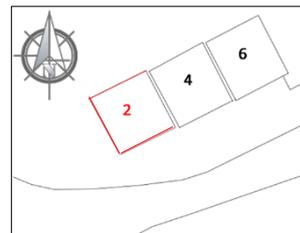


Date: September - October 2018

Person in charge: Lea Puglisi



PN_EN_02 south, west and north side of the tomb.

Dangers and Risks for Visitors

Masonry - cornice

Static Problems

Possible subsidence of the ground

Large Cracks in Masonry (Reason?) key beam entrance

Deformation of Wall

Other

Damages

Unfunctional / defect Rain Tubes

Material loss

Loss structural Elements

Missing Mortar (Joints, Cornices)

Lacuna of Stone/Brick

Cracks

Detachment (originals + overlapped layers of the cornice)

Erosion

Powdering/Sanding

Mortar

POMPEJI SUSTAINABLE PRESERVATION PROJECT

State of Conservation

Tomb Nr. PN_EN_02

		X	Stone/Brick
			Scaling
			Deposit (Dust + soil)
Collapsing Areas	X		Loose Stone/Brick
			Other
Salts			
Biological Colonization	X		Biodeteroration
	X		Plants/Roots
Plaster/Stucco			
Structural Damages	X	X	Lacuna Total Loss of Render / Masonry visible
		X	Loss of Intonaco / Preparatory Layer visible
		X	Partial Loss of Intonaco / Eroded Surface
	X	X	Cracks Surface Cracks
		X	Deep Cracks
	X	X	Detachments Intonaco
		X	Preparatory Layer
			Intonaco & missing Preparatory Layer
			Detachment from Structure
	X	X	Flaking Intonaco
			Preparatory Layer
	X	X	Powdering/Sanding Intonaco
			Preparatory Layer
			Deformation
Salts			
Biological Colonization	X		Biodeterioration - lichens outside - the most of the deterioration is concentrated inside the tomb

POMPEJI SUSTAINABLE PRESERVATION PROJECT

State of Conservation

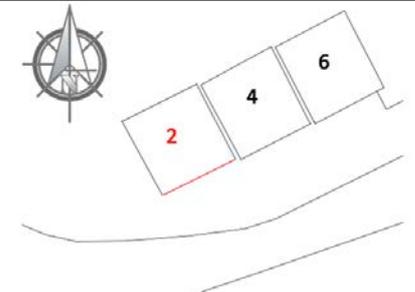
Tomb Nr. PN_EN_02

X Plants/Roots - most on the rock basement

Notices / Observations / possible Reasons in general:

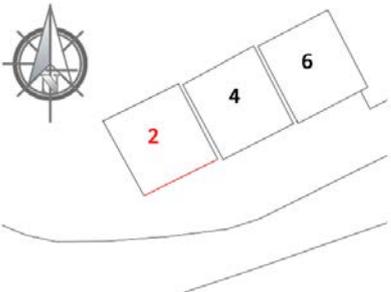
Persons in charge: Henrieke Drengemann, Ivan Martinovic
Digitalization: Lea Oetinger, Kire Stavrov
Date: Sept. 2018



