordinates: 735731E; 3366064N.

Altitude: 1054.5m.

Dimensions:- Main press basin 3.70m E-W x 4m N-S; connection: 1m x 1m; sieve: 1.30m E-W x 1.10m N-S (actual orientation 60°).

A rock-cut wine press, with an almost

square main basin and smaller "sieve", with a square connection. There is also a round pole hole (for the pressing column) to the east of the main basin (for the different types of rock-cut wine presses see Melhem 1995). Located on a flat sandstone outcrop. Currently used as a water reservoir.

Dating: Nabataean. One Late Islamic sherd was also collected from the site.

Bayda 5

UTM coordinates: 735582E; 3365917N.

Altitude: 1050.6m.

Dimensions:- Opening~0.70m wide; channel: 11m long.

A rock-cut underground cistern, with small opening and horizontal rock-cut channel to the south of the opening. It is currently filled up with silt so internal configuration could not be determined. Located at the bottom of a large rock outcrop. No pottery was noted in the vicinity.

Dating: Nabataean.

Bayda 6

UTM coordinates: 735863E; 3365645N.

Altitude: 1066.1m.

Dimensions:- Rock: 22m N-S x 9m E-W; main basin 2.50m N-S x 2.70m E-W; inlet in the south: 0.50m wide; rounded sieve in the east: 1.10m N-S x 0.80m E-W (actual orientation 40°).

A rock-cut wine press on a small rock outcrop. Almost square basin with a "sieve" in the east. Inlet in the southeast corner of the basin. Remnants of rough hydraulic mortar on the interior. In the south edge of the rock outcrop, there is a rock-cut channel 50-70cm wide. The rock is in an area with several ancient terraces. There are also remnants of wadi barriers to the west. Scarce pottery sherd scatter was noted at the site.

Dating: Nabataean.

Bayda 7

UTM coordinates: 735864E; 3365551N.

Altitude: 1076.1m.

A rock-cut chamber at the top of a sandstone outcrop, with rock-cut steps leading up to the chamber. The steps and chamber are badly weathered. Scarce pottery sherd scatter at the site.

Dating: Nabataean.

Bayda 8

UTM coordinates: 735936E; 3365401N - 735961E; 3365466N.

Altitude: 1077.5 - 1079.9m.

Dimensions: Length ~30m.

A collection of well-preserved Nabataean inscriptions (16 were noted), most starting with the word "*salām*", indicating they are graffiti left by people passing by. Located on a protected part of a rock face, several metres above the current track level, one inscription being on the floor of the ledge.

Dating: Nabataean.

Bayda 9

UTM coordinates: 736294E; 3365043N.

Altitude: 1092.0m.

Rock carving on a steep rock face, representing two large obelisks in relief on a base. There is a carved inscription on the base and another inscription painted in red above the obelisks (Lindner 1986; Zayadine 1994: 497). There is also a carved niche with small idols in the lower left and a badly weathered carved idol in the upper right of the relief. The carvings are disfigured by modern graffiti.

Dating: Nabataean.

Bayda 10

UTM coordinates: 735683E; 3364883N.

Altitude: 1124.9m.

Dimensions: 7 x 7m (actual orientation 0°)

A small square structure of medium to large

unhewn stone blocks, probably a watch tower, with one to two courses showing above ground level. Located on a hill top, within a modern agricultural field and directly to the west of a branch dirt track. Pottery sherd scatter noted at the site.

Dating: Nabataean (first to second centuries AD), Late Islamic.

Bayda 11 (Khirbat an-Naq'a)

UTM coordinates: 736402E; 3364159N - 736447E; 3364167N-736387E; 3364101N - 736432E; 3364050N-736464E; 3364092N - 736428E; 3364115N.

Altitude: 1084.0 - 1099.6m.

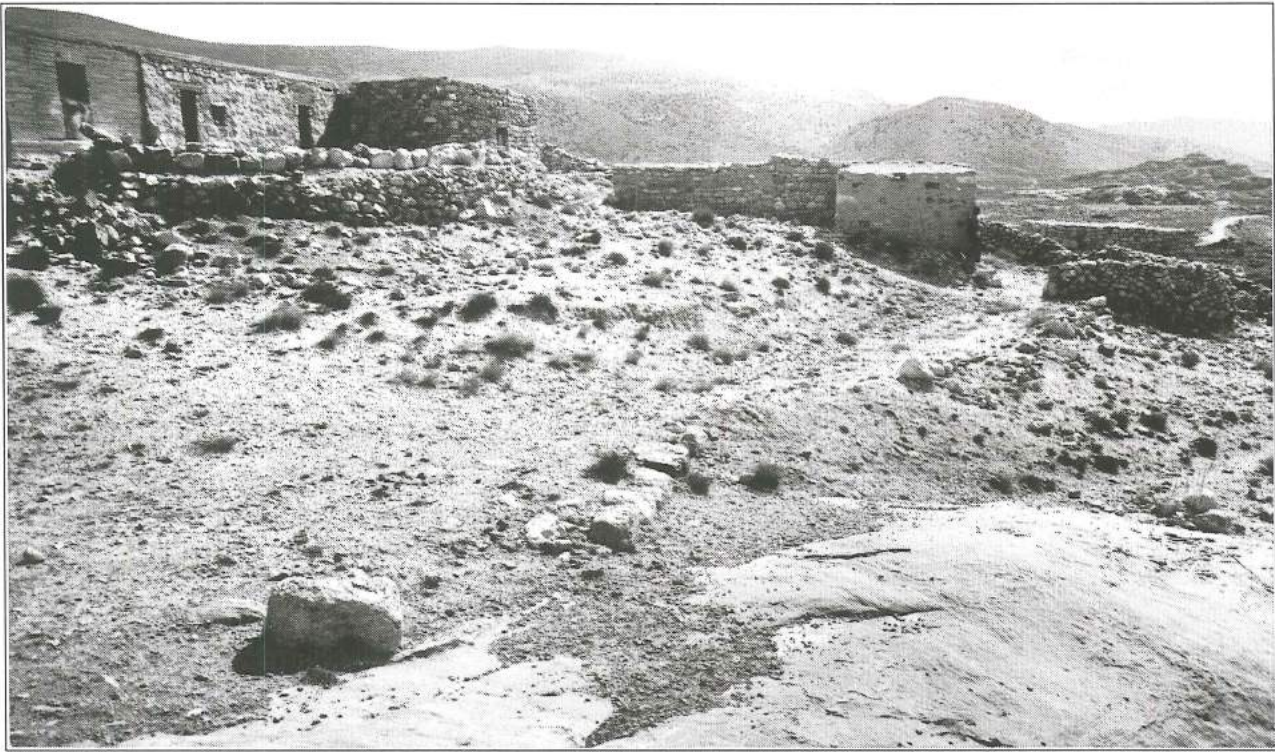
JADIS site 1997.011 (Musil 1908: 220; Glueck 1935: 87 Site 137). An ancient site, most of which is currently occupied by a modern (traditional) village. Ancient wall lines are apparent at the surface to the north and south of the modern village (Fig. 3). Located on a low hill to the east of the modern road. Directly to the north of the village, there is an elaborate rock-cut wine press on a sandstone outcrop. The press consists of a square basin in the north with three steps and a pole hole, a sieve in the south then a deep round collection tank (with five steps in the west), and another pole hole.

Dating:- Village: Nabataean (first and second centuries AD), Byzantine (fourth to sixth centuries AD), Late Islamic;-press: Nabataean.

[JADIS site 1997.046, an unfinished Nabataean facade between Khirbat an-Naq'a and Khirbat Bayda, was found to be located well to the west of the main road and protected by a deep intervening wadi. Therefore it was not recorded in this survey].

Bayda 12 (Khirbat Bayda/Umm Quṣṣa)

UTM coordinates: 736285E; 3363195N - 736161E; 3363037N-735998E; 3363163N-736186E; 3363302N.



3. WMS 1996 site Bayda 11 (Khirbat an-Naq'a): view from the north showing partially buried ancient walls and some of the traditional houses on the mound.

Altitude: 1047.6 - 1067.9m.

JADIS site 1997.037 (Banning and Köhler-Rollefson 1983: 381 Site 30; Zayadine and Farajat 1991: 281-282, pl. V). An extensive area of rock-cut installations, including quarries, several cisterns (both open and roofed), a large pool in the south, one large triclinium in the southeast, rock carvings representing animals and Nabataean graffiti, and numerous steps and channels. Located on several sandstone outcrops directly to the east of Siq al-Bārid. A modern cemetery is located in the southwest corner of the site. Abundant flint and pottery sherd scatter was noted at the site (Fig. 4).

Dating: Neolithic, Chalcolithic (?); Nabataean (predominant, date of most of the rock-cut installations), Roman, Early and Late Byzantine (first century BC to sixth AD); Late Islamic.

Bayda 13 (Bi'r al-'Arāyis)

UTM coordinates: 735999E; 3363331N.
Altitude: 1058.8m.

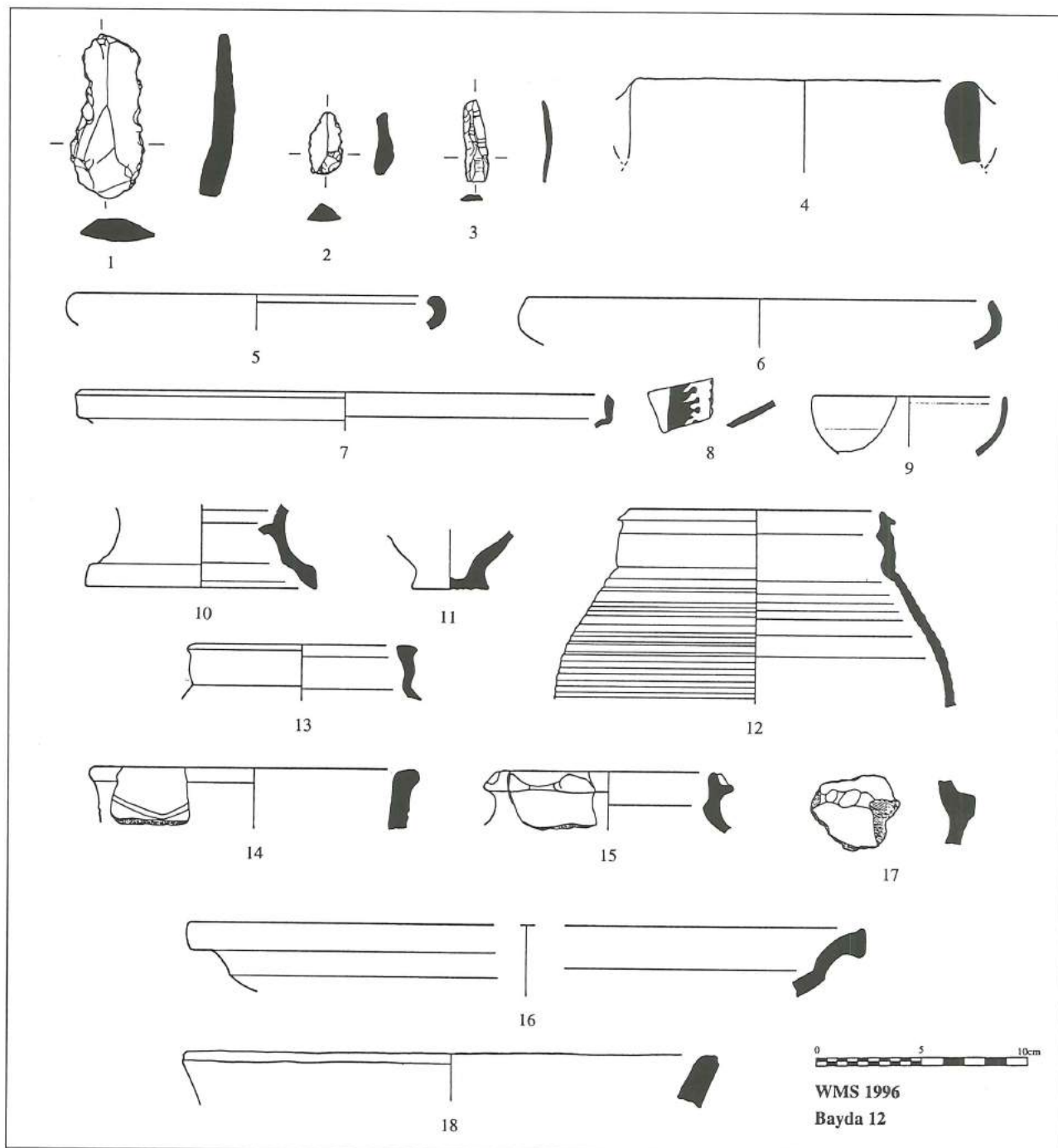
A large rock-cut cistern with three internal divisions. Remnants of a staircase leading from the opening to the bottom are currently reconstructed with concrete. The opening also has a concrete facade (cistern was dry when visited but it is usually used by local people, it was recently cleaned by the Department of Antiquities and detailed drawings for restoration were done by M. Sha'er and Z. Aslan). There is also a large channel leading to the cistern from the top of the sandstone outcrop. Located on the southern cliff face of a large sandstone outcrop, directly to the east of Siq al-Bārid.

Dating: Nabataean.

Bayda 14

UTM coordinates: 736234E; 3363444N - 736285E; 3363423N-736302E; 3363489N.
Altitude: 1063.3 - 1065.2m.
Dimensions: Total preserved length 64.50m.

A large dam or wadi barrier, of two sections built against a small rock outcrop. The pre-



4. WMS 1996 site Bayda 12 (Khirbat Baydā/ Umm Quṣṣa) flint and pottery (drawn by A. al-Momani and L. Mo-hamadiéh): 1. Blade fragment, grey; 2. borer, grey with extensive hydration; 3. sickle blade, light grey; 4. jar, red with wide grey core, abundant mineral and grog inclusions, very rough, Chalcolithic(?); 5. bowl, yellowish pink ware, Nabataean late 2nd-early 1st cent. BC; 6. bowl, fine light red ware, Nabataean 1st cent. BC- early 1st AD; 7. bowl, fine red ware, Nabataean 1st cent. AD; 8. bowl, fine red ware, red paint, Nabataean 1st cent. AD; 9. bowl, fine red ware with light grey ext. rim, Nabataean early 1st cent. AD; 10. base, fine red ware, Nabataean 1st-early 2nd cent. AD; 11. string-cut base, red ware with light grey core, thin cream slip ext., abundant sand inclusions, Nabataean 2nd cent. AD; 12. cooking pot, red ware. thin cream slip ext., many mineral inclusions, Nabataean 2nd cent. AD; 13. cooking pot, red ware, thin cream slip ext., sand inclusions, Late Nabataean 3rd-early 4th cent. AD; 14. jar, incised decoration, red ware with abundant sand inclusions, Byzantine 5th-6th cent. AD; 15. jar, thumb impressed decoration, red ware, light grey slip ext., Late Roman/ Early Byzantine 4th cent. AD; 16. "Late Roman Red" bowl, 4th cent. AD; 17. body sherd, impressed rope decoration, red ware with very wide grey core, abundant chaff impressions, Late Islamic; 18. jar, red ware with very wide grey core, burnished red slip, abundant chaff impressions, Late Islamic.

served part of the east section is 47m long (oriented at 100°), and 2.5m wide, with the anchorage cuts against the rock outcrop having remnants of mortar. This section is built with well cut sandstone blocks, some of which have oblique Nabataean trimming. The west section is 9.5m long (15m long if anchorage cuts on rock are considered, oriented at 55°), built of relatively small unhewn stone blocks. There is also a rock-cut channel to the south of the structure. Located across a flat area – currently an agricultural field directly to the west of the modern asphalt road – with high sandstone outcrop to the west, to the east of Siq al-Bārid. Badly eroded by several water courses and disturbed by agricultural field.

Dating: Nabataean.

Bayda 15

UTM coordinates: 736412E; 3363069N - 736461E; 3363010N-736450E; 3363099N - 736487E; 3363135N.

Altitude: 1067.3 - 1087.8m.

A complex system of rock-cut channels and cisterns. Located on several sandstone outcrops among agricultural fields, to the east of the main asphalt road. In the southern rock outcrops, natural depressions were used as water collecting areas, with channels leading into them. Rock-cut “steps” are anchorage areas for masonry walls, few remains of which can still be seen. The northern rock outcrops have remnants of five partially rock-cut cisterns that were roofed in antiquity, with the walls having niches for arch supports, one cistern has remains of an arch springer cut in the rock. Most cisterns still have remains of hydraulic mortar. There are also many wall lines in the surrounding fields. Abundant flint and pottery sherd scatter was noted at the site.

Dating: Neolithic (?), Chalcolithic (?), Nabataean (date for rock-cut hydraulic system, first and second centuries AD), Byzantine

(fifth and sixth centuries AD), Late Islamic.

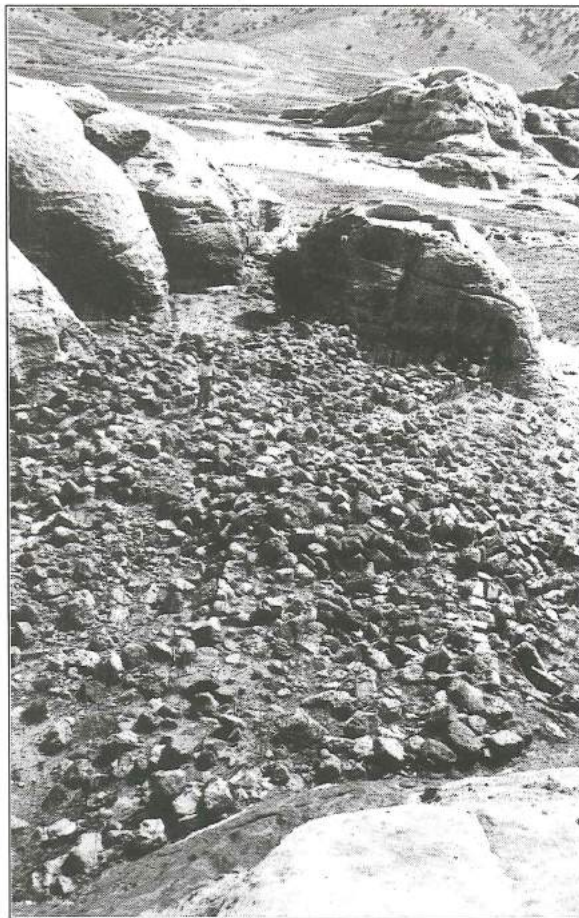
Bayda 16

UTM coordinates: 736546E; 3362943N - 736503E; 3362802N-736433E; 3362792N - 736381E; 3362873N.

Altitude: 1073.5 - 1088.5m.

A complex site with many structures built of medium sized stone blocks, some showing to a height of two to three courses above ground level. Located on a low hill with several sandstone outcrops. In the southern end, two sandstone outcrops have rock-cut installations (sacred high places ?); the rock outcrop in the southeast also has an area for water collection from a channel cut around the rock and several pot holes cut in a line along the side (Fig. 5).

