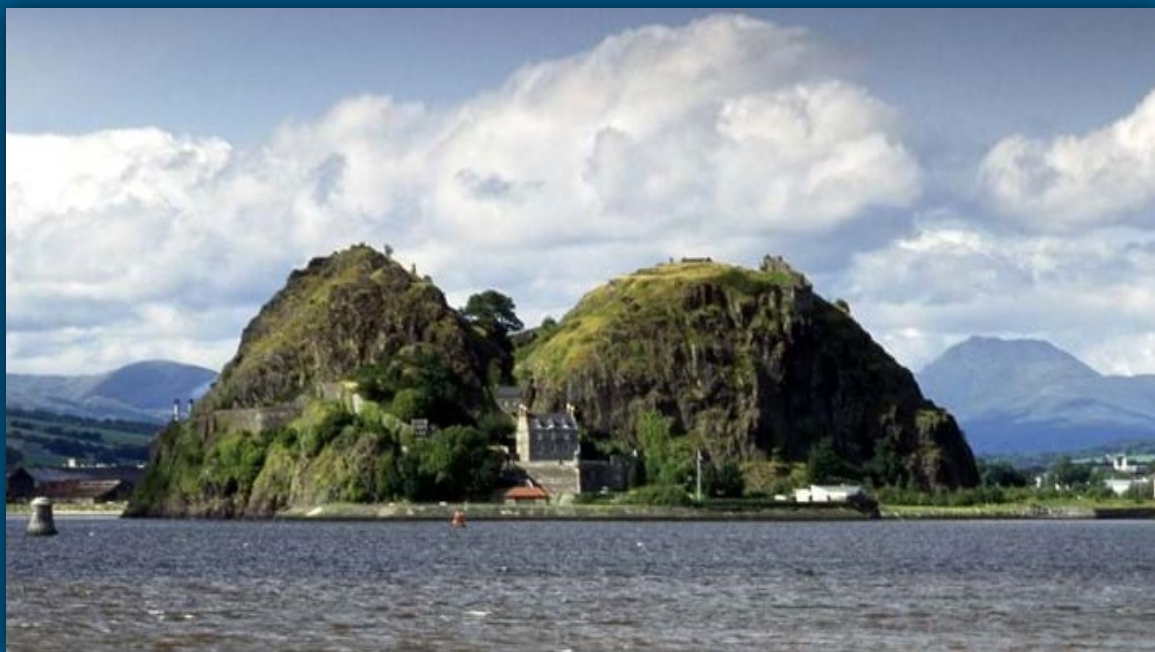


Tactile safety inspection of high-level fabric

REPORT Dumbarton Castle PIC120



HISTORIC
ENVIRONMENT
SCOTLAND

ÀRAINNEACHD
EACHDRAIDHEIL
ALBA

November 2022

CONTROL SHEET

Document Control

Title:	Tactile safety inspection of high-level fabric Report PIC120 Dumbarton Castle
Authors:	[REDACTED]
Document created:	November 2022
Reviewed by:	[REDACTED]
Date Reviewed:	20/12/2022
Approved by:	[REDACTED]
Date of Approval:	20/12/2022
Version Number:	V0001

Version Control

Version	Date	Status	Prepared by	Amendments
V0001	21/11/2022	Draft	[REDACTED]	First draft
V0100	20/12/2022	Approved	[REDACTED]	

High-Level Tactile Inspection: Report - Introduction



PIC ID # ↓	PIC120	Site name	Dumbarton Castle		
Inspection start	28/06/2022	Inspection end		Submission	
Lead Inspector	[REDACTED]				
Other inspectors	[REDACTED]				

Introduction:

The High-Level Fabric Inspection of Dumbarton Castle was lead by [REDACTED], Lead Inspector and [REDACTED], Deputy Lead Inspector and carried out with Inspectors [REDACTED]. Risk Mitigation survey (Zone 10) on 28th and 29/06/2022 and Main HLM Survey from 26/09/2022 to 20/10/2022.

The Inspection Team assessed 50 zones covering the whole monument, using a range of high level access equipment, mainly rope access, but also MEWP, and ladders. For the MEWP ground mats below MEWP protected the ground and in particular archaeologically sensitive areas.

HLF Inspection Risk Matrix:

HES-T1C-HLF-RAS-X-X-V0102-RiskMatrix

Consequence \ Probability		1	2	3	4	5
		No injury	Minor injury	Moderate injury	Major injury	Fatal or life-altering injury
5	Fabric fall almost certain	5	10	15	20	25
4	Fabric fall highly likely	4	8	12	16	20
3	Fabric fall likely	3	6	9	12	15
2	Fabric fall unlikely	2	4	6	8	10
1	Fabric fall highly unlikely	1	2	3	4	5

RISK RATING	RISK SCORE RANGE
High	15 - 25
Medium	10 - 14
Low	1 - 9



Re-inspection frequency: (in years)

		Annual Visitor Numbers				
		up to 5 k	5-20 k	20 - 100 k	100k - 2m	over 2 m
Identified Risk Rating	Low	5 years	5 years	5 years	4 years	4 years
	Medium	3 years	3 years	2.5 years	2 years	2 years
	High	1 year	1 year	1 year	1 year	0.5 year

HL Zones:

Zone:	Colour:	Zone Name:
1		Outer Sentinel Wall- E incl entry gates
2		Outer Sentinel Wall - seaward face
3		Outer Sentinel Wall - E int
4		Coal Shed/MCU Depot
5		KG Battery E flank walls - ext
6		KG Battery E face incl entry foresteps - ext
7		KG Battery W face - ext
8		KG Battery castle entry dog lef stairs
9		KG Battery E flank wall - int
10		Sour Battery S & E faces - KG W flank wall
11		Great Hall retaining wall
12		Steps adjacent to Governor's House
13		Governor's House East Gable Incl. Chimneys
14		Governor's House South Elevation Incl. Chimneys
15		Governor's House North Elevation Incl. Roof
16		Governor's House West Gable Incl. Chimneys
17		Governor's House North Flying stair and retaining walls
18		Spur Battery East and Garden Terrace Walls
19		Spur Battery and Latrine - Inner face
20		Wallwalk Steps - Spur to Spanish Batteries - Internal
21		Sea Defence wall - Spur to Spanish Batteries - Internal
22		Sea Defence wall - Spanish to Bower Batteries - Internal
23		Sea Defence wall - Spanish to Bower Batteries - external
24		Garden Steps and Terrace wall