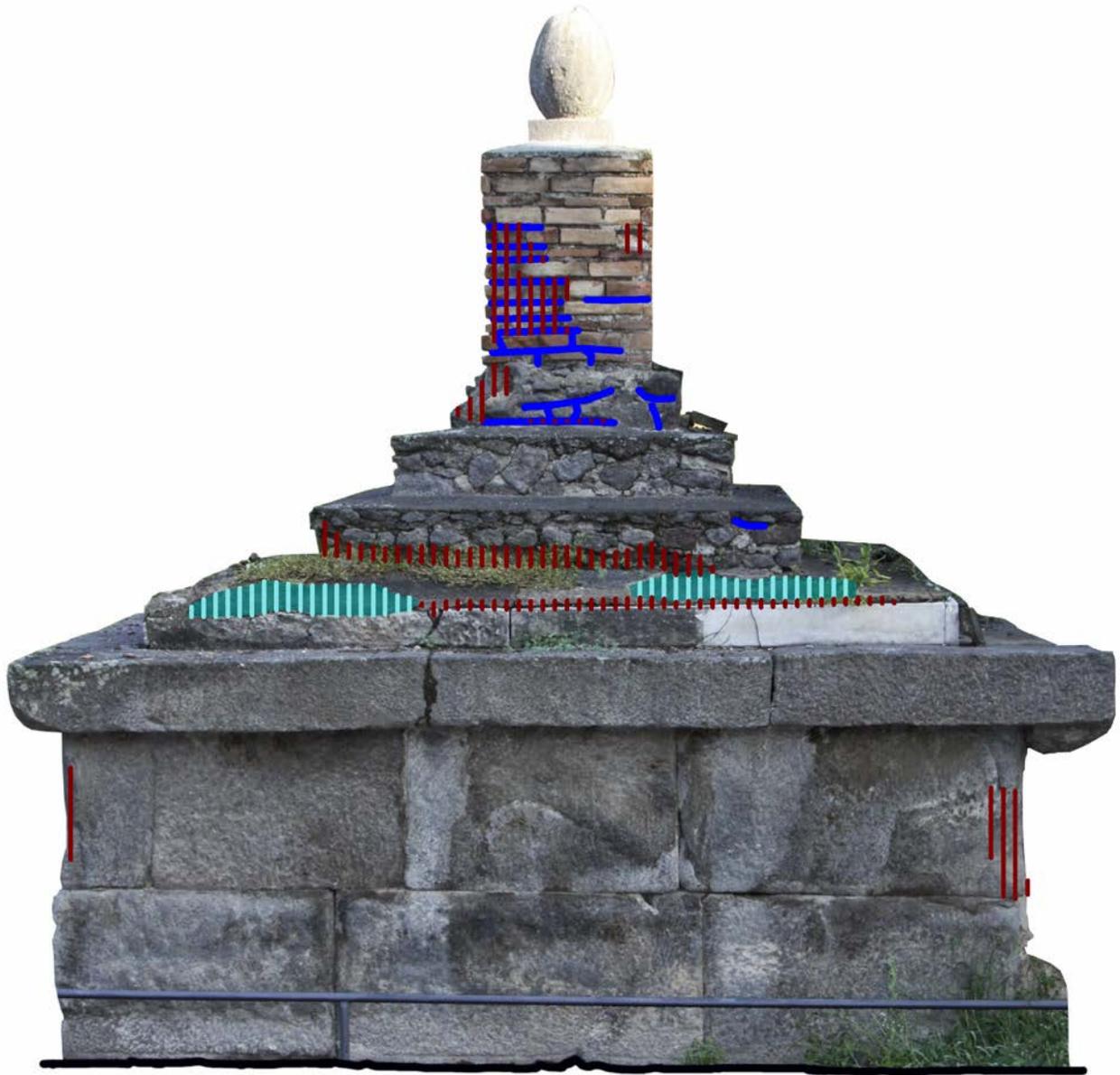
<p>Emergency mapping: State of conservation</p> <p>Tomb no. PN_EN_02 south</p> <p>Titel: Priority damages</p>	<table border="1"><tr><td></td><td>Collapsing elements (Structure)</td></tr><tr><td></td><td>Movable detachment</td></tr><tr><td></td><td>Non movable detachment</td></tr><tr><td></td><td>Cracks</td></tr></table>		Collapsing elements (Structure)		Movable detachment		Non movable detachment		Cracks	 <p>A north arrow is located at the top left of the diagram. To its right is a site plan showing three rectangular structures labeled 2, 4, and 6. Structure 2 is highlighted with a red border. Below the site plan are two curved lines representing a path or boundary.</p>
	Collapsing elements (Structure)									
	Movable detachment									
	Non movable detachment									
	Cracks									

Persons in charge: Henrieke Drengemann, Ivan Martinovic
 Digitalization: Lea Oetinger, Kire Stavrov
 Date: Sept. 2018



<p>Emergency mapping: State of conservation</p> <p>Tomb no. PN_EN_02 south</p> <p>Titel: Superficial layer damages</p>	<table border="0"> <tr> <td></td> <td>Loss of cohesion</td> </tr> <tr> <td></td> <td>Erosion</td> </tr> <tr> <td></td> <td>Flaking</td> </tr> <tr> <td></td> <td>Scaling</td> </tr> </table>		Loss of cohesion		Erosion		Flaking		Scaling	
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Persons in charge: Henrieke Drenemann, Ivan Martinovic
Digitalization: Lea Oetinger, Kire Stavrov
Date: Sept. 2018

