Flemming Aalund.

THE REPUBLIC OF

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(DRAFT.)

Architectural conservation and restoration

of

Abd al-Aziz Khan Madrasa, Bukhara

and

Tillya-Kari Mosque and Madrasa, Samarkand

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Maj 1995

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Technical report.

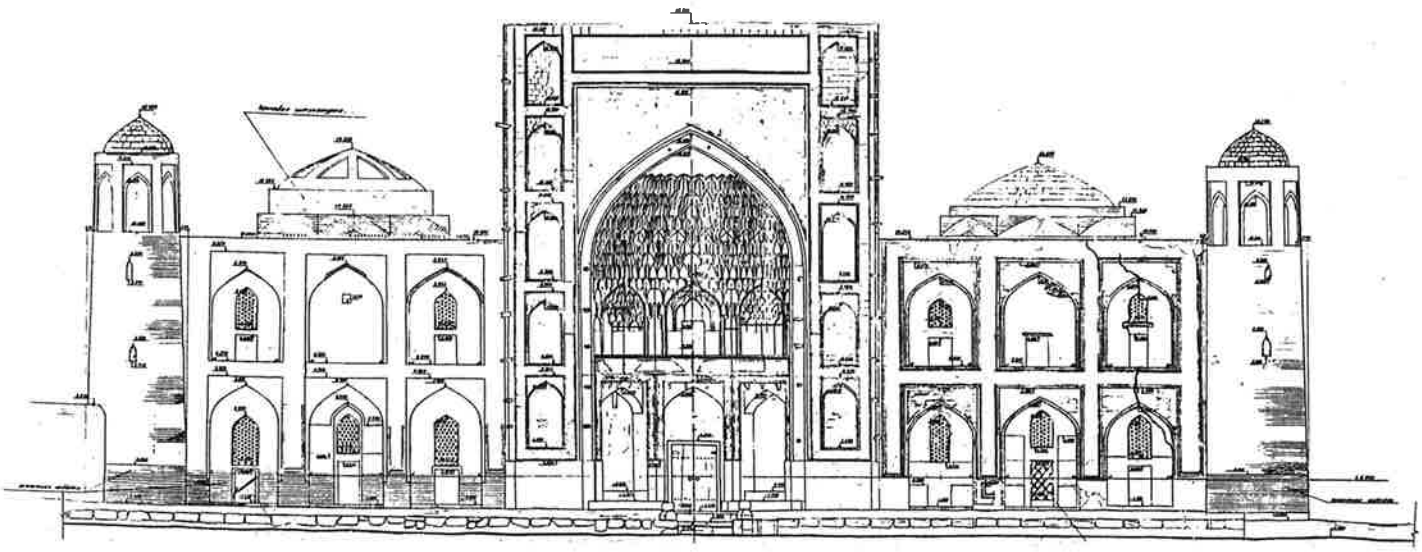
I Introduction:

1. The present report is prepared within the framework of a UNESCO/UNDP project for promoting sustainable development and revival of cultural heritage in Uzbekistan. The mission was undertaken from 17 April to 9 may 1995 with the main purpose of preparing outline proposals for the restoration of selected historic monuments aiming to mobilize international support and to develop an integrated approach between the preservation of cultural heritage, tourism and handicrafts development.

2. The two historic monuments selected for restoration are (i) Abd al-Aziz Khan Madrasa in Bukhara and (ii) Tillya-Kari Mosque and Madrasa in Samarkand. The accurate and detailed survey drawings, which have been prepared under direction of Messrs. Krukov, Notkin and Filimonov in the 1950s, provide an invaluable tool for future planning. Furthermore, the Institute of Restoration under the Board of Monuments has since long been involved with extenxive restoration measures, especially on the Tillya-Kari Mosque and Madrasa, where the most acute problems relate to the urgent need for structural consolidation of the western wall and foundations of the mosque. In the case of the Abd al-Aziz Khan Madrasa, various maintenance measures have been undertaken in the past. A restoration project has been prepared my the Institute of Restoration and a program for restoration of the tile work is currently under preparation.

3. This report is aiming to outline the extent and character of the necessary restoration work and to discuss the possible implications. The buildings are treated separately in the report under the respective headings, providing a brief history and description of the actual condition followed by a review of previous works and the actual planning for restoration. Subsequently, the report provides an outline specification of the proposed restoration work and preliminary cost estimates. More detailed planning will be needed before implementation and the report gives an outline of these requisite requirements. Furthermore, general principles on restoration are being discussed with a special view to *The Charter of Venice* (Venice, 1964).

4. The itinerary and schedule of field visits during the mission are given in annex II of this report, including names of persons consulted and brief personal summery comments. I am indebted to all the persons mentioned for the cordial and hospitable reception, which made my mission most memorable. I am especially grateful to Mr. Bakhtiyar Parsayev and Mr. Igam Nurullaev for extensive discussions about the restoration work and expedient assistance concerning the specifications and preliminary cost estimates. And throughout my mission, I received valuable support from the UNESCO project staff: Mr. Giovanni Boccardi, ass. expert, Mrs. Dinara Abdullayeva, secretary, and Mr. Michael Barry Lane, Chief Technical Advisor.



Madrasa of 'Abd al–Aziz Khan
Bukhara

II Madrasa of 'Abd al-Aziz Khan Bukhara

A Building history:

5. The reign of Khan 'Abd al-Aziz (1055-91/1645-80) was regarded as the end of the great period of Uzbek rule that replaced Mongol sovereignty in 1500. Lasting until the Russian revolution, the Uzbek polity, howerer, was carved up by various princes, who made themselves independent and the Khan in Bukhara came to rule only a small portion of his former kingdom. The central power structure ceased to exist and thereby also the capability to built the monumental architectural, which had developed to be the hallmark of the past empires.

6. Founded in the year 1651 'Abd al-Aziz Khan Madrasa was then one of the last big Muslim madrasas to be erected according to the Bukhara school of architecture that developed fully in the 16th century. Built opposite the Ulugh Beg Madrasa dating from 1417, it also follows and terminates the so-called *Kosh* tradition by which two madrasas are facing each other, creating an architectural ensemble as well as an urban space between the two main facades.

7. At first glance there is little to distinguish the two buildings from each other despite disparity in age of more than two hundred years. Together they form a harmonious whole. Studied more closely, however, the tile decoration and wall paintings reflect the new extraneous influences which modified the traditional Timurid style. In addition to geometric and floral patterns of design, panels with flower vases in high relief, snakes with birds' heads and similar alien motifs appear.

8. The benefactor wanted a building which would muster the best of Bukhara, bringing together architecture and the applied arts. In addition to the traditional glazed tile decorations, rich decorative paintings were put to use for decorations at the *muqarnas* vault of the *pishtaq* (portal) and in the most prominent rooms of the building. The *darskhana* (assembly hall) and the *khanaka* (winter mosque) in particular, located to either side of the entrance hall, as well as the vaulted summer mosque, have rich polychome mural paintings in the so-called *kundal* techniques. The intricate floral patterns in high relief appear on a blue background. But also picturesque landscapes with garden pavilions and kiosks sparsely decorate some panels, resembling romantic Indian miniatures from the time of the Moghuls.

9. We know, according to Pugachenkova (1975), the names of the master craftsmen. The architect was Muhammad-Salihi whereas the name of the master calligrapher was Maulian-Muhammad Amin and his son, Mim-Chakan ibn Chodsha-Muhammad Amin, was responsible for the mosaic work.

10. Unfortunately the decorative elements were never completed due to a *coup d'etat,* but still the building remained in use as a madrasa until 1920. More recently the courtyard was used for concerts and other public performances, but at present the building is only partially used. The Regional Inspectorate of the Board of Monuments occupies a few rooms at the

ground floor for offices, the *darskhana* is used as an antique and souvenir shop and the winter mosque houses an unpretentious small museum for wood crafts, while the rest of the building remains empty. As part of the historic itinerary the mosque and *darskhana* are accessible for tourists together with the courtyard and the summer mosque.

B Building description and general condition:

The building structure:

11. Designed as a four–*iwan* complex, the building lay–out follows basicly the Timurid tradition that evolved throughout the Turan and Khorrasan areas. The slightly oblong plan measures 48 by 68 metres on the outside. Each corner is accentuated by a *guldasta* (turret) protruding from the facades. The entrance facade has deep niches in two tiers to each side of the *pishtaq* (portal), which appear with an imposing grandeur.

12. The dwelling cells are located both at the ground floor and the first floor. Each cell consists typically of an anteroom with a fireplace for cooking and a flight of stairs leading to a mezzanine, which was used as a sleeping place. The partition walls had openings giving on to the living room and round the walls are niches intended for household objects and personal belongings. At ground floor level the mezzanine was relatively much larger and placed close to the external wall, leaving only a low storage area below. This arrangement was possibly due to the high position of the windows to the outside.

13. The marble panels along the plinth of the building are badly weathered and severely damaged by salt efflorescence in many places, which has caused flaking of the surface and loss of adherence. The dado was never completed and it appears in several places that the elaborated detailing was abrubtly abandoned (se fig. 04). At the front facade only one marble slab is left *in situ* giving a vague idea of the intended splendour. The mable originate from stone quarries at Nurata, approximately 170 kilometres from Bukhara.

14. A pit latrine situated in one room at the south–eastern corner of the building is causing severe salt efflorescence and damp conditions in the walls. At one time modern piped water supply has been installed in some rooms at the southwestern corner, possibly aggravating the structural condition in this part of the building.

15. Parts of the brick flooring inside the courtyard is missing in front of the northern *iwan,* where a stage previously has been put up for public performances and concerts. As appear from early photographs in the archive, previously a sqauare brick structure with three arched openings (to earch side ?) stood in the middle of the courtyard. The funtion is not known, but it may possibly have been a place for ablutions.

Structural problems

16. The main cracks and structural failures are attributed to damage from the earthquakes of 1976 and 1984. The worst situation occurs at the external wall of the eastern and the southern wing, including the south-western tower, where structural consolidation will be needed. The static condition is said to be stable, but telltales put up in 1989 on the walls at first floor of the eastern wing, indicate fairly recent movements varying from 1 to 35 millimetres.

17. The ground to the south of the building has been lowered about 2.50 metres in order to reach the original ground level, but the required retaining walls and drainage have not (yet) been established. To the east of the building accumulated soil reaching to a height of about 3 metres is causing damp conditions and need to be removed. Exposure of the wall, however, will increase the outward thrus, and structural consolidation will have to be completed before removal of the soil. So much more because the eastern wing has severe cracks running all along the external wall.

18. Throughout the building many minor cracks are visible. It is difficult to ascertain in each and every case, whether the cracks are caused by structural failures or whether they relate mainly to the plaster. Hard and brittle, the gypsum plaster is very liable to cracking and any movement of the backing can easily cause detachment of the plaster from the wall.

19. Furthermore, suspended from the vault by means of timber hangers and struts projecting from the masonry and attached with lumps of gypsum mortar, the *muqarnas* vaulting is independent of the structural wall. In most cases experiments are needed to ascertain, whether the wall plaster or the *muqarnas* can be affixed and stabilized *in situ* by gravity grouting.

The glazed tile decoration:

20. Originally introduced in the 12th century as a decoration of glazed blue bricks and tiles in dome facing or as insertions in the overall ornamental design on walls, the polycrome tiling reached a high standard of perfection during the Timurid (and Safavid) times. During the following centuries painted *majolica* tiles came into use instead of the cut tiles, mainly because the *majolika* work was cheaper to produce. Both techniques as well as more ordinary polychrome brickwock are used for the tile revetment in the Abd al-Aziz Madrasa. However, the tile decorations were only partially completed before the construction was hastily abandoned.

21. Judging from the still remaining tilework, only the portal and the right hand side of the main facade, as well as approximately one half of the courtyard facades with a eastern-southern and western exposure, have ever been completed. The condition of the tile revetment is well documented in the beautiful water-colour drawings dating from 1959 and the total area of existing tile decoration is shown on the elevations included in this report. The external facades to the back were probably never intended for decoration and appear with plain masonry.

The wall paintings:

22. The rich and elaborate wall decorations are the most prominent features of the Abd al-Aziz Madrasa (see fig. 05). The painted surfaces are very large, not unfolded, the *muqarnas* vaults and painted wall surfaces comprise roughly the following areas:

- the *muqarnas* vault of the *pishtaq*	125 m2
- the domed room above the entrance hall	25 m2
- the summer mosque	125 m2
- the *khanaka* (winter mosque)	600 m2
- the *darskhana* (lecture hall)	500 m2
Grand total of painted area, approximately	1.375 m2

23. Also the individual cells are richly decorated. Walls and ceilings alike are painted and divided into *ganch* (gypsum) panels, which are carved with patterns in deep relief (see fig. 06 and 11). Each cell has been subject to repeated redecoration according to the current style and preference of the individual student, who rented the accommodation for the entire period of his study in the madrasa. In this way the interior decoration represents different ornamental styles and colour schemes that are characteristic of the various periods during, which the cells were used. In the main the existing decor probably dates from the 19th century, but older decoration may be hidden under more recent layers of plaster, which in several rooms have about six successive layers. The actual condition of the dwelling cells varyies and in most cases the mezzanines have been taken down leaving the compartments incomplete. Altogether, there are about 28 dwelling cells at first floor level, each with its own entrance and a window to the outside.

C Building records

24. The archive at the Board of Monuments in Tashkent contains valuable documentation of measured drawings and index file cards with about 220 black-and-white photographs in approximately 9x12 cm format, documenting the building condition and previous restoration work from the 1920s unwards.

25. The measured drawings date mainly from 1959 at which time a comprehensive survey of the building was carried out under direction by the architects Notkin, Krukov and Filimonov, and subsquent surveys have been completed in 1967. Traced in ink, the majority of the drawings are beautifully water-coloured and constitute a real treasure that merits publication (see selected examples rendered fig. 01-03). A full list of the drawings are given in appendix I. More recently, a new set of survey drawings was made in 1992, including plans, main sections and elevations of all facades in scale 1:100 and subsequently, a restoration project was prepared; see the subsequent discussion.

26. Likewise, Students from the Architectural Department of the Tashkent Polytechnical Institute have made exquisite studies of Islamic architectural and decorative art, illustrating details of the outstanding monuments in the country. Studies have also been made of the interior decoration of the Abd al-Aziz Madrasa and four admirable examples are published in

Ornamentation in Uzbek architecture (in Russian), Tashkent, 1974. Similar studies have been made by art students in Bukhara but the documentation needs to be collected and supplemented.

27. Much additional photographic documentation of the building can be traced, if time permits. Special attention should be made to the depository of the Bukhara Arts and Architecture Museum collections of A. Efremov and I. Panov, who documented monuments and daily life in the city at the beginning of this century. Some of these photographs are published in *Bukhara, a Museum in the Open*, Tashkent, 1991. Further documentation may be available in the archives of the Institute of Oriental Studies and the Institute of History in Tashkent.

D. Previous restoration work:

28. The madrasa has maintained a high degree of authenticity as a historic monument. In the main no alterations have been made to the original building structure, which remain with all the traces of uncompleted work. Some regular upkeep has been carried out in the past. Most importantly, the tile roofing has been regularly maintained and recently new waterspouts in concrete have been installed to throw rain water away from the walls.

29. About one third of the *muqarnas* vaulting of the *entrance pishtaq* was restored in 1930; the new *ganch* surfaces were left unpainted and the year of restoration indicated. The work is documented in black and white photos (index card 4231/37–13 and the following). Likewise, minor repairs to the stalactites of the summer mosque have been left unpainted, leaving the great majority of the 17th century wall paintings untouched. Part of the *muqarnas* in the eastern *iwan* was restored in 1957, but the vault has never been decorated and the actual extent of the renewal is not visible *in situ*.

30. Unfortunately, the Indian caravanserail which was located immediately to the west of the madrasa was demolished in the 1970s in favour of a new public square and a row of new souvenir shops. The exposure was made in consequence of the then current planning concept for 'a museum in the open'. As part of this 'beautification' new gypsum screens were inserted in the window apertures, while the majority of the remaining openings of the external facades still remain blocked up.

