

THE VIJAYANAGARA METROPOLITAN SURVEY: OVERVIEW OF THE 1994 SEASON

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This paper reports preliminary results of the 1994 season of the Vijayanagara Metropolitan Survey (VMS). The project is designed to investigate the operation and structure of imperial economies as they are manifest in the urban and periurban archaeological landscape. Research is focused both on the organization of production of a range of goods – food, other agricultural produce, ceramics and metal goods – and on the ways in which agricultural and craft production changed through time. The city of Vijayanagara – the capital of a vast empire that claimed hegemony over much of peninsular India between the fourteenth and sixteenth centuries – was established in an area that had never been politically central or densely occupied. Its rapid expansion prompted dramatic changes in the organization and scale of production of agriculture and craft goods, and in the regional layout of settlement, fortification and transportation.

Research reported here is directed toward studying the structure of production, settlement, transportation and fortification in the region outside and immediately surrounding the city of Vijayanagara, an area termed the Greater Metropolitan Region. Multiple lines of evidence are combined in an analysis of this area. These forms of evidence are based on archaeological survey and test excavation, analysis of historical data, observation of contemporary craft production and the analysis of fossil pollen and charcoal. Here we report on the 1994 archaeological results.

The VMS consists of a programme of systematic intensive surface survey in the hinterland of the city of Vijayanagara. To date we have been able to identify a complex land-

scape of settlements, roads, temples and agricultural facilities. During the 1994 season 144 new archaeological sites were located and examined and 140 recorded in some detail. Allied with our surface investigation is a programme of small-scale test excavations in several locations of agricultural and craft production. Profiles from one agricultural terrace system were examined during the 1994 season.

Archaeological Survey

The VMS consists of two major components; intensive survey of the area immediately surrounding the city and more extensive examination of a larger area. The intensive survey universe consists of eight arbitrarily defined blocks of land, each approximately 20 sq km. Blocks are divided into 250 m wide north-south transects. We selected a 50 per cent random sample of transects from the block and survey each selected transect. Survey is accomplished by a crew of three to six archaeologists spaced 20 m apart, who walk systematically across the transect and record all archaeological occurrences. When time permits, we also record archaeological sites outside the sample transects, but we recognize that our sample of such areas is not complete. Each site is mapped, described and photographed, and controlled surface collections of artefacts are made (compare Sinopoli and Morrison 1991).

In the 1994 season, all of Block R was surveyed and approximately three-quarters of Block M was surveyed (Figure 1). 144 archaeological sites were located and 140 described

in detail, bringing the total to 511. Thus, with the exception of a part of Block J, all of the intensive survey universe south of the Tungabhadra River has been surveyed. The following sections describe firstly, the areas surveyed in 1994 and, secondly, a few of the archaeological sites recorded.

Block R

Block R (Figure 2) lies to the south and west of the city and consists primarily of flat or gently sloping red soils. Although a few granitic outcrops emerge from the mostly level surface of this block, particularly in the northwest and southeast, only the southeastern corner of the block displays a hilly and dissected topography. At present, there is a very sharp distinction between the irrigated and non-irrigated parts of Block R and this distinction appears to be relevant to understanding Vijayanagara period landuse as well. Although sections of the modern Tungabhadra canals run through this block, they are deeply entrenched and water only a very small area in the block itself compared to the larger contribution of the Vijayanagara period Raya canal and the Kamalapura reservoir. The Raya canal feeds the Kamalapura reservoir as well as providing water for extensive areas of cane and paddy rice. In the northwestern quarter of the block, the Raya canal snakes around several high granitic outcrops, watering areas of lower elevation, and in this area the contrast between wet and dry is the most pronounced.

The dominant archaeological feature of Block R is the northeast-southwest oriented roadway stretching between the city of Vijayanagara and a string of settlements to the southwest. A large number of the sites identified in this block was located in these roadside settlements or along the course of the road. A section of the outer city wall, also recorded in Blocks O and S (Morrison and Sinopoli 1996, Sinopoli and Morrison 1991), arcs across the northeastern corner of the block, where it joins the embankment of the Kamalapura reservoir (VMS-231).

Block M

Block M to the west of the city is dominated by irrigated fields out of which granitic outcrops emerge like high islands (Figure 3). Only the part of Block M south of the Tungabhadra River was surveyed in the 1994 season. The southwestern corner of Block M displays the highest relief. Low lying areas in the eastern half of the block are crossed by a maze of Vijayanagara canals which still water vast tracts of sugarcane, bananas and some paddy rice.

Notable cultural features in Block M include the northern portion of the outer city wall. Curiously, this outer fortification ends rather abruptly in Block M, as a parallel to its termination east of the city on Block O (Sinopoli and Morrison 1991). Thus, the entire outer fortification can be conceived as an upright U-shape, running primarily through dry areas and ending in areas of canal irrigation. Most of the portion of Block M surveyed in 1994 appears to have been under cultivation during the Vijayanagara period, but there are also several settlements, roads, shrines and other structures in the block.

