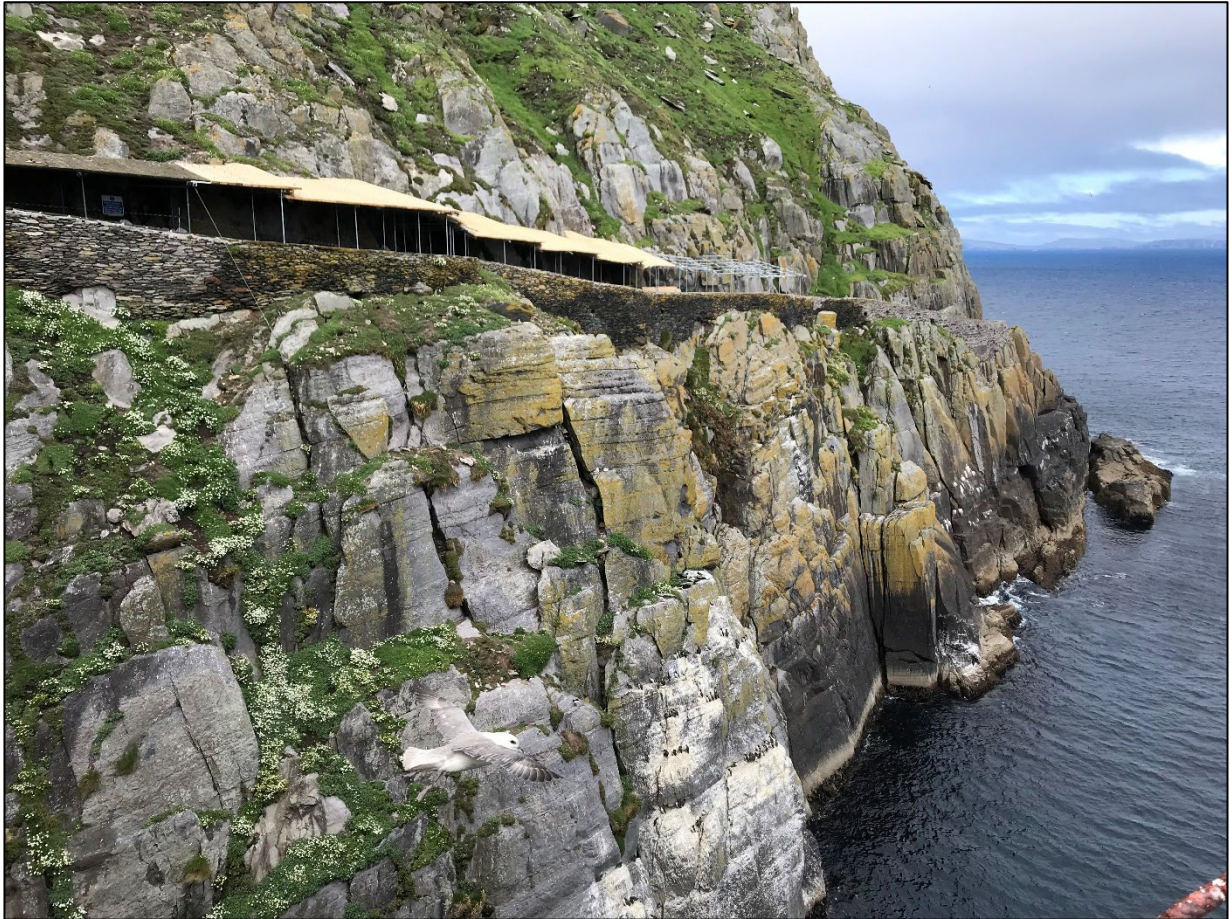


Geological Context of Rockfall Potential

Skellig Michael



on behalf of
the Office of Public Works

January 2023

*Creagh House Environmental Ltd, Main Street, Doneraile, Co. Cork, Ireland
Tel: 022-24433; e-mail: info@che.ie*

Contents

	Page
1.0 Introduction	1
2.0 Location	1
3.0 Geology	1
4.0 Rockfall Potential	1
5.0 Assessment Criteria	1
6.0 Summary	2
7.0 Note	2