Link to 3D model: Not Available

HL Zones:

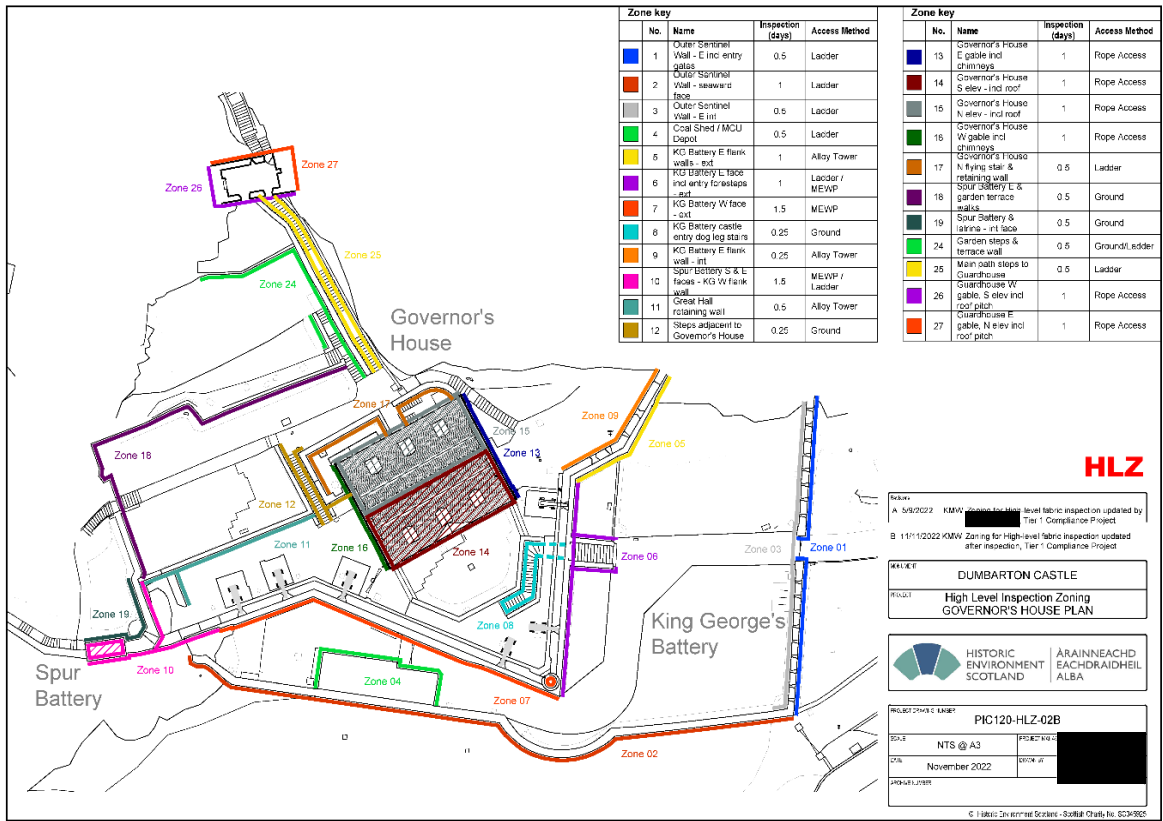


<i>Zone:</i>	<i>Colour:</i>	<i>Zone Name:</i>
25	Yellow	Main Path Steps to Guardhouse
26	Purple	Guardhouse West Gable, South Elevation inc Roof pitch
27	Orange	Guardhouse, East Gable, North Elevation inc Roof pitch
28	Cyan	Portcullis Arch and flank retaining walls
29	Light Orange	Steps over Portcullis Arch
30	Magenta	Over Bailey Drystone Retaining Wall at top of stairs
31	Teal	Well House Stairs
32	Gold	French Prison West Elevation Inc Roof pitch
33	Dark Blue	French Prison North Gable
34	Dark Red	French Prison East Elevation Inc. Roof Pitch
35	Grey	French Prison Elevation South Gable
36	Dark Green	Wallace Tower
37	Brown	One Gun and Duke of York's Battery - Internal
38	Purple	Duke of York's Battery - Internal
39	Dark Grey	North Defence Wallace Tower to Duke of Argyll's Battery - External
40	Light Blue	North Defence Wallace Tower to Duke of Argyll's Battery - Internal
41	Blue	North Defence Wall Internal Incl. Duke of Argyll's Battery
42	Brown	North Defence Wall external Inc. Duke of Argyll's Battery
43	Grey	North Defence Wall Inc. Prince Regent's Battery
44	Green	North Defence Wall Inc. Prince Regent's external
45	Yellow	North Defence Wall Inc. Sentry Box to Crane Bastion - Internal
46	Purple	North Defence Wall to Crane Boston - external
47	Orange	Crane Bastion
48	Cyan	Blast Wall of Magazine - external
49	Light Orange	Blast Wall of Magazine - internal
50	Magenta	Magazine Inc. Roof