Other Areas

A number of other areas was also studied in the 1994 season. VMS-6 is a site complex that includes a settlement area and a fortified hilltop. This site had been located and briefly described (Morrison 1991). In the 1994 season we made more detailed descriptions, maps, and surface artefact collections. Several other sites in the vicinity of VMS-6 (Block W) were described at the same time (see Dega and Brubaker this volume).

Two sites in Block O, east of the city, were also recorded. The sites, a small Shaivite temple (VMS-371) and associated step-well (VMS-372), had been obscured by heavy vegetation in previous seasons.

Transportation

In both Blocks R and M, a great many sites that structured movement of people, animals and wheeled traffic were identified. These sites include roads, paths, bridges and stairways.

Structures that blocked movement or channelled it, such as walls and gates, are also relevant to understanding transportation in the Metropolitan Region. As noted, the largest transportation feature in Block R is the major roadway joining the city of Vijayanagara with towns and villages to the southwest. Mallapannagudi, a substantial settlement during the Vijayanagara period, was located along this roadway, as were many other smaller settlements. Apart from this route, however, a number of other roads were identified. Table 1 contains summary information on these sites; locations are indicated in Figures 2 and 3.

Settlement

Block R was densely settled, containing the remains of at least three areas of nucleated settlement. In the northeastern corner of the block, the embankment of the Kamalapura reservoir serves not only as a dam, but also as a road and fortification (Morrison and Sinopoli 1996). The embankment ends on the west with a gateway (VMS-450). Abutting VMS-450 is a continuation of the outer ring of the city wall (VMS-10, VMS-123), here recorded as VMS-451 and VMS-455. Although the area inside this wall did not fall in the sample universe, it seems probable that it served at least some domestic function. VMS-454 is a badly disturbed, but very substantial north-south wall that runs approximately parallel to VMS-451/455. Adjacent to VMS-454 is VMS-432, a dense ceramic scatter, which would have lay inside the area guarded by the massive wall. Thus, it appears that there were areas of settlement, still not very well defined, in the northeast corner of Block R.

The modern village of Malapannagudi lies astride the Hospet-Kamalapura road. This pattern is not new. Malapannagudi was a larger settlement during the Vijayanagara period and, like its modern counterpart, it lay along the major northeast-southwest roadway. Malapannagudi is bounded by a very regularly shaped rectangular enclosure wall, VMS-383. The latter is 555 m east-west by 360 m north-south. Two identical gateways constitute the only openings into the town, VMS-384 on the west and VMS-385 on the east. Within the

settlement is a monumental Shaivite temple complex, VMS-487, (Plate 2) as well as a smaller shrine, VMS-489, and an elaborate octagonal step-well, VMS-488. Built into an extension of the town wall is a large reservoir, VMS-4. Near the edge of the water contained within this reservoir is an area of iron production, VMS-5 (see also Morrison 1991). VMS-5 consists of an extensive (280 x 200 m) slag scatter, possibly representing the remains of multiple, short or medium term, small-scale episodes of iron working or smelting. The spatial association of this smelting/working area with the settlement of Malapannagudi and the major roadway leading to the city is of note.

The third potential locus of permanent settlement in Block R is the area around the contemporary village of Kondanayakanahalli. A bastion (VMS-494), gateway (VMS-497), rock-cut well (VMS-445), temple (VMS-496) and sculpted Nandi (VMS-419) are all located in or near Kondanayakanahalli. However, there are no definite traces of Vijayanagara period settlement and it is difficult to be sure if there was actually a permanent settlement here.

In Block M, permanent settlement may have extended out from the city itself to the eastern edge of the block. However, this area did not fall in the sample universe. Further, there is at present very dense irrigated vegetation in this area and the exact locations of Vijayanagara residence are thus conjectural. The contemporary village of Kadirampura abuts a well-known complex of Muslim tombs (VMS-504), and this settlement may also have roots in the Vijayanagara period. Finally, an abandoned village identified by the Survey of India as Kalaghatti, was located along the western edge of Block M, just south of the Tungabhadra River. It was not recorded in the 1994 season.

Temples and Shrines

As elsewhere in the survey area, temples and shrines are ubiquitous. Religious sites range from relatively modest depictions of sacred images such as *lingam* to large complexes of structures. Table 2 provides summary information on religious structures from Blocks R

and M recorded during the 1994 season.

Agriculture

A diverse array of facilities related to agriculture was located during the 1994 season. As elsewhere in the study area, there is a sharp distinction between areas under perennial wet irrigation (canals and canal-fed reservoirs) and those farmed under either a rainfall-dependent regime or more seasonal form of irrigation. The southern half of Block R is quite dry, with only modest topographic relief (except for the southeast corner). However, these dry portions of the block appear to have been very intensively farmed in the past. Block R contains a cluster of large reservoirs dating to the Vijayanagara period. The largest of these, VMS-4 (Plate 5, see also Morrison 1991), is associated with the settlement at Malapannagudi. To the northeast of VMS-4 is another reservoir, VMS-417, that has been superseded by the relatively recent expansion of the Basavanna canal. However, these two reservoirs were apparently once linked in terms of water flow. Further east from VMS-4 and also associated with it is VMS-412, another large reservoir. VMS-400 lies in the southeastern corner of the block. This reservoir is not connected to any others but is associated with a number of smaller scale agricultural facilities such as erosion control walls and check-dams.