Directly to the north of the built area, two sandstone outcrops also have rock-cut in-



5. WMS 1996 site Bayda 16: walls in the southern part of the site, and sandstone outcrop with rock-cut features.

stallations, the northern of which has two wine presses, several rectangular basins, and a cave below with an opening at the top (unlikely to be a collection tank as it has an entrance on the west side of the outcrop).

The main built site and rock outcrops are within an area of terraced agricultural fields. The "*khirba*" and the press are approximately 60m to the east of the main asphalt road. Ancient wall lines are abundant in the fields and some of them are showing in sections of water courses (wadi cuts).

Dating: Neolithic (?); Nabataean, Roman, Byzantine (second to fifth centuries AD).

Bayda 17

UTM coordinates: 736326E; 3362817N.

Altitude: 1062.3m.

Dimensions:- Height: 3.00m; width of base 0.90m.

An obelisk on a base, cut in relief on the west face of a sandstone outcrop. No apparent inscription. The obelisk is situated to the south of Bayda 16, approximately 25m to the east of the main road. There is a recent small robbers pit next to the face of the rock.

Dating: Nabataean.

Bayda 18

UTM coordinates: 736311E; 3362817N - 736428E; 3362634N-736428E; 3362669N - 736411E; 3362564N.

Altitude: 1058.3 - 1087.0m.

Dimensions:- Cistern: 30m E-W x 20m N-S. A hydraulic catchment area distributed among several sandstone outcrops. The area is accessed from the west through a small gorge, currently also leading into a small picnic area with concrete tables and benches. The site is to the east of the main road. The most outstanding feature is a natural depression between the rocks in the north adapted to form a large cistern, with a channel leading to it from the east. The southern (rock) wall of the cistern has steps and nich-

es cut into it (on the outer face). There are also two rock-cut chambers to the south of the cistern, one of which is currently blocked – except for a small opening – by a cement breeze block structure. There may also be another cistern to the west of the gorge entrance, the outline of which is currently obliterated by a modern agricultural field. A scarce sherd scatter was noted at the site.

Dating: Nabataean.

Bayda 19

UTM coordinates: 736129E; 3362406N.

Altitude: 1050.6m.

Rock-cut installations among sandstone outcrops, including a small triclinium with a round "wash basin" to the right of the entrance and a weathered cultic niche to the left. The triclinium is currently used for storing straw. The northern face of the outcrop has an unfinished façade and channel cut into it. Another rock outcrop directly to the north has rock-cut steps. A third outcrop further north has a long channel, which should lead into a cistern in the east (currently totally buried). Other rock outcrops to the south have cup holes cut into them. Basalt grinding stone fragments were found in the surrounding fields. A scarce pottery sherd scatter, predominantly Nabataean with a few Late Islamic sherds, was also noted at the site.

Dating: Nabataean, reused Late Islamic.

Bayda 20

UTM coordinates: 736082E; 3362219N - 736115E; 3362247N - 736145E; 3362147N - 735954E; 3362242N-735932E; 3362087N. Altitude: 1055.4 - 1064.5m.

An extensive area of rock-cut installations and wall lines. The most prominent features include a rock-cut house in the northeast (oriented at ~70°) with a large hall measuring 5.75m N-S x 6.60m E-W. The south-

ern wall of the hall has rectangular niches (arch supports). The hall opens onto a smaller, almost square room (2.70 x 2.60m) in the northeast. To the northeast of the house, there is another rock-cut installation where the rock-cut eastern wall is continued with medium sized stone blocks to the south. The structure is too badly weathered and eroded for positive identification.

In the northwest edge of the site, there is an obelisk on a base, cut in relief on the rock face. There is a one-line Nabataean inscription below the base of this obelisk. Also in the northwest, there are several rock-cut channels leading into the weathered remains of rock-cut cisterns. The most noticeable feature from the road, however, is an almost cubical, semi-detached "Sehrij" block in the southwest.

Additionally, there are numerous scattered building blocks in the surrounding fields, including two large fragments of half columns. This indicates that there are (or were?) some masonry built structures at the site as well as the rock-cut installations. Abundant pottery sherd scatter was noted in the area.

The main road cuts this site. The road is also very close to the southeast corner of one less obvious rock-cut installation with one remaining course of ashlar blocks. Additionally, the road bedding here is less than 1m. This implies that bedrock is very close to the surface, but the possibility of archaeological remains preserved under the road cannot be ruled out.

Dating: Nabataean, Late Roman/ Early Byzantine (late first to fifth centuries AD), Late Islamic.

Bayda 21

UTM coordinates: 735823E; 3362120N - 735779E; 3362062N-735914E; 3361972N - 735952E; 3362043N.

Altitude: 1067.3 - 1074.2m.

An extensive site with many structures (wall lines), most of which are obscured by mod-

ern agricultural terraces. Located on an elevated stretch and surrounded by high sandstone outcrops in the east and west. A sandstone outcrop to the east has a rock-cut wine press with several basins, and a deep round "collection basin" with remnants of hydraulic mortar. Abundant pottery sherd scatter was noted at the site (Fig. 6).

The site is cut by the modern road, as well as two dirt tracks.

Dating: Iron II (Edomite), Nabataean (first century AD), Late Roman, Byzantine (fourth and fifth centuries AD), Late Islamic.

Bayda 22

UTM coordinates: 735701E; 3361941N - 735728E; 3361884N-735657E; 3361920N-735608E; 3361841N-735624E; 3361796N.

Altitude: 1048.8 - 1066.1m.

An area of rock-cut installations on several sandstone outcrops, with intervening agricultural fields having abundant wall lines and terraces. Located next to the east face of a large sandstone outcrop, to the west of the modern road. Prominent features are several rock-cut chambers in the northwest, including one small triclinium with a "wash basin" to the left of the entrance. Approximately at the centre of the site, there is a round rock-cut cistern with a channel and settling tank to the east. In the southwest, there is another rock-cut installation, probably a small open-air triclinium (?), and a channel cut in the same rock outcrop directly to the south of the "triclinium". Abundant pottery sherd scatter was noted at the site.

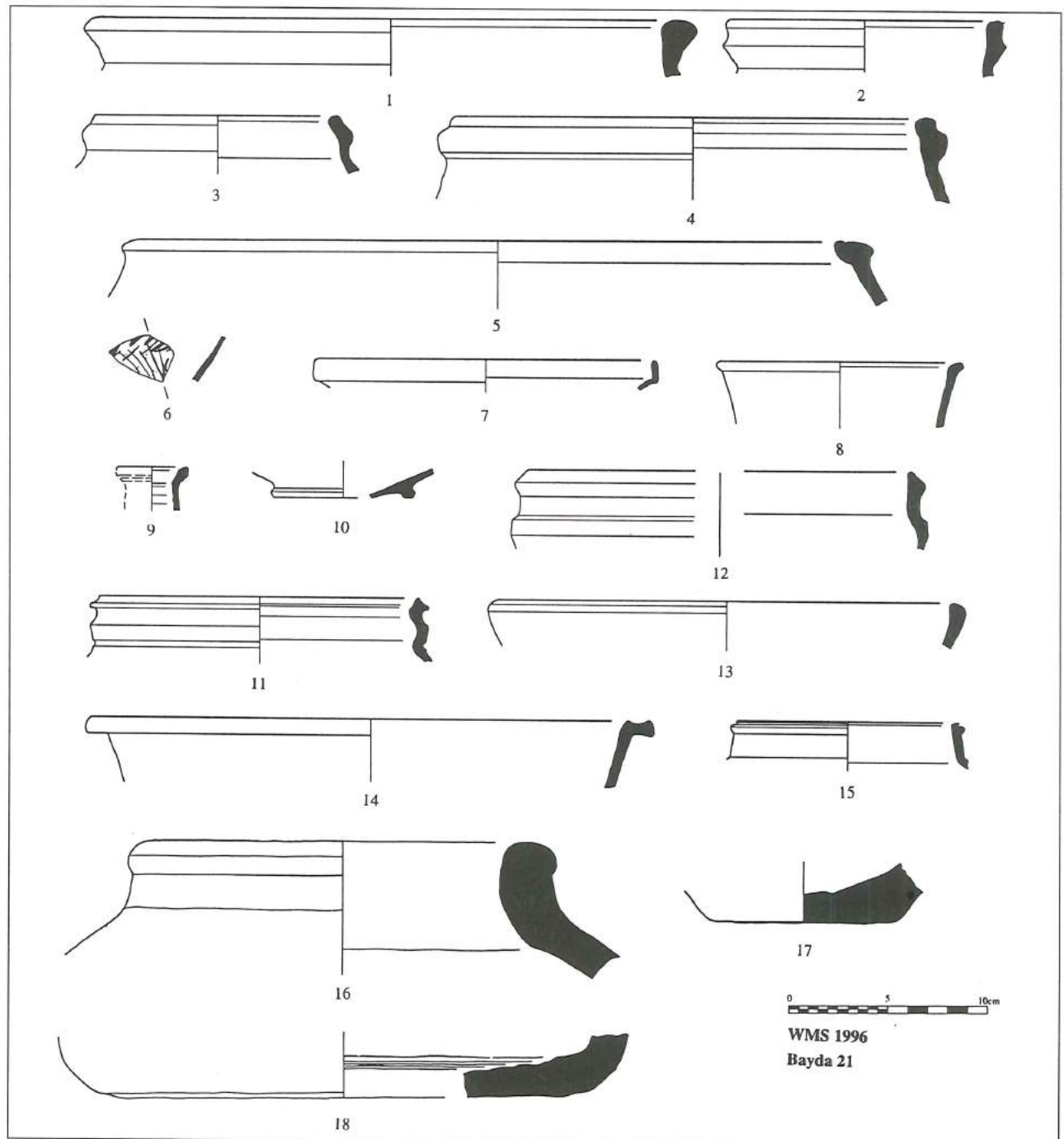
Dating: Nabataean, Roman/ Byzantine (first to fourth centuries AD), Late Islamic.

Bayda 23 (Sadd al-Kharrūba/Kharrū-bat al-Fajja)

UTM coordinates: 735680E; 3361021N.

Altitude: 1047.4m.

A small Nabataean dam located across a



6. WMS 1996 site Bayda 21 pottery (drawn by A. al-Momani and L. Mohamadiéh): 1. Large closed bowl, brown ware with grey core, Edomite Iron II; 2. cooking pot, red ware, dark grey slip, Edomite Iron II; 3. cooking pot/ jar, red ware with grey core, Edomite Iron II; 4. cooking pot/ jar, red ware with grey core and int., Edomite Iron II; 5. holemouth jar, red ware with grey core, grey slip ext., Edomite Iron II; 6. bowl, dark red paint, fine red ware, Nabataean mid-1st cent. AD; 7. bowl, fine red ware, Nabataean early 1st cent. AD; 8. cup, fine red ware, Nabataean 1st cent. AD; 9. jug, fine red ware, Nabataean 1st cent. AD; 10. base, fine red ware, Nabataean 1st cent. AD; 11. jar, red ware, Nabataean 1st cent. AD; 12. jar, red ware with grey core, sandy texture, Byzantine 5th cent. AD; 13. bowl, red ware, cream slip ext., Byzantine 5th cent. AD; 14. bowl, red ware, thin grey slip, Late Roman/ Early Byzantine 4th cent. AD; 15. cooking pot, red ware, dark grey slip ext., Late Roman/ Early Byzantine 4th cent. AD; 16. storage jar, handmade, red ware with wide light grey core, traces of cream slip ext., numerous mineral white, grey and grog inclusions, Late Islamic; 17. base, handmade, red ware, black slip ext. and reddish brown int., many grog inclusions and chaff impressions, Late Islamic (Ayyubid/ Mamluk ?); 18. base, handmade, brown with wide grey core, many mineral grey and grog inclusions, some chaff impressions, Late Islamic.

gorge in a high sandstone outcrop, to the west of the modern road. The three top courses of the medium sized masonry dam wall are missing (as indicated by their anchorage cuts in the rock). The wall is also mended with cement. The dam is named after a large carob tree growing inside it.

Dating: Nabataean, with later reuse.

Bayda 24

UTM coordinates: 736197E; 3360103N - 736159E; 3360146N - 736119E; 3360146N - 736085E; 3360112N.

Altitude: 1027.0 - 1035.9m.

A relatively small site with several structures built with medium sized stone blocks. Located on a hill slope with sandstone outcrops, to the south of the modern road. A rock outcrop on the east has remains of a rock-cut channel with pottery pipes and mortar (the ancient Nabataean line carrying water from 'Ayn Dibdiba to Petra). Below the channel, there is a rock-cut chamber currently used for storage (Fig. 7). Another

rock outcrop to the west has three rock-cut shaft tombs. Abundant pottery sherd scatter was noted at the site.

Dating: Nabataean (first to third centuries AD), Late Islamic.

Bayda 25

UTM coordinates: 735944E; 3359792N - 735972E; 3359765N.

Altitude: 995.1 - 999.6m.

A rock-cut channel and small wadi barrier directly opposite "Elephant Rock". The "Elephant Rock" also has a channel cut into it. The channel is already cut by the main road. Currently both the channel and the barrier are 1.70-3m above the road level.

Dating: Nabataean.

Bayda 26

UTM coordinates: 735918E; 3359709N.

Altitude: 1004.3m.

A sandstone outcrop with rectangular rock-cut shaft tomb at the top. There is also a



7. WMS 1996 site Bayda 24: view from the southwest showing the structures and rock outcrop with the channel and chamber.

Nabataean cistern at the northern face of the rock outcrop, with two sets of cut arch supports—one above the other—in the west wall, indicating that perhaps the cistern had a high roof originally, then the top of the walls collapsed and a lower roof was built to replace the original. Located on a steep mountain slope, to the west of the modern road. There are also remnants of a large dam/barrier across the deep wadi below, connecting the rock outcrop with the “Elephant Rock”.

Dating: Nabataean.

Bayda 27

UTM coordinates: 735794E; 3359663N - 735765E; 3359675N-735751E; 3359585N. Altitude: 992.6 - 1009.2m.

An extensive area of quarries at the (sandstone) mountain side. There is also a rock-cut cistern at the north side of the rock outcrop. In the east, there is a rock-cut chamber, currently faced with cement breeze blocks and used for storage. The chamber has a level area in front with rectangular cuts for arch supports in the western wall, indicating that it was a roofed hall originally.

The westernmost outcrop in this group has the remains of a water channel leading to a cistern, near the current police post at the service entrance to Petra. The modern road is at the southwestern edge of the site.

Dating: Nabataean.

Bayda 28 (Khirbat al-Qarn)

UTM coordinates: 737265E; 3363752N. Altitude: 1170.1m.

JADIS site 1997.075. This site is recorded in JADIS as being a Nabataean/ Roman fortress on a hill top (based on Palumbo 1994b). During this survey, it was noted that there are also other substantial structures down the slope, to the southwest of the hill top structure, being right next to the

edge of the modern village of Bayda (the modern village is built below the slope on which the site is located, resulting in the odd form of the east end of the village plan). The structures are built with small and medium stone blocks. There are also rock outcrops in between the hill top and slope structures, some of which have ancient cuts. A somewhat scarce pottery sherd scatter was noted at the site.

Dating: Nabataean (first to early second century AD).

Bayda 29

UTM coordinates: 734995E; 3366190N. Altitude: 1036.8m. Dimensions: 3.75m x 3.80m.

A small rock-cut cistern/ pool, found with water inside. Located on a slight flat rock outcrop above wadi. The area to the east is a ploughed field and there are no visible traces of channels in the vicinity. No pottery was found at the location.

Dating: Nabataean.

Bayda 30

UTM coordinates: 736091E; 3360259N. Altitude: 1025.3m. Dimensions: Length 11m; height 2m (actual orientation 110°).

A well-preserved wadi barrier/ dam between two rock outcrops. Built with large sandstone blocks. No pottery or flint scatter was noted at the site.

Dating: Nabataean.

2. The Umm Şayḥūn Sector (Fig. 2)

The Umm Şayḥūn sector is considered to start from the intersection of the roads connecting Umm Şayḥūn with Bayda and Petra in the north, through the village of Umm Şayḥūn, down to the intersection of the roads going into the az-Zurrāba district of Wādī Mūsā in the south. One site was re-

corded in the village (Umm Sayhun 3), and two sites along the road between Umm Şayhūn and Wādī Mūsā (Umm Sayhun 1 and 2). Additionally, there are some agricultural terraces and small wadi barriers, especially in the area above Umm Şayhūn, that were noted but not recorded in this survey.

Umm Sayhun 1

UTM coordinates: 737105E; 3359029N - 737162E; 3359005N - 737236E; 3359015N - 737195E; 3358974N.

Altitude: 1054.4 - 1068.3m.

An area of less steep soil deposits on rock outcrops. To the west, on a sandstone outcrop overlooking Petra, there is a small rock-cut triclinium, currently used for storage and the entrance is obscured by a facade of cement breeze blocks. Directly to the southwest of the triclinium on the same rock outcrop, there is a rock-cut shaft tomb partially excavated by robbers, showing that it has at least two internal tiers.

A side wadi of Wādī al-Wu'ayra, to the south of the triclinium, has a series of nine comparatively wide wadi barriers, the centres of which are currently eroded by water. Another sandstone outcrop directly south of the side wadi has a rock-cut niche.

Dating: Nabataean.

Umm Sayhun 2

UTM coordinates: 737184E; 3358363N - 737210E; 3358383N - 737195E; 3358414N.

Altitude: 1056.4 - 1057.4m.

Rectangular rock-cut chamber and niches with a large flat expanse in front. On a sandstone outcrop at the mountain slope. Directly to the east, and across Wādī al-Wu'ayra, from the Medieval fort. The round cave to the north of the chamber is a natural formation.

The nearby Medieval fort of al-Wu'ayra is not discussed in this report.

Dating: Nabataean.

Umm Sayhun 3

UTM coordinates: 735844E; 3359544N - 735888E; 3359599N.

Altitude: 1017.2 - 1023.7m.

A small "tunnel" in a sandstone outcrop, thought to have originally been a water collection tunnel/ channel. Close examination of the remains showed no signs of chiseling or hydraulic mortar. The tunnel is cut in the north and south (by levelling the ground to the west of the modern school) as well as by the modern main road through the village. The part to the south of the main road is currently modified into a storage area for a modern house. A somewhat scarce pottery sherd scatter was noted to the east of the site.