List of Appendices

- Appendix 1. Figures 1 to 3 with Keyplan. Map View of Assessment Sections.
- Appendix 2. Photographs of Assessment Sections.
- Appendix 3. (a) Assessment Criteria and Sub-Categories. (b) Summary Tables.
- Appendix 4. Rockfall Potential Impact Assessment Sheets

Ordnance Survey Ireland Licence No. CYAL50284317
©Ordnance Survey Ireland and Government of Ireland

1.0 Introduction

This report is based on a site visit to Skellig Michael on 8th to 11th July 2022. The purpose of the visit was to examine the potential for rockfall on the 19th century Lighthouse Road and associated medieval North, South and East Steps. A reconnaissance report (June 2022) on the geological context of a rockfall on the Lower Lighthouse Road on 13th June 2022 was previously prepared.

2.0 Location

Skellig Michael is situated 11.6km west-northwest, 0.4km north from Bolus Head, Co. Kerry, at latitude 51°41'N and longitude 10°42'W. The island is 0.8km long, 0.4km wide, elongate NE-SW, and approximately 1.6ha in area. Two peaks, separated by a central high level col, dominate the Island. The col reaches to 130m asl while the northern and southern peaks rise to 183.5m and 214m asl respectively. The monastery site is located at 160 m asl on the Northern peak.

3.0 Geology

The Old Red Sandstone (Devonian) sediments exposed on Skellig Michael were deposited in the alluvial and fluvial environments of the Munster Basin. The present outcrop pattern of the bedrock is due to subsequent structural deformation. This compression or folding of the rocks occurred during the Hercynian Mountain building period, approximately 300 million years ago. The structure of Skellig Michael is characterised by a single open trough-shaped fold (syncline) developed about an axis which plunges 10° to 070° east-northeast. Conjugate joint sets are generated symmetrically about this axis while an intensive cleavage fabric parallels the axis orientation.

4.0 Rockfall Potential

Skellig Michael is an isolated rock precipice situated in the Atlantic subject to the highly erosive effects of wind, rain and temperature fluctuation. **Rockfalls are a characteristic feature of the island and may occur at any location at any time.**

The inspection in August 2022 allowed for the identification of most, moderate and least rockfall potential zones (see Figures 1 to 3 in Appendix 1). The North and South Steps are considered as single sections, the East Steps as two sections. The Upper Lighthouse Road is presented as six sections; whilst the Lower Lighthouse Road is presented as seven sections (see Appendix 1 for map locations and Appendix 2 for photographic record).

5.0 Assessment Criteria

The scheme of assessment is set out in Appendix 3, which also presents the summary tables of results. The individual Rock Potential Impact Assessment sheets are presented in Appendix 4.

The scheme of assessment considers the topics of Bedrock, Overburden, and Pathways to receivers. The sub-criteria under the topic of Bedrock include nature, bedding, cleavage and joints. The sub-criteria under the topic of Overburden include soil, scree, and weathered rock; whilst the sub-criteria of Pathways consider source and type, height above receiver, nature of pathway, and protection of receiver.

In the main, each sub-criterion is assessed in terms of low, moderate or high (exposure or extent), or distance/height of relevant feature from the receiver (see Appendices 3 and 4 for detail).

The total score, in summing the assigned value (1, 2 or 3) for each sub-criterion allows for an assignment of a least, moderate, or most potential character to each section.

6.0 Summary

Utilisation of an assessment scheme incorporating 12 geologically related criteria (each with three sub-criteria) allows for the discrimination of rockfall potential into least, moderate, and high potential categories. This whilst recognising that rockfalls are a characteristic feature of the island and may occur at any location at any time.