The relative paucity of reservoirs in Block R contrasts markedly with their abundance in other dry parts of the study area. However, dry farmed areas in Block R also exhibited unusually high surface densities of slag and slightly lighter than usual densities of earthenware ceramic shards. It is suggested here that these extensive slag and sherd scatters are, at least in part, the product of manuring of fields and indicate a very long history for manuring in the region. Fields in this area are still intensively manured and this practice leaves a low-density, but continuous scatter of modern debris on the fields (glass, plastic, etc.). Slag and shard densities away from settlements are, in general, lower in other dry farmed portions of the study area than they are in portions of Block R. Thus, it is suggested that this area was previously under intensive

dry cultivation that involved at least periodic manuring.

The dominant Vijayanagara period agricultural regime in the areas studied during the 1994 season was, however, canal irrigation. Because all of the Vijayanagara canals in this area are still in use today, it is very difficult to make statements about their construction and age from archaeological evidence alone. Repairs and renovations have taken place more or less continuously since the construction of each canal and, thus, only a little constructional information can be gleaned from the facilities themselves. Analysis of the distribution of archaeological sites on and near the canals, however, confirms their chronological placement, even if it does not allow precise dates to be assigned to each canal.

The Raya canal (VMS-486) extends through both Blocks M and R, making its way from its source in the Tungabhadra River (now submerged by a recent dam) to the northwest to the Kamalapura reservoir on the east. The date of the Raya canal cannot be fixed with any degree of certainty (cf. Morrison 1995). However, there is some reason to believe that it dates to the earlier part of the Vijayanagara period. In Block M a cluster of temples is located atop a high outcrop, around which the Raya canal makes a sharp turn. These temples may date to the early Vijayanagara period, but because there is no surviving bridge or other structure directly linking the canal with the temple complex the association of the features is unclear. Several other sites are located along the course of the Raya canal, including VMS-434, a one-room structure, and VMS-425, a group of displaced architectural elements. Modern irrigation in areas watered by the canal may have displaced other structures and certainly obscures artefact distributions.

The Kalaghatta (VMS-485) and Turtha (VMS-496) canals dominate the surveyed portions of Block M. Like the Raya canal, these facilities are still in use and water large tracts of sugarcane, bananas and some paddy rice. The Kalaghatta has its origin upstream, to the west of Block M, and it flows into the Turtha canal, joining it near the centre of the block. The Kalaghatta splits into several discrete channels before merging with the Turtha; it is

not known if these channels are recent modifications or not. The Turtha canal, in contrast, has its origin in Block M, where a more than 270 m-long series of *anicuts* or diversion weirs (VMS-472, VMS-473) diverts water from one channel of the braided Tungabhadra River. Although the Turtha *anicuts* have been continuously maintained and repaired, much of the original structure is evident. The Turtha canal makes its way into the city of Vijayanagara and emerges on the east into Block O (Sinopoli and Morrison 1991) and eventually back into the river. Structures along VMS-496 located and described in the 1994 season include VMS-449, a raised road segment; VMS-477, a ceramic scatter; and VMS-496, a shrine with a large Hanuman sculpture.

Craft Production

Two sites related to the procurement and processing of stone and iron were located during the 1994 season. The first of these, VMS-5 (cf. Morrison 1991), is in block R approximately 250 m south of the town of Malapannagudi. VMS-5 is a large scatter (280 x 200 m) of iron slag, droplets, brick fragments and ceramics. The distribution of slag and artefacts is more highly concentrated in a few areas. One of the high density areas also contains a high density of brick fragments. This area is currently being dry-farmed and has been subject to considerable disturbance by plowing. In the raised boundary between two fields several bricks appear to be in alignment; this may be a furnace.

VMS-423, in the northwestern corner of Block R, is a quarry area that appears to date to both the recent and the Vijayanagara periods. A number of blocks that has been marked for removal remain in situ, but the strings of rectangular quarry marks, quite unlike the traces of modern quarrying, indicate that many other blocks were removed from this area. One interesting feature of this site is a group of sixteen vertical tick marks incised in the side of a large boulder (for record keeping?). Other areas of craft production may have been located in the settlements.

Fortification

Several features related to defense and boundary definition were located in Blocks R and M. Most prominent among these are the sections of the outer ring of the city wall (VMS-451, VMS-455) that extends across the north-east corner of Block R and into Block M (Plate 6). The other notable defensive feature is the walled settlement of Malapanna-gudi itself. As discussed above, Malapannagudi is enclosed within a well-built rectangular fortification wall (VMS-383), broken only by a pair of matched gateways (VMS-384 and VMS-385) on the west and east. Like the walls of the city itself, VMS-383 is constructed of dry masonry consisting of two faces of wedge-shaped blocks joined by earth and rubble fill.

