

CONTROL SHEET

Title:	Tactile safety inspection of high-level fabric Report PIC157 - Melrose Abbey
Authors:	
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Approved by:	
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Version Control

Version	Date	Status	Prepared by	Amendments
V0001	07/06/2021	Draft		First draft
V0002	08/10/2021	Draft		Updated to include Identified Risk Elevations
V0003	17/12/2021	Draft		Links to IR drawings & OBS forms added. IR drawings revised to include OBS with access restrictions
V0100	04/03/2022	Approved		Approved

High-Level Tactile Inspection: Report - Introduction



PIC ID # ↓	PIC157	Site name Melrose Abbey & Precinct				
Inspection start	10/05/2021	Inspection end	11/06/2021	Submission	10/02/2022	
Lead assessor						
Other assessors						

Introduction:

The High-Level Fabric Inspection of Melrose Abbey was led by (HBFA) and carried out with HBFA from 10th of May - 11th of June 2021.

The Tier 1 Team assessed 27 zones covering the whole monument, using a range of high level access equipment including rope access, MEWP and ladders. Ground mats or alloy tracks were installed below MEWPs to protect the ground and archaeologically sensitive areas.

HLF Inspection Risk Matrix:

HES-T1C-HLF-RAS-X-X-V0201-RiskMatrix

C	onsequence	1	2	3	4	5
Probability		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	Ø	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 Number

High-Level Tactile Inspection: Report - Introduction



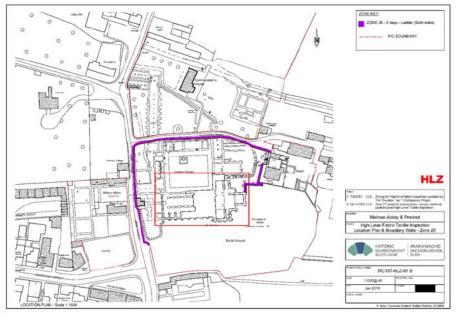
			Annual Visitor Numbers					
		up to 5 k	5-20 k	20 - 100 k	100k - 2m	over 2 m		
Risk	Low	5 years	5 years	5 years	4 years	4 years		
Identified Risk Rating	Medium	3 years	3 years	2.5 years	2 years	2 years		
Ide	High	1 year	1 year	1 year	1 year	0.5 year		

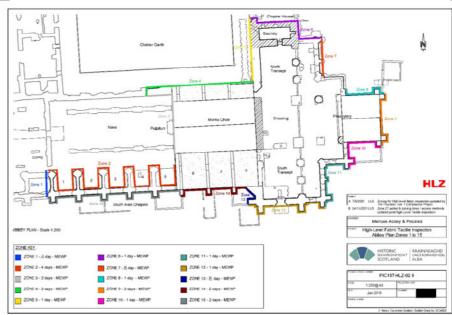
HL Zones:

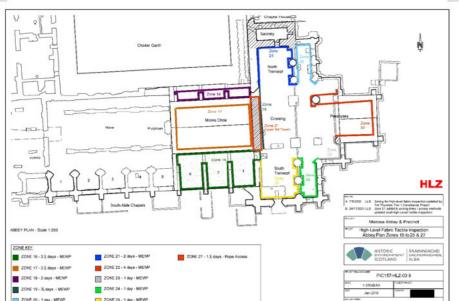
Zone:	Colour:	Zone Name:
1		Nave - West wall of South aisle chapels
2		South Nave Aisle Chapel Aisle 1 - 5
3		Nave - West face of pulpitum
4		Nave - North wall and clearstorey
5		North Transept - West elevation
6		North Transept - North elevation
7		North Transept - East elevation
8		Presbytery - North elevation
9		Presbytery - East elevation
10		Presbytery - South and east elevations
11		South Choir Chapel - South elevation & South transcept aisle - East elevation
12		South transcept - South elevation
13		South transcept - West elevation
14		Nave - South nave and clearstorey
15		Nave - South Aisle chapels 1-5
16		Nave - South aisle chapels 6-8
17		Nave - Monk's Choir. Pulpitum
18		Nave - Monk's Choir. Pulpitum North
19		Tower - West wall (East face)
20		North transcept aisle - West, North and East walls
21		North transcept - West, North and East walls
22		Presbytery - Presbytery and North choir aisle
23		South choir chapel - South and East walls
24		South transcept - East aisle
25		South transcept - West, South and East walls
26		Boundary walls - West, South and East walls - Both sides
27		Upper Bell Tower (Rope Access)