31. Soil deposits of the past have accumulated around the building raising the ground level about 2 to 3 metres above the original level. To the west of the building the area was cleared in connection with the demolition of the Indian caravanseraille and also to the south soil has been removed, leaving a 3 metres wide muddy trench along the facade.

32. Several restoration works were initiated in the early 1980s. The brick facing of the plinth of the main facade was renewed. Also the roofing was repaired, including the installation of new water spouts. To the interior of the courtyard, two new tympanum panels of mosaic tilework were put in place at the ground floor above the niches immediately to the east of the northern and the southern *iwan* respectively. Allegedly, the rest of the existing glazed tile work is authentic, apart from one faded fragment of blue inscription in the *pishtaq*

above the main entrance.

E Outline specification of restoration work and preliminary cost estimate.

33. The following outline specification and preliminary cost estimate have been prepared together with Mr. Bakhtiyar Parsayev, Deputy Director of the Regional State Inspectorate of Historic Sites on the basis of my direct observations at site without prior knowledge of the project prepared by the Institute of Restoration. While scarcely exhaustive, the list is sufficiently extensive to cover the main project activities, awaiting a full translation into English of the Institute's project proposal.

34. The restoration involves three largely independent operations, which may be carried out simultaneously or in order of succession: (i) structural consolidation and restoration of the building structure and the precinct, (ii) restoration and partly renewal of the missing glazed tile work and (iii) conservation of the wall paintings.

Preliminaries

35.1 Identification of a possible future function of the building after consultation with prospective users and subsequent local discussions about the most appropriate use.

35.2 Complete analysis of colour pigments, composition and recipies for the manufacturing of glazed tiles and help resume local production. A possible subcontract with the scientific laboratory and workshop of the Institute of Restoration in Tashkent can help identifying local shortcomings and propose remedies for improvements.

35.3 Complete analysis of colour pigments, binding media and painting techniques used for the 17 cent. wall paintings and ascertain degree of required intervention in consultation with conservator, see subsequent discussion.

35.3 Work out detailed specifications, project drawings and costing; set up steering committee and make appropriate organisation of the work site, including plans for the immediate precinct of the building and arrangements for the reproduction of documentation and survey drawings that need to be readily available at the site before the work starts.

35.4 Make arrangement with the Faculty of Art Painting and Graphics in Bukhara for possible documentation in water-colour drawing of existing wall decor in all dwelling cells.

(i) The building structure and precincts

Excavation, earthwork and amenity service buildings

36.1 Acquire school buildings and plot to the east of the building, set up site office and arrange storage and workshop facilities. After completion

of the restoration work, the premises will provide service amenities as required for the new function of the madrasa, according to design, with direct access from the eastern *iwan* through a new doorway in external eastern wall (sse sketch site plan fig. 12). Total estimate ..... 2.5 mill SUM

36.2 Archaeological trial trenches to the east of the madrasa before lowering the ground to original level in an area of about 10 meters from the building and disposal of about 1.200 m3 surplus soil (structural consolidation completed beforehand and during removal of soil) ..... 0.6 mill SUM

36.3 New drainage, pavements and retaining walls completed according to design ..... 1.0 mill SUM

Structural consolidation and brickwork

37.1 Structural consolidation of the northern and eastern external walls, including the turret to southwest, preferably by use of Adjar timber and tie rods.

37.2 Strip down plaster to expose blank masonry, insert damp-proof courses of bituminous felt, rag out loose joints and cracks, redo brickwork where required and repoint with mortar; same procedure for all external walls and niches. The colour, thickness and surface texture of pointing are vital to the final appearance of the brickwork.

37.3 Opening of all original window apertures presently blocked up and replace with new *pangaras* (*ganch* screens). Reopen and repair staircases leading from the eastern and western *iwan* to the first floor.

37.4 Replace missing brick tiles in courtyard and repair of all brick flooring

37.5 Repair to the roof, including completion of upper part of the western *iwan*.

Total, structural repair and brickwork ..... 6.0 mill SUM

Marble panels

38.1 Remove marble panels and consolidate weakened parts, insert damp proof course and reinstate panels in the original position by aid of cramps of stainless steel leaving ventilated space behind.

38.2 Replacement of weathered or deteriorated panels about to decompose; the total sum depends on the extent to which it can be justified to cut supplementary panels ..... 1.5 mill SUM

Joinery

39.1 New window frames with glass inserted into all openings to the outside behind the *ganch* screens

39.2 New double leave doors to doorways and repair of the existing ancient door leaves , including ironmongery of traditional type.

Total, joinery . . . . . 1.0 mill SUM

Interior repair work and restoration/redecoration of dwelling cells

40.1 Restore cells with wall painting and alabaster panels; selected examples to be restored as exhibition rooms complete with mezzanine and fireplace; rooms with lesser or no decoration are left white washed or redecorated; arrangement can be made with the Faculty of Art Painting and Graphics for training purposes; average cost per room estimated at 30.000 SUM, total . . . . 1.5 mill SUM

General services

41.1 Service requirements for the building, such as electrical installations and heating, need to be investigated. The service facilities , which are thought to be best suited to meet future requirements, will depend largely upon the use of the building; estimated cost . . . . . 1.5 mill SUM

(ii) Restoration of the glazed tile decorations

Project for restoration of glazed tile decorations

42. Presently Mrs. Svetlana Krolivetskaya and Mrs. Irina Filimonova at the Institute of Restoration are preparing working drawings for the restoration of the glazed tile decorations, involving the following activities:

(i) conservation of original tile work;
(ii) partial reconstruction of missing parts based on clear evidence of the original design;
(iii) conjectural design of new decoration at the eastern part of the main facade based partly on analogical reconstruction, while the unfinished parts of the court facades will remain without decorations. Cost estimates have not yet been prepared.

43. The water-colour drawings in scale 1:2 and 1:1 are executed with superior professional skills according to the well established traditions in Uzbekistan. Evaluation of the proposal has to await final completion of the project. However, it would be advisable to prepare alternative designs for a final evaluation by the Board of Monument and Unesco, especially with regard to the main facade. The final decision may be taken on the basis of a

thorougly presented project. The objectives may be based upon the following assumptions and arguments:

43.1 There is no doubt that the whole of the facade was originally intended for decoration, but only the facade of the main portal and the front part to the right hand side was partially completed. The tile revetment has never been applied to the turrets, neither to the inside of the niches and only one marble panel exists *in situ* at the base. Likewise, in the courtyard the tile revetment was only completed at the facades of the eastern half of the building. Fairly recently, two tympanons and the interior of one niche have received a new decorated tile revetment.

43.2 With a view to the principles of restoration as expressed in the Venice Charter, the new tile decoration proposed for the eastern part of the main facade is controversial. Article 9 outlines that..'the aim of restoration is to preserve and reveal the aestetic value of the monument and is based on respect for original material and authentic documents. It must stop where conjecture begins...'.

43.3 The argument for the least possible intervention may also be supported from a purely economic point of view. The need for urgent repair work to a large number of historic buildings must have preference over any restoration work that may be considered redundant.

43.4 Conceiving the aim of restoration to be the rediscovery of material consistency, it may be argued that the manufacturing of glazed tiles is a living tradition which needs to be maintained. And the principles of the design follows fairly well established traditions, which can be imitated with regard to materials, colour and design. A great number of restoration cases in Uzbekistan have been based on this theory that the question on the authenticity lie in recognition of the traditions that are associated with the tile production, rather than in the original authentic material.

43.5 A possible completion of part of the tile decoration can only be contemplated, if the quality of the local production of glazing for mosaic work and *majolica*, can match with that of the Middle Ages.

43.6 Relevant alternative approaches can be drawn for example from the recent restoration of the entrance gate to the Gur-Emir Mausoleum in Samarkand, where the uncompleted decoration indicate the original pattern and leave room for the imagination. Or for example a previous preservation of the Tuman-aka Mausoleum at Shah-i-Zinda, where the missing part of the decoration has been replaced by ordinary plaster to secure the preservation of the remaining tile work, but the colour and texture of the plaster has been delicately blended to enhance the original tile work. Replacement with oil painted replicas or by use of thin industrial tiles of inferior quality for new *majolika* work can under no circumstances be justified.

43.7 Assuming that renewal of the tiling at the inside of the niches will go too far, I am likewise sceptical to renewal of the tile work at the typmpanons, because it remains a pure setpiece deprived a logical connection to the walls of the niches, which are lacking the corresponding tile decor.

43.8 New decorative tiling of the protruding structural part of the building, e.g. the corniche, the belt course and the pilasters, could possibly be justified as a true copy of the pattern used at the right hand side of the facade. A more harmonious and aestetic appearance of the front facade would result, creating some of the intended majesty and splendor in conjunction with the Ulug Beg Madrasa. Eventually, one single niche to the left hand side of the facade could be reconstructed according to the original intention for demonstration purposes, as it has already been done with one nich and related tympanon inside the courtyard.

(iii) Restoration of 17th century wall paintings (*Kundal* technique)

44. Repair of cracks and stabilization of the *muqarnas* vaulting is needed before actual conservation of the wall paintings can start. The large vaults in the *darskhana* and the *khanaka* display serious cracks, but according to Mrs. Larisa Lukina, structural engineer in the Institute of Restoration, the structural problems in the front wing of the building are negligible. Structural consolidation of brickwork is required in southern wing, where the summer mosque is situated. Suspended from above by means of timber hangers and struts rom the masonry behind, the *muqarnas* vaulting can be repaired *in situ* independently of the structural wall. As a first try, this would imply a possible consolidation and stabilization of the *muqarnas* by gravity grouting, after cleaning and surface repair of the cracks has been completed from the outside.

45. So far, preparations have not been made for conservation of the wall paintings. Before any treatment be undertaken, the paintings have to be thoroughly examined, including investigations and analysis of (i) the painting materials, i.e. colour pigments and binding media, (ii) the painting techniques and (iii) the actual state of preservation.

46. A condition report has to be worked out by an experienced conservator from the Department of Scientific Reseach under the Board of Monuments. Alternatively, a conservator from ICCROM (International Centre for the Study of the Preservation and the Restoration of Cultural Property), Department of Mural Paintings, or from a recognized university institution, may be subcontracted for this job. Two– to three weeks would be a likely duration of the undertaking.

47. The condition report forms the basis for the decision concerning the extent and the character of the conservation work. Possible restoration works should be carefully considered. From a visual examination only, it appears that the continous blue background for the ornamentation is seriously faded and worn. The ornamentation in a high relief–technique was originally probably meant to be gilded, which was apparently never done. Comparable studies can be made f.ex. of the wall paintings in the Masjiid Baljand in Bukhara (16. cent., not restored) or in Tillya Kari Mosque in Samarkand (1646–1660, heavily restored).

48. It would be highly problematic, both in terms of ethics and aesthetics, to attempt to re–establish the appearance of the wall paintings in accordance with what may possibly have been the original intention. Generally, a variety of techniques can be adopted denpending on the specific conservation/restoration problems. I will recommend that the treatment be limited

to conservation and some retouching. Minor injuries and small losses are usually tintet with approximate or neutral colours so that they should not interfere with the general artistic impression. This measure could advantageously be applied for the previous repairs to the *muqarnas* in the vault of the summer mosque, where the large white areas are disturbing the general apprehention of the decoration. And in the case of the large areas decorated in *kisil–kasakh* technique (red earth pigment), completion can be made without relief, which will differ from the original parts on close examination. In order to apprehend the original intended appearance, a section of some squaremetres could be reconstructed, including f.ex. gilding of the floral ornamentation standing out in relief on a blue ground.

49. The costing can only be estimated after careful analysis, specification of work procedures and after agreement has been reached to which extent the restoration/conservation shall be carried out. Bukhara musters are very skilled painters, but the actual conservation must be carried out under guidance of an experienced conservator, who can secure consistency and guarantee the quality of the final result.The work can be carried out independently of the building restoration and may be extended over a longer period of time.

(iv) Equipment and sundries

50. One small truck; Steel tube scaffolding, pulleys, tools and equipment according to specifications; Office equipment: one photocopy machine, one computer with printer, camera for photographic documentation, filing cabinet, stationaries and drawing equipment; total, equipment and sundries . . . . . 3.3 mill SUM

F. Preliminary review of the project prepared by the Inst. of Restoration

Project for building restoration and structural reinforcement

51. The actual project for restoration of the building is indeed very detailed, comprising technical specifications, cost estimates and related drawings, including details of structural consolidation. Based on unit costs of 1984 in Rubles, the total restoration of the building is estimated to 11.9 mill SUM in current prices, not including restoration of tile decorations and mural paintings.

52. On the basis of the drawings, the project has been discussed with Mrs. Larisa Lukina, structural engineer, who has been responsible for preparation of the plans. A more detailed evaluation and possible modification await translation of the project into English. The following main points comprise a summery of the discussion:

53.1 The quite extensive refacing and reconstruction of brick work is justified with reference to the seismic standard norms for modern constructions. For this reason new brick facing is anchored to the backing with expansion bolts and the reconstructed upper parts are reinforced at intervals of 50 cm in each direction. Roughly, the upper third of the southern external facade, including the whole of the south–western corner of the building and the turret

is reconstructed and the lower part of the facades towards east and south are being refaced up to a hight of about 2 to 3 metres in connection with realizing new concrete foundations. I have expressed my reservations as to whether such a radical measure is really necessary and I feel that consolidation *in situ* by grouting, patching and repointing should be considered in combination with structural reinforcement of the eastern wall by way of a collar beam and related tie rods. Likewise, the south-western turret can possibly be reinforced by insertion of tie rods to provide hooping and to connect the turret with the central body at the roof- and floor level. However, as an architect consultant I cannot take responsibility for the structural condition of the building.

53.2 The brick roofing is laid in cement/sand mortar on 5 successive layers of bitumen felt on top of a 2,5 cm cement screed and a 8–20 cm thick layer of 'Claydite' laid with fall towards the water spouts. I have expressed special reservations about the metal sheet flashing on top of the brick coping. While highly effective and functional in modern constructions, this solution is hardly compatible with traditional construction methods. Instead, preventive maintenance routines and regular repairs need to be general practice. Expansion joints, reinforcement by mesh and the possible use of hydraulic lime instead of cement need to be discussed.

53.3 We had fruitful discussions about the excessive use of *ganch* (gypsum) and cement. *Ganch* is a hygroscopic material, absorbing moisture and the widely use throughout Uzbekistan may constitute an additional factor in the destruction of plasters and mortars. Special mixes and additives have been used in order to give more plastic properties to the hard and inflexible cement mortars, but there is a growing awareness about the shortcomings and harmful effects of cement in historic buildings. However, lime for building purposes is hardly available and specific efforts will be needed for resuming production of good quality lime products. This is a general problem relating to the preservation of the built heritage all over Uzbekistan and the attention of the Board of Monuments as well as the Department of Restoration is required. The former practice needs to be scrutinized aiming to introduce good quality lime for restoration purposes, possibly under arrangement with Unesco.

G. Institutional Framework, project organisation and implementation

Steering Committee

54. The following persons have been appointed as members of a steering committee that will help promote the project activities in Bukhara and get them well under way:

- Mr. S.S. Sirajev, First Deputy Khokim of the Bukhara Region
- Mr. K.J. Kamolov, Mayor of Bukhara
- Mr. Kh. Salamov, Head, Regional State Inspectorate of historic sites
- Mr. R. Almeyev, Director General of National Parks and Museums of Bukhara and Chairman of the Crafts Association.
- representative from the Board of Monuments.
- Mr. Vladimir Filimonov, honourable member, former chief architect with the Institute of Restoration.

Project Implementation Unit

55. To ensure efficient and effective implementation, it is recommended that the project receives an independent status under the Regional State Inspectorate of the Board of Monuments. The day-to-day responsibility for coordination and implementation of the project is handed over to a site architect, who is appointed specifically for this project by the Board of Monuments with the following main tasks:

(i) Collect, analyze and update all project documents and drawings.
(ii) Appoint the required workforce, negotiate all sub-contracts, procure materials and required equipment, as well as ensuring suppliers delivery dates.
(iii) Coordinate all building activities and ensure satisfactory progress in the day-to-day running of the project, including preparation of regular site reports, periodic summery reports and documentation for record purposes.
(iv) Deal with any queries raised on the site and exercise daily quality control in terms of material, workmanship and adherence to project and agreed principles of restoration.
(v) Exercise cost control and budget management.