The outer ring of the city wall does not completely enclose the city. Instead, it curves around the southern edge of the city, ending at the transition zone between areas of dry and wet agriculture on both east and west. The outer wall appears to have been constructed and/or repaired incrementally, inasmuch as different segments were constructed in quite different styles and using different materials (blocks vs boulders, for example). In areas to the south and east of the city, this wall appears to be a late development and was perhaps designed to protect and define the expanding areas of population in the sixteenth century (Morrison 1995). On the west, in the areas surveyed in the 1994 season, the chronology is less clear. The wall, which was built into the embankment of the Kamalapura reservoir, is broken by a gateway (VMS-450) on the western edge of the reservoir. The major southwest-northeast road would have passed through this gateway. One other large gateway (VMS-452) indicates the location of an alternate entryway into the city. The wall is well constructed of shaped granite blocks fit closely together without mortar. The construction of this fortification wall may post-date the existence of irrigated fields in the area, since provision was made in the structure of the wall (e.g. VMS-456/F1) for the movement of water underneath it. The wall ends in an embankment, VMS-456.

In addition to the walled settlement of Malapannagudi and the sections of the outer

ring of the city wall just described, there were also a number of other features located in the 1994 season that appears to relate to defensive concerns. These include VMS-454, a 285-m long section of wall constructed of large (*c.* 1.5 m diameter) split boulders that runs roughly parallel to the course of the outer city wall (VMS-451) at a distance of *c.* 750 m. The southeast corner of Block R also contains evidence of fortification, in the form of strongly constructed, but more informal walls of large boulders and cobbles. VMS-399 is a U-shaped wall that partly encloses an area of *c.* 100 x 60 m; this feature may be related to the cluster of agricultural facilities found nearby.

Results of the 1994 Season

Coring and Testing

Coring and testing were largely confined to VMS-133, which is a large system of inter-related agricultural terraces located in the southern portion of Block S. This dry area of moderate to rugged topography is not now regularly cultivated, supporting an occasional dry field, grazing by sheep and goats, and firewood collection. There are no modern settlements in the vicinity not indeed have any Vijayanagara period settlements been located in proximity to the terrace system. The terrace covers an area approximately 375 x 375 m and includes a small reservoir, VMS-126. Many terrace walls consist of two widely separated faces, resulting in some walls that are more than a metre wide. However, the terraces are not high, with two courses the maximum present height. Terrace walls are placed both perpendicular to and parallel to the direction of drainage, suggesting that the control of soil and water was only one aspect of their function.

This terrace system was recorded in 1990 (Morrison 1995 and Morrison and Sinopoli 1996), and was slated for test excavation. In 1994, we revisited the site and found that subsequent to the acquisition of the land by Kannada University, they had dug several hundred tree-planting holes, each *c.* 50 x 50 cm, spaced more or less regularly across the site. With the kind permission of the university, these tree-planting-holes allowed us to make observations of sediment profiles

across a portion of the site. Some 61 profiles were drawn from the exposed faces made by the tree planters. This information will allow us to refine our strategies for further excavation in agricultural facilities.

Other Research

Although no studies of contemporary pottery production were carried out this season, we did make some preliminary observations on the process of brick making. Brick manufacture is carried out on a small to medium scale throughout the area and leaves a significant mark on the landscape. Inasmuch as brick production was also important during the Vijayanagara period – and the abundant remains of bricks suggest that it was – it is useful to consider both the technology and organization of brick making today (see Fogelin this volume).