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



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High-Level Tactile Inspection: Report - Summary dashboard

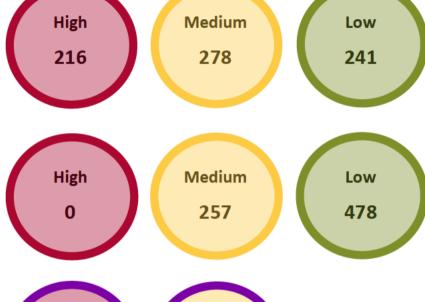


PIC ID#	PIC157	Submission	10/02/2022	
Select zone of v	All zones			

Number of zones	27
Number of observations	735



Residual Risk



After Inspection Action

Residual RiskMitigated with applied Access
Restriction in place

High	Medium
172	12

Inc	pecti	on A	CTIO	n.
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Class V Report = Fabric		Monitor Observation /		
detached during tactile inspection	Full site, notifiable	Partial site, notifiable	Partial site, not notifiable	Plan Repairs = No immediate action
51	0	44	150	497

Inspection types:	Tactile	719	Visual	16
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Key comments:

High-Level Tactile Inspection: Report - Summary dashboard



KEY FINDINGS

Melrose abbey features some of the most ornamental elements of medieval Scottish architecture. However, the ruined nature of the building exposes carved elements to the weather that were never designed to shed water. The abbey is predominantly built from sandstone while individual stones of the local breccia type building stone, 'Melrose Agglomerate', were found within the Abbey. This stone has very poor levels of cohesion and is vulnerable to fragmentation and crumbling, especially when exposed to high levels of moisture. The main sandstone is vulnerable to moisture driven decay resulting in large areas of surface scaling on ashlar masonry and delamination of projecting, edge- or face bedded elements e.g. gargoyles, mullions and tracery.

Melrose Abbey has had previous conservation work completed to secure and consolidate vulnerable stone. Although some of this work has lasted well and is still performing satisfactorily, some is now requiring further attention to ensure that it continues to keep the fabric in a stable and secure condition.

PREDOMINANT RISKS:

- Exposed window tracery is vulnerable to decay from erosion and structural stresses. The large presbytery windows are at particularly high risk of fabric fall due to split or misaligned stones as well as delaminating and scaling surfaces.
- The 17th century infill wall on the North side of the monk's nave is poorly consolidated with many stones and areas of mortar at the exposed East and West end at high risk of fall from substantial heights.
- Exposed ends of springing vault ribs inside the crossing were found to be delaminating with surfaces at risk of falling into the area below. Numerous vault ribs are delaminating, particularly where exposed.
- The West gable apex is one of the most exposed aspects of the abbey building and subsequently suffers advanced decay. The apex stone and ceiling arch hood moulding below are at high risk of fall from great height.
- Split and partially detached vault ribs were found in the South Aisles which, at present, are wedged in place but could fall if there was slight structural movement and these should be secured to prevent loss and remove risks to life.
- Partially detached sections of masonry were found in the remains of the springing arches in the North Trancept as well as areas of fully detached masonry, all of which present risk of falls from height.
- Isolated stones of 'Melrose Agglomerate' were found on the wall head in the North Trancept which were friable. These are likely to continue to deteriorate due to their exposed condition and the nature of the stone and lead to small to medium sized fragments falling from height.