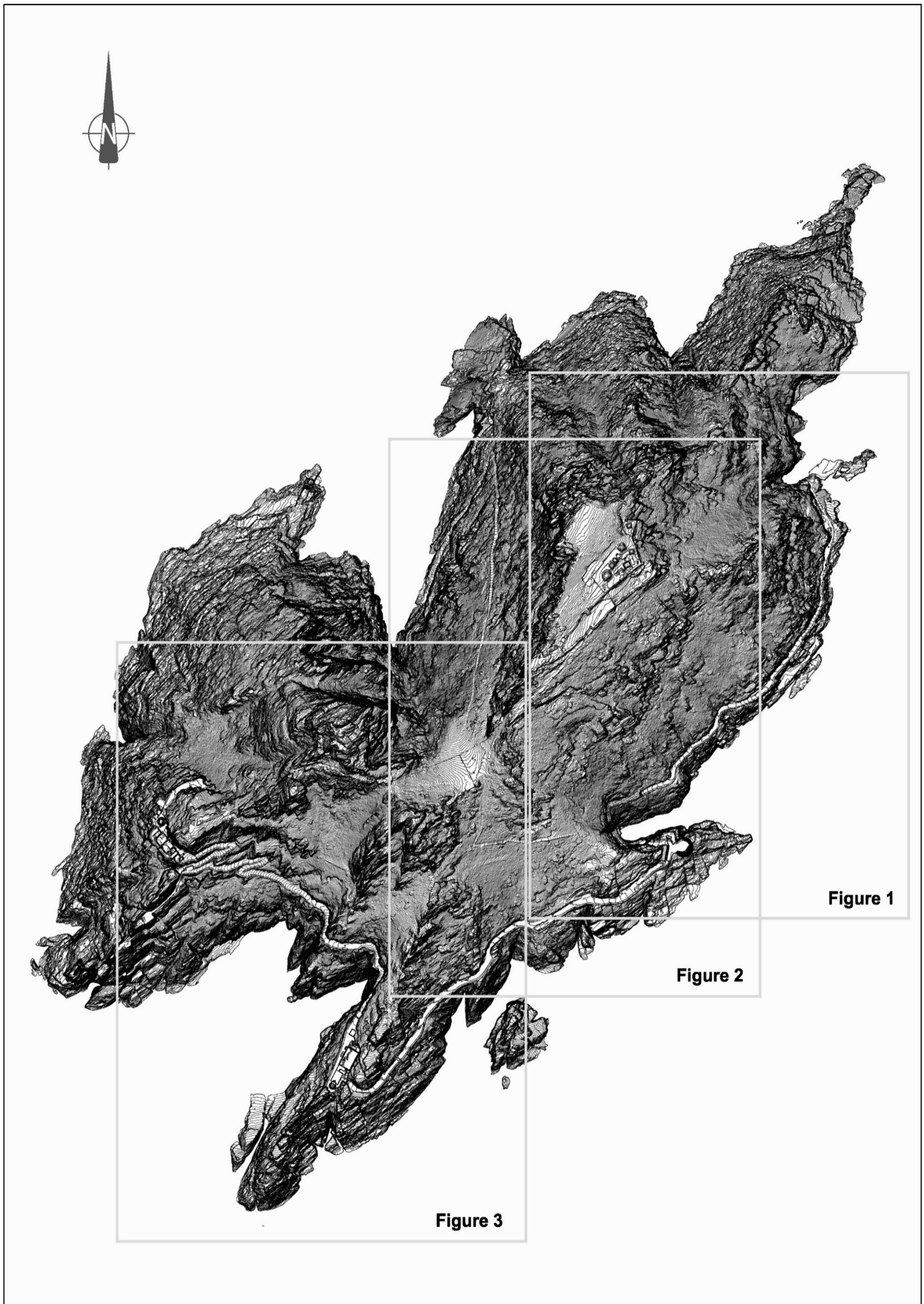
A distinction may be made between the monastic-era steps (north, south and east) and the 19th century Lighthouse Road. The monastic steps are assigned moderate and high categories, whilst the Lighthouse Road is assigned least, moderate and high categories. The overreaching feature controlling this difference is that the monastic steps are located in areas subject to weathering, at least since the Quaternary period, whilst the Lighthouse Road is a man-made feature, blasted from the island edge c. 200 years ago. The sections of the Lighthouse Road assigned a least potential category are found at locations where high rock spines continue to sea level and rock blasting resulted in zones of high "clean" cleavage face bedrock exposures without material weathered rock or overburden. These occur at sections 1, 4 and 6 on the Lower Lighthouse Road, and sections 1 and 6 on the Upper Lighthouse Road. Whilst the receiver is largely protected from adjacent rockfall in these locations by virtue of "clean" wall-like bedrock exposure, the potential for rockfall from higher weathered exposures generally remains.