A possible candidate for the post as site architect can be Mr. Zohair Klichev, who previously has been working with the Regional State Inspectorate of Historic Monuments.

56. The project will be subject to periodic review in accordance with the policies and procedures established by UNDP/Unesco for monitoring project and programme implementation.

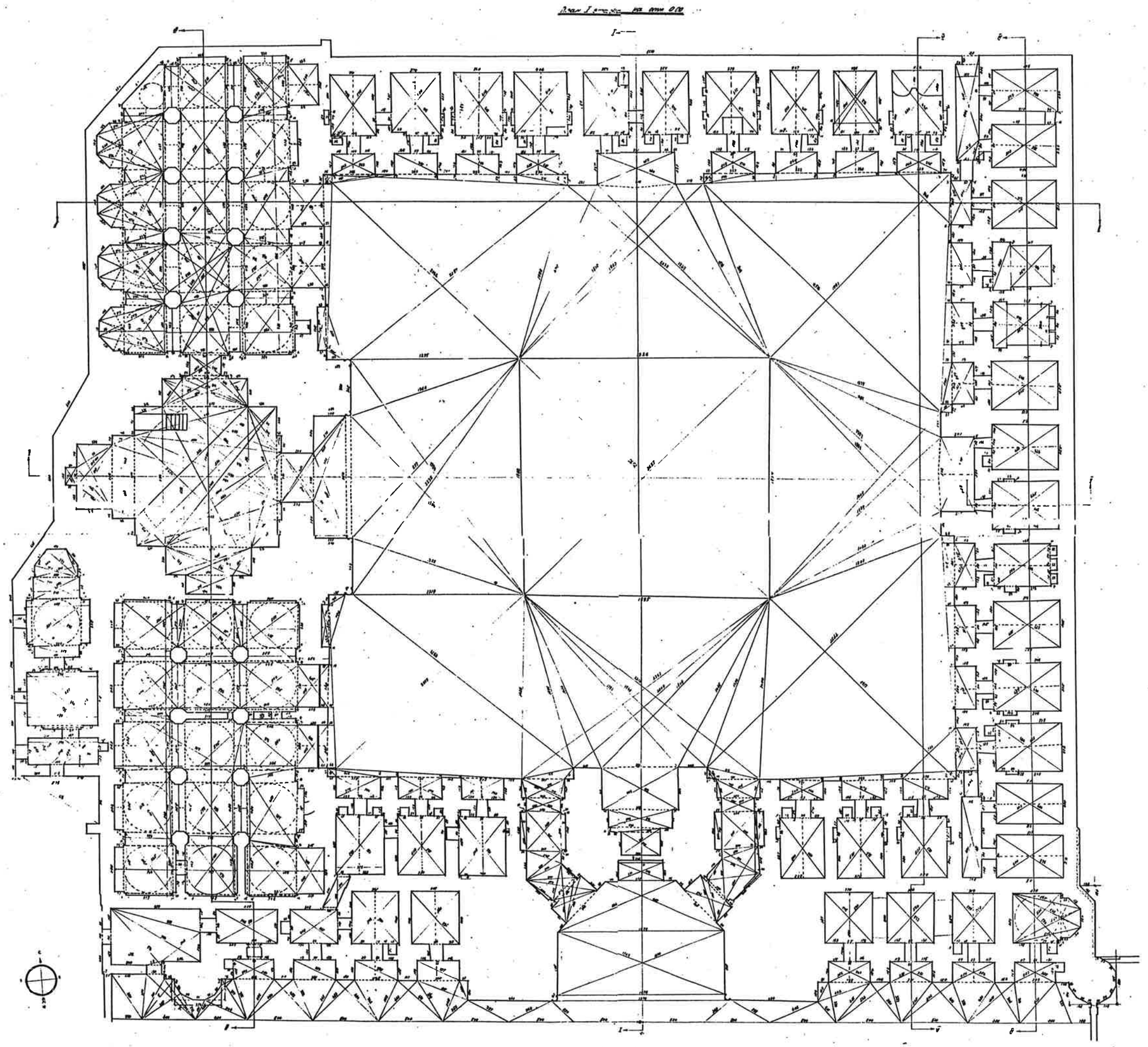
Appendix I : Abd al-Aziz Khan Madrasa
List of drawings in the archive of the Board of Monuments:

ref. nr.	text of drawing	scale	drawing technique
Portfolio no. 77:	Drawings without date:		
2663	Plan	1:67	ink
2664	Main facade	1:100	ink
2665	Section through main portal	1:143	ink
2666	Panel of main portal (mosaics)	1:5	water-colour
2668	Facade of main portal	no scale	water-colour
2667	Court view from summer mosque	no scale	water-colour
Drawings dating from 1959:			
38/59	Ground floor plan	1:100	ink
39/59	First floor plan	1:100	ink
40/59	Roof plan	1:100	ink
41/59	Elevation of the main facade	1:50	watercolour
42/59	Elevation of the western facade	1:100	ink
43/59	Elevation of the eastern facade	1:100	ink
44/59	Elevation of the southern facade	1:100	ink
45/59	Elevation of the western court facade	1:50	water-colour
46/59	Elevation of the northern court facade	1:50	water-colour
47/59	Elevation of the eastern court facade	1:50	water-colour
48/59	Detail of southern court facade	1:10	water-colour
49/59	Elevation of the southern court facade	1:50	water-colour
50/59	Elevation of the eastern court *iwan*	1:25	water-colour
51/59	Section A-A	1:50	water-colour
52/59	Section B-B	1:50	water-colour
53/59	Section C-C	1:50	water-colour
54/59	Section D-D	1:50	water-colour
55/59	Stalactites of entrance portal	1:10	ink
56/59	Stalactites of eastern court *iwan*	1:8	ink
57/59	Decoration of vault at the summer mosque	1:25	water-colour
58/59	Tympanum of the northern court facade	1:2	water-colour
59/59	Tympanum of the northern court facade	1:2	water-colour
26/69	Stalactites of vault in *darskhana*	1:10	ink
26/70	Stalactites of vault in *kitobkhana* (library)	1:10	ink
Portfolio of drawings no. 77 (1): Drawings dating from 1967:			
2147	Elevation of south-eastern court facade	1:20	water-colour
2148	Elevation of north-western court facade	1:20	water-colour
2149	Eastern court facade; wall at the first floor	1:10	water-colour
2150	*Majolica* panel of eastern *iwan*, detail	1:1	water-colour
2151	Elevation of the eastern facade	1:50	ink

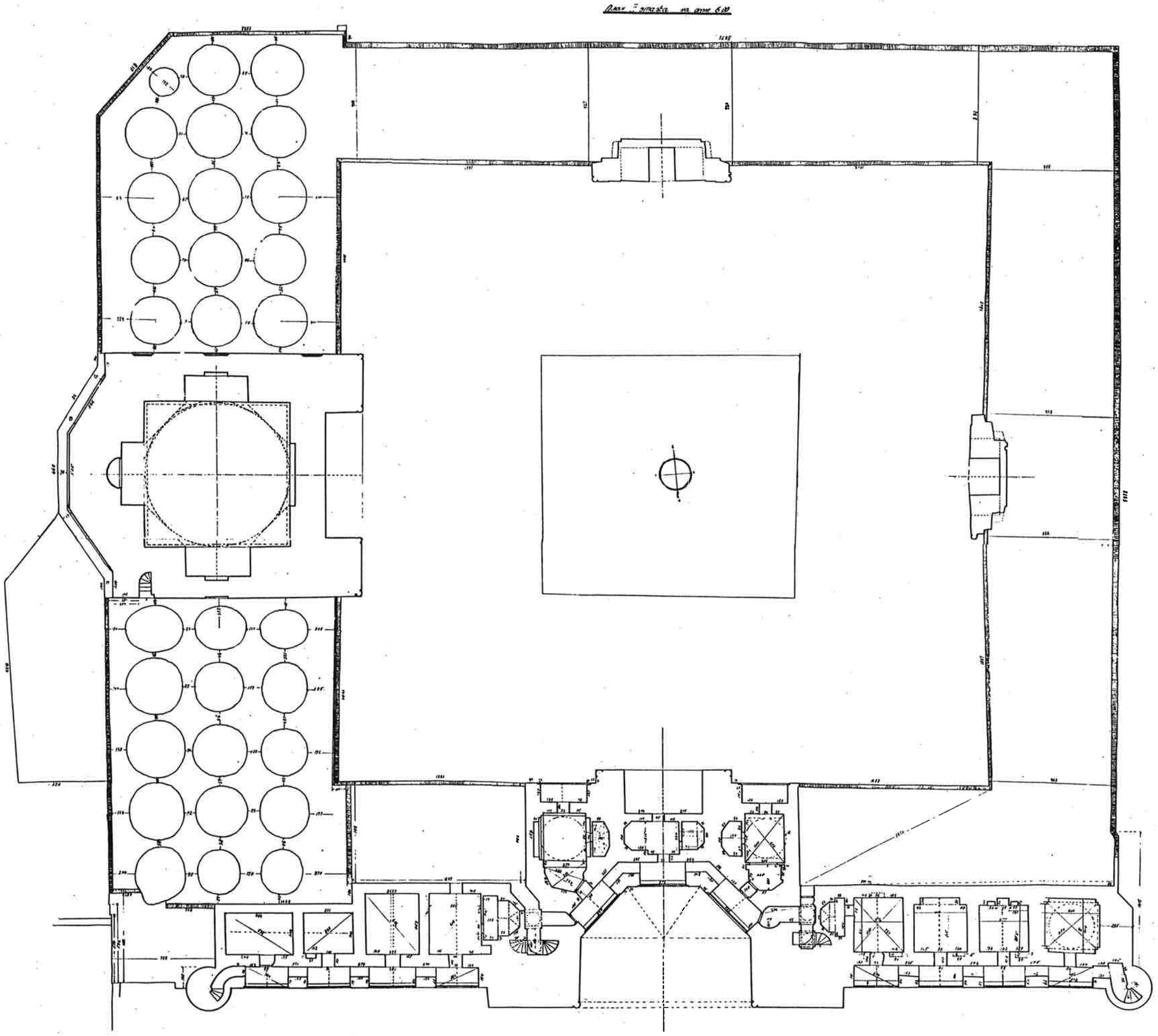
List of illustrations: Abd al-Aziz Khan Madrasa

Colour photographs (photo: F. Aalund)

Survey drawings: (reduced from the originals in the archive of the Board of Monuments; registration of glazed tile decoration added by G. Boccardi from survey of 1958 and 1967).