High-Level Tactile Inspection: Report - Access Scope



PIC ID#

PIC157

Site name

Melrose Abbey & Precinct

Access methods: Select all methods used to conduction inspection $oldsymbol{\downarrow}$

MEWP	Yes	Design Scaffold	No	Alloy Tower Scaffold	No
Rope Access	Yes	Steeplejack	No	Ladder	Yes
Ground	Yes	Binoculars / Photo	No	UAV	No
Other method	No	If yes, details:			

Ground protection / tracking required:		
External Contractor appointed for access requirments:	Yes	

Inspection info:

Limitations of inspection:

The high level tactile inspection of Melrose Abbey covered the all external elevations of the Abbey, internal (semi-enclosed) areas of the Abbey and both sides of the boundary wall surrounding the Abbey, where this was within HES ownership, subject to the limitations highlighted below.

The South and North elevation clerestorey and upper buttress finials as well as the external West wall of the South transept, the monk's nave roof and the Presbytery roof could only be visually inspected from MEWPs. The North, South, East and West upper elevations (above the 22m reach of the MEWP) were inspected using rope access with live feedback via Go Pro cameras and radios. No inspections were completed to areas below 1500mm above ground or floor level. No inspection was completed of the walls of the Visitor Centre/Shop, which formed part of the boundary wall.

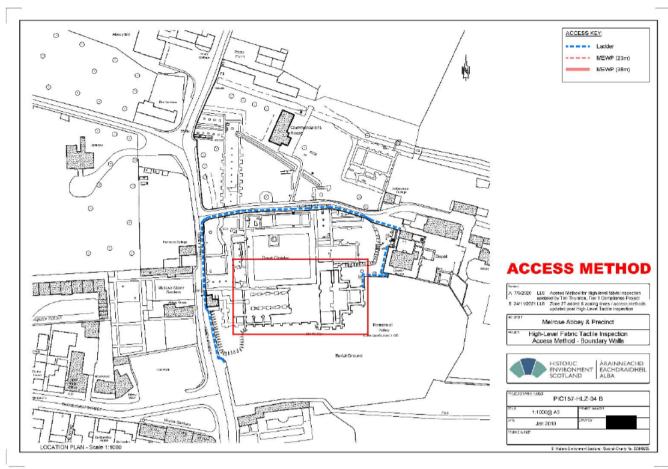
While the tactile inspection was very detailed and carried out with great diligence, it is unlikely that 100% of risks will have been identified. As with every large scale survey, detail can be missed due to the angle of view, the size of the defect e.g. hairline cracks, and the quality of lighting. However, the inspection has identified the reasonably foreseeable risk of fabric fall at Melrose Abbey at the time of inspection.

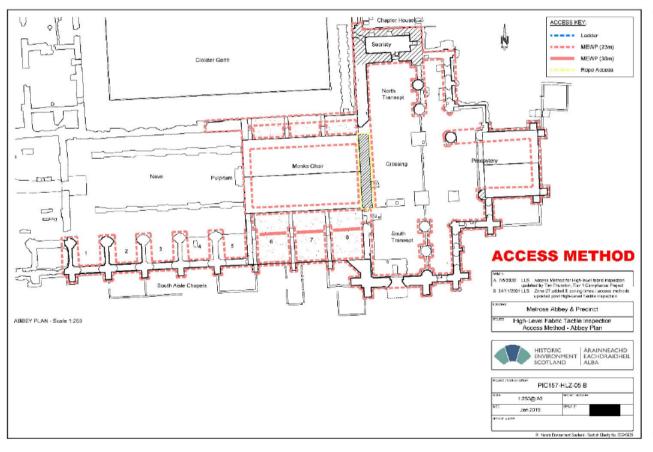
Areas not inspected: Enclosed internal spaces ie. the Sacristy, were not included in the inspection. Buildings and structures outwith the grounds of the abbey ie. the Visitor Centre, Brewery Yard, Priory Farm, Cloister House, Abbey House, the museum and surrounding grounds also did not form part of this inspection project.