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Works Cited

Morrison, K.D., 1991, *The Vijayanagara Metropolitan Survey: Preliminary*

Table 1. Sites Related to Transportation

Site	Block	Transect	Description
Roadways			
VMS-392	R	14-16	This long (ca 865 m long x 10 m wide) double wall skirts the edge of an outcrop, running primarily east-west. It creates an elevated roadway high above the dry farmed south-east corner of Block R. It probably connected with VMS-393.
VMS-393	R	17	Starting at the eastern end of VMS-392, this ramp-cum-staircase (40 x 7 m) leads up the side of an outcrop.
VMS-396	R	13	This is a narrow but well-defined passageway (10.4 x 3 m) cleared through the saddle of an outcrop.
VMS-426	R	9	This short (26.4 x 2.6 m) segment is bounded by parallel walls.
VMS-429	R	9	Skirting the north edge of an outcrop, this road segment (25 x 0.4 m) consists of terrace walls and a raised earthen pathway.
VMS-430	R	9-10	This roadway (78 m long) is a continuation of VMS-429 east of the outcrop. It is defined by worn sheet-rock, a possible paved surface and quarried road walls.
VMS-431	R	8-9	This roadway (255 m long) is a continuation of VMS-429 to the west. Like VMS-429 it consists of a raised road surface bounded by walls that hug the north edge of an outcrop. The western end consists of a cleared passageway in the boulders.
VMS-435	R	12	This roadway (120 x 0.75 m) is defined by parallel walls and may be a continuation of VMS-426.
VMS-449	M	9	Running perpendicular to the road along the Turtha canal, this raised roadway (82 x 5 m) stands 2 m above the present ground surface. It may have connected sites on a low outcrop to the canal road.
VMS-465	M	13	This roadway (50 x 2 m) is defined by parallel walls; probably related to VMS-467, 468, a complex of temples and a <i>mandapa</i> .
VMS-466	M	13	This short (7 x 1.2 m) roadway was probably once connected to VMS-465.
VMS-470	M	10	This elaborate cobbled road surface (250 x 15 m) runs up over an outcrop and is associated with a small columned structure base (F1) and several pecked figures (Plate 1).
VMS-471	M	9-10	The car street associated with the temple VMS-448, this straight (95 x 19 m) roadway is associated with a Nandi, other Shaivite imagery, and a small room.
VMS-495	M	12-13	This roadway (55 x 2.5 m) is bounded by parallel walls.
VMS-501	M	3	A short (12 x 8 m) paved surface that runs from an area of sheet-rock to the river, this pathway may have been associated with the settlement of Kalaghatti.
VMS-502	M	3	This roadway (16 x 1 m) consists of walls placed along the side of an outcrop, creating a raised terrace.
Bridges			
VMS-480	M	15	This two-section masonry bridge (17 x 5 m) spans the Turtha canal outlet channel.
VMS-472	M	8	The Turtha canal diversion weirs, or <i>anicuts</i> , could also have been used as foot-bridges over the Tungabhadra.
VMS-473	M	7	The Turtha canal diversion weirs, or <i>anicuts</i> , could also have been used as foot-bridges over the Tungabhadra.

Table 2. Sites with Religious Associations

Site	Block	Transect	Affiliation	Description
VMS-387	R	7	Shaivite (?)	Shrine, modern with Vijayanagara elements
VMS-389	R	8	Unknown	Shrine, 2 by 2 columns
VMS-395	R	16	Shaivite	Shrine, 2 by 2 columns on platform
VMS-414	R	11	Vaishnavite	Shrine, 2 by 2 columns with brick superstructure
VMS-415	R	14	Vaishnavite	Anjaneya Hanuman sculpture
VMS-416	R	10	Unknown	Shrine, 2 by 2 columns
VMS-418	R	4	Shaivite	Displaced Nandi sculpture
VMS-419	R	3	Vaishnavite	Anjaneya Hanuman and possible structure
VMS-421	R	13	Vaishnavite	Anjaneya Hanuman in 2 by 2 column shrine
VMS-433	R	14	Shaivite	Large sculpted Nandi on platform
VMS-437	M	6	Unknown	2 by 2 column, possibly not a shrine
VMS-438	M	6	Unknown	Small temple, 24 x 20 m
VMS-439	M	6	Shaivite	Temple tank, <i>lingam</i> , and associated small structures and pathway
VMS-440	M	6	Shaivite	Temple complex, on raised platform (Plate 3)
VMS-441	M	6	Unknown	3 by 2 column <i>mandapa</i> on high platform
VMS-442	M	2	Vaishnavite	Small temple, Anjaneya Hanuman image, lamp column
VMS-444	M	2	Other	Rock-shelter, Nagamma images, wall
VMS-446	R	1	Vaishnavite	2 by 2 column shrine
VMS-447	M	6	Vaishnavite (?)	Ornate small temple, badly disturbed
VMS-448	M	11	Shaivite (?)	Small temple, 12.5 x 7.5 m
VMS-453	R	16	Vaishnavite	3 by 2 column shrine with Anjaneya Hanuman
VMS-457	M	13	Other	<i>Sati</i> stone
VMS-458	M	12	Vaishnavite	Anjaneya Hanuman and platform
VMS-462	M	15	Unknown	Large shrine on hillside platform with associated walls and stairs
VMS-463	M	15	Shaivite	Sculpted boulder with footings and peg holes
VMS-467	M	13	Unknown	2 small shrines, rock shelter, and terrace walls
VMS-469	M	15	Unknown	2 <i>mandapas</i> , together 120 x 34 m, may not be temples
VMS-478	M	15	Unknown	2 by 2 column shrine
VMS-479	M	15	Unknown	2 by 2 column shrine
VMS-487	R	7	Shaivite	Large walled temple complex with multiple subsidiary shrines and structures
VMS-489	R	7	Unknown	Small temple
VMS-492	R	16	Unknown	Small shrine, 7 x 5 m
VMS-493	R	16	Shaivite	2.1 x 2.1 m shrine
VMS-496	M	18	Vaishnavite	4 by 3 column shrine with Anjaneya Hanuman
VMS-498	R	2	Vaishnavite	6 x 6 m temple
VMS-499	R	2	Shaivite	Temple complex with modern additions and inscription
VMS-500	M	16	Shaivite	10 x 5.5 m shrine
VMS-504	M	15	Muslim	Kadirampura tombs and cemetery (Plate 4)
VMS-508	M	8	Unknown	3 by 2 column shrine
VMS-511	R	2	Shaivite	2 by 2 column shrine