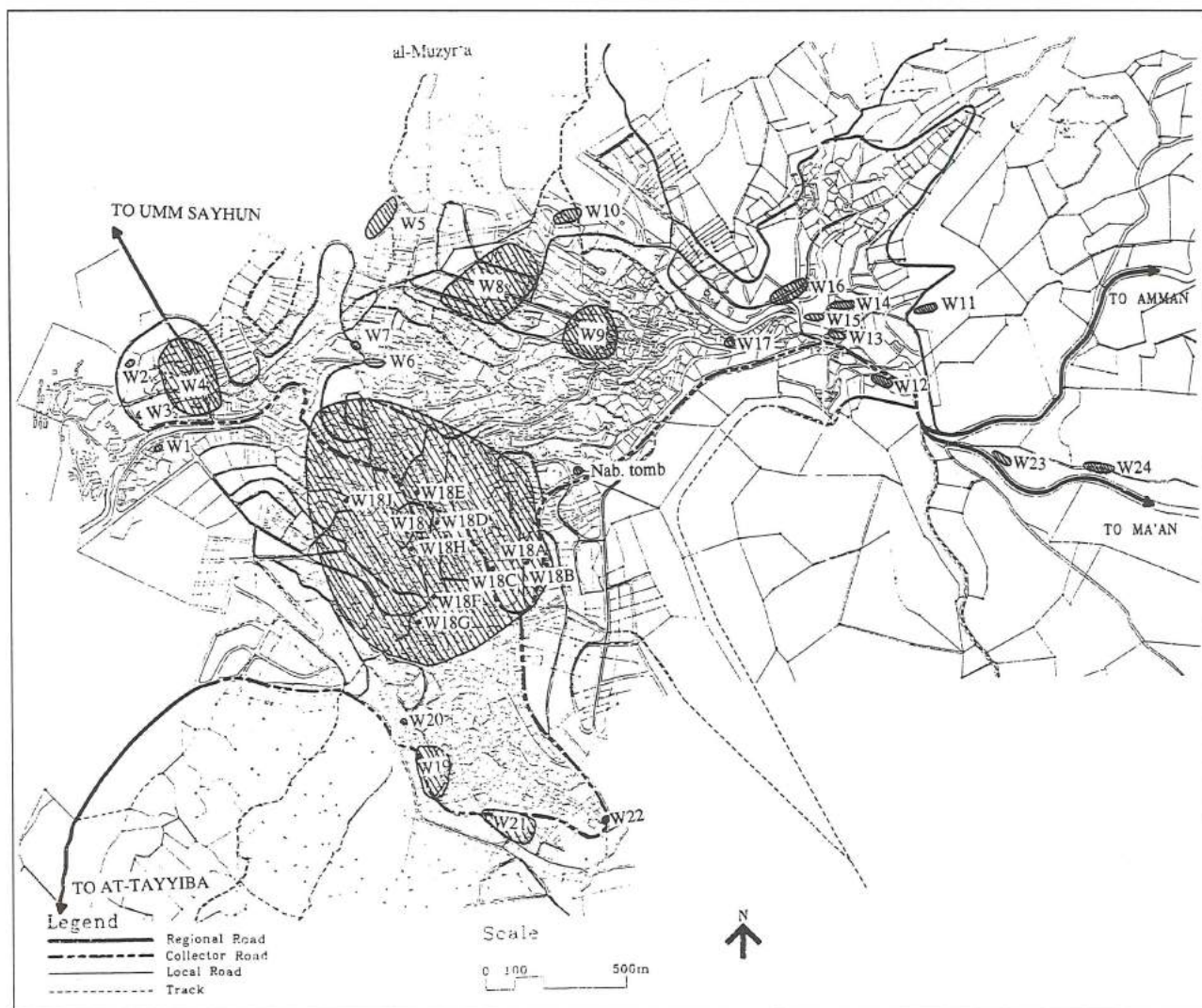
Dating: Nabataean (?).

3. The Wādī Mūsā Sector (Fig. 8)

The present town of Wādī Mūsā is built over an area with several water courses and rich agricultural land, add to this the fact that it was on ancient routes and the result is a rich archaeological heritage. Varying sites from almost all periods were discovered during the survey, three of which had been previously partially excavated (Wadi Musa 4, 10 and 18D), while two others were excavated in 1997 after the survey (Wadi Musa 8 and 9, see below). Additionally, there are many agricultural terraces and small wadi barriers within the town that were noted but not recorded in this survey. The discovery of ancient architectural fragments and decorations is an on-going event at the town (see for example Zayadine 1981: 250), and several such fragments were recorded out of context during the survey. Unfortunately, the fast rate of development over the past few years at Wādī Mūsā made it very difficult to conserve much of its rich archaeological heritage.

Wadi Musa 1

UTM coordinates: 737408E; 3357493N - 737434E; 3357474N - 737425E; 3357441N



8. WMS 1996: recorded archaeological sites in the Wādī Mūsā sector (base map supplied by the Petra Region Planning Council).

- 737385E; 3357456N.

Altitude: 1022.5 - 1026.1m.

Low agricultural terraces on the southern bank of Wādī Mūsā. Reused (and much disturbed) by small agricultural fields. Abundant Nabataean pottery sherds were noted but no wall lines other than the agricultural terrace walls. The site is on the lowest of a series of low terraces on the mountain slope adjoining the Wādī Mūsā ravine near the modern entrance gate to Petra. Sherd scatters indicate that these terraces are an archaeological site. A cultural resources impact assessment of this terrace area recommended that they be kept green, and "an archaeological park for the illustration

of agricultural terracing in Nabataean times" be developed (Palumbo 1994b).

Floods during the winter of 1996/1997 revealed the existence of two substantial walls in the wadi cut, approximately 200m to the north of site Wadi Musa 1.

Dating: Nabataean, Roman, Late Roman/Early Byzantine (first to fourth centuries AD).

Wadi Musa 2 (Birkat az-Zurrāba)

UTM coordinates: 737370E; 3357735N-737382E; 3357747N-737345E; 3357786N-737333E; 3357775N.

Altitude: 1055.9 - 1056.5m.

A double cistern, partially rock-cut and continued with masonry walls. The southern section has a staircase in its west wall. A channel leads to the cistern from the east (uphill, probably originating at 'Ayn Mūsā for the transfer of water into Petra). The channel joins the cistern at a square stone built inlet, then water goes down into a "cave" with small niches at the facade, in the northern section. The cistern walls are partly collapsed, especially at the northern section. The interior of the cistern is currently used as an agricultural field.

Dating: Nabataean, with later reuses.

Wadi Musa 3 (al-Quff)

UTM coordinates: 737387E; 3357575N-737360E; 3357623N-737382E; 3357688N-737418E; 3357624N.

Altitude: 1030.9 - 1047.7m.

Several rock-cut features, on the slope of the same sandstone outcrop as site Wadi Musa 2. A rock-cut chamber in the north is currently full of modern dump. In the centre, there is a rock-cut shaft tomb with top and side (west) openings and three interior chambers. In the south, a circular hydraulic structure built with unhewn stones over a rock-cut vertical channel (perhaps would have been the entrance into a now destroyed cistern, although there are no apparent remains of a channel). This structure can now be seen in section in the Mövenpick Hotel parking lot, and a small palm tree is planted inside it. A few pottery sherds in the mortar are not diagnostic.

Dating: Nabataean rock-cut features, hydraulic stone structure in the south may be later.

Wadi Musa 4 (az-Zurrāba)

UTM coordinates: 737611E; 3357730N.

Altitude: 1058.7m.

Dimensions: ~200m E-W x ~250m N-S.

JADIS site 1997.012. An ancient industrial

area. Seven pottery kilns and parts of a pottery workshop were excavated by the Department of Antiquities in 1980, 1981, 1991 and 1997 (Zayadine 1981: 350-351; 1982: 380-393; 1986; 'Amr 1991; Mason and 'Amr 1995: 629-631; 'Amr and al-Momani 1998a). The excavation area, which is currently fenced, is only the central part of the site, which is characterized by layers of ash and red soil very rich in pottery. The site is now much disturbed by modern buildings, including several hotels. Additionally, there are several weight and pressing stones that were reused in terraces in the area, indicating that there were also olive presses at the site (Zayadine 1982: 384; Mason and 'Amr 1995: 623-633).

Dating: Nabataean-Byzantine (first to sixth century AD).

Wadi Musa 5 ('Ayn at-Ṭinah)

UTM coordinates: 737911E; 3357730N.

Altitude: 1058.7m.

Dimensions: - mine: 80m N-s x 45m E-W x 15m deep (actual orientation 160°).

An ancient clay mine on the slope of Jabal a-Ṭinah. There are also structures showing in the wadi section opposite the mine that may be related to pottery production ('Amr 1987: 42-43; 1997; Mason and 'Amr 1995: 635). All archaeological remains in the wadi itself had been eroded down to the natural rock.

Dating: Nabataean, with Neolithic below the structures in the wadi section.

Wadi Musa 6 (al-'Udmal)

UTM coordinates: 738209E; 3357775N.

Altitude: 1090.1m.

Dimensions: ~100m E-W.

In the wadi cut (Wādī al-Madar), up to 6m of archaeological deposits can be seen. A thick layer of ash at the bottom has much burnt bone, some charcoal, some hematite, some flint tools and numerous cobbles. Layers above that have finely crushed pot-

tery sherds. There are no apparent structures in the section. All archaeological remains in the centre of the wadi had been eroded down to the natural rock.

There is a small water spring to the west. Locals say that the famous 'Ayn al-'Udmal (mentioned by al-Nuwayri in 1276 as a stop along the route of the voyage of Sultan Baybars from Cairo to al-Karak, Zayadine 1985: 168-170) was directly upstream but had dried up, and this present spring (now called 'Ayn as-Sayl) evolved after the drying up of 'Ayn al-'Udmal. The crushed pottery may be the result of people and animals trampling the route to the spring. There are modern agricultural terraces above the site with again much finely crushed pottery.

An Early Islamic lamp fragment was found at the site by 'Amr during a visit earlier this year, but no Early Islamic pottery was recovered during the present survey.

Dating: Epipalaeolithic/ Neolithic, Nabataean (first - third centuries AD), Byzantine, Early Islamic, Late Islamic.

Wadi Musa 7

UTM coordinates: 738163E; 3357841N.

Altitude: 1104.2m.

Walls of somewhat large limestone blocks showing in a road cut. The depth of archaeological deposits is between 1-1.5m above bedrock in the cut. Scarce small sherds noted at the site, none diagnostic.

Dating: Uncertain.

Wadi Musa 8 (al-Basit)

UTM coordinates: 738413E; 3358021N - 738632E; 3357932N - 738766E; 3358166N - 738793E; 3357954N.

Altitude: 1195.5 - 1235.5m.

Dimensions: ~250 x 250m.

An area of somewhat ashy soil with abundant flint tool scatter, and some pottery. A few houses are built there while much of the area is terraced agricultural fields. The cut

for one house in the north shows a burnt layer with much burnt bone and cobbles. The site is also cut by several roads.

Some wall lines could be seen in the south, built with cobbles, being very similar to the Bayda/ Sayl 'Aqlat Neolithic village structures (this section was destroyed by a road cut soon after the survey). Fragments of grinding stones and querns were also found in the agricultural fields. An olive press stone was found among a pile of cleared stones in the south.

A small scale excavation was carried out by the Department of Antiquities in the north-eastern part of the site in August-December 1997 (Fino 1997; 1998). Remnants of structures with red-painted plaster floors were discovered. The structures were dated to the LPPNB.

Dating: Neolithic (predominant), Iron II, Nabataean, Byzantine.

[The substantial site of al-Muzayr'a, overlooking Wadi al-Yasala, is to the northwest of al-Basit. It is not included in this survey due to its distance from the proposed pipe network].

Wadi Musa 9 (Khirbat an-Nawāfla)

UTM coordinates: 739081E; 3357818N - 739291E; 3357788N-739243E; 3357822N.

Altitude: 1198.8 - 1218.2m.

JADIS site 1997.071. An ancient site currently occupied by a modern (traditional, abandoned) village and olive groves. Located on a flat area in the mountain side, above Wadi Khalil. The most outstanding archaeological feature at the time of the survey was a square, masonry built cistern in the west. Many ancient decorated stone blocks (cornices, Nabataean oblique-trimmed masonry, marble fragments, olive press stones and at least one Nabataean inscription) are reused in the building of the houses. Directly to the southeast of the village, there are the remains of a substantial

bridge crossing Wādī Khalīl. The southern springer of the bridge is still preserved to a height of 2.5m, and remains of a base can still be seen in the wadi bed.

The traditional village had been purchased for conversion into a tourist resort, similar to "Taibet Zaman". Archaeological excavations by the Department of Antiquities were carried out at the site from April to December 1997 ('Amr and al-Momani 1998b). The site is basically a series of superimposed and overlapping agricultural villages starting from the first century BC, while earlier material was recovered from the northern part of the site.

Dating: Probable Middle Bronze Age, Iron II (Edomite), Hellenistic, Nabataean (first century BC onwards), Early Byzantine, Late Byzantine, Early Islamic, Ayyubid/Mamluk, Late Islamic.

Wadi Musa 10 (Ṭawīlān)

UTM coordinates: 738912E; 3358203N.

Altitude: 1233.9m.

JADIS site 1997.002. A major Iron Age site, with other period remains, including cemeteries and towers. The site was excavated over several seasons by the British Institute in Amman for Archaeology and History (Bennett and Bienkowski 1995).

Dating: Chalcolithic, Iron I, Iron II (predominant), Iron III, Late Roman, Umayyad, Mamluk, Ottoman.

Wadi Musa 11

UTM coordinates: 740304E; 3357975N - 740240E; 3357922N.

Altitude: 1341.2 - 1343.7m.

An area of ashy soil, with a few wall lines of small stone blocks much obscured by collapse and dump. Located on a mountain slope above a wadi, with a spring—now collected in a modern pool—to the north. The east edge of the site may be cut by the modern road, a section in an olive orchard

to the east of the road shows less than 0.5m of ashy deposits but no wall lines there. Some pottery, iron lumps, a corroded bronze coin and fragment of a green glass bracelet were found at the site.

Dating: Late Islamic (probably Mamluk).

Wadi Musa 12 (Ṭāḥūnat 'Ayn Mūsā)

UTM coordinates: 740067E; 3357619N.

Altitude: 1293.2m.

A water mill, built with medium and large stone blocks. Located on the mountain slope opposite and above 'Ayn Mūsā. Revealed in a cut to the south of the main road from 'Ayn Mūsā to the town centre. Conduit wall (in the south) is used as a boundary wall separating two modern (traditional) houses, indicating that the water mill is earlier. There are other traditional structures, now partially collapsed, directly to the north of the mill and may be associated with it. No pottery was found at the site. Such mills are most probably Late Islamic, but are very difficult to date precisely (see for example Greene 1995; McQuitty 1995). Only two water mills in Wādī Mūsā were mentioned in the Ottoman records dating between 1864 and 1918: Ṭāḥūnat Banī 'Aṭā wa ash-Shurūr (probably site Wadi Musa 22) and Ṭāḥūnat al-'Alāyā (site Wadi Musa 13, see also site Wadi Musa 17) (Tarawneh 1992: 168, 171). Due to the proximity of this mill to Ṭāḥūnat al-'Alāyā, its state of exposure as well as its location, it is probable that it went out of use before 1864 and was replaced by the lower Ṭāḥūnat al-'Alāyā.

Dating: Late Islamic (probably Ottoman).

Wadi Musa 13 (Ṭāḥūnat al-'Alāyā)

UTM coordinates: 739911E; 3357806N.

Altitude: 1285.8m.

Dimensions: Length ~10m (actual orientation 15°).

A water mill, built with medium and large stone blocks, partly collapsed, mill stones

missing. Located above the main Wādī Mūsā. Conduit wall carrying channel preserved from the north. Scarce Late Islamic pottery scatter was found at the site. Ṭāhūnat al-‘Alāyā was mentioned in the Ottoman records dating to 1864-1918 (Tarawneh 1992: 171), although the probability that the name in the records referred to the mills of site Wadi Musa 17 cannot be ruled out. Judging by the state of exposure and location, this mill seems later than Ṭāhūnat ‘Ayn Mūsā (Wadi Musa 12).

Dating: Late Islamic (Late Ottoman).

Wadi Musa 14 (Khirbat al-Muḥaylla)

UTM coordinates: 740013E; 3357850N.

Altitude: 1302.3m.

JADIS site 1997.014. An area with modern and traditional houses. Many oblique-trimmed Nabataean blocks are reused in the houses and terraces, but no clear ancient walls could be seen. The site is much obliterated, and may be destroyed, by the modern houses and terraces (Glueck 1935: 74, Site 97 was hoping to find an Edomite fort at this location but only found modern pottery fragments; see also Musil 1908: 11). A scarce Nabataean pottery scatter was also noted at the site during this survey.

Dating: Nabataean, Late Islamic.

Wadi Musa 15

UTM coordinates: 739796E; 3357830N.

Altitude: 1263.3m.

Dimensions: Length of wall ~8m (actual orientation 115°).

A wall, 1.20m wide with very solid mortar between the facing stones, much destroyed. Located at the north edge of a side wadi off Wādī al-Muḥaylla, next to a modern channel. Most probably a conduit. Scarce pottery scatter (including a Nabataean ceramic water pipe fragment) and two microliths were found directly next to the wall. There is a cave directly to the east of the wall, current-

ly used for storing dung.

Dating: Natufian (?) in the vicinity, Nabataean (?) for the conduit wall.

Wadi Musa 16

UTM coordinates: 739776E; 3357951N.

Altitude: 1267.9m.

Dimensions: ~100m E-W x ~50m N-S.

Several structures of medium sized stone blocks, showing in section in the road cut. There is also an ash layer in the cut to the east. Site very difficult to define exactly due to extensive modern deposits at the surface, it is also badly disturbed by the modern road. Located at the mountain slope, well above Wādī al-Muḥaylla. Pottery sherds were noted at the surface and in the section.

Dating: Nabataean/ Roman (first - third centuries AD), Ayyubid/ Mamluk, Ottoman.

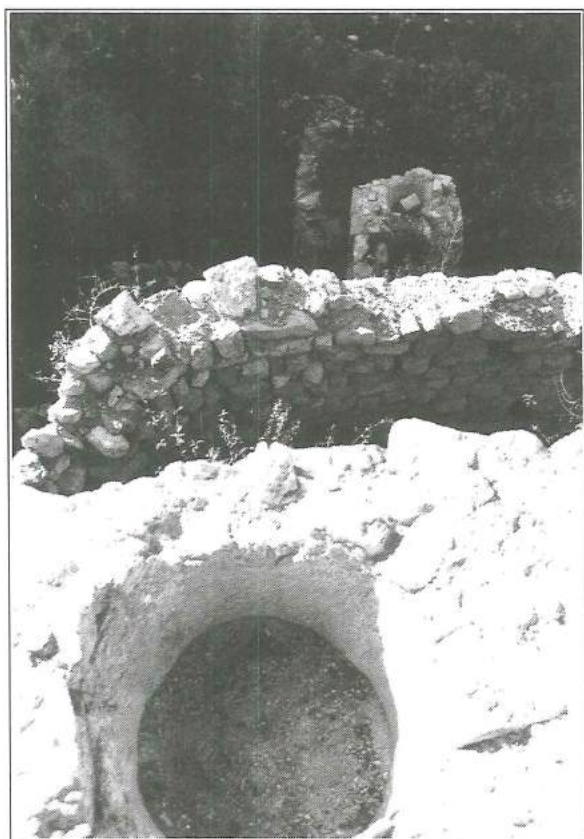
Wadi Musa 17

UTM coordinates: 739569E; 3357780N.

Altitude: 1246.0m.

Two water mills, one situated above the other on a mountain slope overlooking Wādī al-Muḥaylla, within terraced orchards. Built with medium and large stone blocks. The conduit of each mill leads into a circular structure, while the top structure is situated directly above the lower mill's conduit (Fig. 9). There are remnants of hydraulic mortar in the conduit channels. It is difficult to determine whether the upper mill was earlier and replaced by the lower when the water level dropped, or whether the two mills were used concurrently. Such mills are most probably Late Islamic, but are very difficult to date precisely. These mills may be the Ṭāhūnat al-‘Alāyā mentioned in the Ottoman records dating to 1864-1918 (Tarawneh 1992: 171; see also site Wadi Musa 13). A few washed sherds were noted at the site.