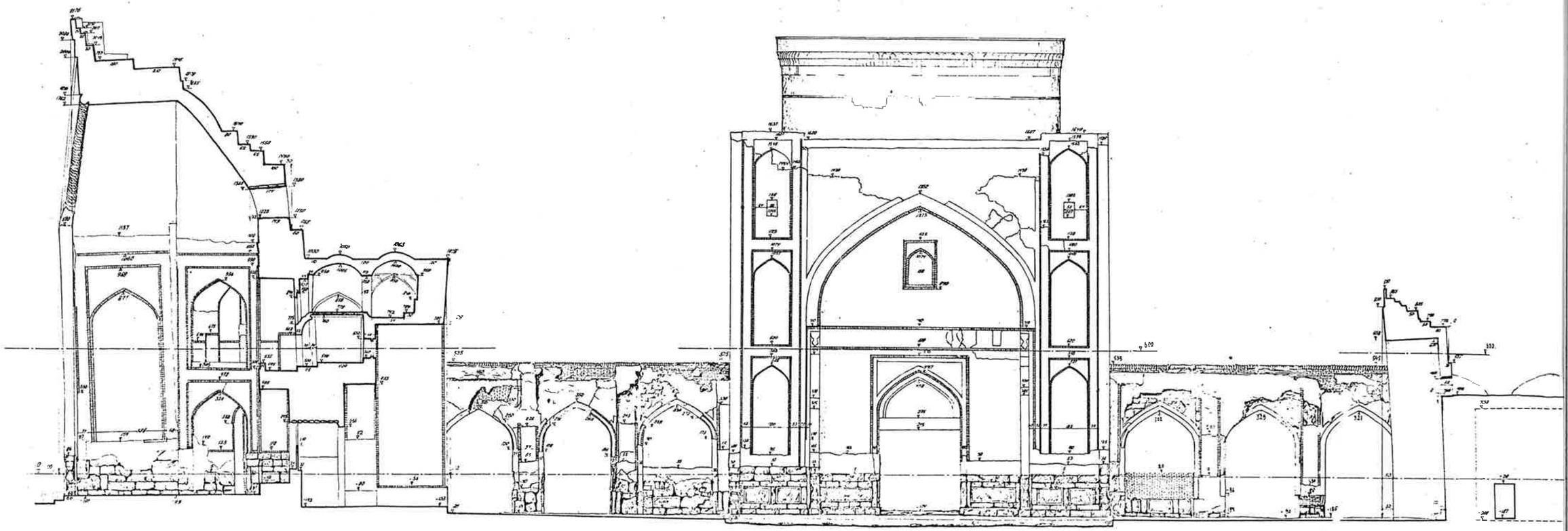


Ground floor plan 1950s before restoration, scale 1:600, ... fig. 5

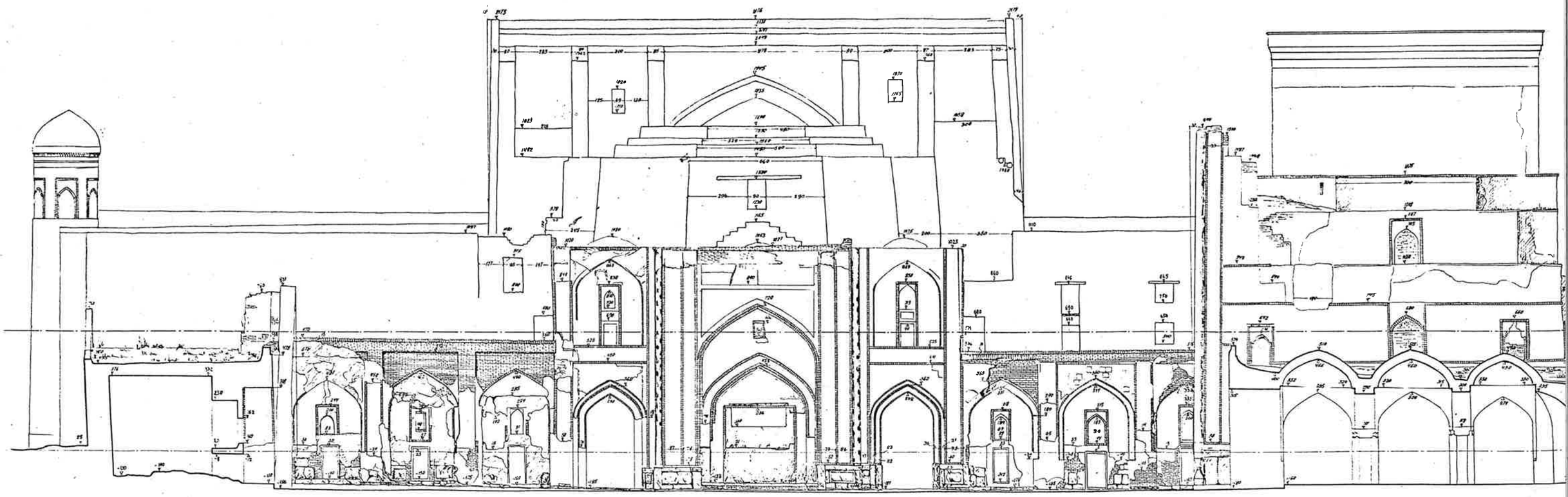


Roof plan 1950s before restoration, scale 1:600 . . . . . fig. 6

Разрез I-I



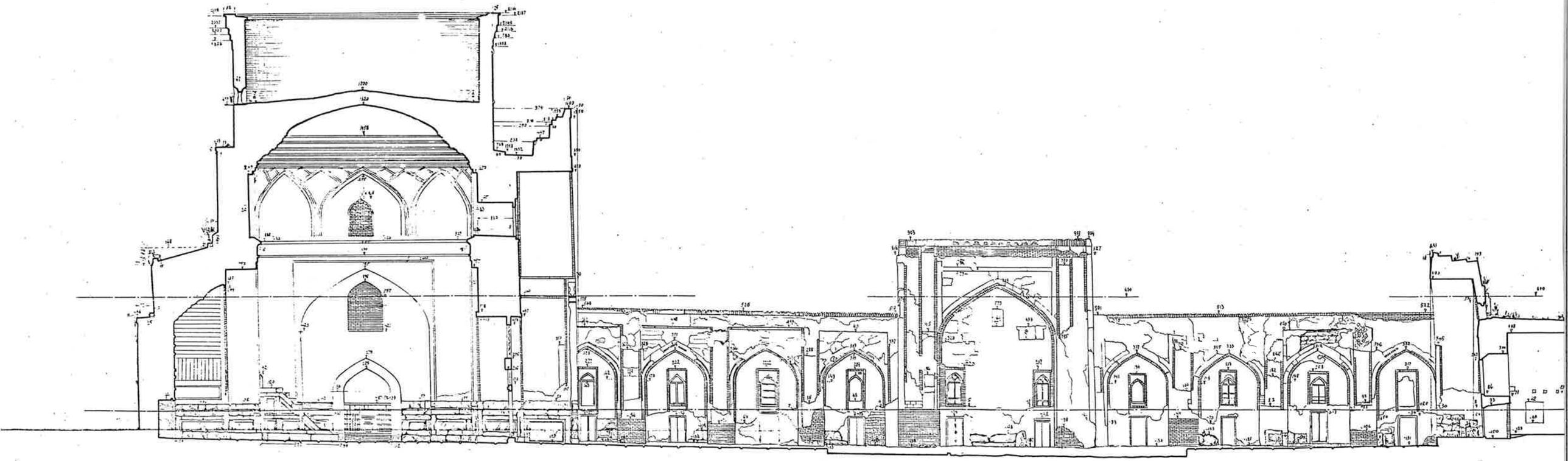
Разрез II-II



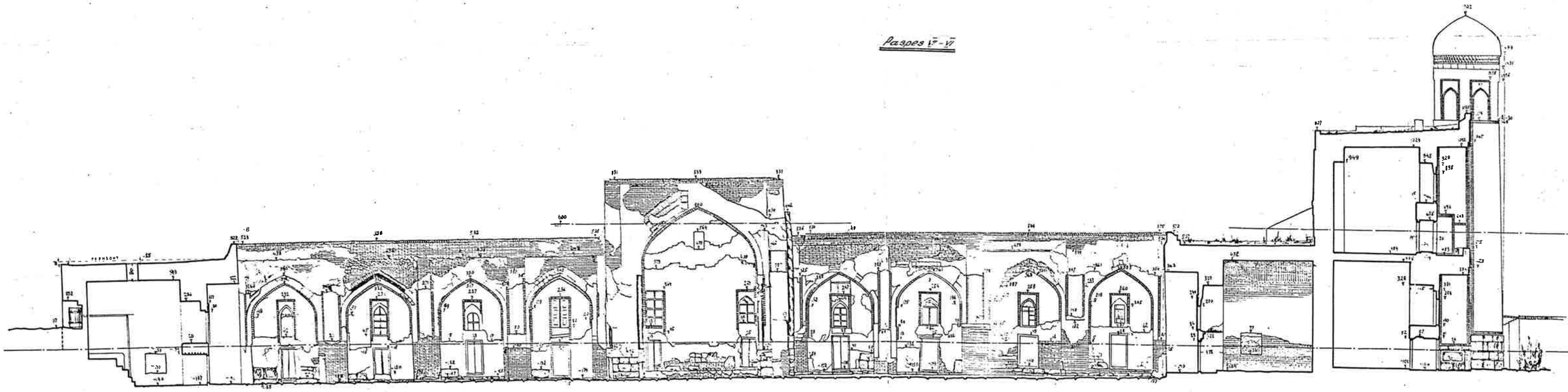
Масштаб 1:100

Main section South–North and section East–West through courtyard, scale 1:200 .

Разрез V-V



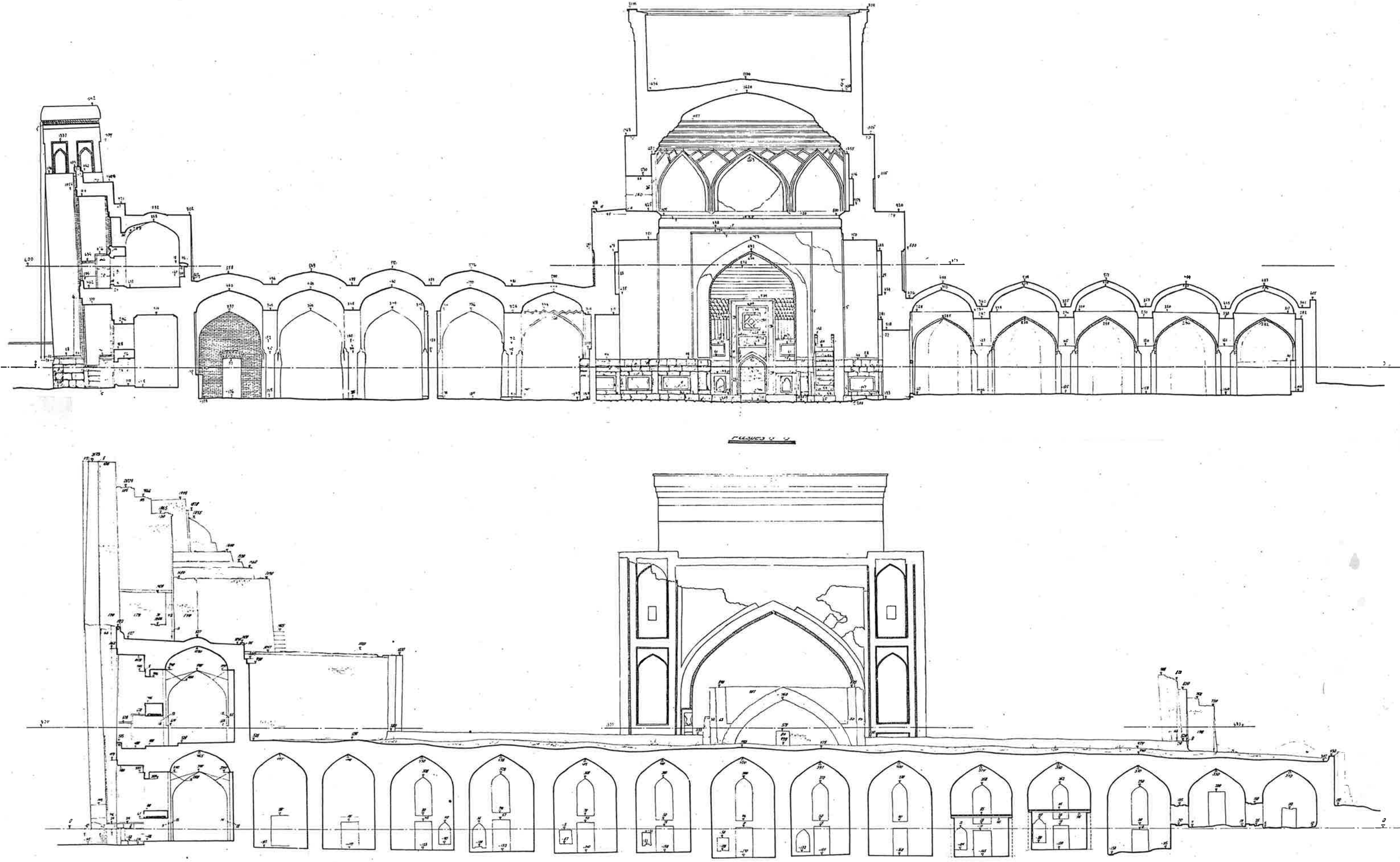
Разрез VI-VI



М. 1:100

Main section West–East and section north–south, scale 1:200 . . .

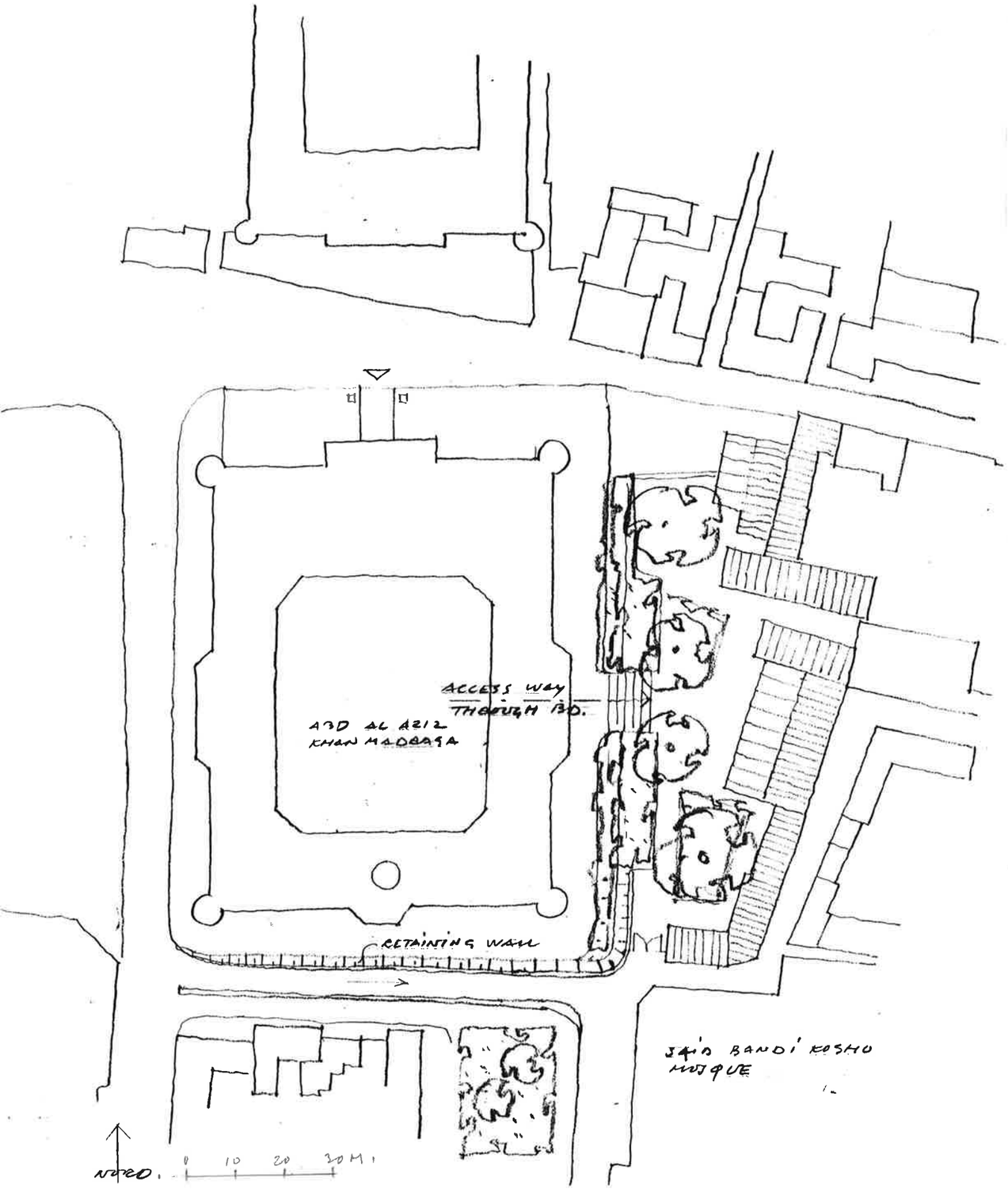
Разрез Б - Б



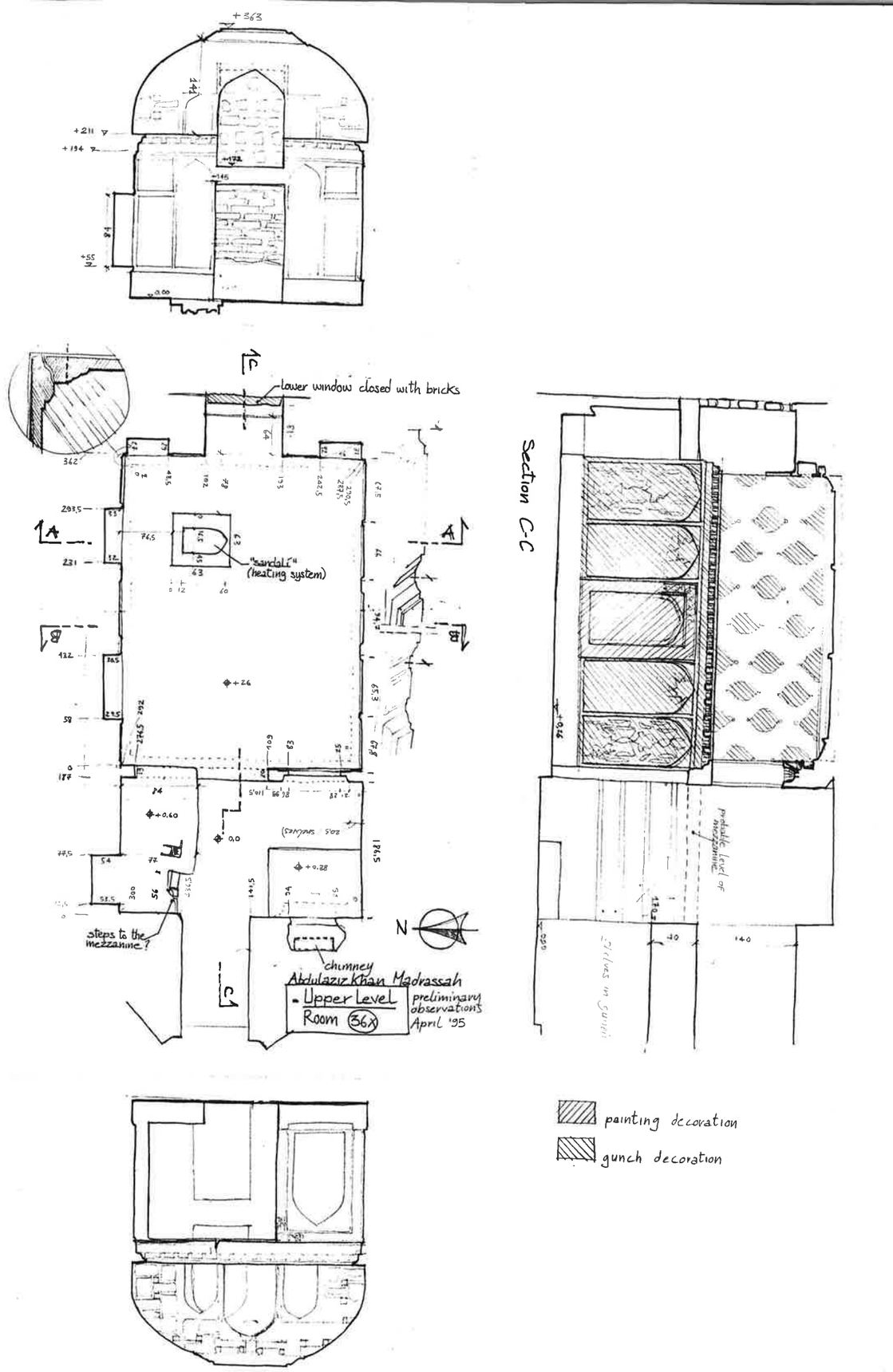
Разрез В - В

М - 1 : 100.

