# Project: Archaeology of Silk Roads' Highland Urban Hubs (SR-HUBs)

# Report on Field activities, June 10-August 1, 2024

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#### **Project Overview:**

The "Silk Roads" Highland Urban Hubs (SR-HUBs) project focuses on high elevation regions of the Eurasian Silk Roads and aims to shed new light on the architectural innovations, infrastructural planning, and alternative expressions of political hegemony that emerged with the growth of urban centers in mountainous regions of Central Asia from the 6<sup>th</sup>-12<sup>th</sup> centuries CE.

The 2024 field season of the SR-HUBs project – supported in part by funding from the Society for the Exploration of Eurasia (EurAsia) – represented the first season of extensive archaeological excavation to study the medieval architecture and highland infrastructural planning of the ancient urban complex "Tugunbulak" (TGB), located at ~2000 m elevation in Southeastern Uzbekistan (Frachetti et al. 2024). TGB was first discovered by our international team in 2015 and initial mapping and survey across the site documented archaeological remains spanning a minimum extent of more than 100 hectares. Preliminary fieldwork conducted in 2022 utilized the region's first drone-based lidar scanning to document the topographic surface of the site in very high resolution, mapping the superficial layout of extensive architectural investment over an area of at least 120 hectares (Frachetti et al. 2024). This research revealed a dense urban construction in the northwestern sector of the site (sector A), with a minimum of five large archaeological mounds and the traces of over 300 individual buildings aligned across an area of roughly 40 hectares. Additional structures and wall fortifications were documented in other sectors of the city (B, C, and D), as well as a series of outer wall lines enclosing a large territory, presumably associated with the city (**Fig. 1a, b, c**).





Fig. 1 A: Upper inset panel: Overview of the TGB's topography and features, with Sectors A, B, C, and D. B) Hillshaded representation of the central urban area of TGB (Sector A), created from a 2022 drone-LiDAR scan.C) Automated delineation of archaeological and architectural features derived from the high-resolution LiDAR data.

Test excavations in 2022 at TGB focused on the central architectural area and successfully verified the presence of large-scale stone/mudbrick walls and rammed earth (pakhsa) architectural fortifications on the central citadel mound. Specifically, mound A2 in Sector A showed evidence of a 3m wide fortification surrounding the central fortified citadel as well as production kilns within the adjacent architectural sector (**Fig. 2a, b**). These limited soundings also produced organic remains that radiocarbon date the occupation of these, suggesting an uninterrupted chronology of occupation of the urban center at TGB from the 6<sup>th</sup> c. CE to the 11<sup>th</sup> c. CE (**Fig. 2c**). These preliminary findings together established the main points of inquiry for the ongoing SR-HUBs project: to study TGB's urban and architectural development, chronology, material culture, and economic and social organization.



Fig. 2 a) 10m x 2m stratigraphic test trench in the central citadel mound, showing rammed earth fortifications. b) 4m x 5m pilot excavation of a production structure, showing evidence of two construction phases. c) Preliminary C14 dating results from TGB excavation in 2022.

#### Goals/Aims of the 2024 season:

The vast scale and apparent architectural complexity of TGB define it as one of the most unique high-altitude cities in medieval Central Asia. As such, the site can only be properly studied through a systematic and sustained (multi-year) archaeological approach that relies on modern technological advancements in excavation and mapping methods as well as sound material and bioarchaeological analysis.

The main questions of the project include:

Q1: What is the scale and structure of architectural planning at TGB, and how were major architectural investments (such as its monumental structures, productive facilities, water management, etc.) implemented and engineered through the life of the site?

Q2: How were high-altitude cities like TGB provisioned in relation to both the limits of their local (high-altitude) environment and the available circuits of regional trade and exchange across medieval Central Asia?

Q3: How do the architecture and material signatures of a heavily fortified highland city like TGB reflect the political identity and sources of power on the part of various sectors of its population?