Dating: Late Islamic (probably Late Otto-



9. WMS 1996 site Wadi Musa 17: View from the conduit of the upper mill, with the lower mill and its associated semi-circular structure directly below the upper semi-circular structure.

man).

Wadi Musa 18

UTM coordinates:- Upper: 738033E; 3357588N - lower: 738471E; 3357467N.
Altitude: 1104.6 - 1159.3m.

Dimensions: ~750m E-W x 1000m N-S.

This is a very extensive site, currently the Wādī Mūsā town centre. It is thought that this area is the site of the ancient city of Gaia, with plentiful water and on the trade routes. Wādī Mūsā is JADIS site 1997.003 (see also Zayadine 1985: 168-170).

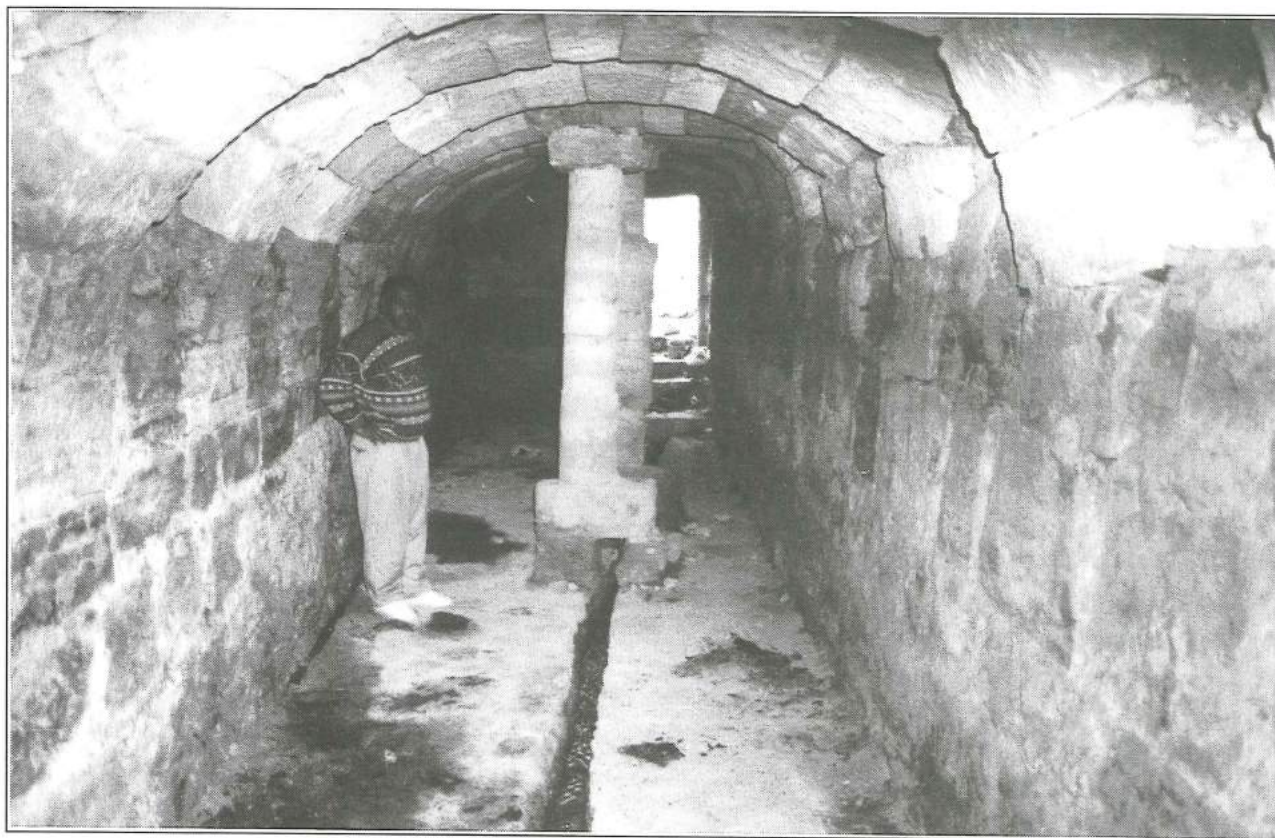
Wadi Musa 18 is by far the largest (and most dense) recorded site in this survey, being an ancient city. It is also the most densely built up area in modern times, a trend that will be very difficult to stop at the time being. Due to the expanse of this site, and the extensive disturbance due to the modern town, the exact boundaries could not be de-

termined and only highlights could be recorded:

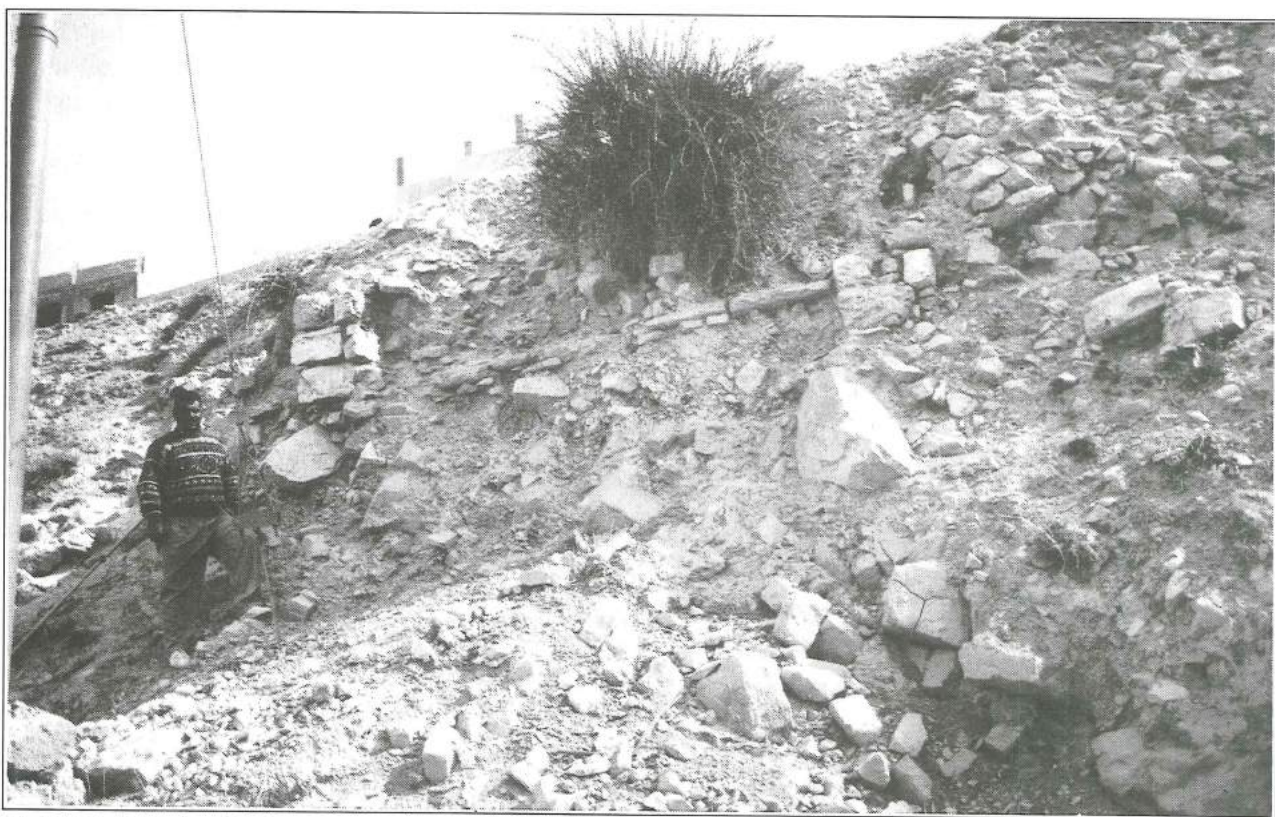
Wadi Musa 18A (Dār al-Birka): (UTM coordinates: 738733E, 3347069N; altitude: 1181.6m). In the east part of the site, on a mountain slope. The main feature (the dār) is a chamber built at a water spring still flowing from the east (uphill) side of the chamber. The chamber is roofed with ten arches, there are also three columns that seem to be a later addition for supporting the central arches (Fig. 10). The north wall, opposite the entrance, is cut in the limestone rock, with a niche in it. The rock-cut floor has channels cut into it, the main channel crosses under the modern street and leads to an open cistern in the terraced orchards to the west. The upper courses of the cistern walls have several reused blocks, including a fine cornice. To the north of the dār, there is a substantial wall against which a traditional, now deserted, house was built. An abundant pottery sherd scatter was noted at the site, which seems to have originally been Nabataean but reused in later periods. The dār was cleared and restored by the Department of Antiquities in 1993.

Wadi Musa 18B: (UTM coordinates: 738792E, 3356935N; altitude: 1186.9m). JADIS site 1996.025 (Palumbo 1994b, where it is named al-Brayka but see site Wadi Musa 18C below). At the east edge of the site, on a mountain slope, a "row" of substantial and well-built structures is cut by the main road and a side track. Many of the walls are plastered. The road-cut also shows that several rooms have flagstone pavements (Fig. 11). A built drain covered with slabs can also be seen at the northern edge of the row of structures. Abundant pottery sherd scatter at the location, dating to the Nabataean period (first through to the third century AD).

Wadi Musa 18C (Al-Brayka): (UTM co-



10. WMS 1996 site Wadi Musa 18A (Dār al-Birka): interior of the underground chamber.



11. WMS 1996 site Wadi Musa 18B: room with a flagstone pavement showing in the road cut. This section was covered by a modern retaining wall in early 1998.

ordinates: 738604E, 3357056N; altitude: 1149.3m). In the east section of the site, on a mountain slope. Substantial and well-built structures cut by the main road, and remnants of a ceramic water pipe as well as a drain. In 1994, the collapse of a section in front of which now a new building stands, revealed a large wall and drain (only the northward continuation of the upper walls is now evident). Still further north and close to the main circle in Wādī Mūsā town centre (the Martyr Circle), a retaining wall can be seen based on a substantial earlier wall. Abundant Nabataean pottery sherd scatter was noted at the location (of the first centuries BC/ AD).

Wadi Musa 18D: (UTM coordinates: 738430E, 3357222N; altitude: 1126.9m). Inside the triangle that forms the centre of the Wādī Mūsā main market place. The location was excavated in February to June 1996 by a team from the Department of Antiquities ('Amr *et al.* 1997a, b). The excavations uncovered a Nabataean roofed cistern, around which were structures dating from the first century AD through to the Late Byzantine, topped by Ayyubid/ Mamluk and Ottoman. To the north, there was a first century AD villa with the only known Nabataean mosaic floor up till now. The excavated part of the villa is now destroyed (the mosaic was transferred to the Petra Nabataean Museum), but parts remain under a traditional building to the east, while the cistern and the other structures were back-filled. In between, there are walls showing behind "Al-Anbat II Hotel". The "Yākhūr" building to the east, the largest central traditional building in Wādī Mūsā, is now destroyed. Much of its stones were of the typical oblique-trimmed Nabataean masonry and were sold off for inclusion in new buildings in various areas of the modern town.

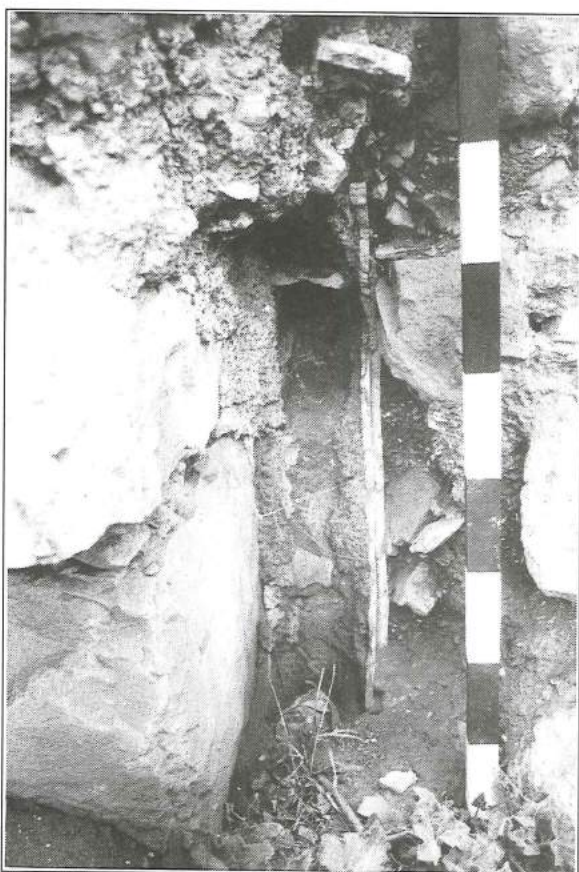
Wadi Musa 18E (Maqbarat Wādī Mūsā): (UTM coordinates: 738390E, 3357312N; altitude: 1124.5m). To the north of location

18D, in the modern town cemetery. A column drum was noted in the east edge (*in situ?*), and a column base on the roof of a traditional room next to it. Inside the room, it is evident that the north wall was built on earlier arches, next to them there is a large robbers pit revealing ashlar blocks. Abundant Nabataean pottery sherd scatter was noted (first to third centuries AD), and people report that pottery, coins and decorated architectural fragments are found when graves are excavated.

Wadi Musa 18F: (UTM coordinates: 738451E, 3356889N; altitude: 1127.0m). Along the road from the old mosque to the southern bridge (Jisr al-Falaḥāt) and in side wadis off Wādī al-Juḥaysha, an area of obviously monumental buildings is exposed by the road cut and the water course from the town slaughter house. Part of a substantial wall now forms the back wall of a multi-storey building (Fig. 12). To the south, the side wadi has uncovered part of a building with arches (only the springers are now preserved, but people say at least one arch was standing intact around twenty years ago). Opposite the arches, a horizontal clay pipe attached to a wall and covered with two layers of plaster is showing in section, however, it does not look like a flue pipe for a bath (Fig. 13). During a visit last summer, 'Amr noted a fragment of crimson red painted plaster at the site, but none could be seen during the survey. More wall lines can be seen in section in the main wadi below. A modern building to the northwest (to the south of location Wadi Musa 18H) had lost all soil under one of its supporting pillars, leaving it and its foundation hanging in midair several metres above the wadi slope and indicating that the whole area is loose fill. The old mosque, between locations Wadi Musa 18D and 18F, is called "Al-Masjid al-'Umari" and people say that it was built on the remains of an archaeological mosque. The Ayyubid/ Mam-



12. WMS 1996 site Wadi Musa 18F: ancient monumental walls in the road cut.



13. WMS 1996 site Wadi Musa 18F: ceramic channel and plaster against a wall face in a side wadi cut off Wādī al-Juḥaysha.

luk structures of Wadi Musa 18D are only across the modern road and shops to the north of the mosque, but only Nabataean pottery sherds (of the first to early second century AD) were noted at Wadi Musa 18F.

Wadi Musa 18G ('Ayn al-Baṣṣa): (UTM coordinates:- channel 738344E, 3356796N; spring: 738415E, 3356672N; altitude:- channel: 1128.7m, spring: 1137.4m). In the southern part of the site. A ceramic water channel with hydraulic mortar and probable side branches, as well as a stone drain with slab cover (Fig. 14). Found while dismantling a modern agricultural terrace wall, being in the cut behind the terrace wall. Abundant Nabataean pottery sherd scatter was noted at the location. This channel started at the 'Ayn al-Baṣṣa spring. Al-Baṣṣa was mentioned in the Petra Church papyri discovered in December 1993 (Kaimio and Koenen 1997: 460).

Wadi Musa 18H: (UTM coordinates: 738330E, 3357116N; altitude: 1114.5m). In the centre of the site. The remains of the



14. WMS 1996 site Wadi Musa 18G ('Ayn al-Baṣṣa): ceramic water channel and stone drain to the right.

early twentieth century village of "Eljī". The extent of loss of the village houses can be seen by the intervening new structures between the houses at this location and the "Yākhūr" of Wadi Musa 18D. Many reused architectural blocks (Nabataean oblique-trimmed masonry and doorjambs, column drums and aqueduct blocks) were found incorporated in the walls. Scarce Nabataean and Late Islamic pottery scatter was noted at the location.

Wadi Musa 18J: (UTM coordinates: 738101E, 3357268N; altitude: 1094.9m). Near the western edge of the site. A substantial wall of well-cut ashlar blocks (Fig. 15). Several new houses are built against this wall, which local people say "stretches for a long way". Only a small portion of the wall is currently exposed—in a yard between two houses above Wādī al-Juḥaysha, to the west of Khirbat al-Falaḥāt—making it very difficult to determine the function of the wall which may have been a city boundary wall at some stage of the site's history. The exposed stretch shows that a gate may

have existed at the location, later blocked by a rough wall. No pottery sherds were found in the immediate vicinity due to modern clearance of the area.

[In November 1997, workers on one of the Petra Region Planning Council projects hit the top of a Nabataean family tomb while excavating shallow foundations for a wall opposite the Wādī Mūsā health centre. The tomb is in a cave and only rock was showing at the surface at the time of the survey. Excavation of the tomb by the Petra Antiquities Office showed it dates to the first century AD (Marahleh 1998), and it seems to be part of a cemetery associated with site Wadi Musa 18].

Wadi Musa 19 (Khirbat Banī 'Atā)

UTM coordinates: 738351E; 3356289N.

Altitude: 1188.1m.

Dimensions: ~150m N-S x 100m E-W.

A modern (traditional) village built on an ancient site. Many reused stone blocks are evident in the walls of the houses, the most frequent are oblique-trimmed Nabataean



15. WMS 1996 site Wadi Musa 18J: ancient wall preserved at the back of a modern courtyard.

blocks, but there are also column drums, a doorway built with a well-cut array of door jambs, and an Arabic inscription (dotted Kufic, perhaps a tomb stone) reused sideways above a door in one house (Fig. 16). No wall lines are showing at the surface, but local people say that the mosque in the *khirba* was built on the foundations of an ancient mosque. Some pottery sherds were noted at the site.

Dating: Iron II (Edomite), Nabataean, Late Byzantine, Early Islamic, Late Islamic.

Wadi Musa 20 ('Ayn Ridān)

UTM coordinates: 738239E; 3356403N.

Altitude: 1183.4m.

Dimensions: 8.5 x 9.0m.

A cistern, built with cut stone blocks. Steps of slabs protrude from the east wall internally, and there are remnants of hydraulic plaster on the interiors of the walls. Located approximately 60m below the spring of 'Ayn Ridān, above the present wadi. The

walls of the cistern had been reused as foundations for modern (traditional) houses, now deserted and collapsed. A new house is built against the north wall and the cistern is used as a yard within the surrounding terraced agricultural field. A scarce Nabataean and Late Islamic pottery sherd scatter was noted at the site.