PIC157-HLZ-04B PIC157-HLZ-05B Click on link to open drawing in PDF viewer:

High-Level Tactile Inspection: Report - Access Scope

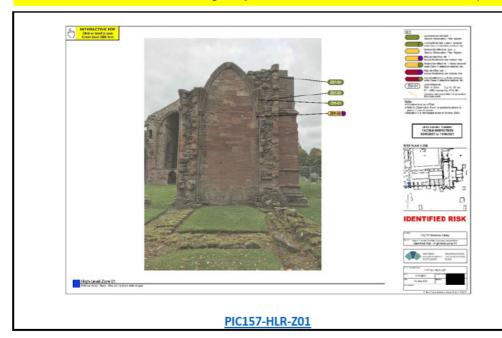


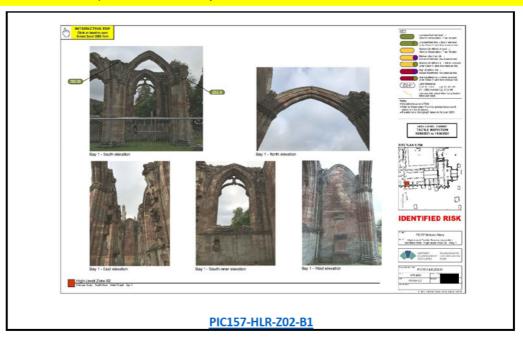


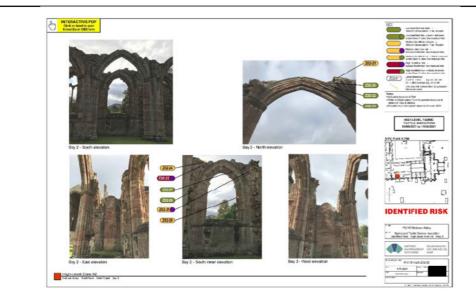


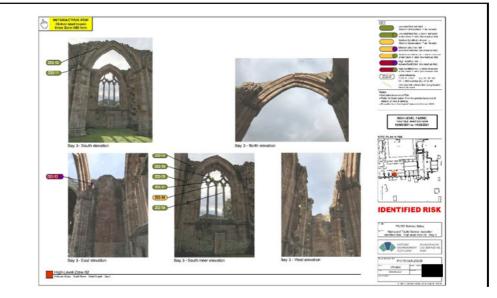


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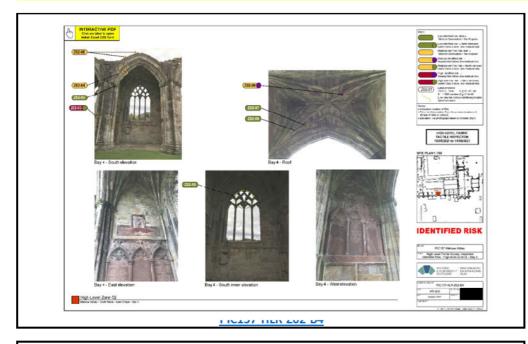


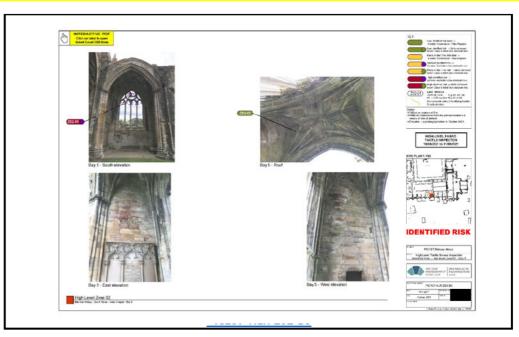


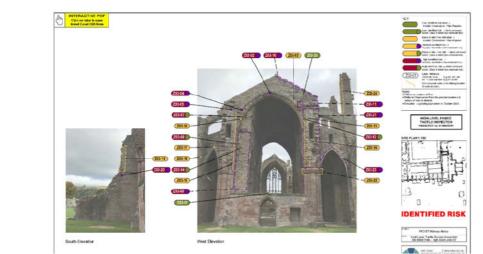


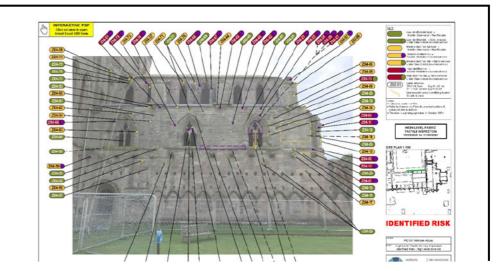
<u>PIC157-HLR-Z02-B2</u> <u>PIC157-HLR-Z02-B3</u>