To address these broad questions, the **2024 season** focused on open area excavations of mound A2 in sector A, with the following specific goals:

- 1) Document archaeologically the construction and infrastructure of the mound's architectural features and phases of occupation (specifically on mound A2, Sector A))
- 2) Produce an improved chronology of construction, occupation, and abandonment of the city, as reflected in mound A2 (Sector A)
- 3) Document the economic activities of TGB throughout the occupational history of the city
- 4) Design an approach to understanding the water management system and the impact of the city on local and regional hydrological systems

# **Results of 2024 excavations in Sector A**

#### Excavation areas:

In 2024, we implemented wide-area, stratigraphic excavations beginning with major architectural features in Sector A, mound A2. To orient and locate our excavations in Cartesian space, we established a sitewide, 10m grid, using alphabetical labels along the north to south axis and numerical labels along the east to west axis (**Fig. 3, Fig. 4**). Our trenches spanned a total area of 265 sq. m, within grid cells V92, V93, V94, and W94.

T90	T91	T92	- T93	T94	T95	T96	<b>T</b> 97	T98
U90	U91	U92	- "U93 <sup>- *</sup>	U94	U95	U96°	U97	ບໍ່ອຸສ
V90	V91	A B V9 <del>2</del> C D	A B V93 C D	A B V94 C D	V95	Ne	V97	V98
W90	N W91	W92 10 meter	W93	A B W94 C D	W95	W96	W97	W98
X90	X91	cartesian grid X92	Х93	X94	3 X95	X96	X97	X98•
Y90	Y91	Y92	Y93	Y94	Y95	Y96.	¥97	Y98
Z90	Z91	Z92	Z93	Z94	Z95	Z96	Z97	Z98

Fig. 3 Grid map of TGB

#### Overview of methods

The A2 mound in Sector A has an upper platform roughly 40m in diameter, and our trenches were positioned to intersect linear wall features visible in the LiDAR model. All archaeological operations followed contemporary excavation and material recording standards, including stratigraphic and horizontal documentation of all excavated areas using a Topcon Total Station, as well as Trimble G2 GNSS positioning system. Archaeological sampling included the systematic recovery of organic materials for radiocarbon dating (CB) and comprehensive soil samples (SS) taken from hearth or burn features, floors, and fill levels for botanical analysis and micro-artifact recovery. All artifacts such as stone, bone, and ceramic implements, pottery, etc., were hand recovered throughout the excavation process, and immediately bagged according to a unique 1m grid location and stratigraphic context. Wet sieving and screening of soil samples to as many as 45L (for larger contexts).



Fig.4 Aerial view of 2024 excavations, view West.

## Preliminary Results:

The excavation revealed a building complex composed of six rooms and a corridor, the outer area, and a burial from a later period. Evidence of production activities was identified within the complex, as indicated by the presence of kilns and remnants of iron and glass slags. Based on a new series of 28 AMS dates taken from across the excavated area and all depths of the excavation, the occupation of mound A2, Sector A spanned from the last half of the 6<sup>th</sup> to the 9<sup>th</sup> c. (calibrated CE), and stratigraphy indicates three occupation phases.

## Phase 1: Early occupation

Phase 1 represents the earliest occupational phase on the A2 mound, dated mid-6<sup>th</sup> to mid-7<sup>th</sup> c. CE. During this period, a substantial multi-roomed building complex was constructed for the first time, situated at an elevation of 1964.5–1965 m. This structure, comprising more than six interconnected rectangular rooms oriented west-east and a central corridor oriented north-south, was constructed using mudbrick and pakhsa. The corridor is positioned centrally within the building complex, with rooms 1, 2, and 3 situated to its west and rooms 4, 5, and 6 located to its east (**Fig. 5**).



Fig. 5 Top-down view of TGB in 2024

The features that belong to this phase include the original floors, walls, and installations such as ovens and metallurgical kilns. Notably, each room has fire-related features made of mudbrick or stone-made kilns, with evidence of metallurgical slag remaining within the kilns. These kilns/furnaces were cut into the pakhsa walls, with ventilation channels running parallel to the walls and dug into the floor levels. The western sections of rooms 2, 5, and 6 reveal significant concentrations of burnt features and ashy soils, pointing to intense fire-related processes. The abundant slag remains and repeated organization of each room in the structure are suggestive of intensive production activities associated with high temperatures, likely for iron and/or steel. Direct analysis of the slag materials is forthcoming, which will shed necessary light on the particular stage of production, technological details, and output from this large scale production facility.