Dating: Nabataean (?), with later reuses (Musil 1908: 234 and Glueck 1935: 77 Site 109 "Ain Ghidan" date the cistern as Islamic).

Wadi Musa 21 (Khirbat Şubḥiyya)

UTM coordinates: 738652E; 3356027N.

Altitude: 1213.0m.

Dimensions: ~150m E-W x 120m N-S.

JADIS site 1996.009. N. Glueck (1935: 77, Site 110) described the site as a pile of collapsed stones with nothing to date them. Since the mid-thirties, a modern (traditional) village, and some new houses, were built over the ancient site which is located



16. WMS 1996 site Wadi Musa 19 (Khirbat Banī 'Aṭā): tombstone with dotted Kufic inscription reused sideways above the doorway of a traditional house.

on a mountain slope, approximately 200m to the west of 'Ayn aṣ-Ṣadr. Wall lines can be seen among the houses and in the cuts for the new houses. Many reused stone blocks (Nabataean oblique-trimmed masonry and column drums) can be seen in the walls of the traditional houses. Scarce pottery sherd scatter, and some steatite vessel (body) fragments, were noted at the site.

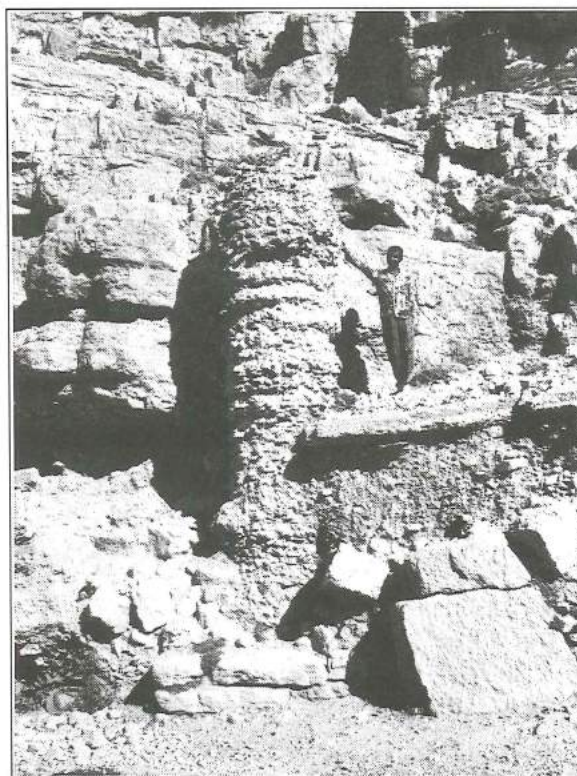
Dating: Nabataean (first-early second century AD), Early Islamic (?), Ayyubid/ Mamluk, Late Islamic.

Wadi Musa 22 ('Ayn aṣ-Ṣadr)

UTM coordinates: 739015E; 3356078N.

Altitude: 1185.2m.

Remnants of a water mill above 'Ayn aṣ-Ṣadr. The core is standing around 5m high (Fig. 17). Most stones are either robbed or eroded away. A stone channel can be seen cut by the wadi, directly under a modern concrete channel to the west of the mill.



17. WMS 1996 site Wadi Musa 22 ('Ayn aṣ-Ṣadr): the water mill core. Note the remaining stone blocks at the base.

Water for running this mill would have come from 'Ayn Suwākha (JADIS site 1996.013).

Judging by the proximity of this mill to Khirbat Banī 'Aṭā (site Wadi Musa 19), this is most probably Ṭāḥūnat Banī 'Aṭā wa ash-Shurūr mentioned in the Ottoman records between 1864 and 1918 (Tarawneh 1992: 168).

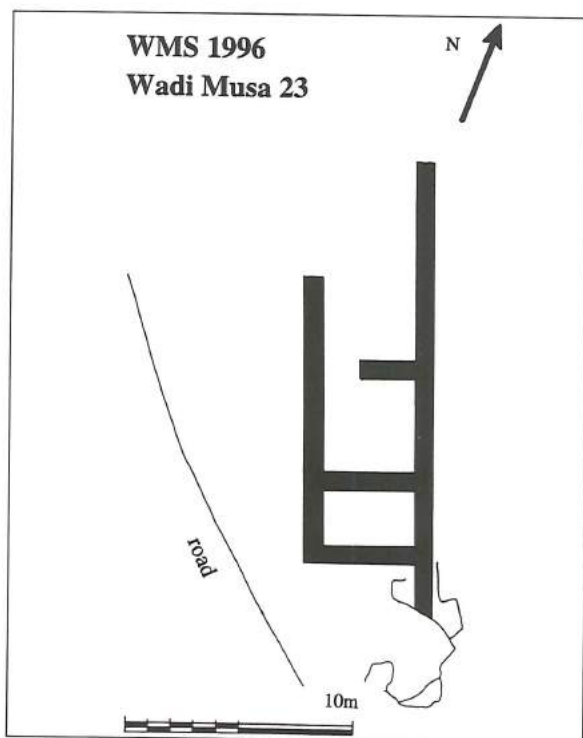
Dating: Probably Late Ottoman.

Wadi Musa 23

UTM coordinates: 740414E; 3357314N.

Altitude: 1335.3m.

A structure built of large rough flint blocks, with internal divisions, only one to two courses preserved above rock outcrop (Fig. 18). A cave at the southern edge of the structure has walls built in front and may have been incorporated in the building. Located at the tip of a flat knoll above a wadi to the southwest. The modern road connecting Wādī Mūsā and Baṣṭa runs above this wadi and has cut the edge of the site.



18. WMS 1996 site Wadi Musa 23: sketch plan of the structure (drawn by A. al-Momani).

Additionally there is much dumping at the side of the wadi opposite the structure. The structure may be associated with roads site Wadi Musa 24 directly to the east (between the town of Wādī Mūsā and Wādī Mūsā existing water reservoir). Scarce pottery sherd scatter was noted at the site (ignoring what may have come from the dumps).

Dating: Hellenistic/ Early Nabataean, Nabataean (second century BC - second century AD).

Wadi Musa 24

UTM coordinates: 740726E; 3357240N - 740598E; 3357208N - 740595E; 3357270N - 740654E; 3357242N.

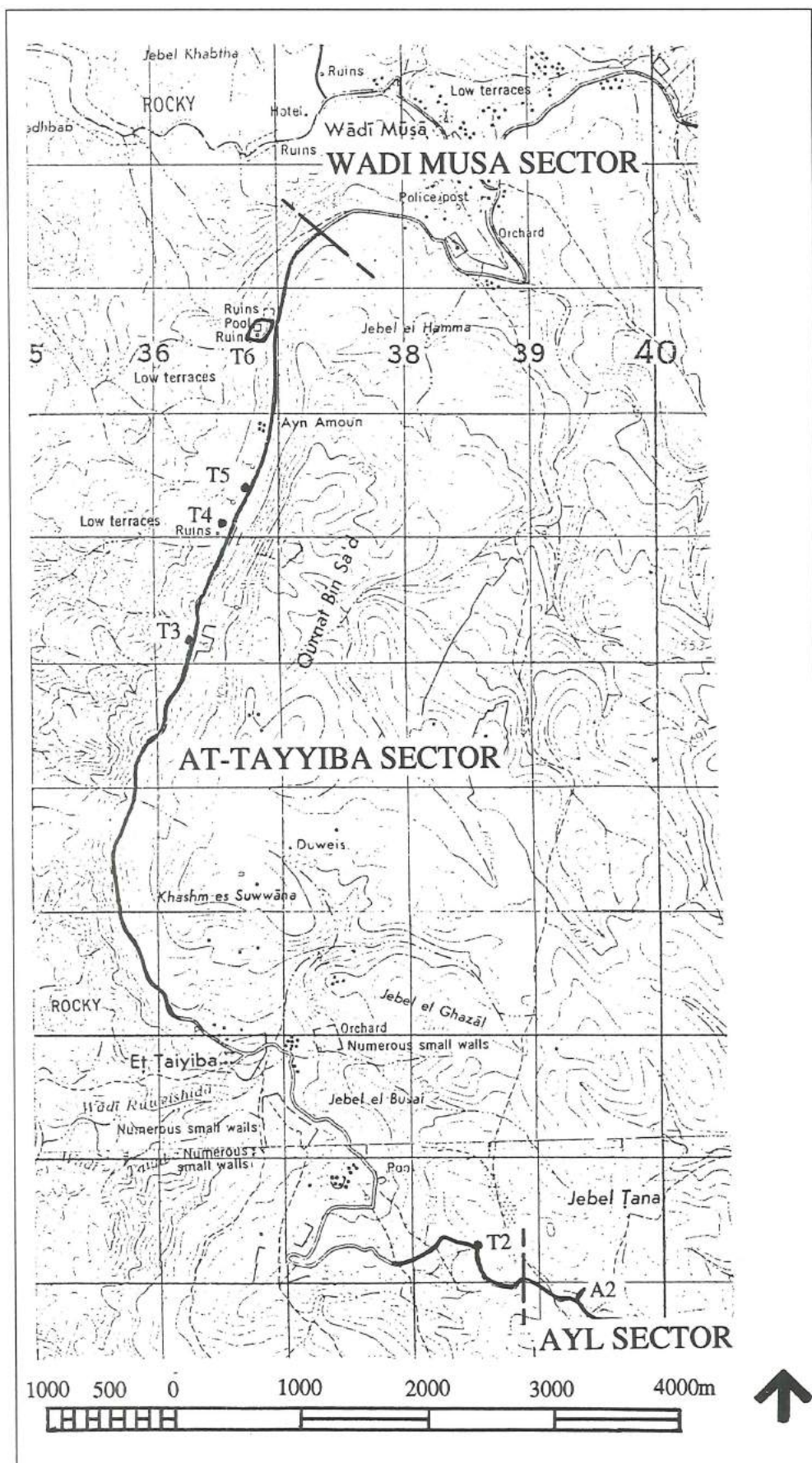
Altitude: 1361.9 - 1374.5m.

Two ancient roads, the edges of which are defined by layouts of chert stones. Located along the ridge of a long knoll, to the south of site Wadi Musa 23. The higher road could only be traced for a short stretch to the west of the better preserved road, which is defined by smaller stones. The lower road is still cut by the main road and several side tracks, it is also lost around an area where a modern water hole was excavated. The road may join with ar-Raṣīf (site Qa' 10, see below). A modern bedouin cemetery is also located to the west of the northern part of the road. Scarce Nabataean pottery sherd scatter was noted near the site.

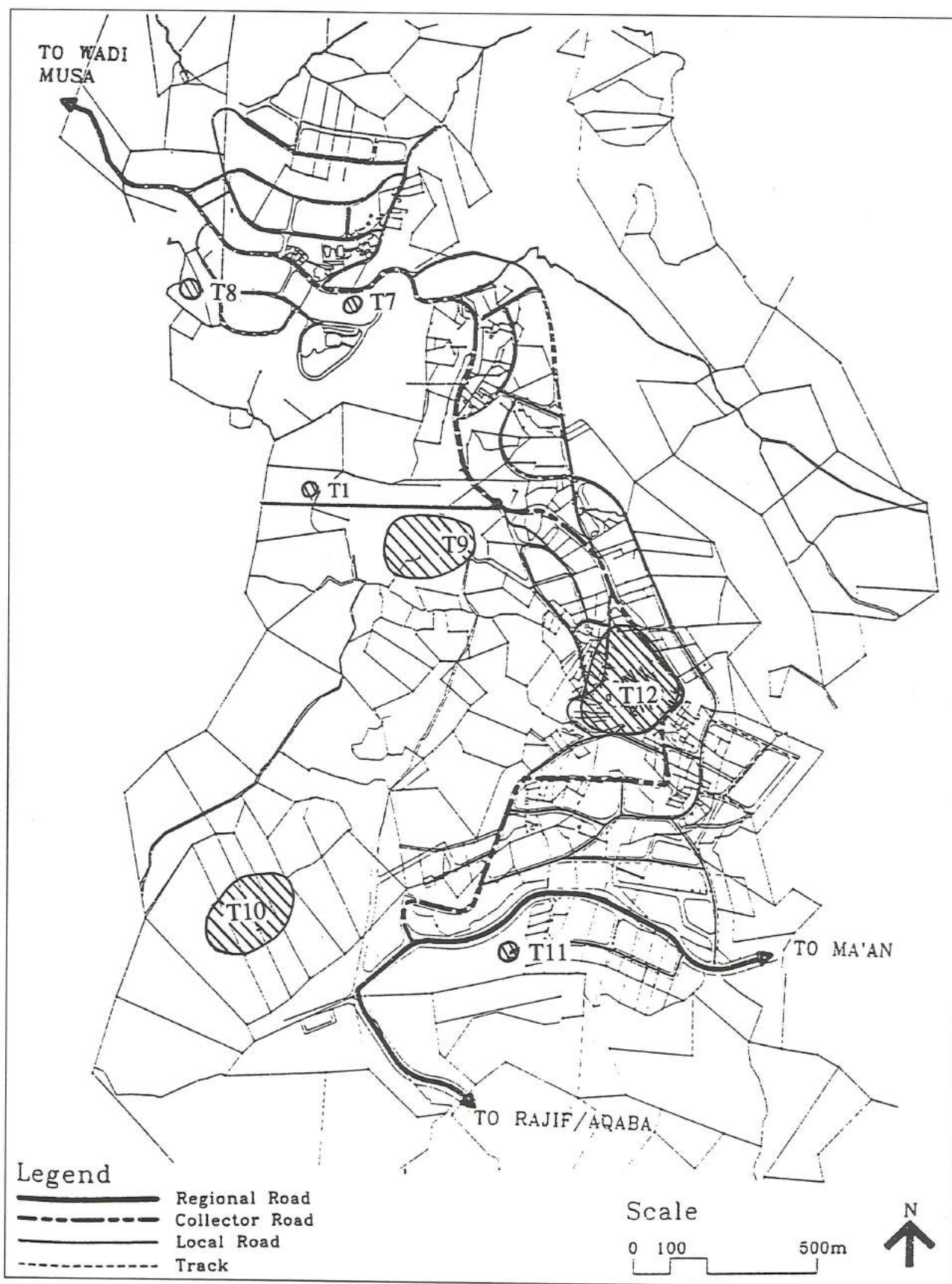
Dating: Nabataean, probably with earlier as well as later use.

4. The aṭ-Ṭayyiba Sector (Fig. 19a, b)

The aṭ-Ṭayyiba sector is comprised of the area extending in the north from the beginning of the road connecting the towns of aṭ-Ṭayyiba and Wādī Mūsā, the town of aṭ-Ṭayyiba itself, all the way south to the road connecting the towns of aṭ-Ṭayyiba and Ayl, the division being at the new water reservoir installed by the Water Authority (Fig. 19a). Sites Tayyiba 1 and 7-12 lie within the



19a. WMS 1996: recorded archaeological sites in the at-Ṭayyiba sector along the routes connecting at-Ṭayyiba with Wādī Mūsā, and at-Ṭayyiba with Ayl (ref. maps Jordan 1:50,000 Petra 3050I K737 and Rās an-Naqab 3050II K737).



19b. WMS 1996: recorded archaeological sites in the town of at-Tayyiba (base map supplied by the Petra Region Planning Council).

boundaries of the town of aṭ-Ṭayyiba (Fig. 19b), Tayyiba 2 is along the road between Ayl and aṭ-Ṭayyiba, while Tayyiba 3-7 are along the connecting road between aṭ-Ṭayyiba and Wādī Mūsā. The plotting of JADIS sites showed that 'Ayn Dubayl (JADIS site 1996.026) and 'Ayn Āmūn (JADIS site 1996.021) are also close to the road connecting aṭ-Ṭayyiba and Wādī Mūsā, but during the field survey it was found that 'Ayn Dubayl is far enough above the route not to be affected, and the archaeological site at 'Ayn Āmūn is well below the route and protected by the intervening modern buildings of the village. Therefore it was decided not to include these two known archaeological sites in this survey.

The water sources in this sector made it ideal for small agricultural villages, as indicated by the types of sites recorded. In addition to the recorded sites, there are numerous agricultural terraces and wadi barriers in the aṭ-Ṭayyiba area that were noted but not recorded in this survey. Most noteworthy are the terraces to the northwest of the modern town, which are also characterized by a "background" of flint implements (the only concentration noted being at site Tayyiba 1). There are several known Palaeolithic, Epi-palaeolithic and Neolithic sites to the north and west of aṭ-Ṭayyiba (see for example Gebel 1985; Schyle and Uerpmann 1988). It is possible that the mountain slopes next to aṭ-Ṭayyiba were favoured hunting grounds during these periods.

Tayyiba 1

UTM coordinates: 736698E; 3349386N.

Altitude: 1272.7 - ~1280m.

Wadi barriers of unhewn medium sized stone blocks and deeply buried terrace walls revealed by the wadi cut. Additionally, there is an abundant flint scatter on the slopes of the wadi. The area is a flat ridge below limestone cliffs, with wadis in the north and south. It is currently an agricultural field, and there are several (mod-

ern) agricultural terraces and rock shelters in the vicinity.

Dating: Uncertain for the walls; Natufian (?) for the slope.

Tayyiba 2

UTM coordinates: 738508E; 3348310N.

Altitude: 1652.0m.

Dimensions: 60m N-S x 20m E-W; actual orientation 340°.

Wall lines, of somewhat large stones. Possibly the remnants of an ancient road. On an elevated area (midway down a mountain slope) surrounded by obvious ancient terraced agricultural fields. The site is disturbed by modern agricultural fields and cut by the modern road connecting aṭ-Ṭayyiba with Ayl. The modern road cut shows several terrace walls, all the way down to bedrock. Pottery sherd scatter was noted at the site.

Dating: Nabataean, Early Byzantine.

Tayyiba 3 (Khirbat Dubayl)

UTM coordinates: 736258E; 3353211N.

Altitude: 1398.1m.

JADIS site 1996.016 (Musil 1908: 128, 283; Glueck 1935: 79 Site 122). Several structures on a ledge along the mountain slope, directly to the west of the road connecting aṭ-Ṭayyiba with Wādī Mūsā. The site is characterized by a concentration of large stones. Abundant pottery sherd scatter was noted at the site.

Dating: Iron II (Edomite), Late Islamic.

Tayyiba 4 (Khirbat al-Mu'allaq)

UTM coordinates: 736553E; 3354146N.

Altitude: 1367.0m.

JADIS site 1996.011 (Glueck 1935: 79 Site 121). Several structures within a walled agricultural village, located on a flat area in the mountain slope. The site was partially excavated in 1994 by a team from the Natu-

ral History Museum of Nürnberg (Lindner and Knauf 1994; Lindner *et al.* 1996), therefore no samples were collected from the site during this survey.

Dating: Iron II (Edomite), Late Islamic.

Tayyiba 5

UTM coordinates: 736769E; 3354389N.

Altitude: 1348.8m.

Dimensions:- Structure: 12.5m N-S x 5m E-W (actual orientation 20°).

A small rectangular structure, of medium and large stone blocks, currently covered with small stones from field clearance. Located in a flat terraced area on the mountain slope, below the road connecting aṭ-Ṭayyiba with Wādī Mūsā. Abundant flint and pottery sherd scatter was noted at the site, indicating that the terrace area is an archaeological site as well as the structure (Fig. 20).