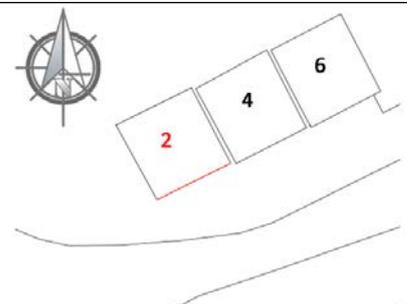


Emergency mapping:
State of conservation

Tomb no. PN_EN_02 south

Titel: Missing elements

-  Missing elements (structure)
-  Missing joint mortar
-  Lacuna (Coccio pesto layer)



Persons in charge: Henrieke Drengemann, Ivan Martinovic
Digitalization: Lea Oetinger, Kire Stavrov
Date: Sept. 2018

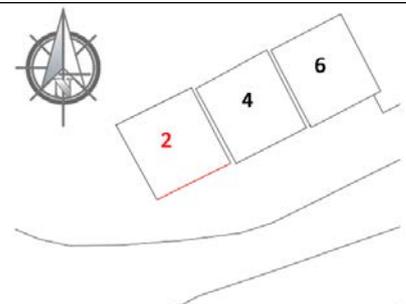


Emergency mapping:
State of conservation

Tomb no. PN_EN_02 south

Titel: Biological colonization

-  Plants/Roots
-  Biodeterioration



Conservation Treatment

Tomb Nr. PN_EN_02_S

P XXIV 2 2 S

Treatment Number: PN_EN_02 south (1/2)	Period of Treatment: 08.10.2018-12.10.2018
Person in charge: Henrieke Drengemann	

Type of Object: pedestal bricked from tufa, staircase pyramid with brick and lava stone structure, cocciopesto layer on the basement of the upper part used as a protective layer overlap the marble slab	Position: upper part of the tomb
Damage: 1. Growing of plants 2. missing or loose joint mortar 3. Missing elements of the lavastone 4. Big sized hole 5. Cracks and missing elements of the <i>cocciopesto</i> original layer 6. Cracks and missing elements of the overlapping <i>cocciopesto</i> layer	Kind of Treatment: 1. Cleaning of the whole tomb, Removing the plants 2. Filling holes/gaps and missing parts of the roman joint mortar with new created mortar (test area) 3. Filling the parts of the missed lavastone with mortar 4. Testing new mortar for cracks and edging repair of the <i>cocciopesto</i>

Used Materials					
 <p>Figure 1 PN_EN_02 south working area</p>	Used Materials				
	Mortar filling	Joint Mortar JM2			
	Mortar filling	Cocciopesto C3			
	Mortar filling	Cocciopesto C4			
Sampling	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Pre-Treatment Analysis	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Sample-Number:	-		Analysis-Number:	-	
Photos: PN_EN_02_Ge_IMG_0087, PN_EN_02_S_DSCN3705 PN_EN_02_S_IMG_2023, PN_EN_02_S_IMG_2273 PN_EN_02_S_IMG_2114, PN_EN_02_S_IMG_2116, PN_EN_02_S_IMG_2278 PN_EN_02_Ge_IMG_0132, PN_EN_02_Ge_IMG_0142					

Conservation Treatment**Tomb Nr. PN_EN_02_S**

The main focus lies on the upper part of the tomb due to the high proportion of missing joint mortar (Figure 1). The intervention also aimed at stopping water from entering the tomb. Several mortar recipes were created to find a mortar similar to the existing one. The restoration mortar should resemble the existing one in its grain size distribution and appearance. It is possible to use the recipe of the restoration mortar for future intervention of the tomb.

Cleaning

The plants, which were growing on the different levels of the tomb, especially in the lower part, were removed. A solution of water and ethyl alcohol (1:1) was sprayed to kill them. Loose joint mortar between the brick and the lava stone structure were removed. Furthermore, the tomb was cleaned from dust by using a brush (Figure 2).