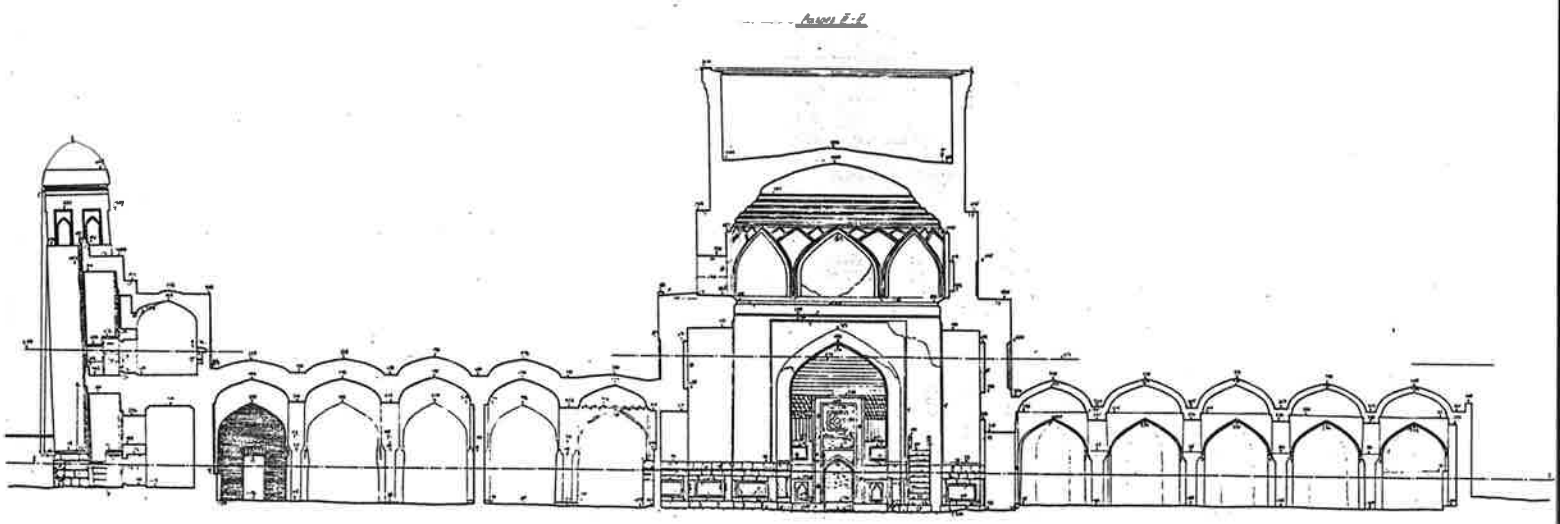
Section south–north and longitudinal section through mosque, scale 1:200 — fig. 9



Site plan, sketch only, with proposal for ajoining service amenity buildings (F. Aalund) fig. 12



Sketch survey of cell at first floor with stucco panels and wall paintings (G. Boccardi) fig. 11



Tillya–Kari Madrasa and Mosque
Samarkand

III Tillya-Kari Madrasa and Mosque Samarkand

A Building history.

1. The Tillya-Kari Mosque and Madrasa was built in 1646-47 in the northern section of the Registan Square as a substitute to the Bibi Khanum Mosque, which had been reduced to ruins by earthquakes. The work on the glazed tile decoration continued until 1660 and in fact, the decoration was never fully completed.

2. The new Friday Mosque and Madrasa was erected on the site of the Mirzoi caravanserai, allegedly taking maximum advantage of the previous foundations and partly reusing the former building structure (see drawing fig. 10) The neighbouring Ulug Beg Madrasa (1417-1420) and the Shir-Dor Madrasa (1619-1636) dictated the design of the building, which was built with a similar large *pishtaq* in the middle and the two-storied wings running the length of the square, thus completing the magnificent Registan square. Within the Islamic world perhaps only the Maidan-i Shah in Isfahan can match the Registan in sovereign dignity.

3 Due to the adaptation to the site, the building is extraordinary in design. Only the front part is built with arcades in two tiers, and the plan does not follow the traditional symmetrical lay-out. From the outside the symmetry relates to the main facade, but once inside the courtyard the western *iwan* and the new dome provide the focal point and a new symmetry line. Originally the outer dome was probably never completed and the high drum, topped with a stalactite collar, remained covered with a shallow, pitched wooden structure until 1976, when the present dome was built as a new highlight of the Registan.

4. The decoration of the inner dome in *kundal* technique being lavishly gilded on a blue background, provided the name *Tillya-Kari*, which means 'gilded all over'.

B. Building records:

5. The documentary material on the Tillya-Kari Mosque in the archive of the Board of Monuments is comprehensive. The index file cards contain valuable documentation of previous work with photographs in approximately 9x12 cm format. Originating from the 1920s onwards the measured drawings are filed in four portfolios, all executed in an exquisite quality and providing a very complete record of the building. The majority of drawings are prepared in the 1950s under responsibility by the architects Krukov, Pletnev and Filimonov. A list of the drawings will need to be compiled for reference.

6. Included in this report is a set of measured drawings, showing the building condition before the major restoration project was launched, including redecoration of the facades with new tile work. Comparison between the early photographs, measured drawings and the actual condition of the building provide a relative good picture of the successive restoration measures, which have been carried out from the 1920s onwards.

7. The ambitious project for the new dome was prepared in 1974. All drawings and related static calculations are filed together with other archaeological and technical reports as listed in appendix I.

C. Previous restoration and actual building condition.

8. By the beginning of this century the building was largely in ruin. Accumulated layers of soil covered the Registan square and during the intervening time extensive restoration work has been accomplished. This tremendous achivement shall not be disparaged by the critical opinions otherwise expressed in this report.

The tile and marble revetment

9. Especially the glazed tile decoration has suffered considerably with time. When the extensive programme for restoration and retiling was initiated in the early 1970's in preparation for the 2000th anniversary of Samarkand in 1978, all external walls had lost the tile decorations with only a small portion of tiles *in situ* at the northern facade. On the facade of the main *iwan* only very few tiles remained. In total, about 70 % of all the tile decoration of glazed bricks work, *majolica* and mosaic has been renewed. The extent of the original tile work is well documented in the exquisite survey drawings in scale 1:100 dating from the 1950s, which allow identification of the authentic parts of the present tile decoration.

10. The glazed tiles for restoration are produced in Samarkand. Up to the 1970's original recipes and locally produced colour pigments were employed but gradually, industrially manufactured pigments have been imported from Moldavia and Russia. The high salt content in the clay (in addition to lack of funds) is currently posing the biggest problem for the production of a good and durable quality of glazed tiles. Previously, the bricks were made from carefully selected clay treated to remove salts, but these methods are no longer being employed.

11. The tile revetment at the external eastern, northern and western facades is, however, in bad shape requiring renewal or partial repair of about one third of the total surface area. Excess moisture and frost erosion under extreme climatic conditions are the main causes of decay, which is aggravated by the presence of water in any of its various forms due to the hygroscopic properties of gypsum. Excess moisture in the walls may stem from raising damp from below, water seepage from above or condensation inside the wall behind the revetment.

12. Impairment of the surfaces at the top of the domes is also partly due to chemical reactions from pigeon droppings. Preventive maintenance is required; previously, regular cleaning (with a chemical product) is said to have taken place every 3rd year.

13. Immediately to the west and north of the building the ground has been surfaced with asphalt, which is supposedly intended to drain the water away from the building. But on the contrary, apart from being unsightly, the moisture is trapped under the impervious surfaces, preventing evaporation from the surround soil and increasing moisture movement through the brickwork of the building.

14. Also the majority of the marble facing of the dado has been renewed. The marble originates from different quarries in close vicinity to Samarkand: Omonkutan (25 km), Zarmitan (60 km) and Yasgan (200 km). The quality of details and joints between the slabs are generally of an inferior workmanship as compared with the original. The revetment of the plinth along the external facades to the back of the building is put up by machine cut facing which shows traces of saw marks and parts are left uncompleted. Iron cramps and cement mortars have been employed and the joints are patched with unsightly cement mortar.

The roofing

15. The traditional tile roofing has been modified in several ways. The vault of the *pishtaq* was covered by galvanized iron plates in the 1960's, which now appear rusty although the plates have been painted at some time. Renovation of the traditional tile roofing in the 1970s implied pouring of a cement screed about 3 centimetres thick, supplemented by several layers of liquid bitumen and topped by square tiles bedded in cement/sand mortar.

16. Several concurrent causes have resulted in severe cracking in the roof surface. Among these are faulty disposal of rain water in combination with structural failures. The hard cement mortar aggravates thermal movement decay because of its lack of resilience and it traps water. In any case expantion joins are necessary and it is not know to which extend they are applied, neither if iron mesh has been used for reiforcement. It should be acknowledged that excessive use of cement has caused more harm than good and should be avoided in the future except for structural purposes.

17. Alledgedly, a fire in 1978 caused by construction work at the dome, aggrevated the situation, which have been reason of much concern. Subsequently, following heavy rains in 1993, it was decided to apply a supplementary metal sheet roofing mounted on elevated wooden lathings in combination with new down pipes and an open storm water drain all along the facades.

18. The new zinc roofing is being justified by the precarious structural condition of the building on the grounds of water infiltration through the many cracks in the tile roofing. It was not completed entirely at the north-eastern part of the building, where the settlements are negligible. Apart from being very unsightly, the craftsmanship and detailing do not comply with the standards that should rightly be expected for a building of the highest architectural merit. As a whole, the zinc roofing has to be considered as an intermediate emergency measure, which has been implemented due to the acute and dangerous structural failures of the foundation and the subsequent movements of the structure.

D. Foundation failures and project proposals for structural consolidation

19. The unstable soil conditions have caused recurrent structural problems in the building. In 1932 the northern *pishtaq* of the courtyard (facing south) was anchored to the central body of the building by means of tie rods and the static condition in this part of the building seems to be stable. However, located on top of a former river bed with bad strength characteristics of the soil up to a depth of 17 metres, experience shows that the foundation is critical of all three buildings at the Registan.

20. The dome was erected on the existing tambour in 1976–78 as a brick construction reinforced by a concrete frame structure and covered by glazed tiles. Total thickness of the masonry shell is 42 centimetres. The added load has serieously affected the foundation of the mosque. Deformation measurements through geodetical observations have been made from 1987, showing that settlements of the western external wall have severely increased since 1989.

21. In an attempt to cope with the severe cracks, various measures have been tried out. All pillars in the mosque were 'strengthened' by renewal of the outer brick facing and iron tie bars were installed in all four directions between the pillars in the western wing. Additionally, a reinforced concrete grid beam system was partially installed at the roof of the western wing and iron rods grouted in cement have been inserted in the lower part of the walls every 3 metres. All these interventions have proved largely inadequate.

22. The foundation settlements increase during winter time and possible leakage of the sewage system could influence on the stability. According to Mr. Igam Nurullaev, Chief architect of the department and of the Registan Ensemble, the drains along the northern and western part of Tillya–Kari were tested for leaks in 1993 and apparently no losses from the main drain were measured. These problems are currently scrutinized by Unesco consultant Mr. Niemezynowicz.

23. The number of recent reports concerning the soil condition, settlements and structural condition of the eastern wall and foundations are considerable, as it appears from the list rendered in appendix I of this report. Due to a severe increase in the deformations of the external wall, investigations were intensified in 1993 by a group of experts from the Samarkand State Architectural and Civil Engineering Institute, headed by Mr. Askar Khasanov, Director of the Laboratory for Soil Mechanics and Foundation Engineering. On 15 March this year a State Commission headed by Mr. Babich submitted a memorandum , recommending immediate implementation of the project for structural consolidation, which has been prepared by the same institue.

24. Additionally, the different proposals have been discussed during a seminar at the Hochschule für Architectur und Bauwesen at Weimar University in March this year. The workshop meeting did not produce any definite proposal for the best remedial measures. The precarious situation is not sufficiently clarified and intermediate consolidation will be needed to be implemented before next winter.

25. The static and structural problems are currently evaluated by Unesco consultant, Prof. Ing. Giogio Croci.

E. Outline specification of restoration work and preliminary cost estimate.

26. The restoration involves four largely independent operations, which may be carried out simultaneously or according to priority: (i) structural consolidation of the external wall of the western wing and subsequent landscaping of the immediate surroundings, (ii) repair and improvement of the existing tile roofing, including new rain water drainage, (iii) repair and partial renewal of glazed tile work and (iv) interior improvements and reorganisation of the present exhibition.

27. The following outline specification and preliminary cost estimate is based upon discussions with Mr. Igam Nurullaev, chief architect in charge of the historic monuments in Samarkand since 1988. A detailed project is needed with a more detailed specification, but the list is considered sufficiently extensive to cover the main project activities and provide a framework for cost accounting.

Preliminaries:

28.1 Carry out archaeological investigations along the western wall and inside the mosque before and simultaneously with the work for structural consolidation of foundation. Apart from general archaeological digging, the investigations should specifically be aiming at a possible extent of the Mirzoi caravanseraille, which originally was sited here. Responsibility for the investigations rests with the Archaeological Institute in Samarkand.

29.2 Monitoring cracks and deformations of structure by a structural engineer and prepare detailed project for structural reinforcement of external western wall foundation and south-western turret. This work is being commissioned to the Architectural and Civil Engineering Institute.

29.3 Work out detailed specifications, project drawings and costing; set up project team and arrange work organisation at site, including reproduction of documentation and previous survey drawings readily available at the site.

29.4 Pprepare detailed roof plan with constructions and slopes, types of coverings, falls, rainwater outlets and spouts.

29.5 Prepare plan for the immediate surroundings for approval, including type of pavements, lights, landscaping.

29.6 Carry out test panels of glazed tile decorations with reinforcement of stainless steel network, installed with ventilated space behind and exposed to different weather conditions.

29.7 Collect historic and photographic documentation concerning the building and start set up a documentation centre for the Registan Ensemble.

Structural reinforcements of dome and western wall foundations:

30.1 Excavation and earthwork, including disposal of asphalt and surplus soil along northern and western facade in preparation for structural consolidation .

30.2 Complete project for structural consolidation by contracted construction company under supervision of consulting structural engineer; machinery and equipment included in contract fee.

Total estimate, based on the project proposed by the Samarkand State Architectural and Engineering Institute . . . . . 3.0 – 6.0 mill SUM

Brickwork :

31.1 Rag out loose mortar in the joints to a depth of about 2 cm to give an adequate key for new pointing and replace weathered and decomposed bricks.

31.2 Clean and rag out all cracks in walls and vaults of western wing after structural reinforcements has been completed, replace bricks were necessary, consolidate masonry by gravity grouting with lime mortars, repair masonry, including rebuilding of two vaults, render with lime mortar and whitewash.

31.3 Render plain masonry at pillars in the galleries and whitewash.

Total estimate for brickwork . . . . . 120.000 SUM

Roofing

32.1 Removal of emergency metal sheet roofing, gutters and down pipes.

32.2 Take away existing roof tiles, remove cement screed, repair cracks by grouting with lime mortar, apply coarse lime mortar screed, three layers of bituminous felt and put back roof tiles possibly laid in hydraulic lime mortar; ensure fall to rainwater outlets and install new water spouts and carefully positioned down pibes if necessary for drainage from the baseof the tambour; total roof area app. 3.500 m2

32.3 Repair all brick coping, total about 450 running metres;

Total estimated cost for roofing repair . . . . . 2.0 mill SUM

Repairs to exterior tile decorations and marble revetment

33.1 Repair and partial renewal of glazed tile facing, possibly reinforced with stainless steel mesh; put up with ventilated space behind panels, total

renewal of tile facing on western wall of mosque, renewal at northern and eastern facade estimated for about 30 % of surface areas; total app. 500 m2

33.2 Repair to the marble slabs and reinstatement of upper row of missing marble revetment on eastern and northern facade; app. 75 running metres .

33.3 Removal of cement patchings and joints from marble revetment and replace with lime mortar of suitable colour and texture

Total estimated cost for external repairs ..... 7.0 mill SUM

Repairs to the dome

34.1 Repair and partly renewal of tiles with decomposed glazing on the drum and at the top of the dome ..... 1.2 mill SUM

Internal repairs

35.1 All rooms of the madrasa restored with original plastered and white washed surfaces to full floor–to–ceiling height, mezzanine floor reinstated, windows re–opened and screens reinstated, total no. of rooms app. 40.