Room 1 (Fig. 6)



*Fig. 6 Room 1 during Phase 1 (early occupation)* 

Room 1 is located at the northernmost part of the building complex within the excavated area, positioned north of room 2 and west of the corridor. The room has a rectangular layout, measuring 9.3 m in length x 2.6 m in width, with a remaining wall height of 1 m and width of 1.2 m. The easternmost part of the room features a doorway that connects to the corridor.

The wall was constructed by combining multiple units of pakhsa, characterized by its remarkable hardness, with each unit measuring 100 cm in length x 60 cm in width. As for the floor, the western part consists of well-arranged brownish mudbrick tiles, varying in size from  $8.0 \times 6.0 \text{ cm}$ 

to 9.0 x 25 cm. The rest of the floor comprises highly compacted brownish sediment, rich in organic remains.

Several structures were identified in the room. At the westernmost part, near the west wall, a stone-aligned structure was found running in the north-south direction. The central and eastern sections include square, rectangular, and circular features, both burnt and unburnt, surrounded by long, thin mudbricks, with pottery sherds found nearby. A few complete artifacts, including a large vessel and a double-spout vessel (**Fig. 12a**), were found near the south wall in the central part of the room. The doorway, located at the easternmost part of the room, measured 1.2 m in width and was constructed from the same material as the walls. Stone fragments, likely aligned in a north-south direction, were identified within the doorway.

Room 2 (Fig. 7)



Fig. 7 Room 1 during Phase 1 (early occupation)

Room 2 is located south of room 1 and west of the corridor. The room has a rectangular layout, measuring 9.5 m in width x 2.75 m in length, and with a remaining wall height of 1 m. The easternmost part of the room features a doorway that connects to the corridor. The room is divided by an inner wall located at the first third of the room from the west. The western section, based on this dividing wall, shows evidence of intense fire-related activities. The floor is greyish in color and exhibits considerable hardness, suggesting it is made of packed clay soil.

This room exhibits a high density of structures compared to other rooms. The space is bisected by an inner wall constructed of mudbricks, presumed a doorway. The central part of this

wall stands at approximately 65.0 cm in height and is composed of four layers of mudbricks. The edges on either side are constructed with eight layers of mudbricks, reaching the height of the room's walls.

The western section contained many burnt features, with severe burning evidence along the wall. In the northwest corner, a mudbrick-lined square or rectangular structure with burnt soil was excavated. Along the south wall, a rectangular fire feature (1.8 m in length x 88.0 cm in width) was identified, constructed with two layers of stacked mudbricks. This feature and the adjacent wall showed strong signs of burning. A square mudbrick-lined burnt feature was discovered attached to the west side of the inner wall, filled with pottery sherds and ashy soil. Attached to the middle of the inner wall, a rectangular structure (1 m in length x 50.0 cm in width), surrounded by thin mudbricks, was found and thought to be associated with door access.

The eastern section includes ovens and kilns. In the northwest corner of this section, a standing oval fire feature (50.0 cm in length x 43.0 cm in width) was found, featuring an outer part built with stones and an interior and ceiling made with mudbricks. A ventilation hole was identified, and the feature contained many bones, pottery sherds, and ashy soil. East of this feature, attached to the north wall, a rectangular structure (2 m in length x 80.0 cm in width) was discovered, bordered by hard and thin mudbricks with its interior dug below floor level, and many bones were found. Adjacent to this structure, a rectangular fire feature (57.0 cm in length x 35.0 cm in width) surrounded by burnt mudbricks was identified. In the southern part of this section, along the south wall, a standing semi-circular fire measuring 32.0 cm in length  $\times$  24.0 cm in width with a height of 80.0 cm was identified. Constructed from mudbricks, the northern portion of this feature was open, with mudbricks surrounding the open area on the floor level. The inside of the feature displayed heavy burning and included lots of bones. To the east of this semi-circular feature, a standing fire feature measuring 55.0 cm in length and 24.0 cm in height was identified. This contained dark, charcoal-rich sediment and ash, as well as a large chunk of iron slag.

## Room 3 (Fig. 8)

Room 3 is located south of room 2 and west of the corridor, with a presumed rectangular layout. The room is partially excavated. The floor in the western section is composed of arranged mudbrick tiles (60.0 in length x 20.0 cm in width), while the rest of the floor consists of greyish sediment.