Mortar fillings (brick)

Before applying the joint mortar (JM2) between the bricks, the joints were wetted with demineralized water. The restoration mortars were applied with different spatulas at the same level of the original one (Figure 3). After a short time, the surface finishing was created by spraying water and collecting it with a sponge so that the color of the grains was more visible. In order to create an optically improved adaption to the environment, the restoration mortars were treated with *acqua sporca*. To guarantee an effective carbonization and because of the sun exposition of the lime mortar, it was necessary to wet the mortar from time to time.

Mortar fillings (lava stones)

As for the fillings of the joint mortar, the first step was to pre-wet the area with demineralized water. Between the lava stones the created mortar (C3) was applied with a spatula in a sloped way, following the angle of the *coccio pesto*. The surface finish was made by spraying water and collecting it with a sponge in order to get a better visible color of the grains. The last step was again the use of *acqua sporca* in order to create a better adaption to the environment. After a certain time the mortar were sprayed with water (Figure 4 - 6).

Mortar fillings (coccio pesto)

A type of mortar (C4) was created to fill the cracks and the edging of the *cocciopesto*. During the summer academy, it was possible to apply this mortar in a first attempt by following the steps which were explained in the upper part of these intervention documentation (Figure 7).

Cleaning



Figure 2 Before and after the dry and wet cleaning of the tomb (PN_EN_02_Ge_IMG_0087, PN_EN_02_S_DSCN3705)

Mortar fillings



Figure 3 Before and after the mortar fillings (PN_EN_02_S_IMG_2023, PN_EN_02_S_IMG_2273)



Figure 4 Cleaning and removing of detached Coccio pesto layers
(PN_EN_02_S_IMG_2114)



Figure 5 During the work
(PN_EN_02_S_IMG_2116)



Figure 6 After the filling of the gaps with restoration mortar C3
(PN_EN_02_Ge_IMG_2278)

Filling of Coccio pesto mortar (testing)



Figure 7 Mortar filling Coccio pesto (PN_EN_02_Ge_IMG_0132, PN_EN_02_Ge_IMG_0142).

Conservation Treatment

Tomb Nr. PN_EN_02_S

P XXIV 2 2 S

Treatment Number: PN_EN_02 south 2/2	Period of Treatment: 02.10.2018-03.10.2018
Person in charge: Silja Walz	

Type of Object: monolithic stone basement	Position: east side
Damage: 1. Flaking, scaling, powdering of the stone surface	Kind of Treatment: 1. Consolidation and Filling

Used Materials													
 <p>Figure 1 Tomb PN_EN_02, state of conservation (right corner)</p>	<table border="1"> <thead> <tr> <th colspan="2">Used Materials</th> </tr> </thead> <tbody> <tr> <td>Consolidation</td> <td>KSE 300</td> </tr> <tr> <td>Mortar</td> <td>KSE 300-100 River sand grey (<0,25 mm)</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Used Materials		Consolidation	KSE 300	Mortar	KSE 300-100 River sand grey (<0,25 mm)						
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<table border="1"> <tr> <td>Sampling</td> <td> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No </td> <td> <table border="1"> <tr> <td>Pre-Treatment Analysis</td> <td> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No </td> </tr> </table> </td> </tr> </table>	Sampling	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<table border="1"> <tr> <td>Pre-Treatment Analysis</td> <td> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No </td> </tr> </table>	Pre-Treatment Analysis	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No								
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<table border="1"> <tr> <td>Sample-Number:</td> <td>-</td> <td>Analysis-Number:</td> <td>-</td> </tr> </table>	Sample-Number:	-	Analysis-Number:	-									
Sample-Number:	-	Analysis-Number:	-										
Photos: PN_EN_02_S_IMG_2335, PN_EN_02_S_IMG_2336, PN_EN_02_S_IMG_23356, PN_EN_02_S_IMG_2337, PN_EN_02_S_IMG_2053													

Conservation Treatment**Tomb Nr. PN_EN_02_S**

The pedestal of the tomb is made of monolithic tufa bricks. In this area are visible flaking, scaling and powdering damages of the stone surface (Figure 1). The aim of the intervention is to consolidate a previously selected testing area by using Silicate based binders (KSE 300 Remmers). In addition, a repair mortar with fine river sand (< 0.25 mm) and KSE 300¹ (+KSE 100) as binder was developed to fill small cracks and scales. A salt analysis was carried out in situ (check salt test) before the intervention was started.

