

**Ancient Monuments and Archaeological Areas Act 1979**

It is important that you read the accompanying guidance notes as incorrect completion will delay the processing of your application. You can complete and submit this form by email ([hs.smc@scotland.gsi.gov.uk](mailto:hs.smc@scotland.gsi.gov.uk)) or by post to Heritage Management Business Support, Historic Environment Scotland, Longmore House, Salisbury Place, Edinburgh, EH9 1SH.

**1 Applicant name and address**

<b>Title</b>	Miss	<b>First Name</b>	Anna	<b>Surname</b>	Serafini
<b>Company / Organisation</b>	University of Strathclyde				
<b>Building No / Name</b>	29 / Flat 2/1				
<b>Street</b>	Park road				
<b>Town / City</b>	Glasgow				
<b>County / Region</b>					
<b>Postcode</b>	G49JD				

**2 Monument to which application applies**

<b>Index no</b>	1539-42	<b>Name</b>	Stirling Castle Palace and King's Old Buildings		
<b>Local Authority</b>		<b>Grid Ref</b>			
<b>Description of location of land</b>					

**3 Pre-application discussions**

<b>Have you undertaken pre-application discussions with Historic Environment Scotland? (If yes, please give details below)</b>	<b>Y</b> <input checked="" type="checkbox"/>	<b>N</b> <input type="checkbox"/>
The application has been discussed and agreed with Tom Gaze, the architect responsible for Stirling Castle, and with Oliver Lewis, Senior Heritage Management Officer (Ancient Monuments)		

**4 Summary of proposed works (max 20 words)**

Assessment of the timber roof structures, comprising visual inspection and in-situ testing (use of thermometer, hygrometer, thermal camera, etc)
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**5 Description of proposed works**

<p>The assessment of the timber roof structures will comprise:</p> <ol style="list-style-type: none"> <li>measurement of the air temperature/relative humidity with a thermometer.</li> <li>removal of loose splinters (see attached document for pictures and location of these splinters) to proceed with microscopic identification of the timber species. Two samples per each structural type of element (rafter, collar, sarking, etc) should be collected as it might happen that the splinters are too decayed to be analysed. The species identification is useful for eventual repair interventions to be</li> </ol>
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done, but it is also necessary to interpret results from Visual Strength Grading of the timbers and to calibrate in-situ testing devices used to assess the timber condition, such as the hygrometer, the thermal camera, etc.

3. Visual Strength Grading (VSG) of the timbers, which comprises measuring the resisting section, the slope of grain, the knots and eventual drying fissures and shakes – this allows to place the timbers in a resistance class providing us with an estimation of their mechanical properties; the identification of the timber species is necessary to interpret results from VSG. VSG will be carried out on approximately one frame every four in each roof.

4. mapping of all the visible material degradation (insect/fungi attack) and damage (cracks, deformations, etc).

5. use of a rubber hammer to 'sound' the timber in search for possible internal decay/damage.

6. use of an electronic hygrometer to measure the wood moisture content. The selected hygrometer is equipped with a resistance-based measuring technique with universal wood species correction (therefore it is necessary to input the timber species previously identified) for each type of wood and with automatic temperature compensation. It is a minor-destructive test as it utilizes an electrode with 2 60mm long insulated pins (about 2mm diameter) that must be driven into the wood – this allows to measure the moisture content within the wood, rather than on the surface. See attached technical sheets. The hygrometer will be used on 3 frames per roof: the frames next to the walls and a central one – unless there are accessibility problems, in that case the closest frame to the previously chosen one will be tested. If visible decay/damage and the hammer sounding suggest possible internal damage in other timber elements, the hygrometer will be used on them as well, in order to be able to proceed with the ultrasonic test (results from the ultrasonic device are influenced by the moisture content – it is therefore necessary to measure the moisture content in all places where the ultrasonic device is to be used).

7. use of an ultrasonic device in search for possible internal decay/damage. This test will be carried out in all places where internal damage/decay is suspected to be present. The timber species identification and the measurement of the wood moisture content are necessary to be able to interpret correctly the results of the ultrasonic test.

8. use of a thermal camera to spot humid areas; the timber species identification is necessary to input the emissivity parameter in the thermal camera.

9. use of a snake camera to try to see invisible parts of the structure, such as the connection with the wall.

This work will allow to identify eventual critical areas where it is highly probable that internal decay is present. The Resistance microdrilling device will then be used in these critical areas to identify the extent of internal damage. It is a minor destructive device that provides density profiles of wood by measuring the energy consumed by a thin borer (3mm diameter) that penetrates the timber all through its section. The model that will be used is an IML RESI-F400, recently purchased by HES (see attached technical sheet).

These works are funded by HES. The applicant will agree access arrangements with a relevant member of HES staff and the works will be overseen by a member of the MCU. The applicant will give HMD 24 hours prior notice of the timetable for works, and within 3 months after completion of field work she will send HES a copy of the report.

<b>6 List of plans, drawings and other documents accompanying application (continue on separate sheet if necessary)</b>				
No	Description	Reference	Document emailed	Document posted
1.	General location map	A1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2.	Location and pictures of loose splinters to be collected for the timber species identification	A2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3.	Location of other in-situ tests	A3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4.	Hygrometer technical sheet	B1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5.	Resistograph technical sheet	B2	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**7 Nature Conservation – Protected Places and Species**

Will the proposed works affect any of the following:

Yes	No	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Site of Special Scientific Interest
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Special Protection Areas
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Special Areas of Conservation
<input type="checkbox"/>	<input checked="" type="checkbox"/>	European Protected Species

**If Yes, please give details below**

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**8 Other information relevant to application**

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**9 Declaration**

I hereby apply for scheduled monument consent for the works described in this application and shown on the accompanying plans and drawings.

I confirm that the information I have given on this form is true and accurate.

<b>Name</b>	Anna Serafini	<b>Date</b>	25/02/2016
<b>On behalf of</b>			

Where an application is being dealt with by an agent to whom correspondence should be sent, state the:-

<b>Name of Agent</b>		<b>Tel No</b>	
<b>Address</b>			
		<b>Post Code</b>	