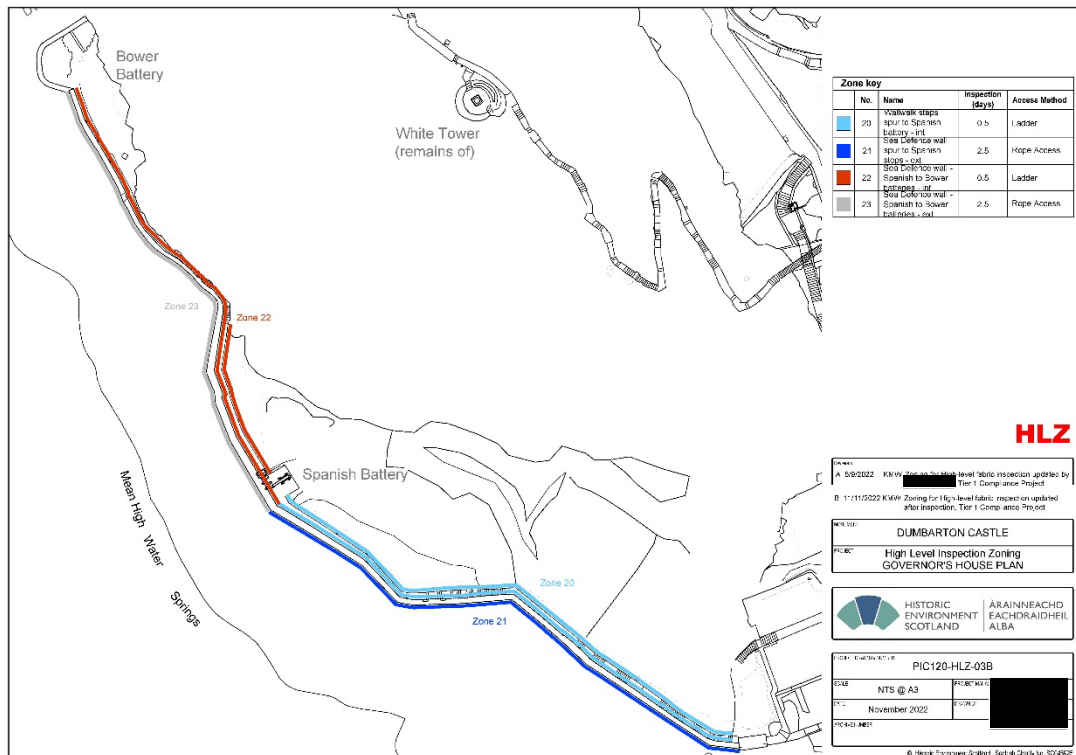
High-Level Tactile Inspection: Report - High-Level Zoning Drawings



Click on link below image to open drawing in PDF viewer:

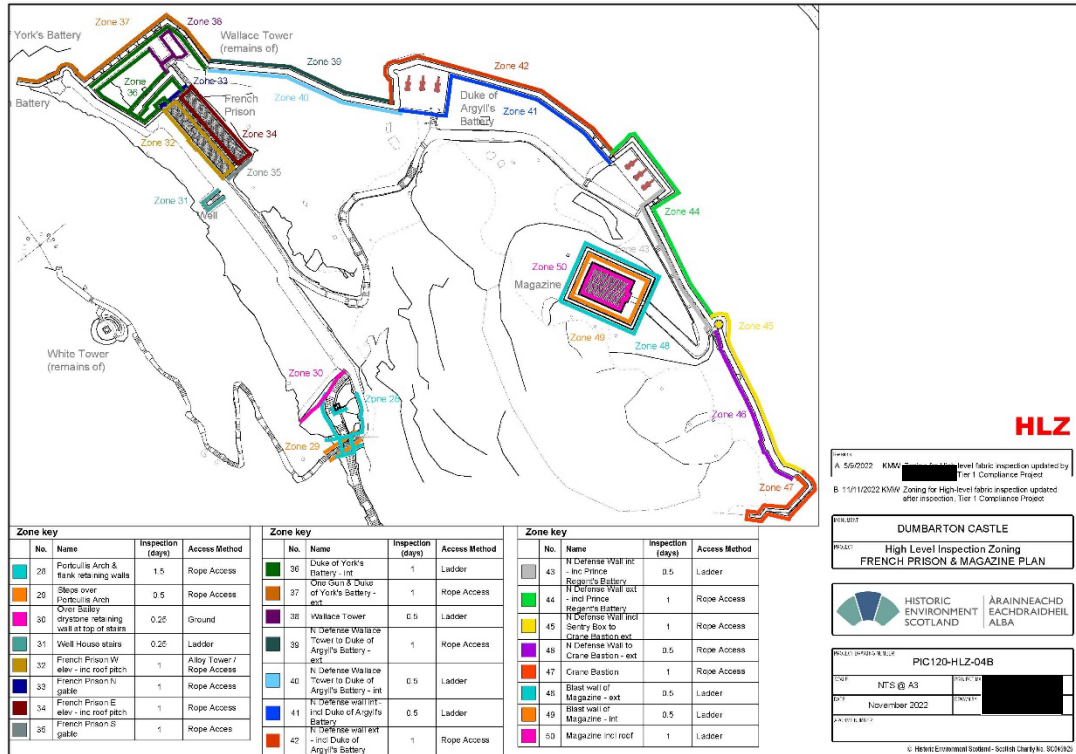


PIC120-HLZ-02B



PIC120-HLZ-03B

High-Level Tactile Inspection: Report - High-Level Zoning Drawings



PIC120-HLZ-04B

High-Level Tactile Inspection: Report - Summary dashboard



PIC ID#	PIC120	Site name	Dumbarton Castle	
Submission	00/01/1900	Number of zones	47	
Select zone of which data should be displayed ↓	All zones	Number of observations	79	

Identified Risk



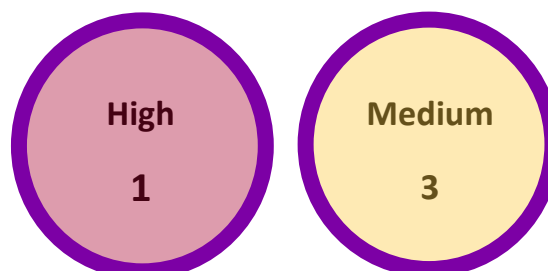
Residual Risk

After Inspection Action



Residual Risk

Mitigated with applied Access Restriction in place



Inspection Action:

Class V Report Fabric detached during tactile inspection	Access Restriction = Risk of fabric falling and causing harm			Monitor Observation / Plan Repairs No immediate action
	Full site, notifiable	Partial site, notifiable	Partial site, not notifiable	
12	0	0	4	63