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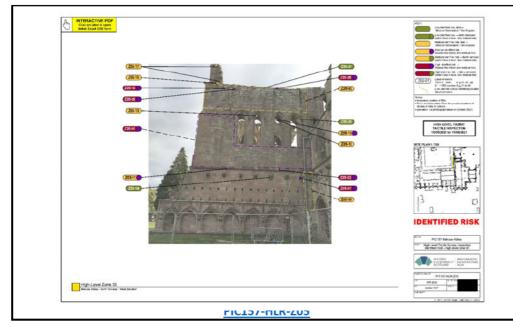


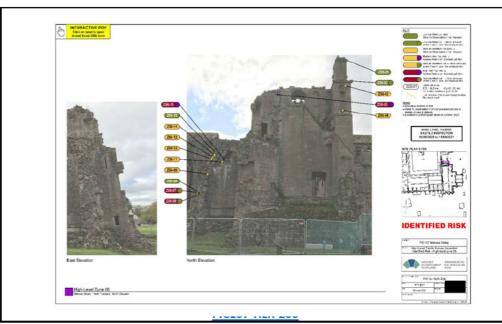


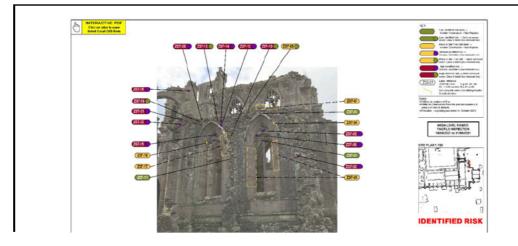


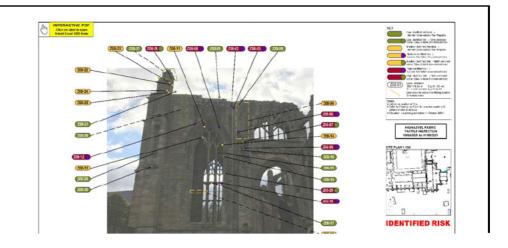


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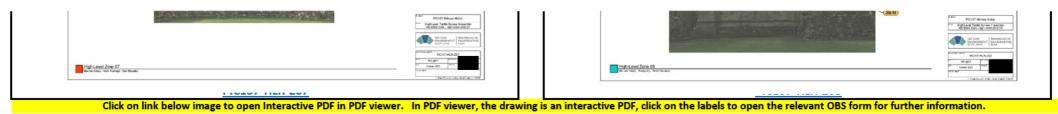