Dating: Unidentified flint, Nabataean (second century AD), Late Roman/ Early Byzantine (fourth century AD), Abbasid (late eighth century AD).

Tayyiba 6 (Khirbat Brāq)

UTM coordinates: 736991E; 3355734N - 736929E; 3355571N - 736918E; 3355774N - 736849E; 3355600N.

Altitude: 1299.6 - 1318.4m.

JADIS site 1996.005 (with adjoining pool being JADIS site 1996.017). (Musil 1908:

78, 98, 102, 108; Glueck 1935: 79 Site 119; 1939: 44-46; Parr 1960: 134-136; Tholbecq 1996: Shara Survey Site 13). An extensive village site with ancient terraces, several structures, a water cistern and a temple, situated on a relatively flat area on the mountain slope. The east edge of the site is currently covered with the bedding of the road connecting aṭ-Ṭayyiba with Wādī Mūsā. A large building and its surrounding area was excavated by a team from the Department of Antiquities in 1995 (Farajat *et al.* in press), therefore no samples were collected from the site.

Dating: Nabataean, Roman, Byzantine, Early Islamic, Ayyubid/Mamluk.

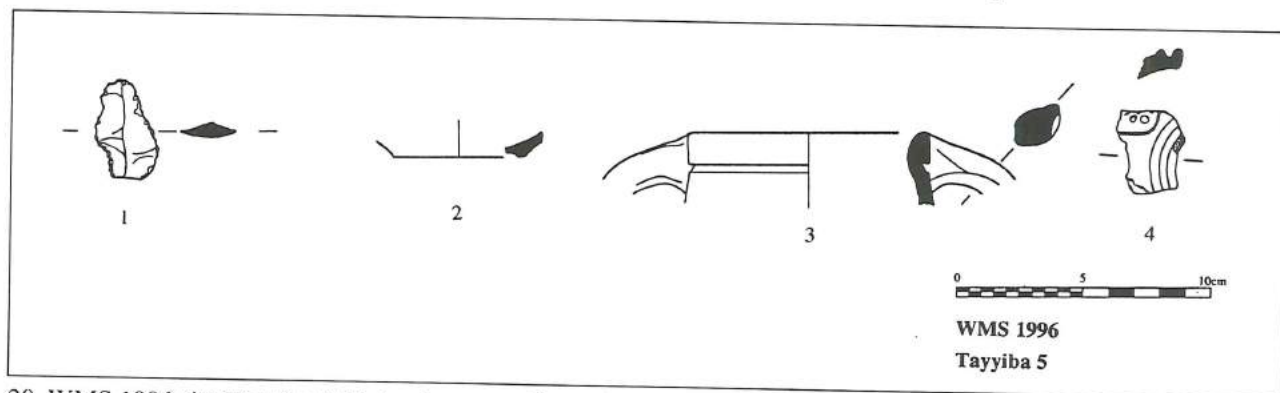
Tayyiba 7

UTM coordinates: 736720E; 3349835N - 736640E; 3349851N-736765E; 3349881N.

Altitude: 1331.8 - 1337.4m.

The modern (1915-1950) site of aṭ-Ṭayyiba is JADIS site 1996.020 (Glueck 1935: 79). Among the traditional houses to the north of Taibet Zaman Hotel, earlier wall lines and a scant sherd scatter was noted. The earlier remains are much obscured by the modern houses and it is difficult to determine the extent of the modern deposits at the site. These houses are located on the mountain slope.

Dating: Nabataean, Byzantine.



20. WMS 1996 site Tayyiba 5 flint and pottery (drawn by A. al-Momani and L. Mohamadieh): 1. Burin, light grey; 2. base, red ware with grey core, Nabataean 2nd cent. AD; 3. jar, red ware, cream slip ext., Late Roman/ Early Byzantine 4th cent. AD; 4. moulded lamp, grey ware, Abbasid.

Tayyiba 8

UTM coordinates: 736305E; 3349844N - 736255E; 3349869N-736257E; 3349874N.
Altitude: 1326.0 -1327.1m.

Probable wall lines in the cut for a dirt road, some flints and pottery sherds were also noted in the vicinity. Located on the mountain slope among agricultural terraces. The area is intensely farmed and disturbed by recent houses, making it difficult to define the limits of the site.

Dating: Neolithic (?), Iron II, Nabataean.

Tayyiba 9 (Khirbat al-Hāma)

UTM coordinates: 737062E; 3349164N - 737109E; 3349091N-737033E; 3349000N - 736903E; 3348994N-736861E; 3349048N - 736889E; 3349191N.
Altitude: 1353.2 - 1380.0m.

A very extensive site with many structures. Located on two hills and wadi in between (walls showing in the wadi cut therefore structures are continuous on hill slopes as well as hill tops, the southern slope is currently cleared for agricultural terraces). The northern part is better preserved than the southern. Pavements of several threshing floors at the site may be, at least in part, cleared ancient pavements. There is a water spring at the northern slope of the southern hill, currently in the middle of a modern agricultural fields. One structure on the southern hill may be a roofed cistern with a square opening, however this identification is difficult to determine without further clearance. Abundant flint and pottery sherd scatter was noted at the site.

Dating: Neolithic (?), Nabataean (first to third centuries AD), Byzantine (fifth to sixth centuries AD), Late Islamic.

Tayyiba 10 (Khirbat al-Hubays)

UTM coordinates: 736924E; 3347495N.
Altitude: 1427.7m.

JADIS site 1995.025. A large complex site

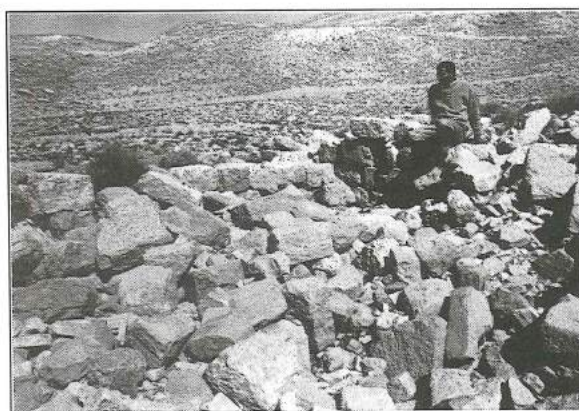
with many structures built using medium sized stone blocks (an agricultural village?), with the main site being on a hill along the mountain slope, and a smaller concentration of structures on a small hill across the wadi to the south (Fig. 21). Both are among terraced agricultural fields. Some walls in the north are still showing several courses above ground level. Two robbers pits were noted at the site, one of which shows walls preserved at least 1.50m high. A Byzantine tomb stone with a cross but no inscription was noted in the field to the northwest, however there are no apparent signs of a cemetery. The area surrounding the concentrations of structures is much disturbed by ploughing and threshing floors that may have disturbed the cemetery. Abundant pottery scatter was noted at the site (Fig. 22).

Dating: Nabataean, Roman, Byzantine (late first - sixth centuries AD).

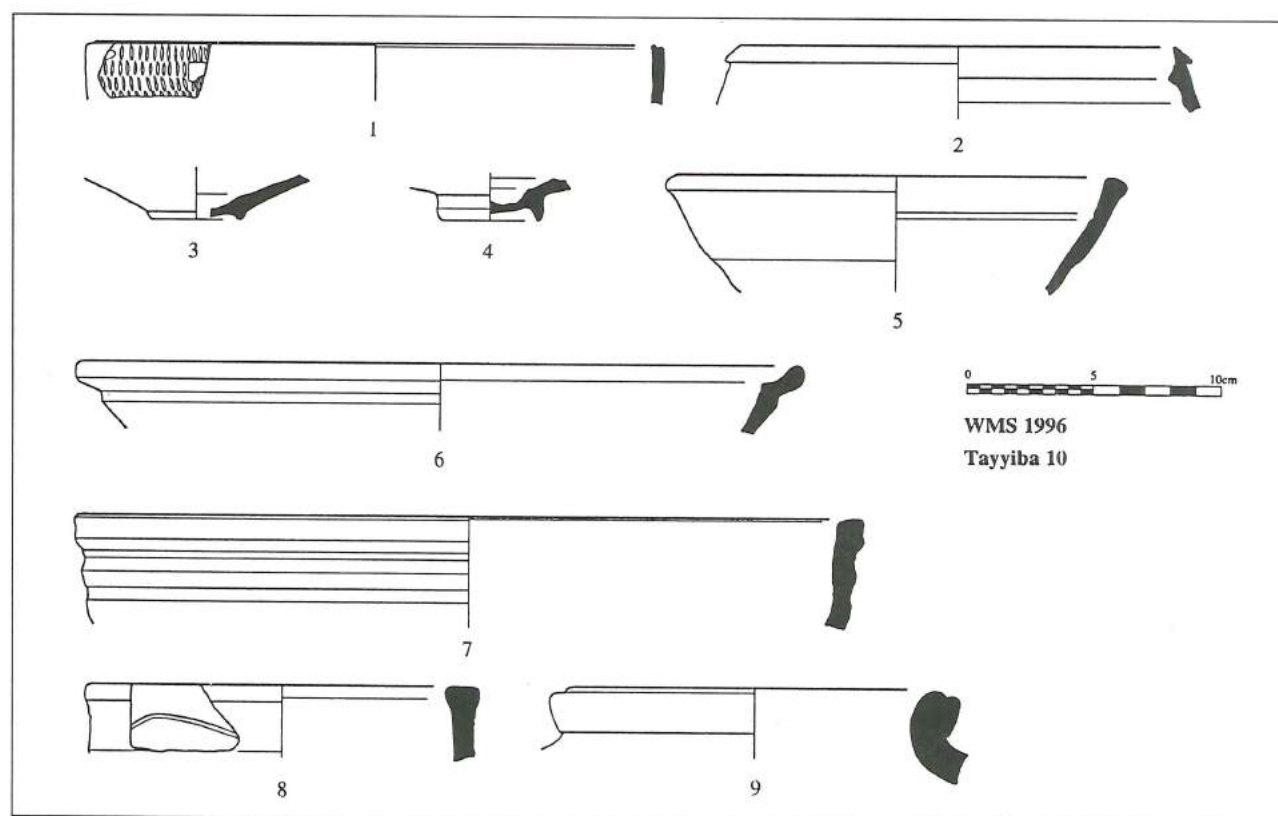
Tayyiba 11 (Khirbat ar-Ruways)

UTM coordinates: 737314E; 3348099N.
Altitude: 1569.9m.

Structures on a hill top and slopes dominating above the town, built of medium and large stone blocks. Extensive concentration of collapsed stones make it difficult to discern wall line, but this is an ideal location for watch towers. There is one robbers pit near the top of the hill.



21. WMS 1996 site Tayyiba 10 (Khirbat al-Hubays): structure in the southern concentration with the main mound across the wadi in the background.



22. WMS 1996 site Tayyiba 10 (Khirbat al-Ḥubays) pottery (drawn by A. al-Momani and L. Mohamadieh): 1. Bowl, red with grey core, fine ware, rouletted decoration, Nabataean late 1st-early 2nd cent. AD; 2. cooking pot, red with cream slip, Nabataean 2nd cent. AD; 3. base, dark red with wide grey core, somewhat coarse ware, Late Nabataean late 2nd-3rd cent. AD; 4. base, greyish red, grey int., Late Nabataean late 2nd-3rd cent. AD; 5. bowl, light orange, sandy texture, Byzantine 5th-early 6th cent. AD; 6. bowl, grey, Early Byzantine 4th cent. AD; 7. large bowl, red, cream slip ext., Byzantine late 4th-5th cent. AD; 8. jar, orange with red core, sandy texture, Late Byzantine 6th cent. AD; 9. storage jar, red with grey int., sandy texture, Late Byzantine 6th cent. AD.

Abundant sherd scatter was noted at the site (Fig. 23).

Dating: Iron II (predominant), Nabataean (second and third centuries AD), Late Islamic.

Tayyiba 12 (Khirbat Dhbā')

UTM coordinates: 737615E; 3348852N.

Altitude: 1459.0m.

JADIS site 1996.015 (Musil 1908: 282; Glueck 1935: 79 Site 125). An extensive site located across two slight rises, currently occupied by modern (traditional) houses, agricultural terraces and cut by the main road through the town of aṭ-Ṭayyiba. People still dwell in the houses on the site. A few wall lines can be seen in the area of traditional houses, and structures can be seen in the modern road cut (which apparently has

gone below floor levels; Fig. 24). A scarce pottery sherd scatter was noted at the site.

Dating: Late Nabataean, Late Byzantine, Late Islamic.

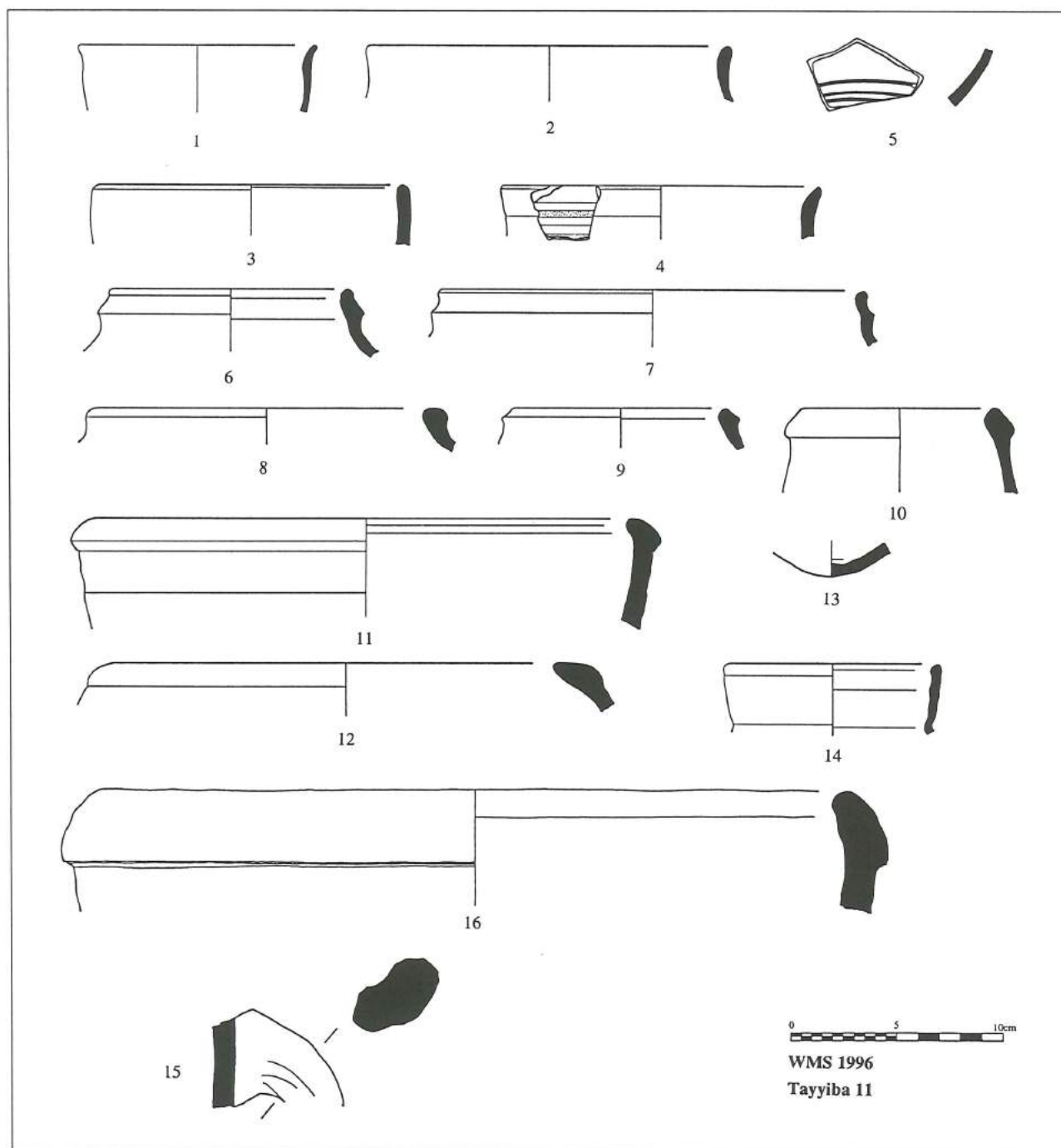
5. The Ayl Sector (Fig. 25)

The Ayl sector starts at the road connecting aṭ-Ṭayyiba with Ayl, and includes the village of Ayl. There are numerous agricultural terraces along this route that were noted but not recorded in this survey.

The impression in this sector is that of mainly agricultural farmsteads and villages. The area around Ayl was also obviously of special military importance.

Ayl 1 (Nabāt 'Ayn al-'Ashra)

UTM coordinates: 743152E; 3344553N.



23. WMS 1996 site Tayyiba 11 (Khirbat ar-Ruways) pottery (drawn by A. al-Momani and L. Mohamadieh): 1. Small bowl, red ware fired with patch of cream ext., thin grey core, Edomite Iron II; 2. closed bowl, brownish red ware with dark grey core, Edomite Iron II; 3. bowl, red ware fired with patch of grey ext., dark grey core, Edomite Iron II; 4. bowl, red ware with grey core, grey slip and black paint ext., Edomite Iron II; 5. bowl, red ware, black paint int., Edomite Iron II; 6. cooking pot, red ware, Edomite Iron II; 7. cooking pot, red ware, dark grey slip, Edomite Iron II; 8. holemouth jar, red ware with wide grey core and int., dark grey slip ext., Edomite Iron II; 9. holemouth jar, greyish brown ware with wide grey core, Edomite Iron II; 10. holemouth jar, red gritty ware, Edomite Iron II; 11. large bowl, red gritty ware, Edomite Iron II; 12. holemouth jar, reddish grey ware with wide grey core, cream slip ext., Edomite Iron II; 13. base, red ware with grey core, Nabataean 2nd cent. AD; 14. jar, red ware, Late Nabataean 3rd cent. AD; 15. storage jar handle, handmade, red ware with very wide grey core, thick cream slip ext., many calcite and grog inclusions, abundant chaff impressions, Late Islamic; 16. basin, handmade, greyish brown ware with very wide dark grey core, many calcite, grog and mineral grey inclusions, many chaff impressions, Late Islamic.



24. WMS 1996 site Tayyiba 12 (Khirbat Dhba'): ancient walls in the cut for the main road through the town.

Altitude: 1530.0m.