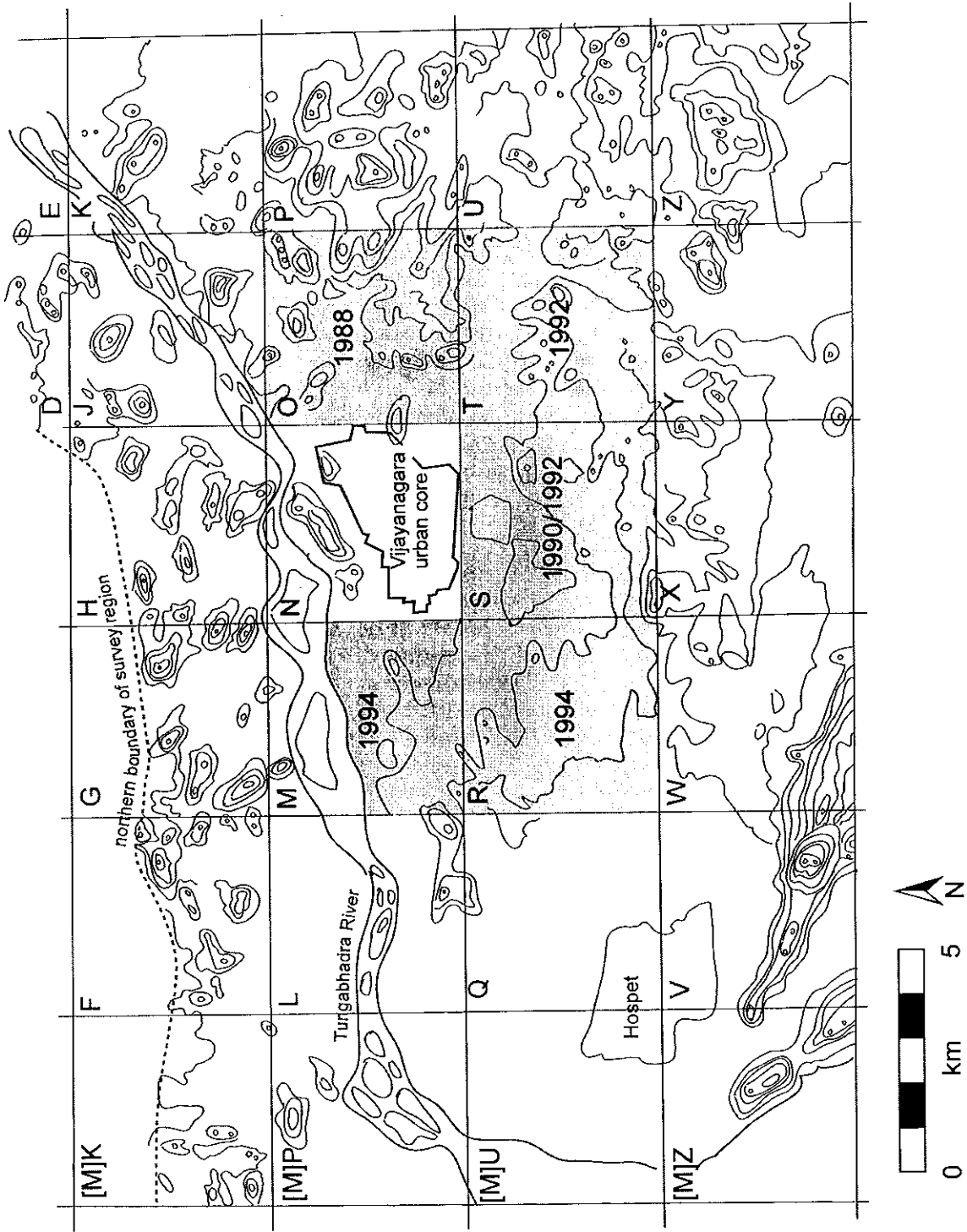


Figure 1. Blocks surveyed and year.