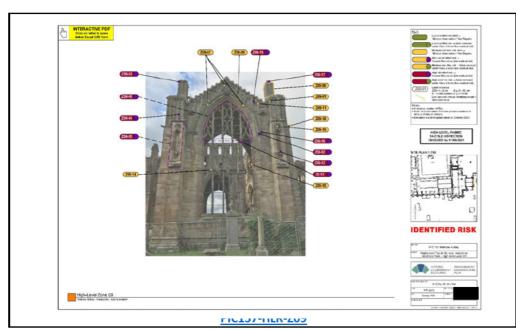


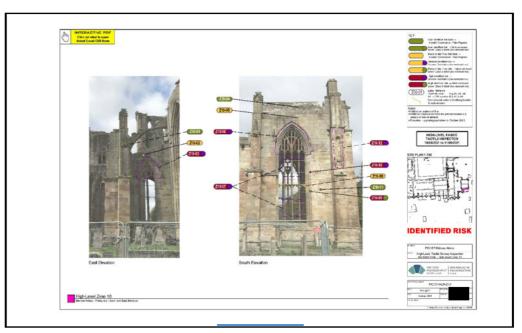


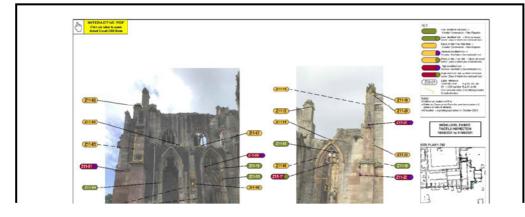
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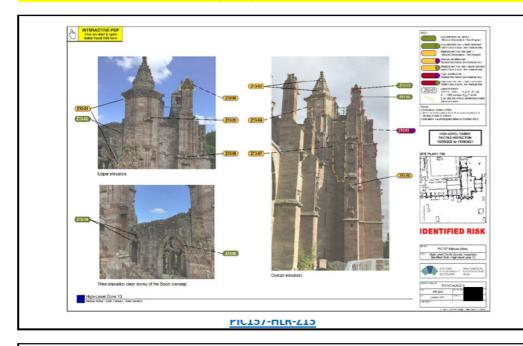


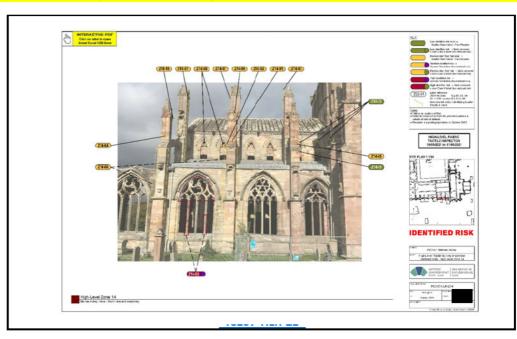


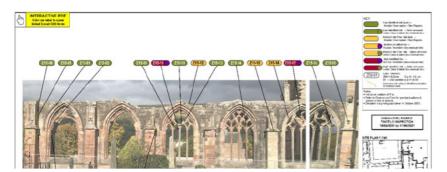


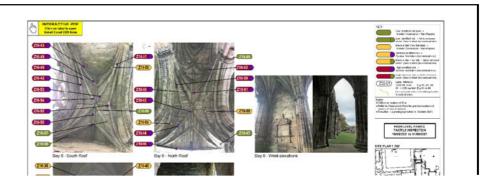


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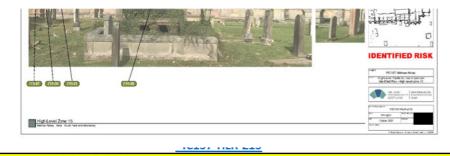






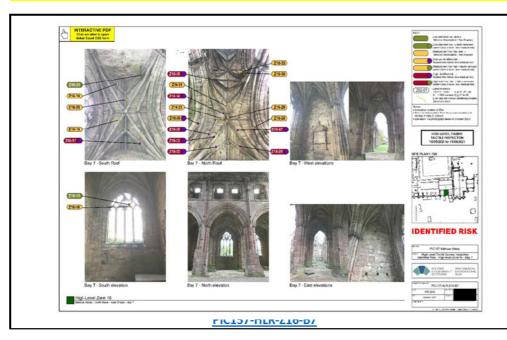


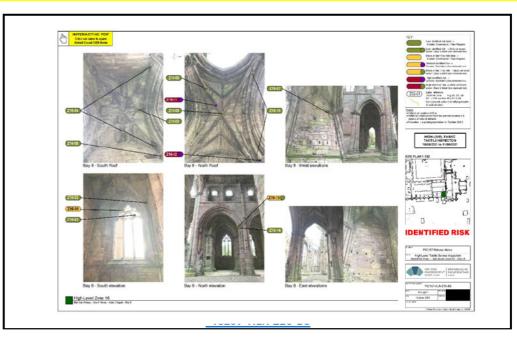




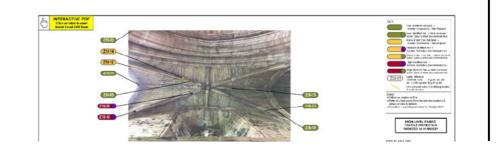


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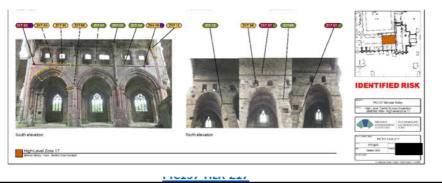