Total estimate internal repair .....3.2 mill SUM

Joinery

36.1 Oiling of wood work, repair of existing two–leave doors, incl. repair of ironmongery; new windows in the madrasa and winter partition walls in the large openings towards the courtyard.

Total estimate for joinery ..... 1.2 mill SUM

Technical installations

37.1 Electrical installation, including lamps, according to future use; costing of technical installations need separate calculation .....

Reorganisation of site museum

38.1 Reorganisation of existing display according to standards established at the Ulug Bek Observatory Site Museum aiming to bring the significanse of the place into focus; total estimate ..... 2.0 mill SUM

Landscaping of precinct

39.1 Public toilets and service amenities in building near the UlugBeg Madrasa; removal of transformers

39.2 New pavement all around the building to the north, east and west according to design;

39.3 Lowering of the courtyard to its original level fully exposing the lower part of the marble revetment;

Total estimate for landscaping ..... 2.1 mill SUM

Equipment, furniture and sundries for the documentation centre

40.1 Photocopying machine, pc and printer, camera, office furniture, filing cabinets, drawing cabinets, stationaries ; total estimate ..... 1.5 mill SUM

F. Institutional Framework, project organisation and implementation

Steering Committee

41. The following persons are proposed as members of a steering committee, that will help promote the project and get it well underway:

- Mr. Aziz Nosirov, Khokim of Samarkand City
- Mr. Faroukh Hoshimor, Khokim of the Siyeb Region.
- Mr. Raufjon Kilichev, Deputy Khokim of the Siyeb Region and Director General of the Registan Ensemble.
- Mrs. Maisara Nabiraeova, Chief Architect for the State Inspectorate of Historic Sites

Project Implementation Unit

42. The responsibility will remain with the existing organisational structure for cultural heritage preservation , more specially within the Samarkand Department of Restoration, which is responsible for the project implementation:

- Igam Nurullaev, Chief architect of the department and of the Registan Ensemble
- Ilhom Tillaev, architect
- Khushvaht Solokhidinov, architect
- Husnia Faizullaeva, sanitary engineer
- Ilhom Uzokov, architect
- Odil Urunov, engineer

43. The project will be subject to periodic review in accordance with the policies and

procedures established by UNDP/Unesco for monitoring project and programme implementation.

G. General Recommendations

44. The water-coloured survey drawings of Tillya-Kari dating from the 1950's are exquisite. It would be a real treat to have them published and made available to a greater public. High quality copies of the drawings in full scale ought to be exhibited in the site museum, which is already staged inside the mosque. The small site museum at the Ulug Beg Observatory provides an exemplary model of its type, which can inspire similar orderly and illustrative exhibitions set up in connection to the major historic sites throughout Uzbekistan. Furthermore, printed on the tickets and offered for sale as postcards and posters, these drawings will surely be highly valued by tourists, who would have an alternative to the traditional tourist souvenirs.

45. Considering the international reputation and a source of national pride and identity, the Registan should rightly maintain the position as the supreme public space. Therefore the Registan square should not be converted into a tourist site to which tickets are needed for admission, but again resume its original function as the natural centre of Samarkand city of our own times, where many people will get together. In order to achieve this aim, the following action would be essential:

(i) The ticketing office should be transferred to the existing building near Registan Street. One common ticket gives access to all three monuments and the control takes place at the individual entrances. The existing brick fences can be removed and public access to the square be secured free of charge.

(ii) The present *son -et -lumière* display needs to be reviewed. If continued, the present plastic seating should not need to be so dominant and disturbing to the general appreciation of the square and the surrounding monuments.

(iii) Toilets and public amenities should be available in immediate connection with the ticket office in conjunction with a second service building presently being constructed at the workshop area immediately to the north of Ulug Beg Madrasa.

(iv) The former 'Silver Street' should be reopened as a pedestrian passage through the Registan Square and the *Char-su* kiosk be reintegrated into daily life of the citizens as a market and a meeting place in conjunction with improved landscaping of the Tillya-Kari precinct and immediate surroundings. In this connection the pedestrian precinct should be extended to incorporate the Tashkent Street and its continuation further on to the old fortress site and beyond, linking up with the area of Ul. Akhunbabayeya. This question has to be dealt with at the general town planning scale, possibly as part of the Unesco project for historic area study and urban upgrading.

Appendix II

Tillya–Kari: List of reports with the Board of Monuments.
(translation from Russian by Mrs. Dinara Abdullayeva)

1. *Conclusions concerning archaeological trial pits at the Tillya–Kari Madrasa*.1961 (file no. C2470/H50).

2. V.T.Raskazovzky, *Conclusions concerning the project for construction of the dome of Tillya–Kari Mosque* , 1974 (file no. C3628/P24).

3. *Explanatory notes to the project for conservation and structural consolidation of the eastern and northern facades of Tillya–Kari Madrasa*, 1961; (file no. C2479/Y74).

4. *Calculations and explanatory notes to the project for reconstructing the columns and consolidating the domes in the southern gallery of Tillya–Kari Mosque.*1952; (file no. C0693/H49).

5. Csipenuk and Gamburg, *Survey of Tillya–Kari mosque and proposal for its consolidation.* 1974. (file no.c3653/TZ 67).

6. Nelle E.O., *Calculation and explanatory notes to the project for structural reinforcement with iron tie–beams in the south–western guldusta of Tillya–Kari*, 1952 (file no. C690/H49).

7 Gendel, *Conclusion concerning the technical state of the eastern wing of the Tillya–Kari Mosque,* 1973 (?); (file no. C3769/134).

8. Goldstein, *Engineering conclusion concerning technical state of northern court portal of Tillya–Kari and proposals on its structural consolidation,* 1972; (file no. C 3447/G63).

9. Nelle E.O., *Calculations and explanatory note to the project for structural reinforcement of the northern and eastern court portals and hujras, using iron tie rods between northern portal and northern gallery of Tillya–Kari Madrasa.*

10. Goldstein, *Calculation for northern court portal of Tillya–Kari Madrasa*, 1959; (file no. C1995/sh33).

11. ?

12. *Report on bibliography and reference materials for the project for the Tillya–Kari Mosque dome construction.*

13. Usmankhodjaev, *Report on digging of trial pits outside walls of Tillya–Kari madrasa*, 1959; (file no. C1958/Y74).

14. Pletnev, *Report on works at Tillya–Kari Madrasa during the period 1956–1957* (file no.

C843/P38).

15. Brusov, *Conclusions concerning structural and geological conditions of the areas of the Ulug bek Madrasa, Tillya-Kari and the Bibi-Khanum Mausoleum*, 1961; (file no. C2272/B87-2).

16. Gendel, *Conclusions concerning the structural condition of the western part of Tillya-Kari Madrasa,* 1975 (?); (file no. 3677/G34).

17. The Registan Ensemble Board, *Report on the results of test of soil condition under foundation of the western wall of Tillya-Kari Mosque,* Samarkand, 1994.

18. Khasanov, Strigo and Ubaidullaev, *Problems of consolidation of the foundations and structure of Tillya-Kari Madrasa*, 1994.

18. Lebedeva, Institute of Archaeology, *Scientific report on archaeological works at bore pits of Tillya-Kari Madrasa*. 1993.

19. Mustafa Erdik, *Emergency measures on preservation of Tillya-Kori Mosque*, Samarkand ; The Technical University, 1993, Istanbul (Aga Khan Culture Trust).

20. Lebedeva and Ivanitsky, *Scientific report on archaeological excavationa at the Tillya-Kari Madrasa*, Institute of Archaeology, 1993.

21. Project by 'Tashmetro', *Consolidation of the eastern wall of Tillya-Kari Mosque, Parts I-IV,* Tashkent, 1994.

22. Institute of Soil Mechanics and Seizmic Engineering, Tashkent Institute of Architecture, *Calculations for static and seizmic effects,* (year ?).

23. Bulatova, Shichkina and Retveladze, *Samarkand, a Museum in the Open Air,* Tashkent, 1986.

24. Pasidov, Saparov and Reporton, *Study and summery concerning structural deformations in Tillya-Kari Mosque and recommendations for intervention*, 1993.

25. Matsura, *Materials concerning the deformation of the western wall of Tillya-Kari Madrasa by 29.07.1993.* Samarkand Geotechnical Institute.

26. Inst. of Restoration, *Estimate N 662-1 for preliminary work to the arches in the galleries of the Tillya-Kari Mosque*, 1993.

27. Raskazovsky, Khodzmetov and Ishakhodjaev. *Conclusions concerning the methods proposed for the consolidation of the foundation in the Tillya-Kari Mosque, (year ?).*

28. *Protocol of the Scientific-technical Council of the Board of Monuments*, (year ?)

29. T. Kashidov, Chairman. *Protocol of the State Commission on the problems concerning*

the emergency condition of the western part of the Tillya-Kari Mosque, Samarkand 1992.

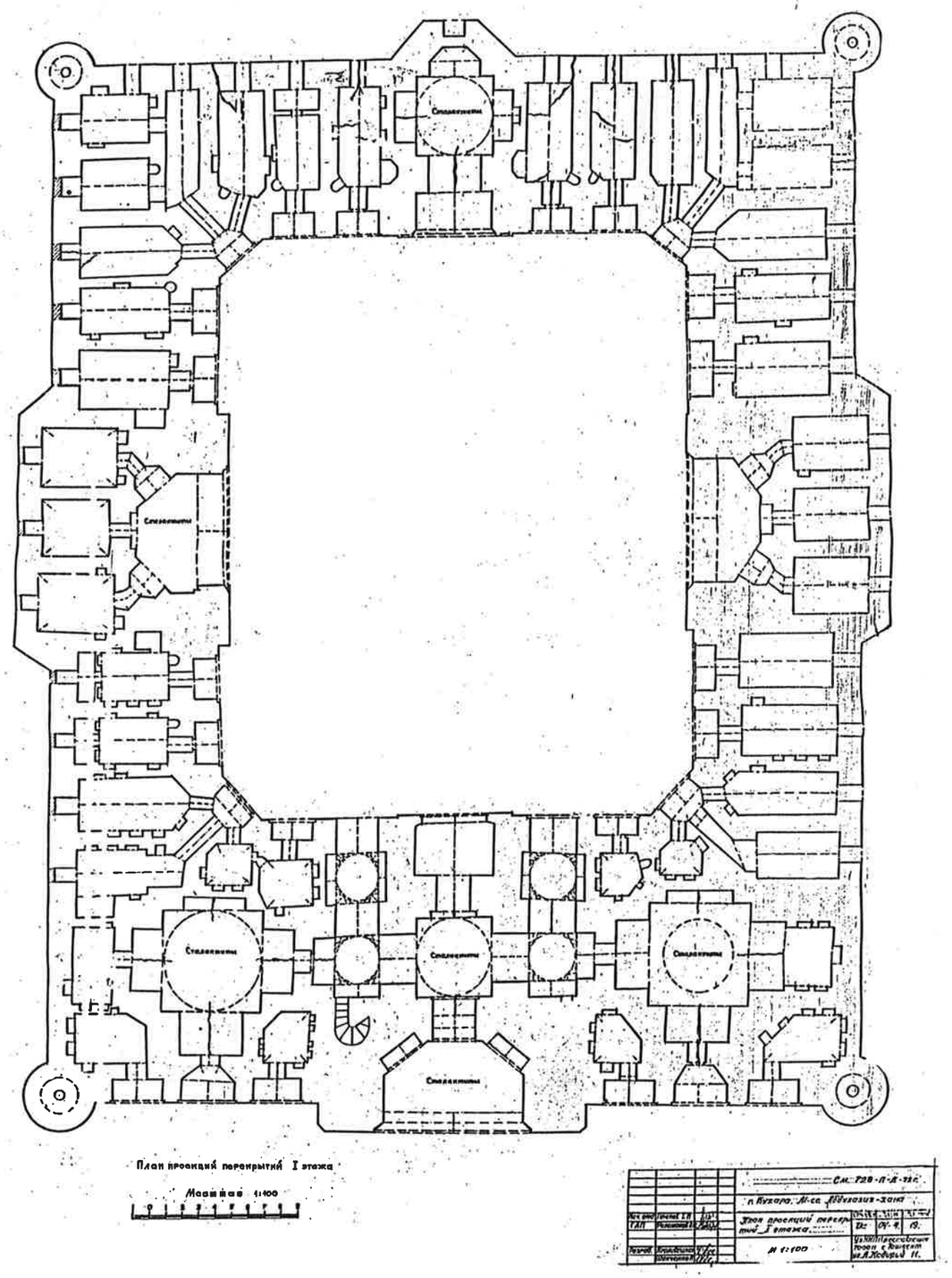
30, 31, 32. *ibid.*, 1993.

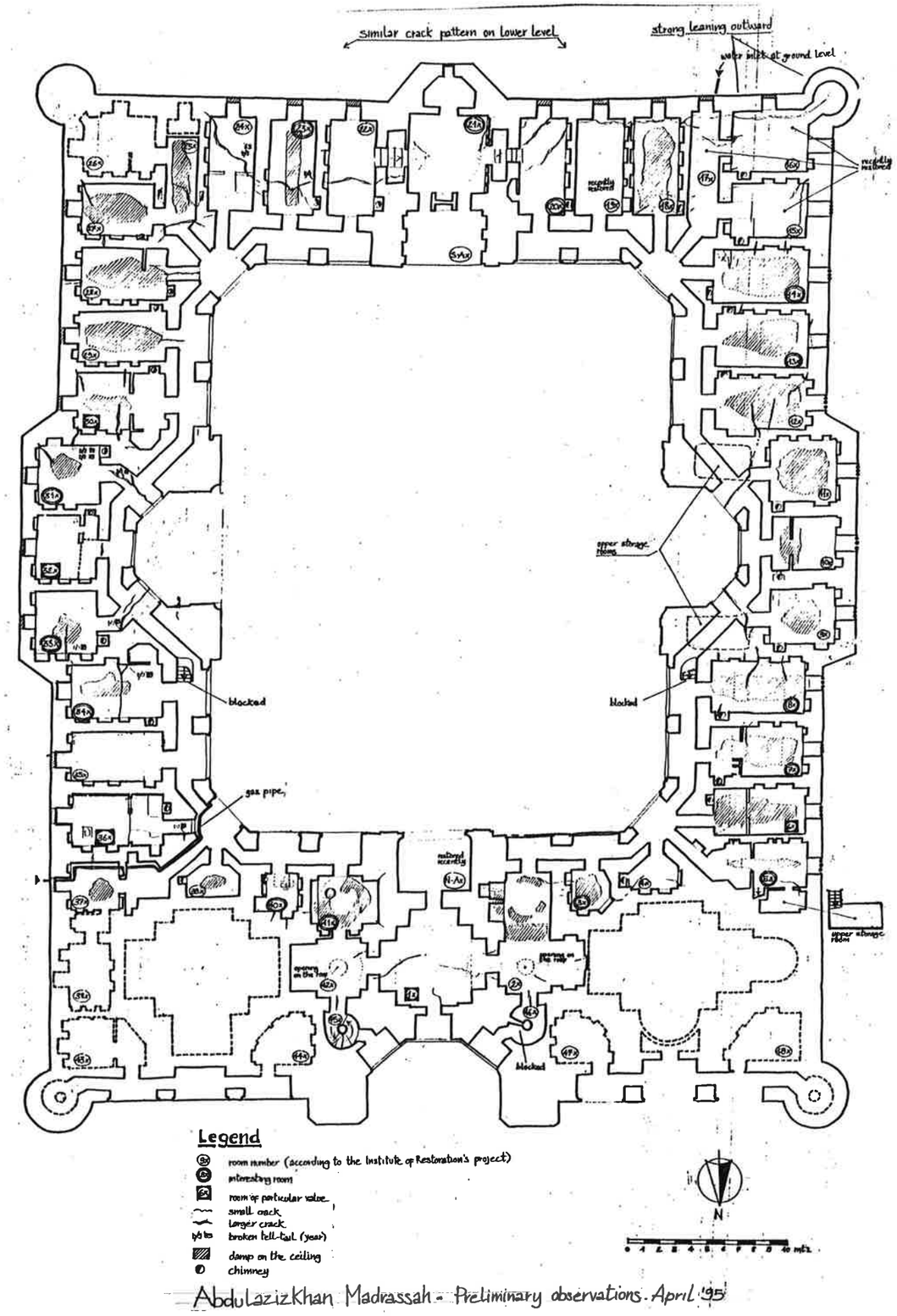
34 Samarkand State Architectural and Civil Engineering Institute. *Project for structural consolidation of the western wall of the Tillya-Kari Mosque*, 1993.