Cleaning

The areas were cleaned from dust by using a bulb syringe and a small brush. To ensure a good bond between the repair mortar and the stone surface, the surface was wet cleaned with alcohol to remove dust (Figure 3).

Consolidation

KSE 300 was applied with a syringe and cannula around 4-5 times until the surface would stay wet and the stone would not absorb anymore (Figure 4).

Mortar fillings

An ad hoc created repair mortar was used to fill in scales and gaps and applied with a small spatula (Figure 4). During the intervention, the mortar seemed too weak. Because of this, the mortars were consolidated with KSE 300 and KSE 100 around 3 times on the following day.

Notes

After the intervention, a detailed inspection was carried out and salt was detected on the surface. Due to the apparently high salt content in the structure of the pedestal, consolidation is questionable.

¹Discussion with Benjamin Hübner M.A. (Fachlabor für Konservierungsfragen in der Denkmalpflege)

Working area, state of conservation



Figure 2 Tomb PN_EN_02 south and detail of the selected working area (PN_EN_02_S_IMG_2337)

Cleaning



Figure 3 Dry and wet cleaning of the surface ((PN_EN_02_S_IMG_2053, PN_EN_02_S_IMG_2334)

Consolidation



Figure 4 Consolidation and filling of smallcracks and detachment (PN_EN_02_S_IMG_2335, PN_EN_02_S_IMG_2336)

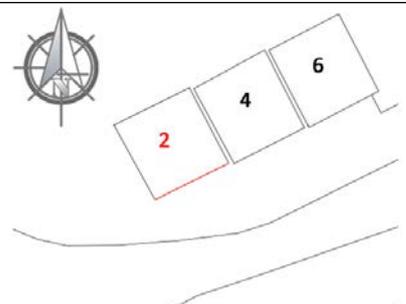
Persons in charge: Henrieke Drenemann, Silja Walz
Digitalization: Lea Oetinger, Kire Stavrov
Date: Sept. 2018



Treatment mapping

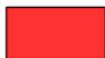
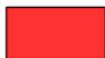
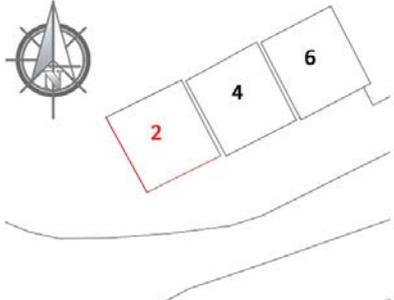
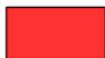
Tomb no. PN_EN_02 south