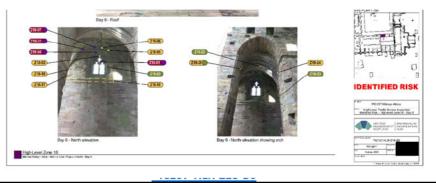




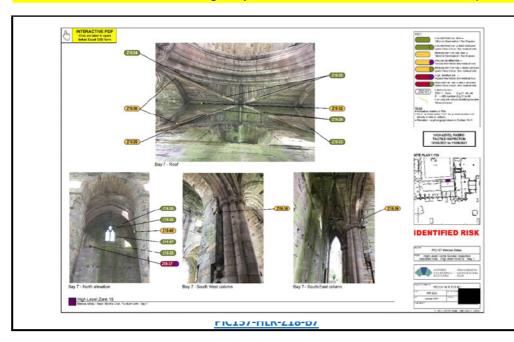


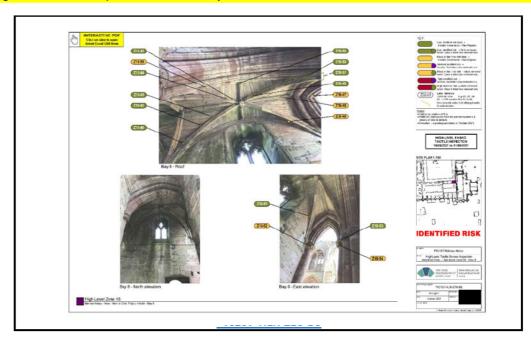






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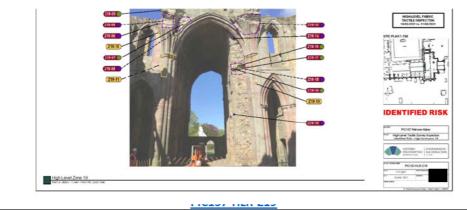


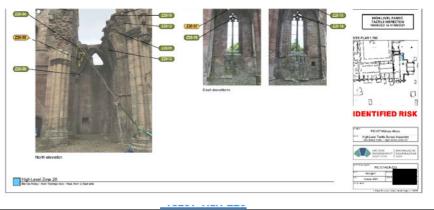




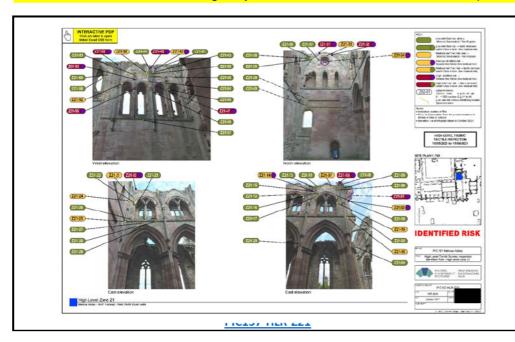


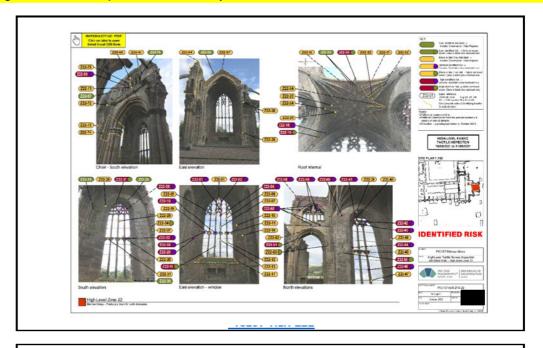






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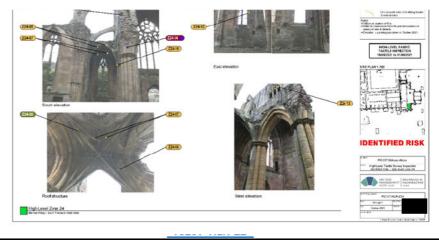