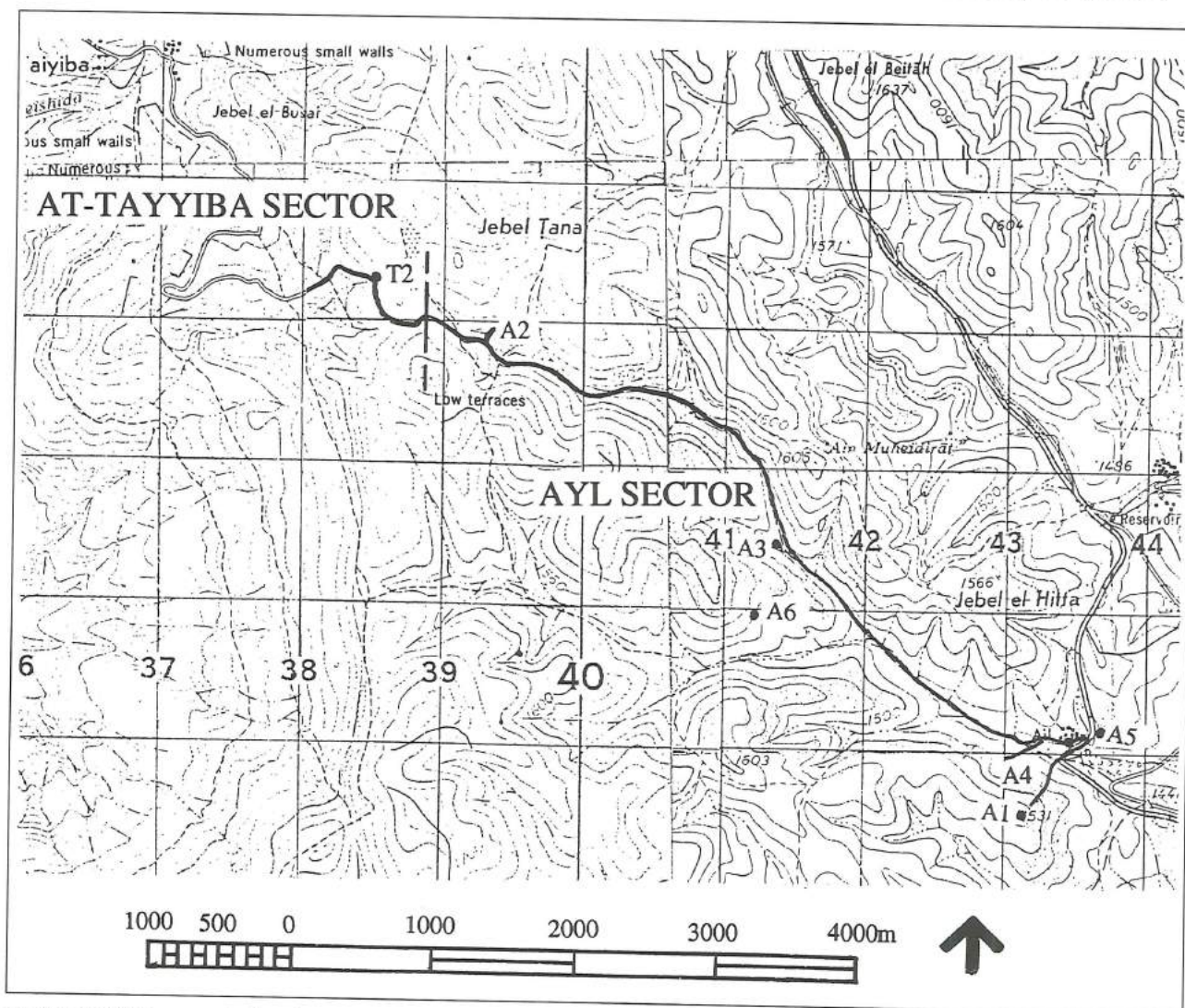
Two square structures (watch towers) at the

summit of the mountain. Built of medium and large stone blocks, with one and sometimes two courses visible above ground. Abundant sherd and some flint scatters were noted in the area. This site is to the south of Khirbat Ayl (site Ayl 5), on a high mountain top and slope. The area is strategically located with a superb view all the way to Ma'an and beyond, and there is (relatively) abundant water in the area.

Dating: Uncertain flint, Iron II (Edomite), Byzantine.

Ayl 2 (Khirbat al-Mabrak)

UTM coordinates: 739311E; 3347912N -



25. WMS 1996: recorded archaeological sites in the Ayl sector (ref. maps Jordan 1:50,000 Ras en-Naqb 3050II K737 and Ma'an 3150III K737).

739286E; 3347826N.

Altitude: 1641.5 - 1654.51m.

Extensive site with several structures built with medium and large stone blocks. On top and slopes of a high hill, above 'Ayn al-Mabrak. A dense scatter of pottery sherds was noted at the surface. Two robbers pits in the northern section—across the modern road from the hill top location—revealed wall lines with grey mortar above a rock cut, indicating that the site extends onto the flat area and is cut by the modern road connecting at-Ṭayyiba with Ayl. The road has cut through the site down to bedrock in the southern part.

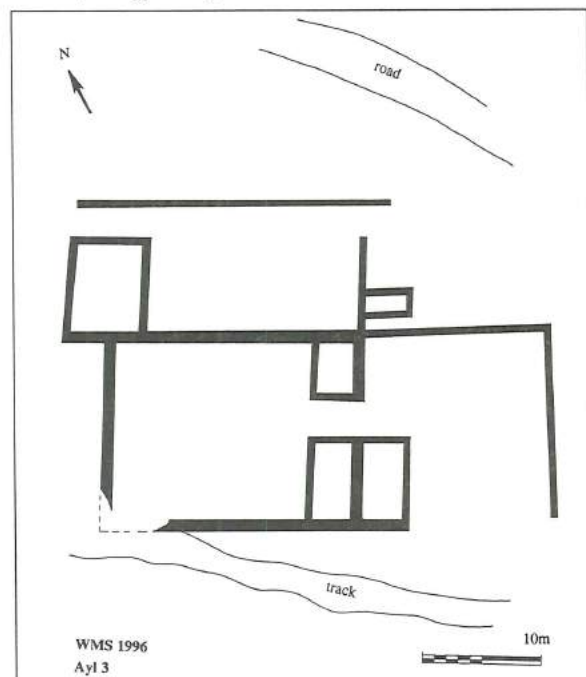
Dating: Nabataean, Byzantine, Late Islamic.

Ayl 3

UTM coordinates: 741371E; 3346484N.

Altitude: 1510.3m.

A complex structure, of medium sized stones. Up to two courses can be seen at the surface. The structure has an entrance in the east, accessed through a courtyard in a typical Oriental fashion (probably a farmstead; Fig. 26). There are also elaborate



26. WMS 1996 site Ayl 3: sketch plan of the structure (drawn by A. al-Momani).

wadi barriers to the north of the structure (across the modern road). The main structure is situated at the bottom of an east facing hill slope. The structure is situated directly south of the main road connecting at-Ṭayyiba with Ayl, and is cut by a track in the south and east. Abundant sherd scatter was noted at the site.

Dating: Nabataean (first to early second century AD).

Ayl 4

UTM coordinates: 743330E; 3344939N - 742994E; 3345105N.

Altitude: 1433.6 - 1443.2m.

A water channel, of small sized cut stones and stone slabs with grey ashy mortar. The interior of the channel is covered with thick hydraulic plaster and calcite deposits. Located on a natural ledge, the eastern section is directly opposite Khirbat Ayl (site Ayl 5), approximately 200m west of 'Ayn Ayl. This eastern section is exposed by the road cut for a length of 22m (internal width of channel is 25cm). Another section of the channel is exposed approximately 300m to the west, along the modern road connecting at-Ṭayyiba with Ayl. The western exposed section is 10m long. The recent road cut has seriously damaged the channel and due to the sheer cut, the level of the channel is currently approximately 2.5m above the present road surface.

Dating: Nabataean/ Roman.

Ayl 5 (Khirbat Ayl)

UTM coordinates: 743462E; 3345086N.

Altitude: 1446.6m.

This is JADIS Site 2095.001, a complex site of various structures (Brünnow and von Domaszewski 1904: 467; Musil 1908: 275; Glueck 1935: 74-75 Site 101; Parker 1976: 24; Fiema 1995: 266; Graf 1995: 418). Much of the ancient site is currently built on by a modern (traditional) village. The site is

on a low hill to the north of the main road.

Dating: Iron II, Nabataean, Roman, Byzantine.

Ayl 6

UTM coordinates: 741230E; 3345973N.

Altitude: 1524.1m.

Dimensions: -Cistern: 12.80m E-W x 12.10m N-S (actual orientation 60°); channel: exposed to a length of 2.50m.

A water cistern at the bottom of a hill, with a channel leading to it from the west (up-hill). The cistern walls are 1.40m wide, built of medium and large stone blocks with remnants of mortar on the east wall. The site is approximately 25m to the west of the main road. No pottery sherds or flint tools

were noted at the site.

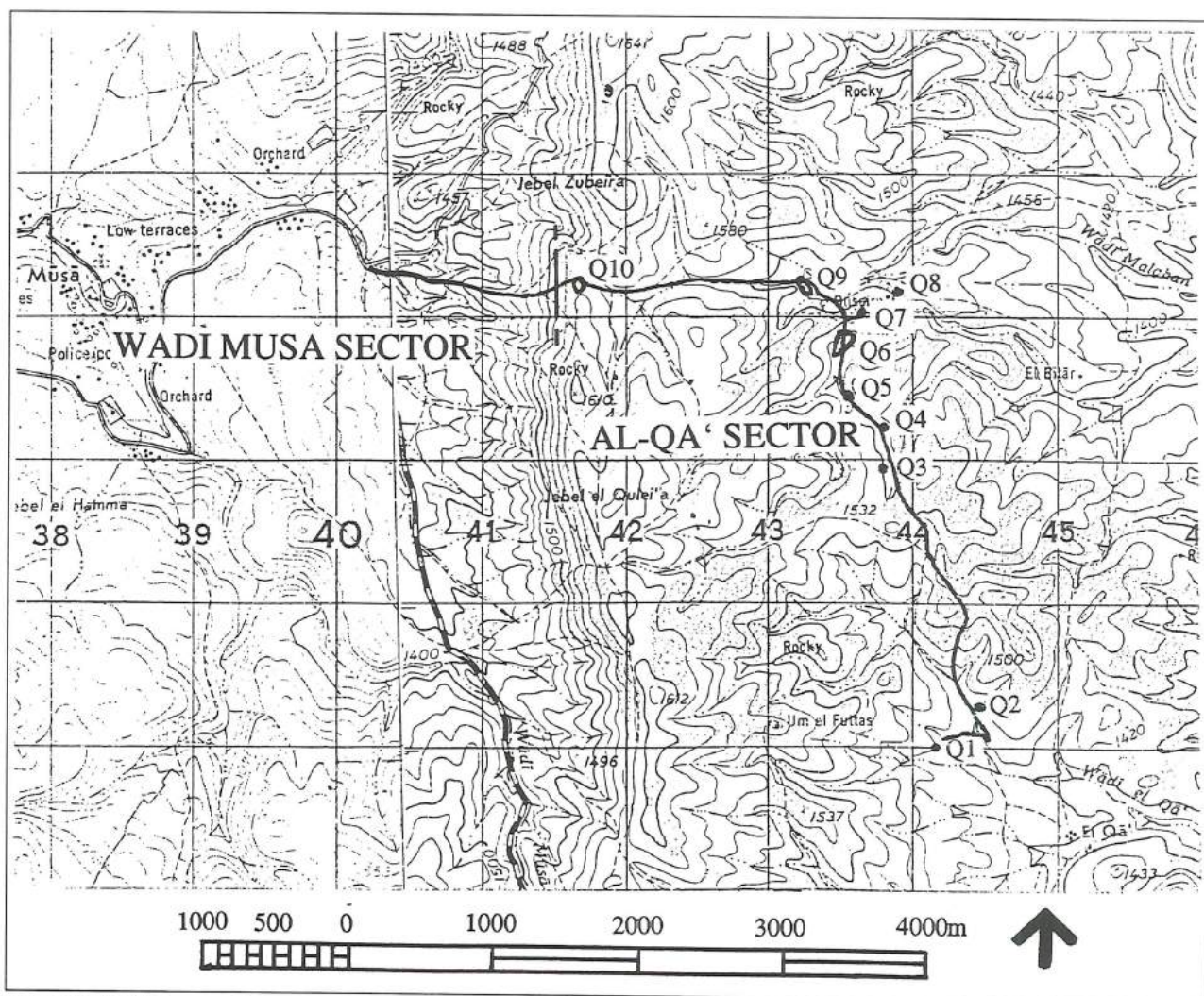
Dating: Nabataean/ Roman (?).

6. The Al-Qā' Sector (Fig. 27)

Along the pipeline route connecting al-Qā' and Wādī Mūsā, the division is at the present Wādī Mūsā reservoir. Ten sites were recorded in the al-Qā' sector. Additionally, there are numerous agricultural terraces along the route that were noted but not recorded in this survey.

Most of the surveyed route in the al-Qā' sector is along dirt tracks, away from the main road.

The general impression at the al-Qā' sector is of an ancient agricultural area, with farm-



27. WMS 1996: recorded archaeological sites in the al-Qā' sector (ref. maps Jordan 1:50,000 Petra 3050I K737 and Bir Khadad 3150IV K737).

steads and hamlets dotted over the sector. This implies that many of terraces are ancient sites in themselves.

Qa'1

UTM coordinates: 744148E; 3354004N.

Altitude: 1436.8m.

A round, rock-cut water well with steps internally (one step at a depth of ~1m, cleared depth above fill 1.30m). One course of stones preserved above rock-cut. Remnants of hydraulic plaster on the inside. The well is connected to a square settling tank directly to the northwest (uphill). There is also a channel leading from the well to the southeast (directly opposing the settling tank). The well is located on the flat top of a low hill, surrounded by remnants of ancient terraces. Some pottery was noted at the site.

Dating: Nabataean (first century AD).

Qa'2

UTM coordinates: 744451E; 3354303N.

Altitude: 1419.4m.

Complex rectangular structure with internal divisions, built of unhewn stone blocks (mostly flint). Branching wall lines also apparent at the surface. Located on a flat area between several hills, surrounded by agricultural fields. The structure is cut by a water course in the south.

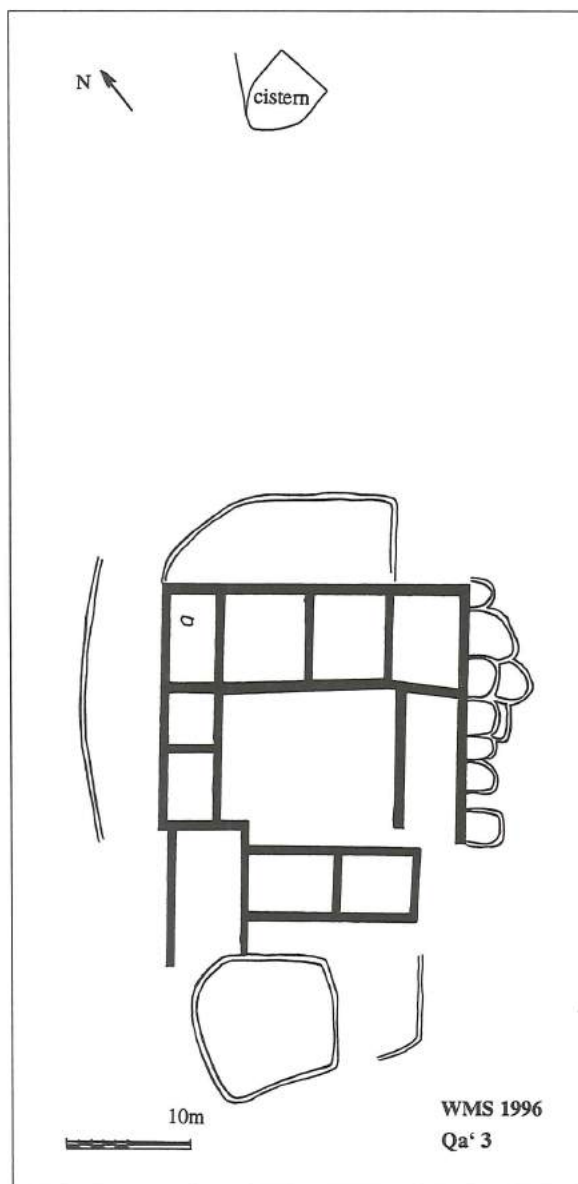
Dating: Nabataean (first/ second century AD).

Qa'3

UTM coordinates: 743779E; 3355974N.

Altitude: 1510.7m.

A large rectangular complex with internal divisions and a well in the northwest corner, built mostly of large flint blocks (Fig. 28). Located on the upper slope of a hill. Original outline of the structure partially obstructed due to recent corrals and shelters built in and around it. Approximately 40m to the northeast of the structure further



28. WMS 1996 site Qa'3: sketch plan of the structure (drawn by A. al-Momani).

down the slope, there is a rectangular rock-cut cistern with remnants of hydraulic plaster, located partially within a natural cave, part of the roof of which is still preserved. The east wall of the cistern, which would have been stone-built, is currently destroyed. Abundant pottery sherd scatter was noted at the site.

Dating:- Structure: Nabataean (first/ second century AD), Late Roman/ Early Byzantine (fourth century AD), Late Islamic; cistern: Nabataean, Early Byzantine.

Qa'4

UTM coordinates: 743787E; 3356224N.

Altitude: 1496.1m.

A rectangular building with internal divisions, built of large flint stone blocks. Located on the lower slope of a hill among agricultural fields. A dirt track may have cut part of the site. Abundant sherd scatter was noted at the site.

Dating: Nabataean (first to second century AD).

Qa'5

UTM coordinates: 743516E; 3356446N.

Altitude: 1480.5m.

Dimensions: 27.5m E-W x 11m N-S (actual orientation 45°).

A rectangular structure located at the bottom of a hill. Very difficult to discern the outline as it is obstructed by the piling of small stones from the clearance of the surrounding agricultural fields, however the northeast and southwest corners are clearly

visible. Scarce sherd scatter (Classical Nabataean body sherds) was noted at the site.