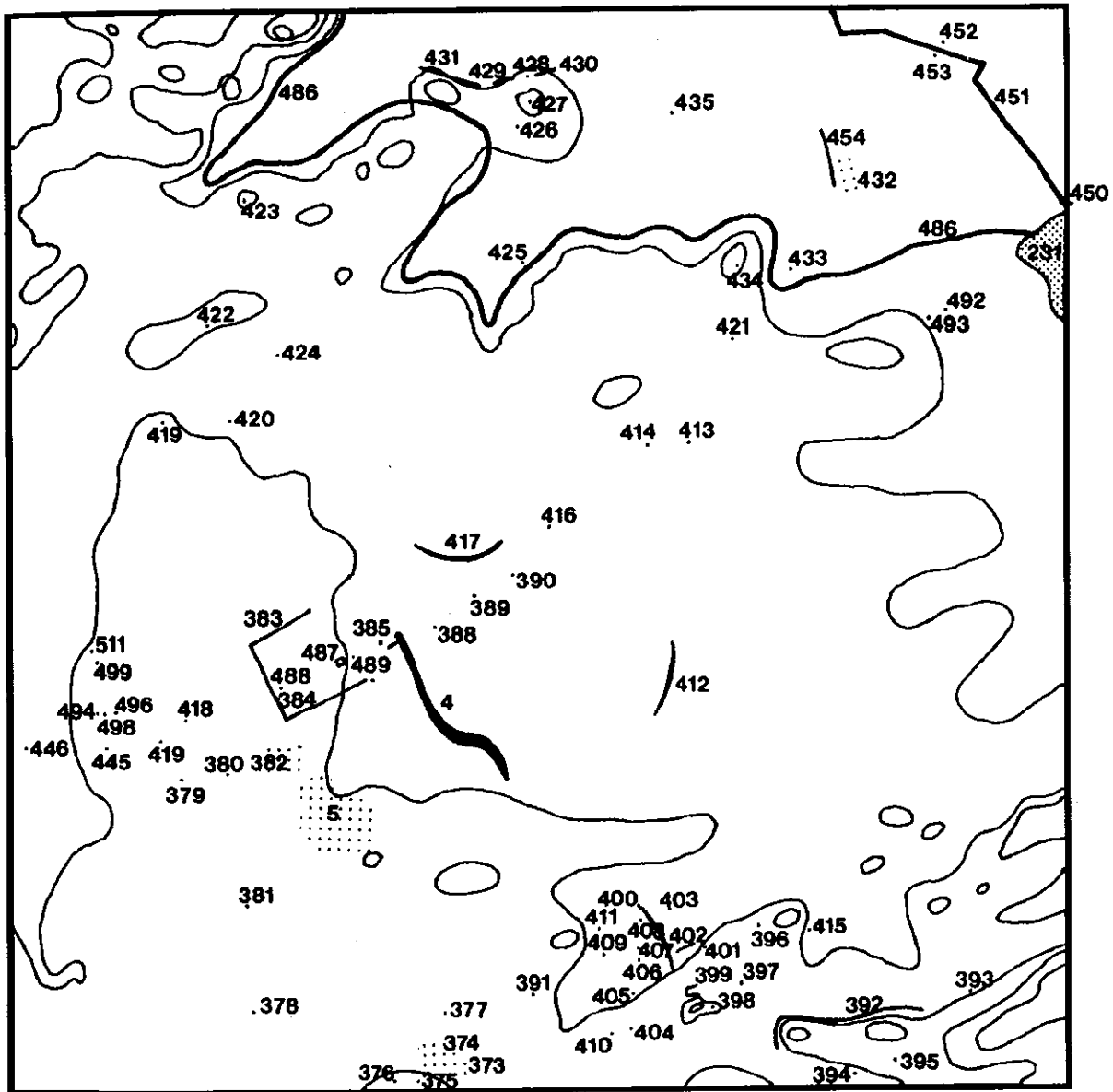


Figure 2. Block R map.