Evidence of fire-related activities was identified in the western part of the room. Along the north wall, a possible oven, made of stones and mudbricks, was discovered. The north wall exhibited signs of burning and had attached rectangular structures.



Fig. 8 Room 3 during Phase 1 (early occupation)

Corridor (Fig. 9)



Fig. 9 3d model of the corridor during phase 1 (early occupation)

The corridor, located between rooms 2 (west) and 4 (east), connects the two rooms and measures 3.3 m in width. It was partially excavated and is believed to extend both northward and southward.

Many stones were found near both doorways, suggesting the presence of entrance facilities. At the western doorway, a rectangular fire feature (70.0 cm in length x 60.0 cm in width) was discovered along the south wall. At the eastern doorway, a round hole was identified at the base of the northern doorway wall, with associated stones found both inside and around this feature, extending southward.

Room 4 (Fig. 10)



Fig. 10 Room 4 during Phase 1 (early occupation)

Room 4, presumed to have a rectangular layout, is located east of the corridor and north of room 5. It measures 2.75 m in width and features a doorway at its westernmost part connecting to the corridor. The room has been partially excavated.

Along the south wall of the room, fire-related features were discovered, and this section of the wall shows significant burning. In the western part, an oven with an opening measuring 40.0-45.0 cm in length was found. To the west of this oven, a rectangular furnace (30.0 cm in length x 18.0 cm in width) was identified. On the floor, a semi-circular ash deposit with a radius of 40.0 cm was observed on its outer edge.

Room 5 (Fig. 11)

Room 5 is located south of room 4 and west of the corridor. The room has a rectangular layout, measuring 9 m in length, with a remaining wall height of 80.0 cm and width of 1.6m. The westernmost part of the room features a doorway that connects to the corridor.

In the western part of the room, a complex of three ovens, presumably interconnected, was found, attached to the south wall of the room. This section of the wall shows clear evidence of intense burning. At the center of the complex is a circular oven (40.0 cm in diameter) made of clay and mudbrick. To the east of this central oven, another rectangular fire feature (61.0 cm in length x 38.0 cm in width) constructed from stone and mudbrick was discovered. To the west of the central oven, there is evidence of a fire feature, though it lacks a clearly defined structure. In the center of the room, a circular structure (30.0 cm in diameter) surrounded by hard clay or mudbrick was found, connected by lined stones to the complex of ovens. At the southern wall of the doorway, a round hole was identified at the bottom, similar to the one in the corridor doorway.



Fig. 11 Room 5 during Phase 1 (early occupation)

## Room 6 (Fig. 12)

Room 6 is located south of room 5 and the west of the corridor. It is the southernmost room in the building complex. The room has a rectangular layout, measuring 9.2 m in length x 2.7 m in width, with a remaining wall height of 80.0 cm. The southern wall, adjacent to the exterior of the building, is 1.3 m in width. The westernmost part of the room features a doorway that connects to the corridor.

Most of the structures are concentrated in the western part of the room. In the south-western corner, a heavily burnt area was found next to an ore smelting kiln. Iron slag and burnt wood were discovered in this part. Immediately west of this area, an oval (almost rectangular) iron kiln (55.0 cm in length x 44.0 cm in width), constructed from soil, was located. The remains inside and around this kiln were completely burnt. To the east of this feature, a square oven (46.0 cm in length x 44.0 cm in width), also made of soil, was found, with kaolinite, slags, and pottery sherds inside. Further east, an irregularly shaped oven, constructed from soil and containing bones, was discovered. These fire-related features are positioned close to one another, indicating a possible connection between them.



Fig. 12a Room 6 during Phase 1 (early occupation)



Fig. 12b: Slag remains recovered from furnaces in room 6.

Key artifacts of Phase 1 (Fig. 13)



Fig. 13 Key artifacts of Phase 1: a) A double-spout vessel found on the floor near the southern wall of room 1. b) Two spindle whorls found in the mudbrick-lined structure in the northwest corner of room 2. c) A stone tool found attached to the southern wall in room 2. d) A small open formed vessel with multi lobed rim and possibly two handles found in the oval fire feature in room 2. e) A square container with an incision on the rim found in the corridor near the entrance of room 4. f) A tandoor fragment with finger imprints found in the oven in room 4. g) Slags in room 6.