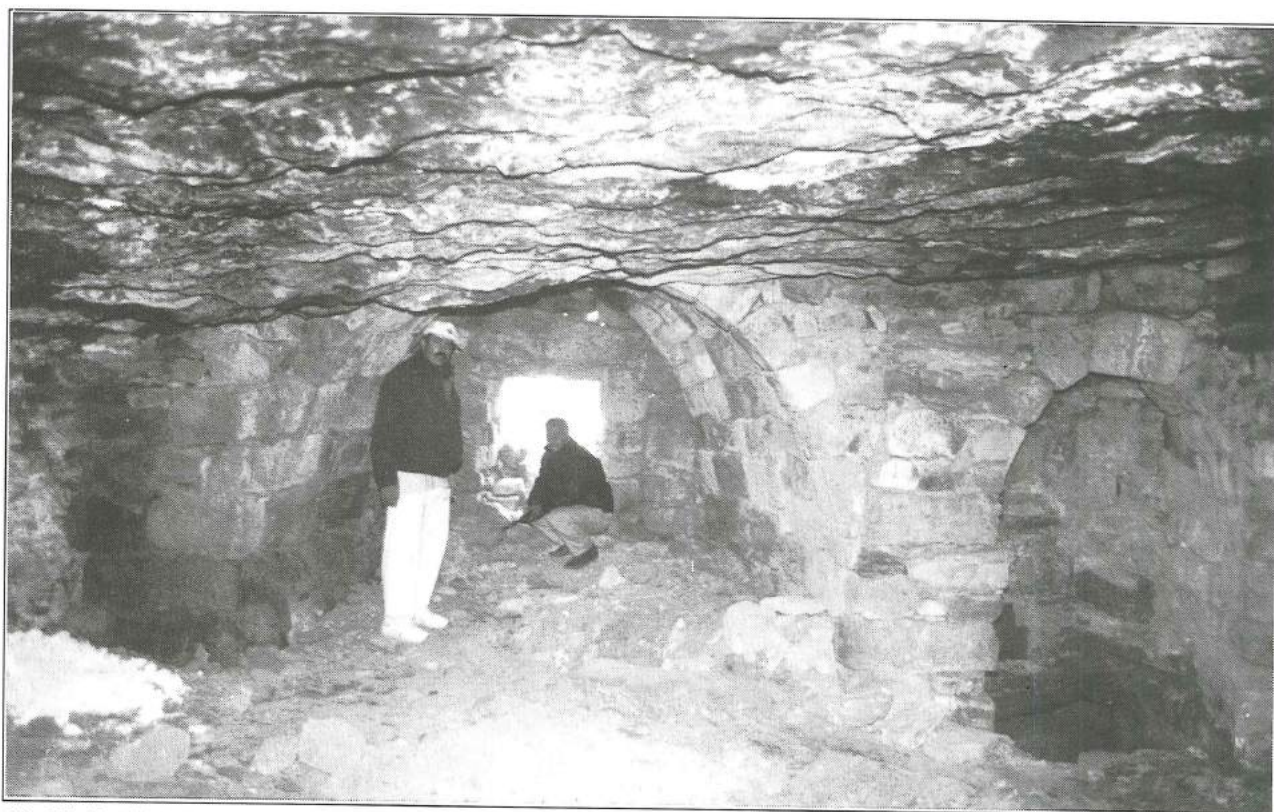
Dating: Nabataean (?).

Qa' 6 (Umm at-Ṭirān)

UTM coordinates: 743511E; 3356871N - 743675E; 3356861N-743416E; 3356736N.

Altitude: 1486.0 - 1494.1m.

An extensive site with many structures built with medium and large stone blocks. There are three main concentrations of structures showing at the surface, located on three close-lying low hills (continuity of structures may have been disturbed by intervening agricultural fields). The largest concentration (in the northeast) has one cave with an arched entrance, rock-cut niches and a cistern inside, also built walls within the cave are showing in robbers pits (Fig. 29). The roof of another cave in this main concentration, to the south, had collapsed. A round water well, to the east of the second cave, has a ceramic water pipe leading



29. WMS 1996 site Qa' 6 (Umm at-Ṭirān): interior of the first cave. The cistern is below the arch to the right.

into it from the west (uphill). The present water pipe line, laid in 1974, cuts this part of the site. It has already destroyed the edge of a structure at the southern end of the main concentration. The vehicular dirt track also cuts the main concentration of structures at its east end.

There are also two smaller concentrations of similar structures to the south and east of the main concentration, the eastern of which has several recent threshing floors and many corrals. Abundant sherd scatter was noted at the site (Fig. 30).

Dating: Nabataean to Byzantine (first to fifth centuries AD), Late Islamic.

Qa'7

UTM coordinates: 743674E; 3357052N.

Altitude: 1500.8m.

A complex structure with several internal

divisions, built of medium and large stone blocks, located at a hill top within a mountain slope and surrounded by agricultural fields. Abundant flint scatter was noted in the field surrounding the structure indicating that the area around the structure is a prehistoric archaeological site.

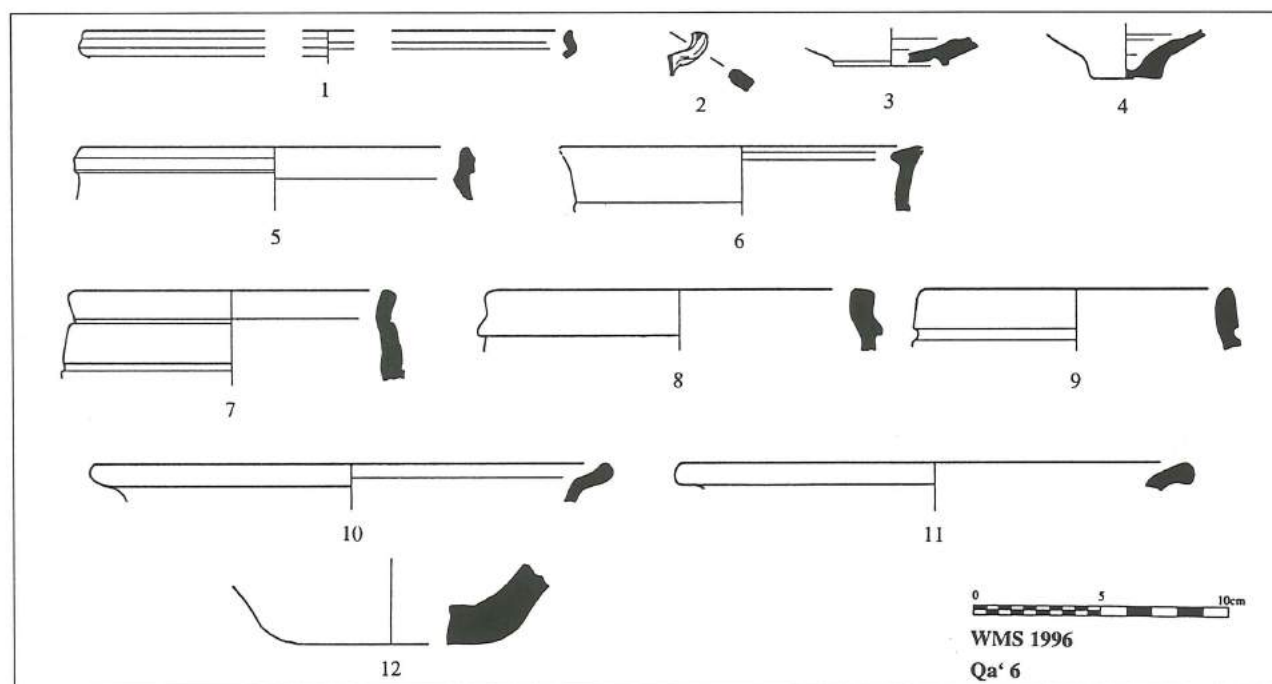
Dating: Neolithic for the field; Nabataean and Late Roman/Early Byzantine for the structure.

Qa' 8

UTM coordinates: 743866E; 3357120N.

Altitude: 1486.2m.

Structures located on a hill at the mountain slope. The site is currently dominated by the remnants of a modern (traditional) structure which had partially collapsed. There are also several modern corrals. A cave in the northwest edge of the site has rec-



30. WMS 1996 site Qa' 6 (Umm at-Ṭirān) pottery (drawn by A. al-Momani and L. Mohamadieh): 1. Bowl, fine red ware, cream ext. rim, Nabataean 1st cent. AD; 2. small juglet handle, fine red ware, Nabataean late 1st-early 2nd cent. AD; 3. base, fine red ware, Nabataean 1st cent. AD; 4. string-cut base, buff ware with red core, Late Nabataean 3rd cent. AD; 5. cooking pot, red ware, cream slip ext., Nabataean 2nd cent. AD; 6. jar, sandy red ware, cream slip ext., Late Nabataean late 2nd-3rd cent. AD; 7. jar, sandy red ware with grey core, cream slip ext., Nabataean 2nd cent. AD; 8. jar, sandy red ware, traces of grey slip ext., Byzantine 5th cent. AD; 9. jar, brownish red ware with grey core, Byzantine 5th cent. AD; 10. bowl, buff ware, traces of cream slip ext., Byzantine 5th cent. AD; 11. bowl, red ware, grey slip, Early Byzantine 4th cent. AD; 12. base, handmade, red ware with wide dark grey core and int., abundant calcite, grog and mineral grey inclusions, abundant chaff impressions, Late Islamic.

tangular niches cut into its walls. Abundant pottery sherd scatter was noted at the site.

Dating: Nabataean to Late Roman/ Early Byzantine (second to fourth centuries AD), Late Islamic.

Qa' 9 (Bi'r al-Biṭār)

UTM coordinates: 743220E; 3357218N-743293E; 3357184N-743205E; 3357278N.

Altitude: 1484.5 - 1502.1m.

Site with several structures located on a hill top, now occupied by modern (traditional) houses and a school. Some of the houses in the east had collapsed and ancient wall lines are apparent in the vicinity. Modern pits behind the school revealed well-preserved ancient walls (Fig. 31). Abundant pottery sherd scatter was noted at the site (Fig. 32).

Dating: Iron II (Edomite), Nabataean (first and second centuries AD), Late Byzantine to Early Islamic (sixth and seventh centuries AD), Late Islamic.

Qa' 10 (ar-Raṣīf)

UTM coordinates: 741683E; 3357298N-741668E; 3357239N-741673E; 3357205N-

741744E; 3357228N.

Altitude: 1549.5 - 1552.9m.

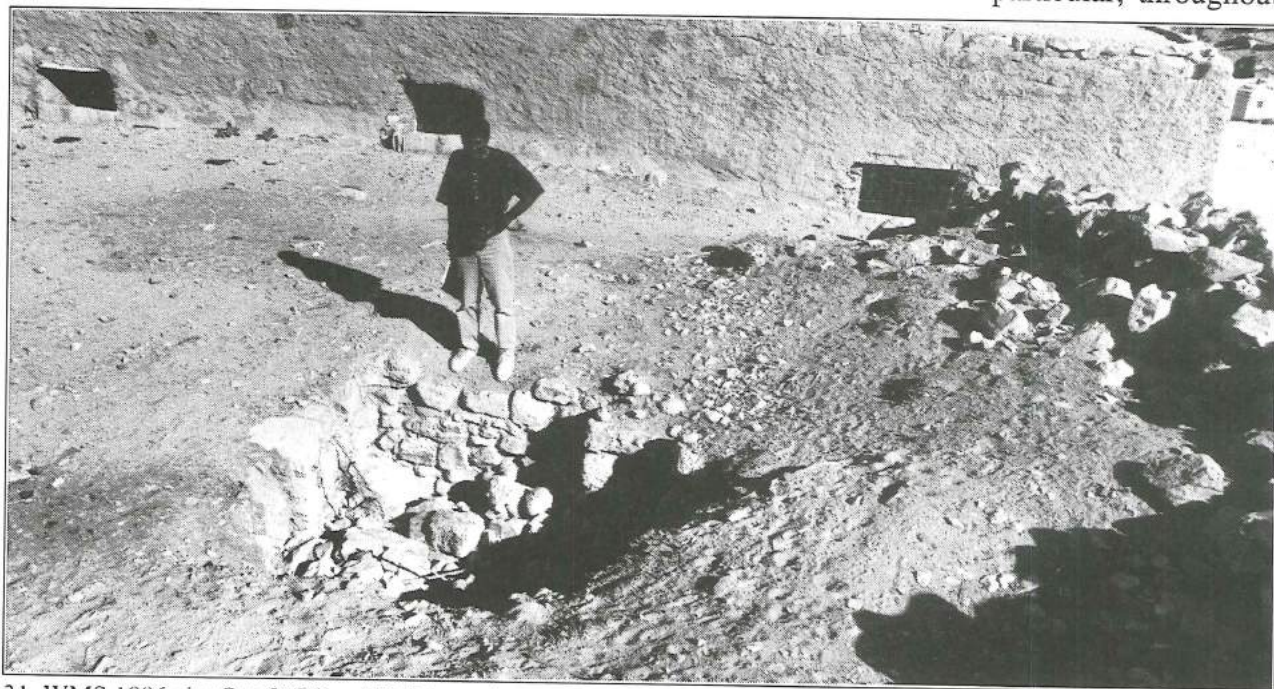
What may be the junction of three ancient roads, one from Udhrūḥ (Fig. 33), the second from aṭ-Ṭayyiba, and the third from Wādī Mūsā (Site Wadi Musa 24; see also Graf 1992: 256). The "aṭ-Ṭayyiba road" is the best preserved, being several kilometres long. The stretch concerned is directly to the south of the present Wādī Mūsā reservoir, and is already disturbed by its enclosure. A cave to the west of the "aṭ-Ṭayyiba road" was used as a cistern, with stone-built walls around it. Robbers pits directly to the south of the cistern unearthed much pottery and an ash layer, including restorable pots. There are also several wall lines to the west of the cistern.

Terrace walls to the east of the road seem to be based on older structures.

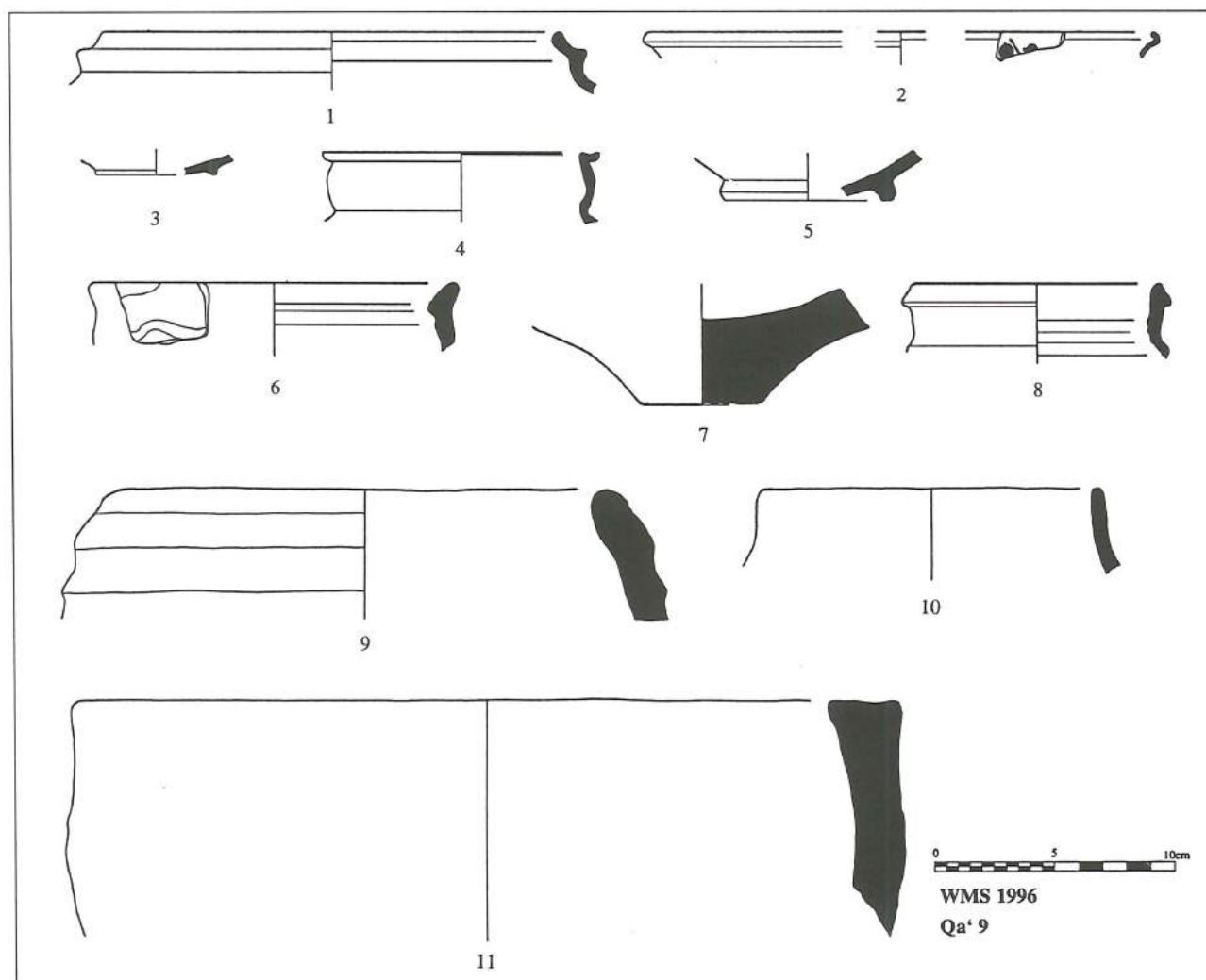
Dating: Nabataean, Roman, Late Roman/ Early Byzantine.

Acknowledgement

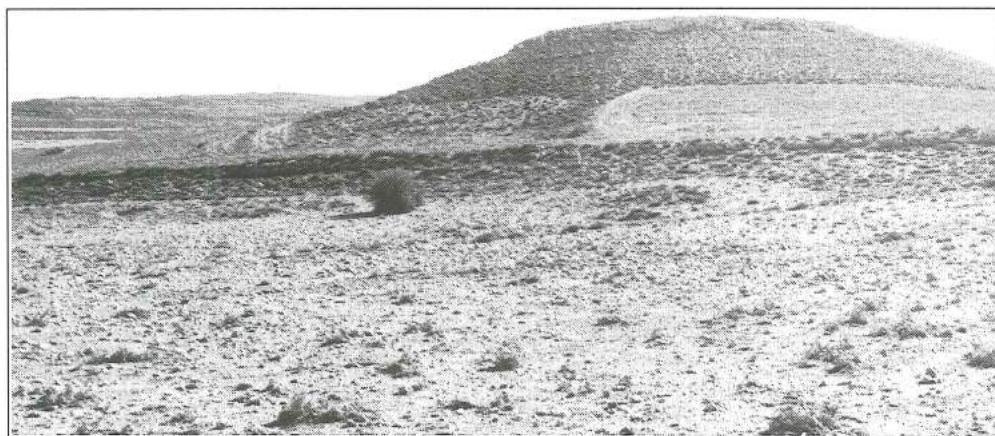
We wish to express our gratitude for the support received from CDM in general, and Mr Fred McNeill in particular, throughout



31. WMS 1996 site Qa' 9 (Bi'r al-Biṭār): ancient walls showing in a pit behind the school house.



32. WMS 1996 site Qa' 9 (Bi'r al-Biṭār) pottery (drawn by A. al-Momani and L. Mohamadieh): 1. Cooking pot, sandy brownish red ware, Edomite Iron II; 2. bowl, fine red ware, brown paint, Nabataean 1st cent. AD; 3. base, sandy red ware, Nabataean 2nd cent. AD; 4. jar, red ware, thick cream slip ext., Nabataean 2nd cent. AD; 5. base, fine red ware, Nabataean 1st-early 2nd cent. AD; 6. jar, incised decoration, sandy red ware, orange slip ext., Late Byzantine 6th cent. AD; 7. storage jar base, handmade, red ware with grey core, Late Byzantine - Early Islamic late 6th-7th cent. AD; 8. cooking pot, sandy reddish brown ware, Early Islamic 7th cent. AD; 9. storage jar, handmade reddish buff ware with wide grey core, many mineral grey and grog inclusions, many chaff impressions, Late Islamic; 10. small jar, unevenly fired red, brown and grey with wide grey core, many mineral grey and grog inclusions, many chaff impressions, Late Islamic; 11. basin, handmade, greyish buff ware with wide grey core, many mineral grey and grog inclusions, many chaff impressions, Late Islamic.



33. WMS 1996 site Qa' 10 (ar-Raṣīf): view from the north. The level at which the plants are growing is the surface of the ancient road from Udhrūḥ.

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