-  Mortar Fillings/ Joint mortar fillings
-  Consolidation

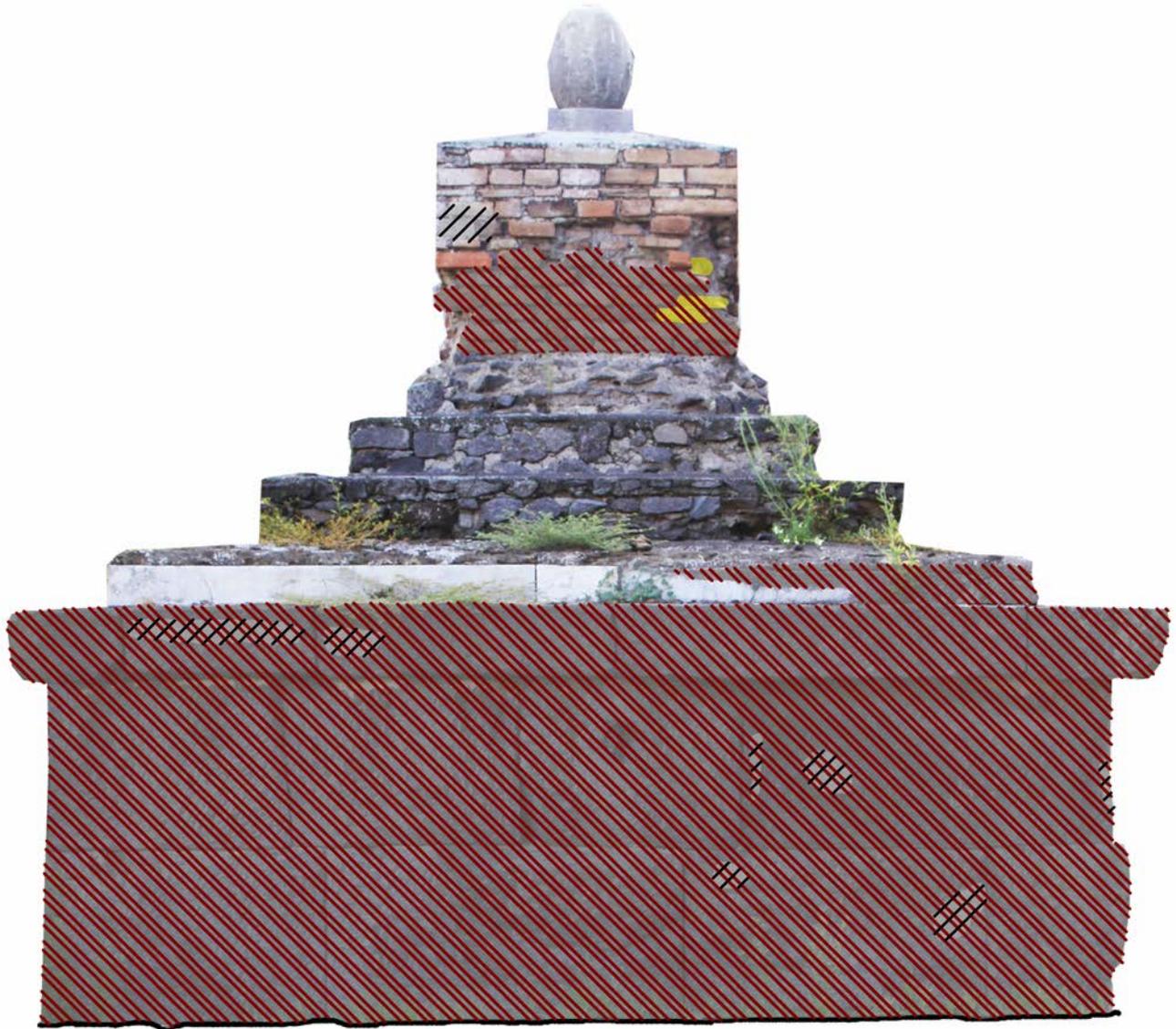


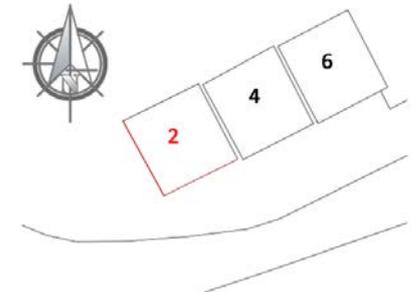
Persons in charge: Henrieke Drengemann, Ivan Martinovic
Digitalization: Lea Oetinger, Kire Stavrov
Date: Sept. 2018



<p>Emergency mapping: State of conservation</p> <p>Tomb no. PN_EN_02 west</p> <p>Titel: Priority damages</p>	<table border="0"><tr><td></td><td>Collapsing elements (Structure)</td></tr><tr><td></td><td>Movable detachment</td></tr><tr><td></td><td>Non movable detachment</td></tr><tr><td></td><td>Cracks</td></tr></table>		Collapsing elements (Structure)		Movable detachment		Non movable detachment		Cracks	
	Collapsing elements (Structure)									
	Movable detachment									
	Non movable detachment									
	Cracks									

Persons in charge: Henrieke Drengemann, Ivan Martinovic
Digitalization: Lea Oetinger, Kire Stavrov
Date: Sept. 2018



<p>Emergency mapping: State of conservation</p> <p>Tomb no. PN_EN_02 west</p> <p>Titel: Superficial layer damages</p>	<ul style="list-style-type: none"> Loss of cohesion Erosion Flaking Blistering Scaling	
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Persons in charge: Henriek Drengemann, Ivan Martinovic
Digitalization: Lea Oetinger, Kire Stavrov
Date: Sept. 2018