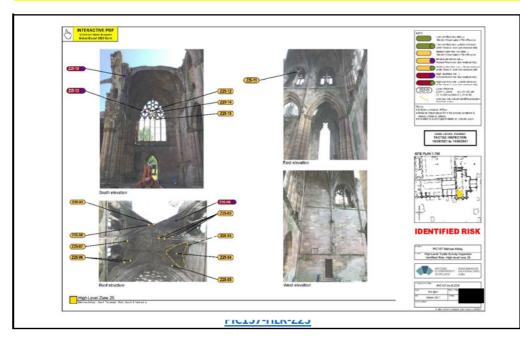


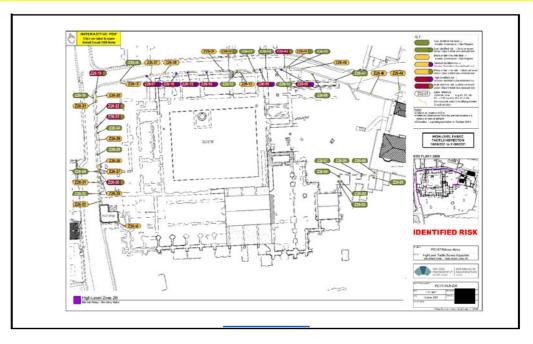






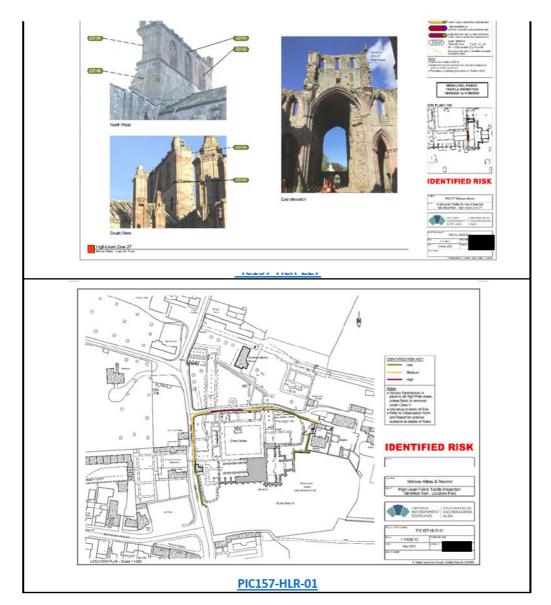
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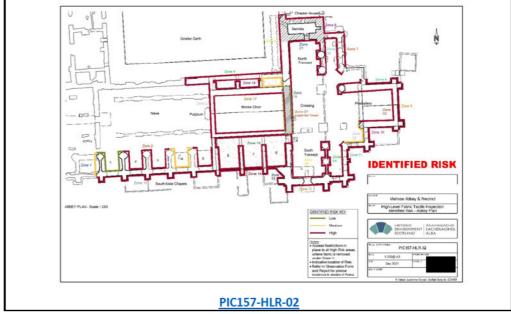






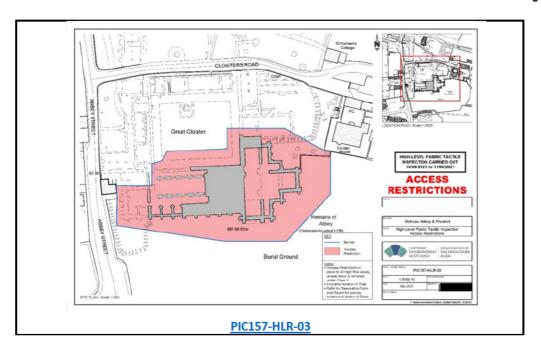








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