# Phase 2: Burial (Fig. 14)

Phase 2 represents the period when a burial was built in the location of room 6, dating from the mid/ late 7<sup>th</sup> c. CE (based on modelled radiocarbon dating), and presumably occurring during a hiatus in the Phase 1 occupation of the building complex, as it was stratigraphically cut into the Phase 1 floor of room 6, but was beneath the uppermost habitation phase (Phase 3).



Fig. 14 Burial during Phase 2

The burial is situated in the western quarter of room 6 at an elevation of 1964.8-1965m. The orientation of the burial pit is North-South, and it measures 2.25 m in length and 1 m in width. The burial contains human remains, which are interred in an extended supine position, with the face looking upward. Alongside the body to the east was the remains of an articulated (in situ) horse. A complex inventory of metal grave goods, including a pottery vessel, personal accessories, weapons, and coins, was found on and around the body (**Fig. 15**). Among the grave goods were personal ornaments such as round bronze earrings, iron items, a bark sachel bag, a bronze ring, bronze buttons with carnivore iconography, coins, and three pointed arrowheads. These items and the burial form are believed to date to the Turk Khaganate period late 7<sup>th</sup>-8<sup>th</sup> c. CE.

Key artifacts of Phase 2 (Fig. 15)



Fig. 14 Burial goods: a) Personal ornaments. b) A drinking vessel with arched handles. c) Iron dagger. d) Arrowheads.

#### Phase 3: Re-occupation of the mound

Phase 3 represents the partial reoccupation of the building complex, as indicated by evidence of small houses and stone foundations recovered in room 1 and the western portion of room 2, along with a stone foundation structure with posts built against the southern wall of room 6, extending into the outer space to the south of room 6. Artifacts, mostly metal products and pottery, were found scattered throughout the upper stratigraphy across the entire excavated area. This phase is dated from the early 8<sup>th</sup> c. CE, based on modelled calibrated radiocarbon dates, but may extend into the mid-8<sup>th</sup> and early 9<sup>th</sup> c. CE (note: the C14 calibration curve reflects a reversal in this period, leading to multiple calendar year ranges with equal probability). The elevation of the documented features ranges between 1965.3m and 1965.4m.

At the westernmost part of room 1, nearly attached to the west wall, a stone-aligned structure oriented in a north-south direction was discovered, with stones varying in size. At the easternmost part of room 1, stone features were identified.

In the western section of room 2, along the northern wall, a large cooking pot measuring was found, partially surrounded by mudbrick that appeared to form part of an oven structure (Fig. 16, 19e). Additionally, a mug was identified not far to the southeast of that feature (Fig. 19f).

The outer space is located south of room 6, where a substantial amount of ash and a burnt layer were generally observed. In the western part of this area, stone-lined features, a posthole, an oven, and fire-related features were identified (**Fig. 17**). Also, a coin depicting an Afshin and a tamga on the reverse side, was discovered in this area, which is estimated to date from the late 7<sup>th</sup> to early 8<sup>th</sup> c. CE based on direct analogues known from Zaamin. In the eastern part, a toilet pit (1 m in diameter) was discovered (**Fig. 18**), containing coprolites, bird bones, a nearly complete skeleton of a juvenile sheep/goat, and a complete pottery vessel. Comprehensive soil samples were taken for future archaeobotanical recovery.



Fig. 16 The western section of room 2 during Phase 3 (re-occupation of the mound)



Fig. 17 The outer space during Phase 3 (re-occupation of the mound



Fig. 18 The toilet (bodrab), during Phase 3 (re-occupation of the mound

Key artifacts of Phase 3 (Fig. 19)



Fig. 19 Key artifacts of Phase 3: a) An iron sword found in room 5. b) A coin found in room 6. c) A bronze item found in the toilet. d) A jug found in the toilet. e) A cooking vessel found in room 2. f) A mug found in room 2.