Inspection types:	Tactile	79	Visual	0
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Key comments:

KEY FINDINGS:

- The Castle North and South (Sea) Defensive Walls are in reasonable condition but some areas have open joints and missing pointing and pinnings. Defects were found mainly at wall copes and were remedied by MCU.
- The outer face of the Flank wall to Spur Battery was inspected as part as the Risk Mitigation, open joints present and pinnings and rubble stone found loose requiring this area to be kept closed (that area already had a access closer).
- Long standing movement between the Sea Defenses curtain wall and wall walk at the section from the Spur Battery to the Spanish Battery is currently being monitored by HES Engineers and it should continue (NB settlement movement is on the wall walk not the rock founded curtain wall).
- The French Prison is also under structural monitoring by HES engineers. Deep recess pointed south gable has movement cracks, hungry joints and loose mortar and pinnings were found. It is awaiting for comprehensive consolidation. Several saddle ridge stones in the middle section of roof ridge were found dry bedded and access restrictions put in place until rope team made them secure with MCU supervision.
- The rest of the buildings were found in good condition as have been recently consolidated or works undergoing. Only a chimney cap stone found detached at Guardhouse and was immediately rebedded.

PREDOMINANT RISKS:

- Tree roots are pushing dry stone retaining wall to Over Bailey and stones were found loose around the tree. Although height of wall is approx 1 metre, it is located above main steps and mitigation measures might be required.



High-Level Tactile Inspection: Report - Access Scope



PIC ID #	PIC120	Site name	Dumbarton Castle
----------	--------	-----------	------------------

Access methods: Select all methods used to conduction inspection ↓

MEWP	Yes	Design Scaffold		Alloy Tower Scaffold	
Rope Access	Yes	Steeplejack	Yes	Ladder	Yes
Ground	Yes	Binoculars / Photo		UAV	

Other method		If yes, details:	
--------------	--	------------------	--

Ground protection / tracking required:	Yes
--	-----

External Contractor appointed for access requirments:	Yes
---	-----

Inspection info:

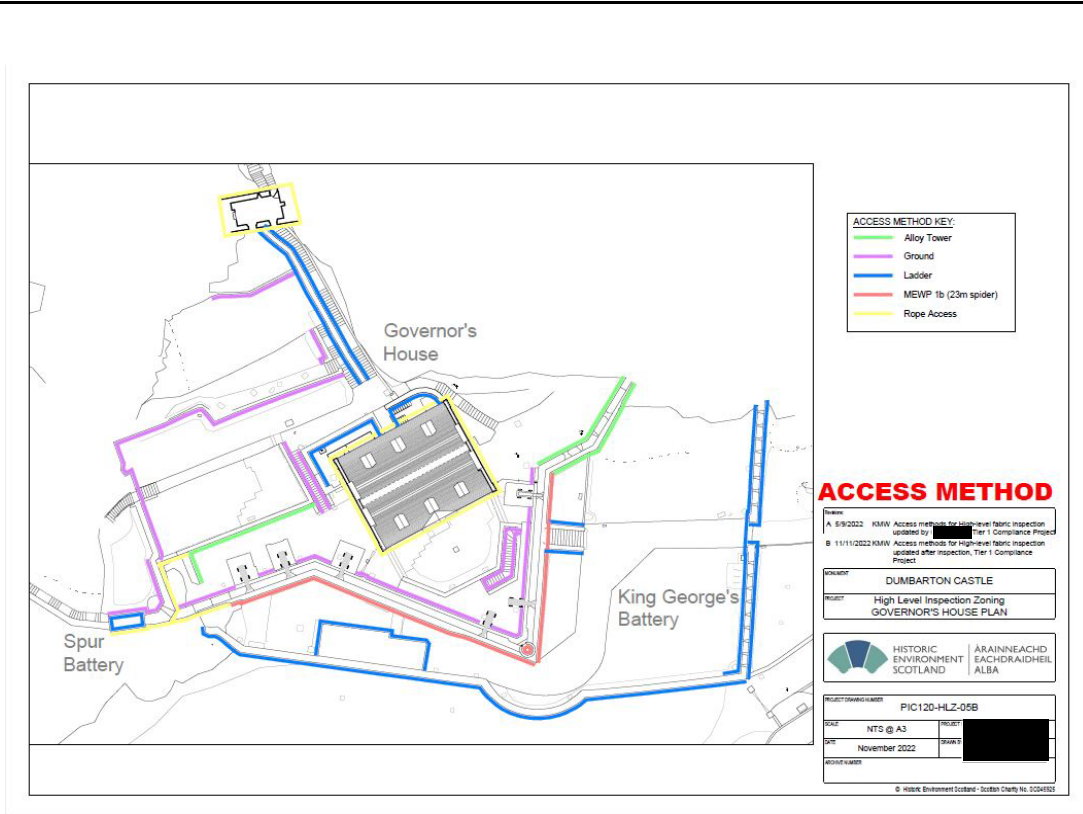
Limitations of inspection:	Invasive vegetation (mainly ivy) had to be removed in some areas of the North and South Defensive Walls and Portcullis Arch by rope access team to allow for the inspection to be carried out
-----------------------------------	---

Areas not inspected:	Zones where, at time of inspection, there were works ongoing: -Masonry Consolidation works at KG Battery East flank wall (Z05 & Z09) -Roof repairs and Limewashing works ongoing at the Powder Magazine and therefore zones 49 and 50 not inspected
-----------------------------	---