List of illustrations: Tillya Kari Mosque and Madrasa

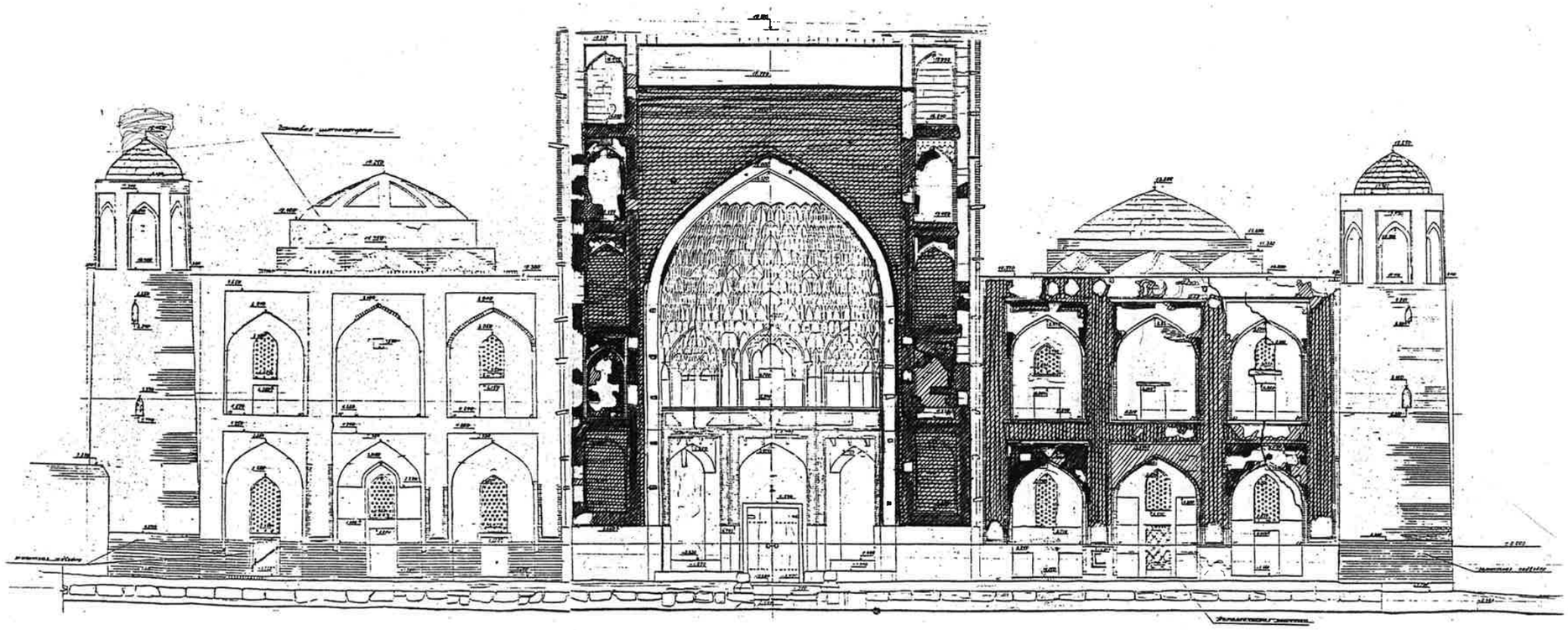
Colour photographs (photo: F. Aalund)

Survey drawings : (reduced from the originals in the archive of the Board of Monuments).

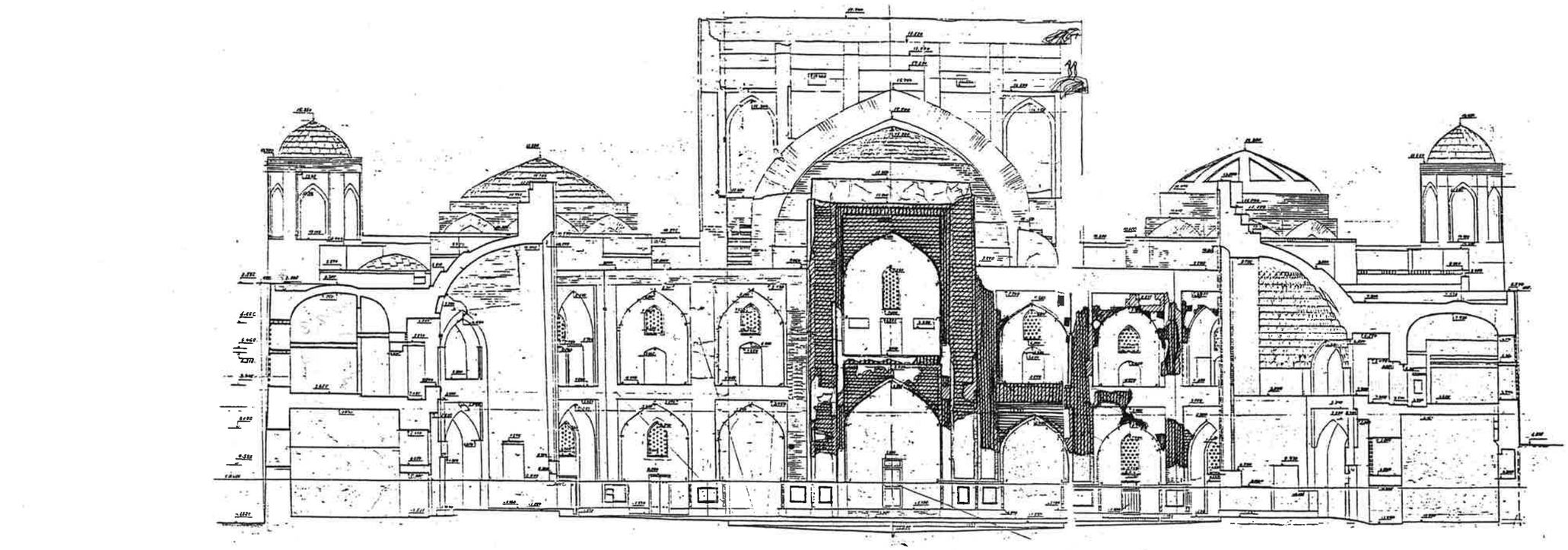


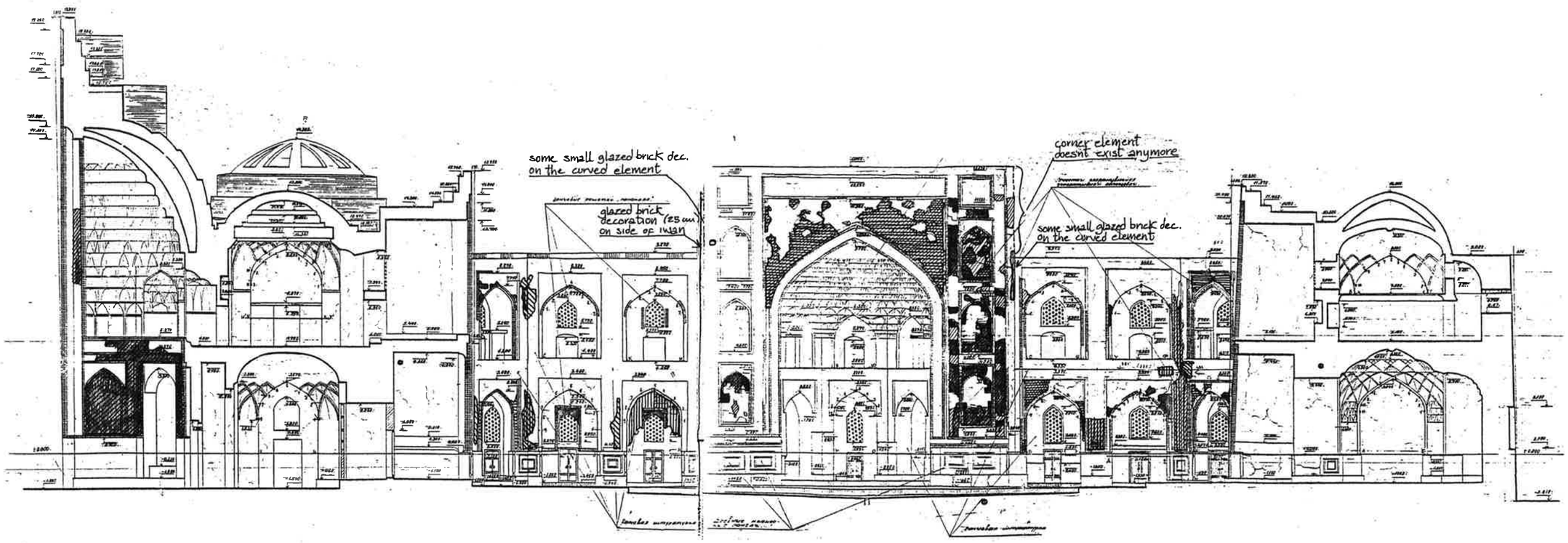


Plan of ground floor and first floor, scale 1:300 . . . . . fig. 07

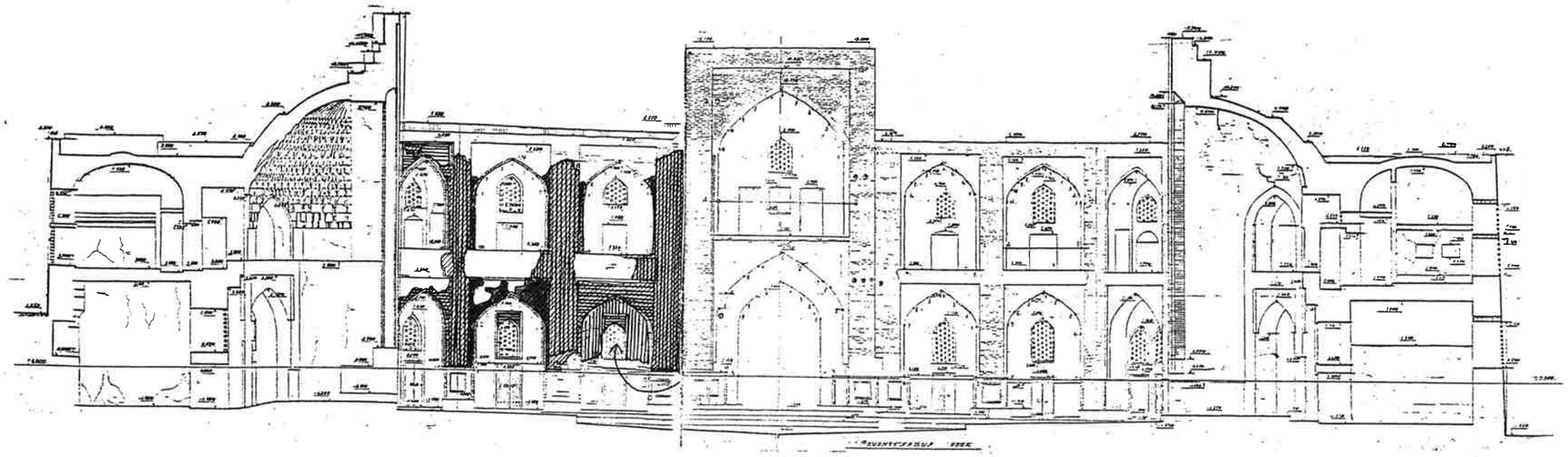


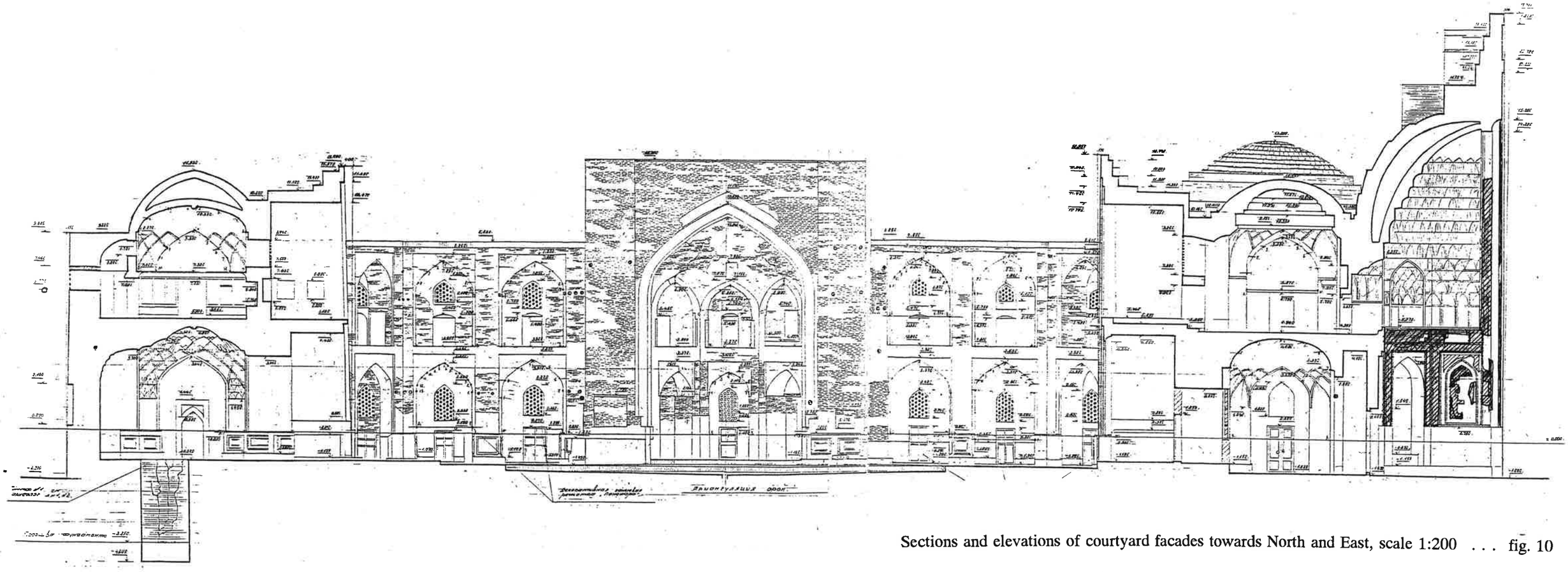
Elevation of main facade, scale 1:200 . . . . . fig. 08