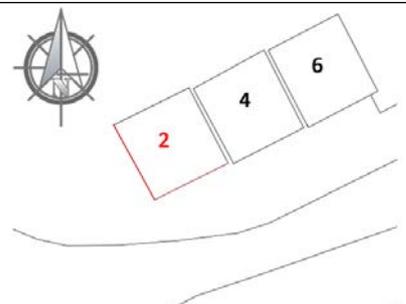


Emergency mapping:
State of conservation

Tomb no. PN_EN_02 west

Titel: Missing elements

-  Missing elements (masonry)
-  Missing joint mortar
-  Lacuna

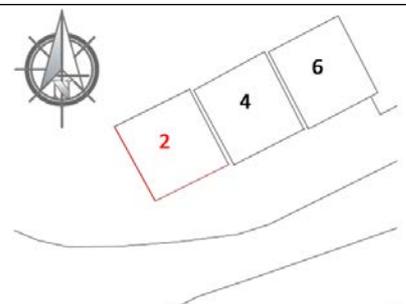
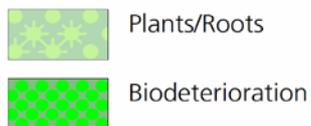


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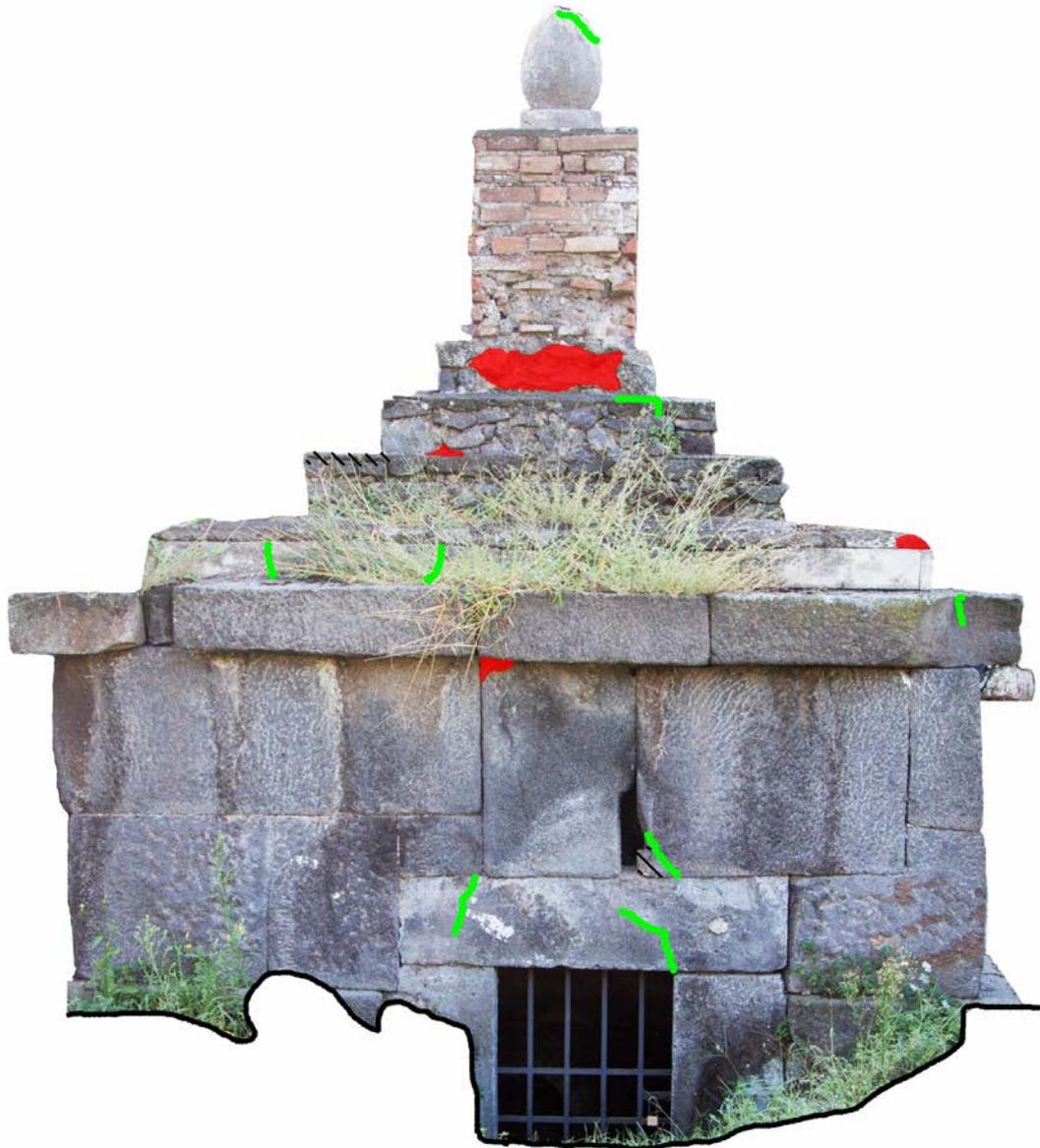