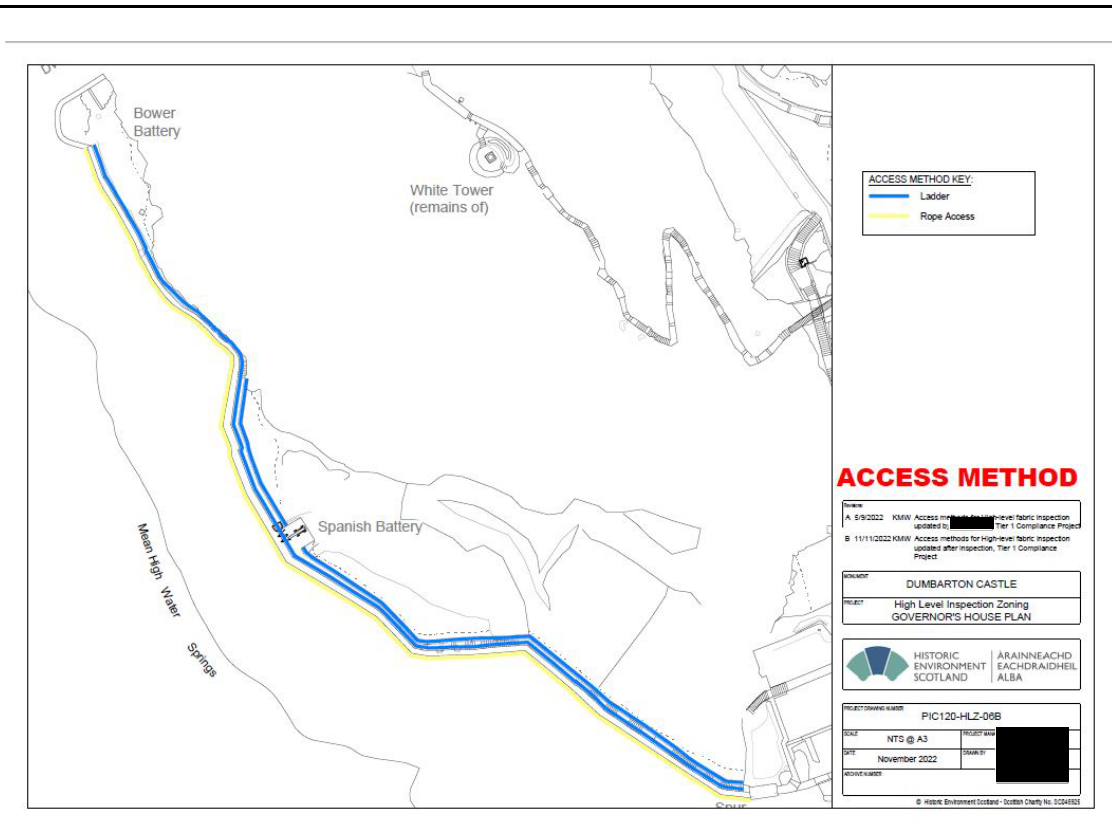
High-Level Tactile Inspection: Report - Access Scope



Click on link below image to open drawing in PDF viewer:

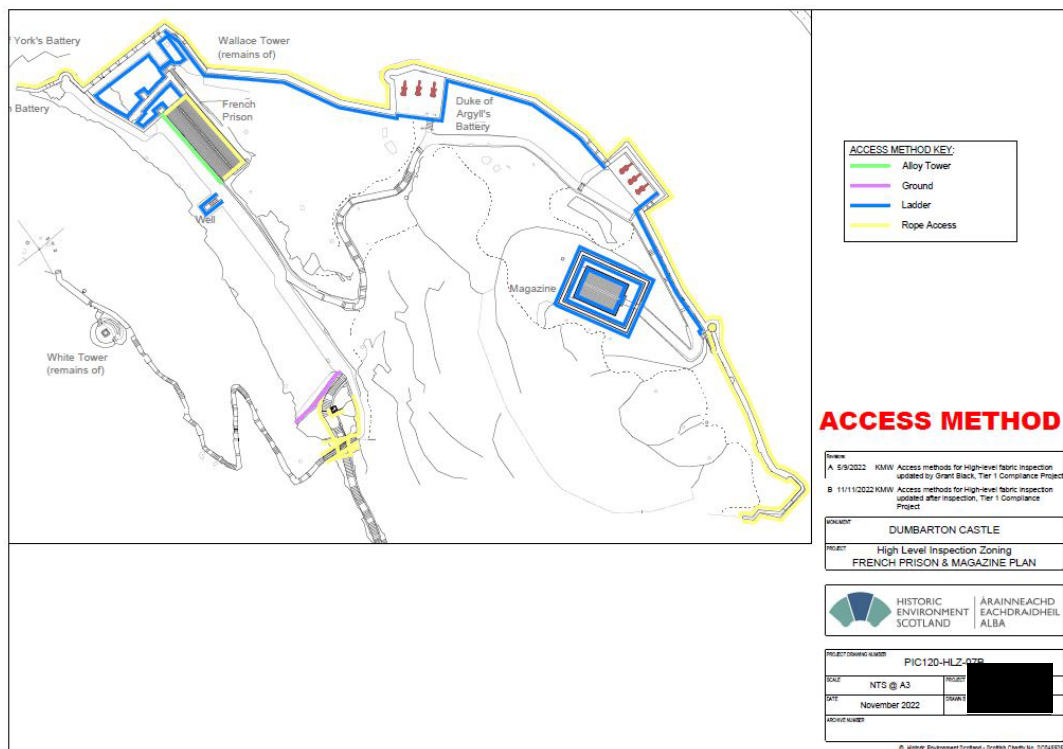


[PIC120-HLZ-05B](#)



[PIC120-HLZ-06B](#)

High-Level Tactile Inspection: Report - Access Scope



[PIC120-HLZ-07B](#)



Click on link below image to open Interactive PDF in PDF viewer. In PDF viewer, the drawing is an interactive PDF, click on the labels to open the relevant OBS form for further information.