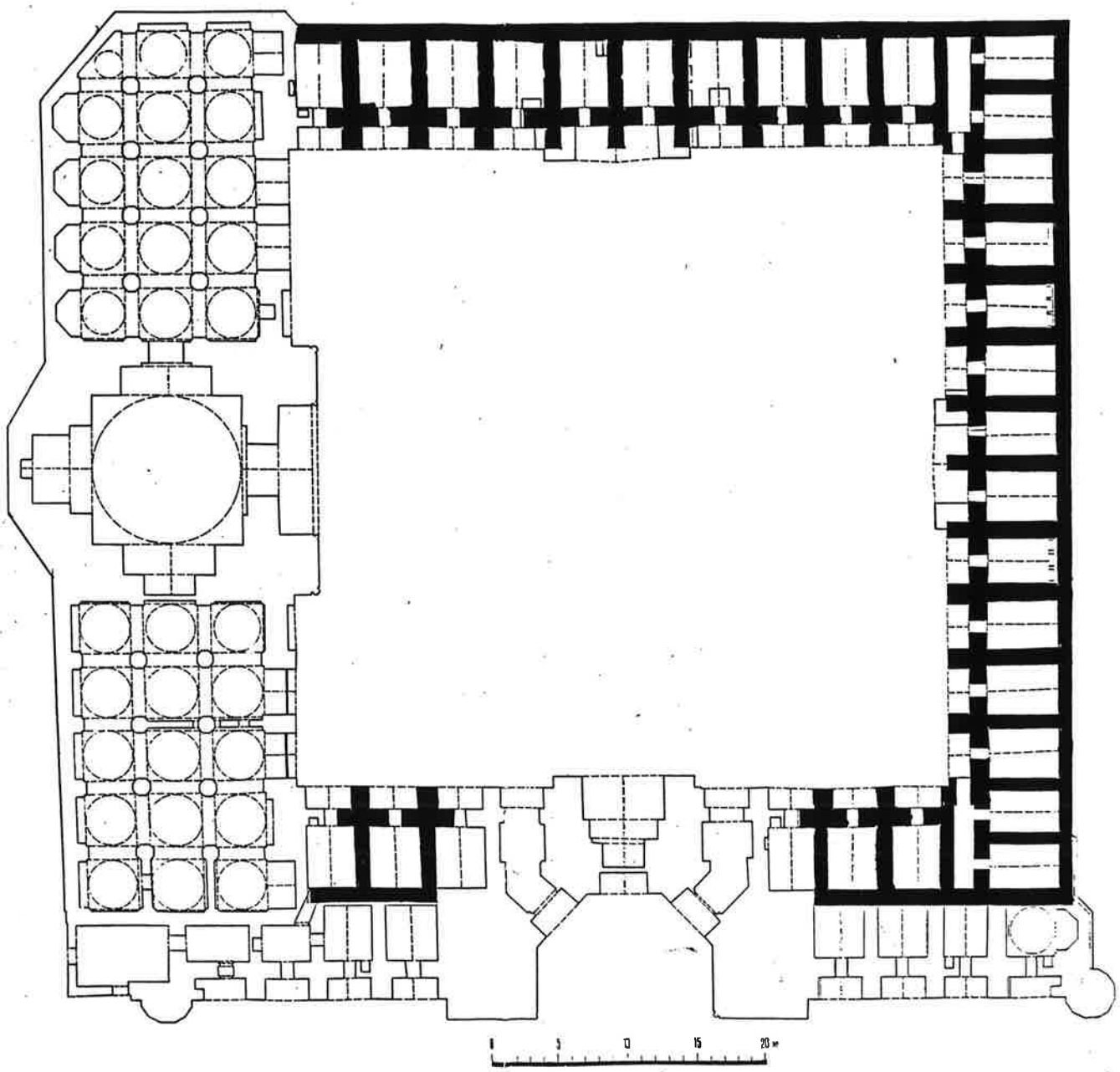


Sections and elevations of courtyard facades towards South and West, scale 1:200 . . . fig. 09





Sections and elevations of courtyard facades towards North and East, scale 1:200 . . . fig. 10



Plan showing foundationon and building structures of the former Mirzoi caravanseraille

Annex I

Select bibliography

(Author's note: Regretfully, essential books on historic monument preservation in Russian language are not listed due to my inability to read Russian).

Vitaly Naumkir, *Samarcande, Juste à temps: Les grandes archives photographique*, Paris, 1992.

T. Pulatov, L.Y.Mankovskaja, *et. al., Bukhara, a museum in the open,* (in Uzbek, Russian and English language), Tashkent, 1991.

Lisa Golombek and Donal Wilber, *The Timurid architecture of Iran and Turan*, vol I–II, Princeton, 1988.

T. Bulatova, G. Shishkina, *et. al., Samarkand, a museum in the open* (in Uzbek, Russian and English language), Tashkent, 1986.

G.A. Pugatschenkowa, *Samarkand – Bukara*, Berlin, 1975; translated from Russian, first edition Moschow, 1968.

V.A. Nielsen and V.N. Manakova, *Ornamentation in Uzbez architecture* (in Russian), Tashkent, 1974.

Ernst Cohn–Wiener, *Turan, Islamische Baukunst in Mittelasien*, Berlin, 1930.

Z. von Schubert– Soldern, *Die Baudenkmäler von Samarkand*, Vienna, 1898.

Conservation practice and theories:

InternationalCommitteee on Monuments ans Sites, *'International charter for the conservation and restoration of monuments and sites' ('The Charter of Venice'),* Paris, 1966.

Hans E. Wulff, *The traditional crafts of Persia*, MIT, Cambridge, Massachusetts, 1966, reprint 1976.

Bernard M. Feilden, *Conservation of Historic Buildings*, London, 1982.

Bernard M. Feilden and Jukka Jokilehto, *Management guidelines for world cultural heritage sites,* ICCROM, Rome, 1993.

Annex II

Mission agenda and itinerary.

Monday 17 April : Departure Copenhagen 14.35 p.m. via Frankfurt arriving in Tashkent 18 April at 3.30 a.m.

Tuesday 18 April : Met with Mr. Michael Barry Lane, CTA, and Mr. Giovanni Boccardi, ass. expert; whole day used for introduction to the project, discussing the overall planning and the two historical monuments selected for conservation: Abd al- Aziz Khan Madrasa in Bukhara and the Tillya-Kari Mosque at the Registan in Samarkand; decided on the itinerary and work schedule for the consultancy; arranged to have a set of working drawings prepared and copied in a manageable scale 1:200; Mrs. Dinara Abdullayeva, secretary to the project, was also most helpful.

Wednesday 19 April: Meeting with Mr. Rashot Asamov, Director General at the Institute of Restoration, discussing details about the monuments in question, the itinerary and arrangements for meetings with the national counterparts in Bukhara and Samarkand; also Mr. Salikhov Rachmatulla, Mr. Jusufov Karimberdi and Boziskin Vladir, architects/engineers at the Institute, attended the meeting. On request we were referred to the archives of the Board of Monuments for documentary material.

Meeting with Mr. Rakhmonov Abdusafi Rafikovich, Deputy Director and Mr. Batir Usmanov, Director General of the Board of Monuments; specific emphasis was put on the needs of urgent consolidation of the Tillya-Kari Mosque; reference was made to the most recent proposal by Mr. Giorgio Croci, which has to be evaluated together with numerous other plans; in view of the extensive documentation needed of historic monuments with tile decoration in Uzbekistan, the possibility of using photogrammetric survey techniques was shortly discussed and wishes were expressed to have the required equipment at the Department.

The rest of the afternoon was spend in the archive, a formidable treasure house, possessing invaluable documentary material from the 1920s to the present; Mrs. Lydia Livovna, historian and head of the archive, was a most proficient and resourceful aid, but the space and her working conditions are totally inadequate.

Thursday 20 April: Continued work on the Abd al-Aziz Khan Madrasa at the historic monument archive, listing the measured drawings and looking through the photographic documentation. The quality of the water-coloured drawings is superb, giving a complete documentation of the building condition in the 1950s.

Friday 21 April: Continued work on the Tillya-Kari Mosque at the historic monument archives; the amount of documentary material is overwhelming; photographed

selected examples. Meeting with Mrs. Svetlana Krolivetskaya and Mrs. Irina Filimonova to see the polychrome watercolour drawings, which they are preparing for the restoration of the tile decorations of the Abd al-Aziz Khan Mosque; the third person on the team Mrs. Lisa Nekrasova, archaeologist, is presently in Bukhara and I will meet her there; we were in total agreement about the inappropriate use of the thin, industrial tiles; it was promised that a costing of the tilework would be ready within two weeks.

Saturday 22 April: Left for Bukhara together with Barry Lane at 10.00 A.M. with about two hours delay and missed an appointment with Mrs. Lisa Nekrasova. Went to the Abd al-Aziz Khan Madrasa to get a first-hand impression; rest of the day used for sightseeing in the central parts of Bukhara; very impressive and the townscape has (not yet) been distorted by new constructions, but unfortunately much demolition.

Sunday 23 April: Continued sightseeing to get an overall impression of construction methods, building techniques and shortcomings.

Monday 24 April: Meeting with Mr. Bakhtiyar Parsayev, Deputy Chief of the Regional Inspectorate of the Board of Monuments. The office is housed in the Abd-al Aziz Khan Madrasa; a most informative discussion about the project and its possible organisation, there seems to be agreement upon the general principles of restoration leaving the tile decoration only partly completed ; subsequently we met with Mr. Khairulla Salamov, who has been appointed as the new director only a few months ago, when responsibilities of historic monument and the museums were split into two separate sections. Mrs. Noila was most effective as an interpreter.

Went to see the famous and spectacular Chor-Minar Madrasa with the four minarets together with Mr. Parsayev; one of them has recently collapsed, regrettably leaving the structure visible for inspection. The solid core of the minaret is constructed by use of clay mortar, which is very vulnerable to swelling and most unfortunate, the building has recently been encaged by a cement roofing and completely repointed by cement mortar. The cement forms an impermeable vapour barrier that traps moisture. I believe this is the main reason to the calamity – much more than structural failures of the foundation. Indeed, cement is cheap, strong and durable and last longer than the monuments !!

Visited the brick kiln and the workshop for production of glazed tiles, which is owned by Mr. Khairulla Salamov. Obviously there is a great need to improve the working facilities, if a local production shall be compatible with the production in Samarkand and problems with incompatible ownership.

Payed a courtesy visit to see Mr. Robert Almaev, former Director General for the Preservation of Buildings and places of Architectural Significance of Bukhara, now Head of the Museum Section under the Board of Monuments.

Tuesday 25 April: Continued investigations and surveys of the 'Abd al-Aziz Madrasa together with Giovanni Boccardi.

Wednesday 26 April: Visited Chor Bakr, the 16th cent. necropolis about 5 km to the west of the city, together with Mr. Bakhtiyar Parsayev and Mrs. Lisa Nekrasova. The mosque and

khanaka complex is in an alarming state of repair, a previous project for restoration has never been completed and the general condition of the graveyard area is deplorable. Continued discussions in the Abd al-Aziz Khan Madrasa; disposition can possibly be made of the area to the east of the madrasa for future use related to the madrasa.

Thursday 27 April: Meeting with Mr. Bakhtiyar and Mrs. Nekrasova discussing the restoration project and putting up a cost estimate. Mr. Klichev Zair is a possible candidate for the job as site architect while responsibility for structural consolidation and tile work may rest with Mr. Bakhtiyar Parsayev.

Visited the Mir-i Arab Madrasa, which is still functioning as a madrasa with the kitchen facilities positioned in secondary structures next to the monument.

Meeting with Mr. Sadulla Khojayev, Director of the Restoration Workshop under the Board of Monuments; about 170 people employed, but working on a very low budget mostly on modern constructions. Restoration of the Ulug Bek Madrasa was carried out by the workshop, also manufacturing the sculptural parts of the *morpech* ('winding snake'). The blue glazing stands out very faded in comparison with the original colour, however, not to speak about the painted imitation of tilework. This blunder may not entirely be due to the workshop, but is symptomatic to a sudden and hasty restoration, which had to be completed on the occasion of the Ulug Beg jubilee. The work shop facilities are deplorable and the mill for preparing colour pigments has broken down; reorganisation needed if activity within the historic monument preservation shall be resumed..

Visited the small Masjid Baljand, which have beautiful 16th cent. wall paintings in the *kundal* technique, about 100 years older than the decorations in the Abd al-Aziz Madrasa; the red colour (*kisil kasakh*) is actually applied to the carved pattern standing out in high relief on a faded blue ground; whereas the red pigment apparently has been applied directly to the ground in the Abd al-Aziz Madrasa.

Friday 28 April Met with Mr. Zoir Klichev, former architect with the Bukhara State Inspection of the Board of Monuments, a promising candidate for the job as site architect.

Visited the Merchant´s House Museum; the rich, traditional Bukhara house has been (hastily) restored in bright colours on the occasion of the Abu Ali ibn Sina (Avicenna) 1000th anniversary; the original 19th cenury wall paintings were preserved under the mud plaster; the redecoration follows faithfully the old pattern, but the authenticity has been lost, leaving only small areas for documentation.

Saturday 29 April Travelled to Samarkand by bus arriving about 11.30 a.m. after about 6 hours drive, met with Mr. Barry Lane and toured the city to get familiar with the historic sites. The small site museum at the Ulug Beg observatory appears very orderly and extraordinarily well presented, a model of its kind. The huge reconstruction of the Bibi Khainum Mosque appears to be controversial; considering its potential candidature for the WHL, I should recommend an early visit by a review committee, who can discuss problems concerning the completion of this challenging restoration.

Met also with Mr. Nemaijan Sadikov, architect and local representative of the Agha Khan

Trust. He presented drawings of a new commercial building complex of a rather modern fashion, which is planned to be constructed at the corner between Tillya-Kari Mosque and Ulug Beg, and context missing.

Sunday 30 April Met with Ganisher Rahimov, young student from the Institute of Foreign Languages, who assisted as interpreter. Visited the Tillya-Kari Mosque to get a first impressions of the shortcomings.

Monday 1 May Meeting with Mr. Igam Nurullaev, chief architect in charge of the Registan ensemble (since 1988), reviewing the current problems concerning the Tillya-Kari Mosque; the discussion centred upon (i) the need of structural consolidation and (ii) dampness and rainwater infiltration into the structure.

Tuesday 2 May Further discussions with Mr. Nurullaev, obviously a special Russian amendment concerning reconstruction and anastylosis to the Venice Charter! Courtesy visit to Mr. Roufjon Klichev, Director General of the Registan Ensemble; apparently a decision has been reached in favour of the project for structural consolidation formulated by the Samarkand State Architectural and Civil Engineering Institute; a subsequent meeting with Mr. Muhammad Akmedov, Dean of the Department of Architecture, made it clear that his department was not involved in the proposal.

Wednesday 3 May Meeting with Mr. Klichev and Mr. Askar Khasanov, ass. professor, soil mechanics and foundation engineering, discussing the structural consolidation; the State Commission, headed by Mr. Babich, had approved the proposal in a statement of 15.03.1995; I requested a copy of the approval and official information about the actual situation. It seems that the Government is prepared to allocated the necessary funds estimated in the range 3-6 mill. SUM. Alternatively, has Unesco made commitments in the range of 50.000 USD for an immediate instalment, and 75.000 USD subsequently ?

Visit to the Workshop for tile manufacturing; highly professional approach but lack of essential supplies. Invited for lunch by Mr. Nurullaev. Mrs. Maisara, Head of the Preservation of Historic Sites in Samarkand, was also present, most enjoyable atmosphere.

Continued meeting with Mr. Khasanov at the Institute. Mr. Rustam Kholmuradov, Rector of the Institute, Mr. Stregor, Structural engineer and other staff members were present; informative orientation expressing determination for an early start, probably within a month completing external work before mid September this year and continuing to the interior during winter.

Thursday 4 May Final meeting with mr. Nurullaev concerning project proposal and cost estimates. Met shortly with Mr. Usmanov, Director General of the Board of Monuments, who expressed great concern to have the recommendation by Mr. Croci soonest. Left for Tashkent at 18.50 p.m.

Friday 5 May Meeting with Mr. Roshot Asamov, Mrs. Lisa Nekrasova, Mr. Filimonov (one of the grand old men in Uzbek restoration, now retired) and Mr. Barry Lane discussing the Abd al-Aziz Khan project. Long discussion about principles of restoration; it was agreed to carry out archaeological trial trenches along the northern wall possibly starting

in June this year. Subsequent meeting with Mrs. Maksuma, Head of the Scientific laboratory at the Institute, discussing tile manufacturing and assistance to resume production in Bukhara; followed by meeting with Mrs. Svetlana Krolivetskaya and Irena Filimonova..

Saturday 6 May Continued yesterdays meeting with structural engineer Mrs. Larisa Lukina concerning the Abd al-Aziz Khan Madrasa project; the extensive reconstruction and structural consolidation is justified with reference to seizmic standard norms.

Sunday 7 May

Monday 8 May Courtesy call on Mr. Khalid Malik, Res. Rep. of UNDP and Mrs. Dona Abdourazakova, national programme officer.

Tuesday 9 May Departure 7.40 a.m. arriving Cph. 13.55 p.m.; End of mission.