Spatial modeling and 3D architectural reconstruction

During the excavation, we established a permanent site grid system using advanced GPS technology (GNSS) and total stations. Survey and site datums were created to construct the core GIS platform, which integrated survey data and excavation findings into a 3D digital analytical environment. Architectural remains at TGB were meticulously mapped using 3-dimensional photogrammetry software, facilitating the digital reconstruction of buildings with high-resolution oblique photography. A series of high-resolution photographs were captured from various angles, allowing photogrammetry software to produce realistic digital models of the buildings. Beyond serving as a visual archive, the data enabled quantitative analysis, providing insights into construction techniques, physical dimensions, engineering properties, and virtual simulations of movement and viewing within the reconstructed city. This work was led by M. Frachetti at the Spatial Analysis, Interpretation, and Exploration (SAIE) Laboratory at Washington University in St. Louis.

#### Material analysis and conservation

All archaeological materials, including ceramics, metals, glass, and human and animal remains, were documented and photographed in the field, then labeled, bagged, and transported to the laboratory at the National Center of Archaeology in Tashkent. Local ceramic specialists from the Uzbek team alongside other project specialists will work to catalog, sort, illustrate, and conserve pottery uncovered during excavations. Additional finds, such as coins, metal tools, weapons, jewelry, and stone implements were catalogued during excavation with basic attribute analysis conducted onsite by team members under the direction of M. Frachetti and F. Maksudov. After complete documentation, all excavated trenches were sealed with a non-permeable membrane and completely backfilled to the original surface levels.

#### **Concluding remarks**

The medieval history of Central Asia has long been defined as an interplay between two deeply rooted political-economic systems: urbanized agrarian empires and nomadic tribal confederacies (i.e. *khanates*) (Grousset 1939; Krader 1978; Lattimore 1940: 77; Weissleder 1978). Archaeological and historical evidence clearly illustrates that Central Asian cities fostered the growth and political hegemony of regional empires, serving as hubs for production and trade, religious expansion, and political power for thousands of years (Khazanov 2005; Hansen 2012; Golden 2003; Baumer and Novak 2019). Almost by definition, however, highland (nomadic) polities have been viewed as untethered by urbanism, instead generating their political power from swift-moving cavalries and confederated tribal networks based in the steppes, mountains, and deserts of Central and Inner Asia (Chaliand 2004, cf. Sneath 2007). All the while, highland regions and their populations are uncritically assumed to be dependent upon the agrarian and technological productivity of lowland centers and their political influence (Khazanov 1994).

Challenging this narrative, the results of the 2024 field campaign at Tugunbulak illustrate a long-standing integration of nomadic and urban institutions starting at the time of the first Turkic Khaganate (ca. 560 CE) and the development of a complex political and economic center in highland Ustrushana throughout the  $6^{th}$ ,  $7^{th}$  c. CE. While future field campaigns will shed much needed light on this question, the coinage, chronology, and burial traditions thus far recovered from mound A2 at Tugunbulak point to a population most likely aligned with medieval Turks, who were engaged in metallurgical production and the management of this large, highland urban constellation until the mid  $8^{th}$  c., if not early  $9^{th}$  c. CE.

Medieval archaeological research in Central Asia points to appreciable social diversity in lowland centers and competitive political dynamics across a range of regional geographies, where communities of Turks, Persians, Arabs, Chinese (and others) fused and fissured to shape a complex political landscape from the 6<sup>th</sup> to 12<sup>th</sup> c. CE (Mantellini and Berdimuradov 2005). Meanwhile, our own previous archaeological work in the highlands has documented abundant occupation throughout Ustrushana by mobile pastoralists in the medieval period (Frachetti and Maksudov 2014). These facts suggest the existence of a broader complexity of political forces at play across the economic and social landscape of medieval Central Asia, especially in the highland realms.

As one of the largest known highland urban settings in medieval Central Asia, TGB has vast potential to revise the canonical history and archaeological narrative generated from lowland Central Asian cities. Building from our preliminary data showing dense architectural investment, diverse forms of economic production and trade, and robust political signaling of Turkic identity at Tugunbulak, the **SR-HUBs project** aims to continue the archaeological campaign of in-depth excavations to provide the requisite detail and range of archaeological data to expand our understanding of the social, economic, and political landscape of Central Asia – especially in the highlands – throughout the early medieval era.

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