INTERACTIVE PDF
Click on label to open linked Excel OBS form

KEY:

- Low identified risk label → Monitor Observation / Plan Register
- Low identified risk → fabric removed under Class V label (low residual risk)
- Medium identified risk label → Monitor Observation / Plan Register
- Medium identified risk → fabric removed under Class V label (low residual risk)
- Access Restriction (low residual risk)
- Medium identified risk → fabric removed under Class V label (low residual risk)
- Access Restriction (low residual risk)
- High identified risk → fabric removed under Class V label (low residual risk)
- High identified risk → fabric removed under Class V label (low residual risk)

(Z02-01) Label reference
Z02-01 Zone # (e.g. 01, 02, etc)
01 = OBS number (e.g. 01 to 50)
Line (very thin colour) identifying location Structural draw

Notes:

- Indicative location of Risk
- Refer to Observation Form for practice locations & details of risks & defects.

■ High-Level Zone 07
Dumbarton Castle - External face of K/O Battery West

■ High-Level Zone 08
Dumbarton Castle - K/O Battery Caste

HIGH-LEVEL FABRIC TACTILE INSPECTION
28/06/2022 to 07/11/2022

SITE PLAN 1:750

IDENTIFIED RISK

PROJECT: PIC120 Dumbarton Castle
RISK: High-Level Tactile Survey Inspection
Identified Risk - High-level zone 07 & 08

CLIENT: HISTORIC ENVIRONMENT SCOTLAND | ARAINNEACHD SACHAIRACHIEL ALBA

PROJECT NUMBER: PIC120-HLR-207-08

HTS 042	DATE
28/06/2022	07/11/2022

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[PIC120-HLR-Z07-08](#)

INTERACTIVE PDF
Click on label to open linked Excel OBS form

KEY:

- Low identified risk label → Monitor Observation / Plan Register
- Low identified risk → fabric removed under Class V label (low residual risk)
- Medium identified risk label → Monitor Observation / Plan Register
- Medium identified risk → fabric removed under Class V label (low residual risk)
- Access Restriction (low residual risk)
- Medium identified risk → fabric removed under Class V label (low residual risk)
- Access Restriction (low residual risk)
- High identified risk → fabric removed under Class V label (low residual risk)
- High identified risk → fabric removed under Class V label (low residual risk)

(Z02-01) Label reference
Z02-01 Zone # (e.g. 01, 02, etc)
01 = OBS number (e.g. 01 to 50)
Line (very thin colour) identifying location Structural draw

Notes:

- Indicative location of Risk
- Refer to Observation Form for practice locations & details of risks & defects.

■ High-Level Zone 10
Dumbarton Castle - Retaining wall to Spur Battery (old guardhouse W gable)

■ High-Level Zone 13
Dumbarton Castle - Governor's House East Gable Incl. Chimneys

■ High-Level Zone 18
Dumbarton Castle - Spur Battery E and Garden Terrace walls

HIGH-LEVEL FABRIC TACTILE INSPECTION
28/06/2022 to 07/11/2022

SITE PLAN 1:750

IDENTIFIED RISK

PROJECT: PIC120 Dumbarton Castle
RISK: High-Level Tactile Survey Inspection
Identified Risk - High-level zone 10, 13 & 18

CLIENT: HISTORIC ENVIRONMENT SCOTLAND | ARAINNEACHD SACHAIRACHIEL ALBA

PROJECT NUMBER: PIC120-HLR-Z10-13-18

HTS 042	DATE
28/06/2022	07/11/2022

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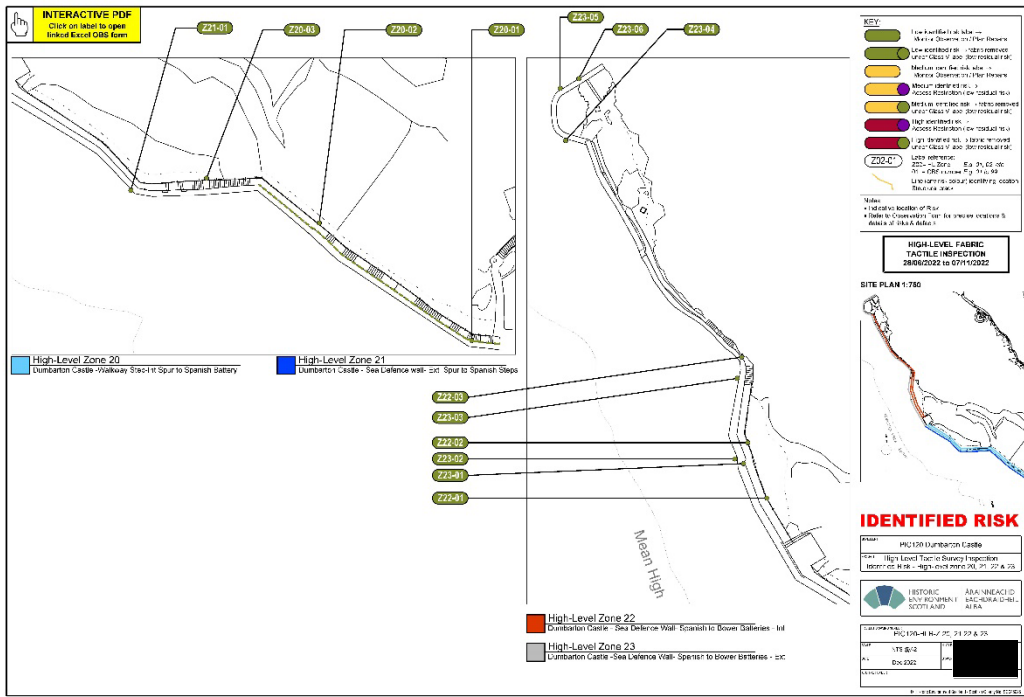
[PIC120-HLR-Z10-13-18](#)

PIC120-HLM-REP-20221220-X-V0100-Report.xlsx

Section 6



Click on link below image to open Interactive PDF in PDF viewer. In PDF viewer, the drawing is an interactive PDF, click on the labels to open the relevant OBS form for further information.