Emergency mapping:
State of conservation

Tomb no. PN_EN_02 west
Titel: Biological colonization



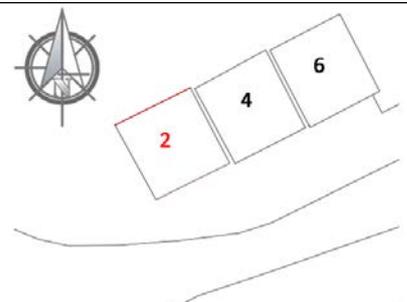
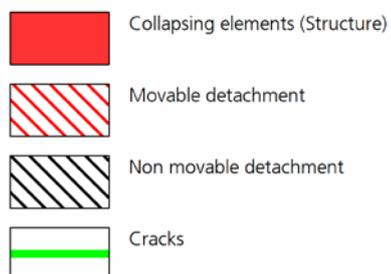
Person in charge: Henrieke Drengemann
Digitalization: Lea Oetinger, Kire Stavrov
Date: Sept. 2018



Emergency mapping:
State of conservation

Tomb no. PN_EN_02 north

Titel: Priority damages



Person in charge: Henrieke Drengemann
Digitalization: Lea Oetinger, Kire Stavrov
Date: Sept. 2018

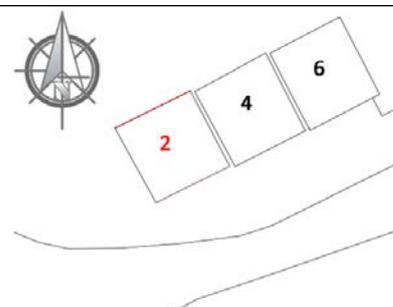


Emergency mapping:
State of conservation

Tomb no. PN_EN_02 north

Titel: Superficial layer
damages

-  Loss of cohesion
-  Erosion
-  Flaking
-  Blistering
-  Scaling



Person in charge: Henrieke Drengemann
Digitalization: Lea Oetinger, Kire Stavrov
Date: Sept. 2018

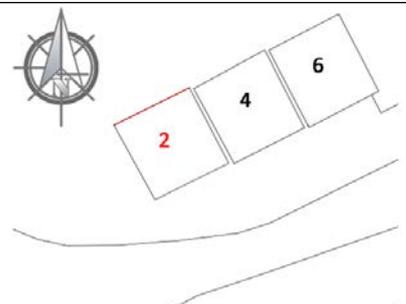


Emergency mapping:
State of conservation

Tomb no. PN_EN_02 north

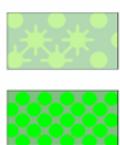
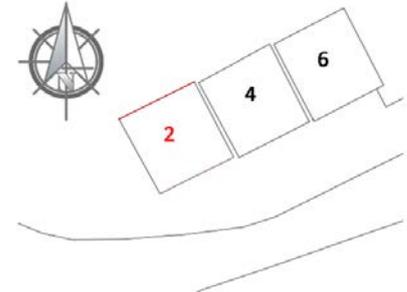
Titel: Missing elements

-  Missing elements (masonry)
-  Missing joint mortar
-  Lacuna



Person in charge: Henrieke Drengemann
Digitalization: Lea Oetinger, Kire Stavrov
Date: Sept. 2018



<p>Emergency mapping: State of conservation</p> <p>Tomb no. PN_EN_02 north</p> <p>Titel: Biological colonization</p>	 <p>Plants/Roots</p> <p>Biodeterioration</p>	
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