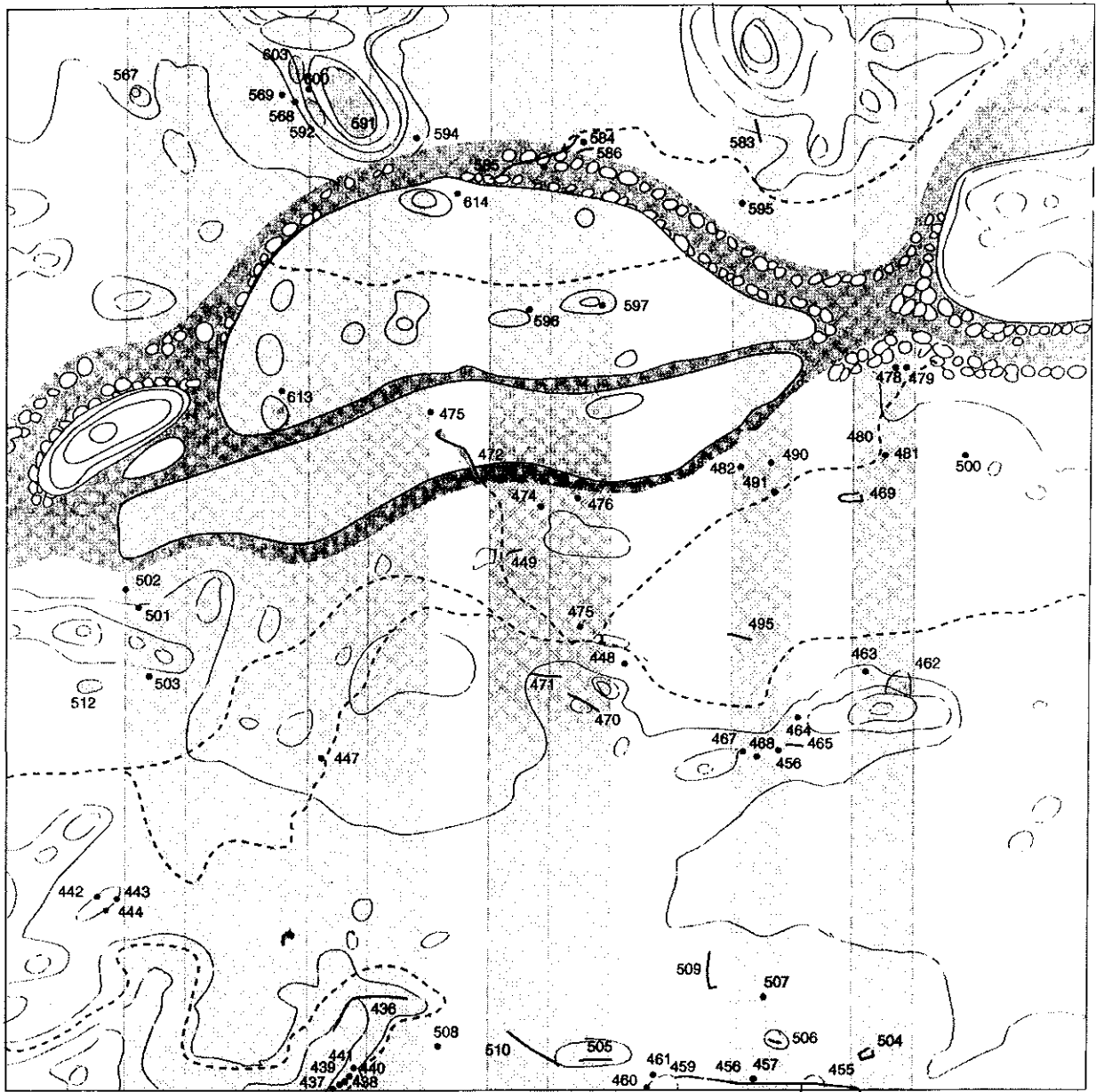


Figure 3. Block M map.



Plate 1. VMS-470, cobble road segment.



Plate 2. VMS-487, Malapannagudi temple *gopura*.



Plate 3. VMS-440, temple complex.



Plate 4. VMS-504, Kadirampura tombs and cemetery.



Plate 5. VMS-4, reservoir embankment.

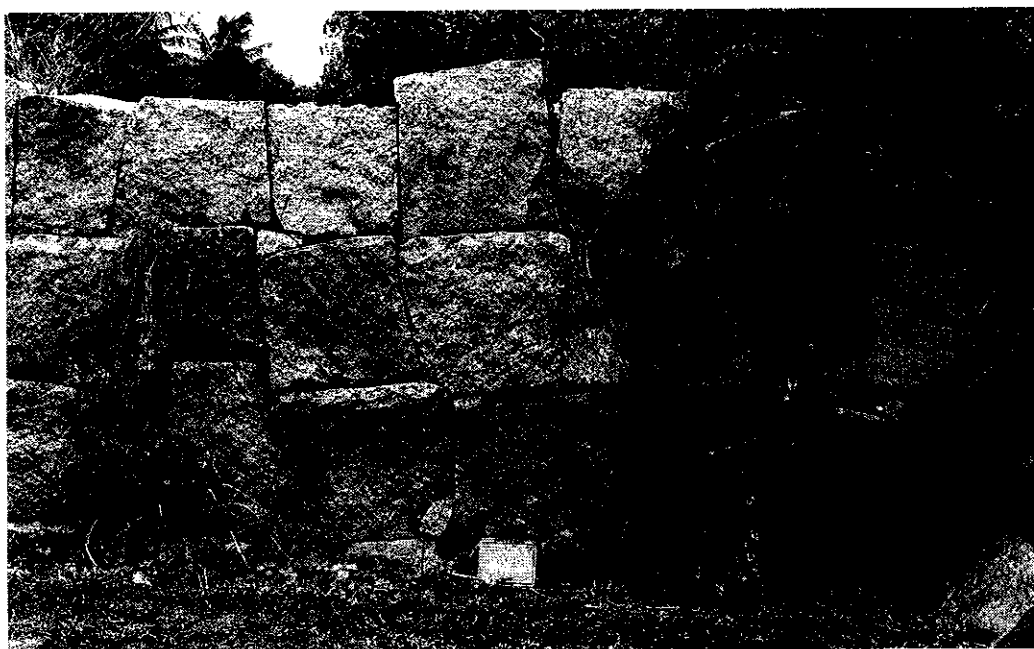


Plate 6. VMS-451, outer city wall segment.