[PIC120-HLR-Z20-21-22-23](#)



[PIC120-HLR-Z25-26-30](#)



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INTERACTIVE PDF
Click on label to open linked Excel OBS form

High-Level Zone 32
Dumbarton Castle - French Prison 3 - Front West Inc roof patch

High-Level Zone 34
Dumbarton Castle - French Prison 3 - eave inc roof patch

High-Level Zone 35
Dumbarton Castle - French Prison 3 - Gable

KEY:

- Low level fabric - low level fabric
- Medium level fabric - medium level fabric
- High level fabric - high level fabric
- High level fabric - high level fabric
- High level fabric - high level fabric
- High level fabric - high level fabric
- High level fabric - high level fabric
- High level fabric - high level fabric

Z32-01

Notes:

- Indicate location of risk
- Refer to observations on the process reports & details of risk & controls

HIGH-LEVEL FABRIC TACTILE INSPECTION
28/06/2022 to 07/11/2022

SITE PLAN 1/750

IDENTIFIED RISK

PROJECT: PIC120 Dumbarton Castle

TYPE: High-Level Fabric Tactile Inspection
Identified Risk - High-Level Zone 32, 34 & 35

HISTORIC ENVIRONMENT SCOTLAND | **ARCHITECTURE & HERITAGE SCOTLAND**

CLIENT: Historic Environment Scotland

REF: HLE120-HLR-2022-34-35

DATE: 18/02/2022

BY: [Redacted]

CHK: [Redacted]

APP: [Redacted]

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[PIC120-HLR-Z32-34-35](#)

INTERACTIVE PDF
Click on label to open linked Excel OBS form

High-Level Zone 36
Dumbarton Castle - Duke of York's Battery Int. (South retaining wall)

High-Level Zone 36
Dumbarton Castle - Duke of York's Battery Int. (East Retaining Wall)

High-Level Zone 36
Dumbarton Castle - Duke of York's Battery Int. (West retaining wall)

High-Level Zone 36
Dumbarton Castle - Duke of York's Battery Int. (North Retaining Wall)

KEY:

- Low level fabric - low level fabric
- Medium level fabric - medium level fabric
- High level fabric - high level fabric
- High level fabric - high level fabric
- High level fabric - high level fabric
- High level fabric - high level fabric
- High level fabric - high level fabric
- High level fabric - high level fabric

Z36-01

Notes:

- Indicate location of risk
- Refer to observations on the process reports & details of risk & controls

HIGH-LEVEL FABRIC TACTILE INSPECTION
28/06/2022 to 07/11/2022

SITE PLAN 1/750

IDENTIFIED RISK

PROJECT: PIC120 Dumbarton Castle

TYPE: High-Level Fabric Tactile Inspection
Identified Risk - High-Level zone 36

HISTORIC ENVIRONMENT SCOTLAND | **ARCHITECTURE & HERITAGE SCOTLAND**

CLIENT: Historic Environment Scotland

REF: HLE120-HLR-2022-36

DATE: 18/02/2022

BY: [Redacted]

CHK: [Redacted]

APP: [Redacted]

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[PIC120-HLR-Z36](#)



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INTERACTIVE PDF
Click on label to open
linked Excel OBS form

High-Level Zone 38
Duff-Gordon Castle - Wallace Tower North and East Walls

High-Level Zone 38
Duff-Gordon Castle - Wallace Tower West Wall

High-Level Zone 38
Duff-Gordon Castle - Wallace Tower North Wall

KEY:

- Green: Good (No risk obs.)
- Yellow: Minor (Observation) - No Risk
- Orange: Medium (Observation) - No Risk
- Red: High (Observation) - No Risk
- Purple: Medium (Observation) - No Risk
- Blue: High (Observation) - No Risk
- Pink: High (Observation) - No Risk
- Grey: High (Observation) - No Risk
- Black: High (Observation) - No Risk

Z38-01

Z38-02

Z38-03

Z38-04

NOTES:

- Historic location of site
- Part of Duff-Gordon Castle (see section 5.1.1)
- Part of Wallace Tower

HIGH-LEVEL FABRIC TACTILE INSPECTION
20220320 to 07/11/2022

SITE PLAN 1730

IDENTIFIED RISK

CRS: PIC120 HLM REP 39, 42 & 43

DATE: 15/03/22

BY: [Redacted]

REV: 1

APP: [Redacted]

[PIC120-HLR-Z38](#)

INTERACTIVE PDF
Click on label to open
linked Excel OBS form

High-Level Zone 39
Duff-Gordon Castle - North Defence Wall (over to Duff-Gordon Castle) - External

High-Level Zone 42
Duff-Gordon Castle - North Defence Wall (Internal) - Duff-Gordon Castle

High-Level Zone 43
Duff-Gordon Castle - North Defence Wall (Internal) - Prince Regent's Battery

KEY:

- Green: Good (No risk obs.)
- Yellow: Minor (Observation) - No Risk
- Orange: Medium (Observation) - No Risk
- Red: High (Observation) - No Risk
- Purple: Medium (Observation) - No Risk
- Blue: High (Observation) - No Risk
- Pink: High (Observation) - No Risk
- Grey: High (Observation) - No Risk
- Black: High (Observation) - No Risk

Z39-01

Z42-01

Z42-02

Z43-01

Z43-02

NOTES:

- Historic location of site
- Part of Duff-Gordon Castle (see section 5.1.1)
- Part of Wallace Tower

HIGH-LEVEL FABRIC TACTILE INSPECTION
20220320 to 07/11/2022

SITE PLAN 1730

IDENTIFIED RISK

CRS: PIC120 HLM REP 39, 42 & 43

DATE: 15/03/22

BY: [Redacted]

REV: 1

APP: [Redacted]

[PIC120-HLR-Z39-42-43](#)



Click on link below image to open Interactive PDF in PDF viewer. In PDF viewer, the drawing is an interactive PDF, click on the labels to open the relevant OBS form for further information.

INTERACTIVE PDF
Click on label to open linked Excel OBS form

KEY

- Low level fabric (e.g. slate) - where observed the fabric is in good condition - no replacement or repair needed
- Medium level fabric (e.g. stone) - where observed the fabric is in poor condition - repair needed
- High level fabric (e.g. masonry) - where observed the fabric is in very poor condition - replacement or repair needed
- Masonry (e.g. stone) - where observed the fabric is in poor condition - repair needed
- Masonry (e.g. stone) - where observed the fabric is in fair condition - repair needed
- Masonry (e.g. stone) - where observed the fabric is in good condition - no replacement or repair needed
- Masonry (e.g. stone) - where observed the fabric is in very poor condition - replacement or repair needed
- Masonry (e.g. stone) - where observed the fabric is in very poor condition - replacement or repair needed

2022

Notes:

- 1 - Fabric Location - See Fabric Characteristic Sheet for specific locations & extent of fabric.

High Level Zone 46
North Wall to Crane Bastion - Internal

High Level Zone 46
North Wall to Crane Bastion - Internal

High Level Zone 47
North Wall to Crane Bastion - Internal

IDENTIFIED RISK

PIC120 Dunbarton Castle

High Level Tactile Survey Inspection Summary of Inspected Zones with No OBS

HISTORIC ENVIRONMENT SCOTLAND

AREA INHERENTLY EXCLUDED FROM THE AREA

PIC120-HLR-20221219-001

NTE 642

Dec 2022

High Level Zone 46
North Wall to Crane Bastion - Internal

[PIC120-HLR-Z46-Z47](#)

ZONE KEY

- Z06 KG Battery E face incl entry to ramparts - ext
- Z11 Green Hall retaining wall
- Z12 Steps adjacent to Governor's House
- Z13 Governor's House South Elevation Incl Chimneys
- Z15 Governor's House North Elevation incl. Roof
- Z16 Governor's House West Gable incl Chimneys
- Z17 Governor's House North Flying stair and retaining walls
- Z18 Spur Battery and Lattice - lower face
- Z22 Garden Steps and Terrace wall
- Z23 Courthouse - East Gable
- Z24 North Elevation, no Roof pitch
- Z28 Portcullis Arch and Rank retaining walls
- Z29 Steps over Portcullis Arch
- Z31 Wall - House Stairs
- Z32 Francis Erskine North Gable
- Z37 One Gun and Ditch of York's Battery - Internal
- Z40 North Defence Magazine Tower to Duke of Argyll's Battery - Internal
- Z41 North Defence Magazine Tower to Duke of Argyll's Battery - North Defence Wall incl. Prince Regent's external
- Z45 North Defence Wall incl. Sanitary Box to Crane Bastion - Internal
- Z48 East Wall of Magazine - external

Notes:

- 1 - Fabric Location - See Fabric Characteristic Sheet for specific locations & extent of fabric.

High Level Zone 46
North Wall to Crane Bastion - Internal

High Level Zone 46
North Wall to Crane Bastion - Internal

High Level Zone 47
North Wall to Crane Bastion - Internal

High Level Zone 46
North Wall to Crane Bastion - Internal

High Level Zone 46
North Wall to Crane Bastion - Internal

High Level Zone 47
North Wall to Crane Bastion - Internal

High Level Zone 46
North Wall to Crane Bastion - Internal

High Level Zone 46
North Wall to Crane Bastion - Internal

High Level Zone 47
North Wall to Crane Bastion - Internal

High Level Zone 46
North Wall to Crane Bastion - Internal

High Level Zone 46
North Wall to Crane Bastion - Internal

High Level Zone 47
North Wall to Crane Bastion - Internal

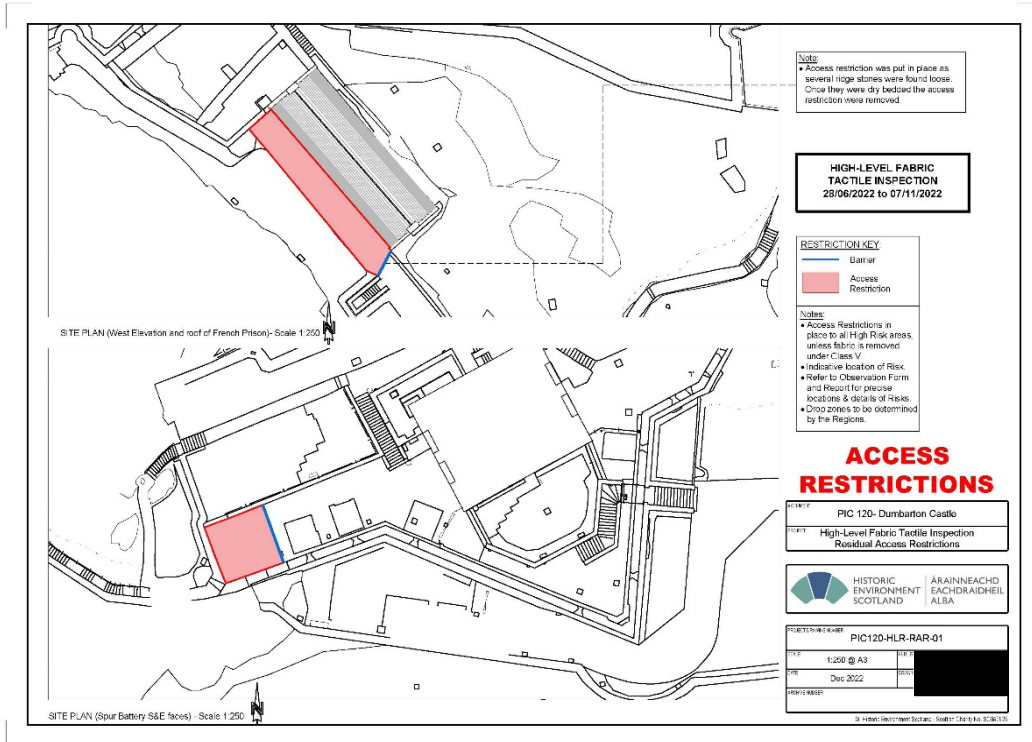
[PIC120-HLR-20221219-001](#)



High-Level Tactile Inspection: Report - Access Restrictions Plan



Click on link below image to open PDF in PDF viewer.



[PIC120-HLR-RAR-01](#)