7.0 Note

For clarity and avoidance of doubt, this is a relative assessment and not an absolute assessment. Equally, a least potential assessment does not connote the absence of the potential for a rockfall. The nature and timing of prospective interventions to protect these areas are not considered in this report.

Appendix 1

Figures 1 to 3 with Key Plan Map View of Assessment Sections



Skellig Michael - Key Plan to Figures 1, 2 and 3.

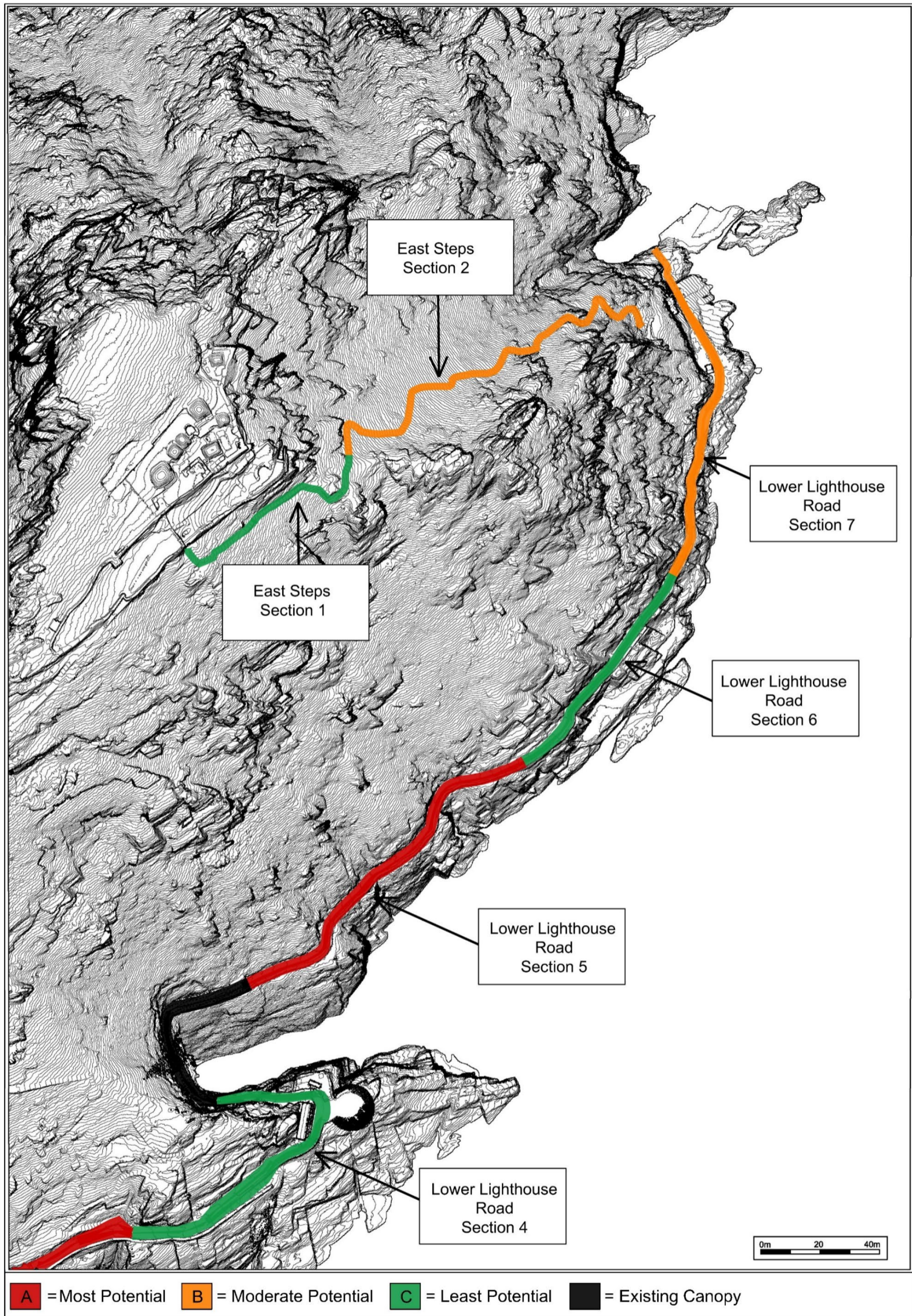
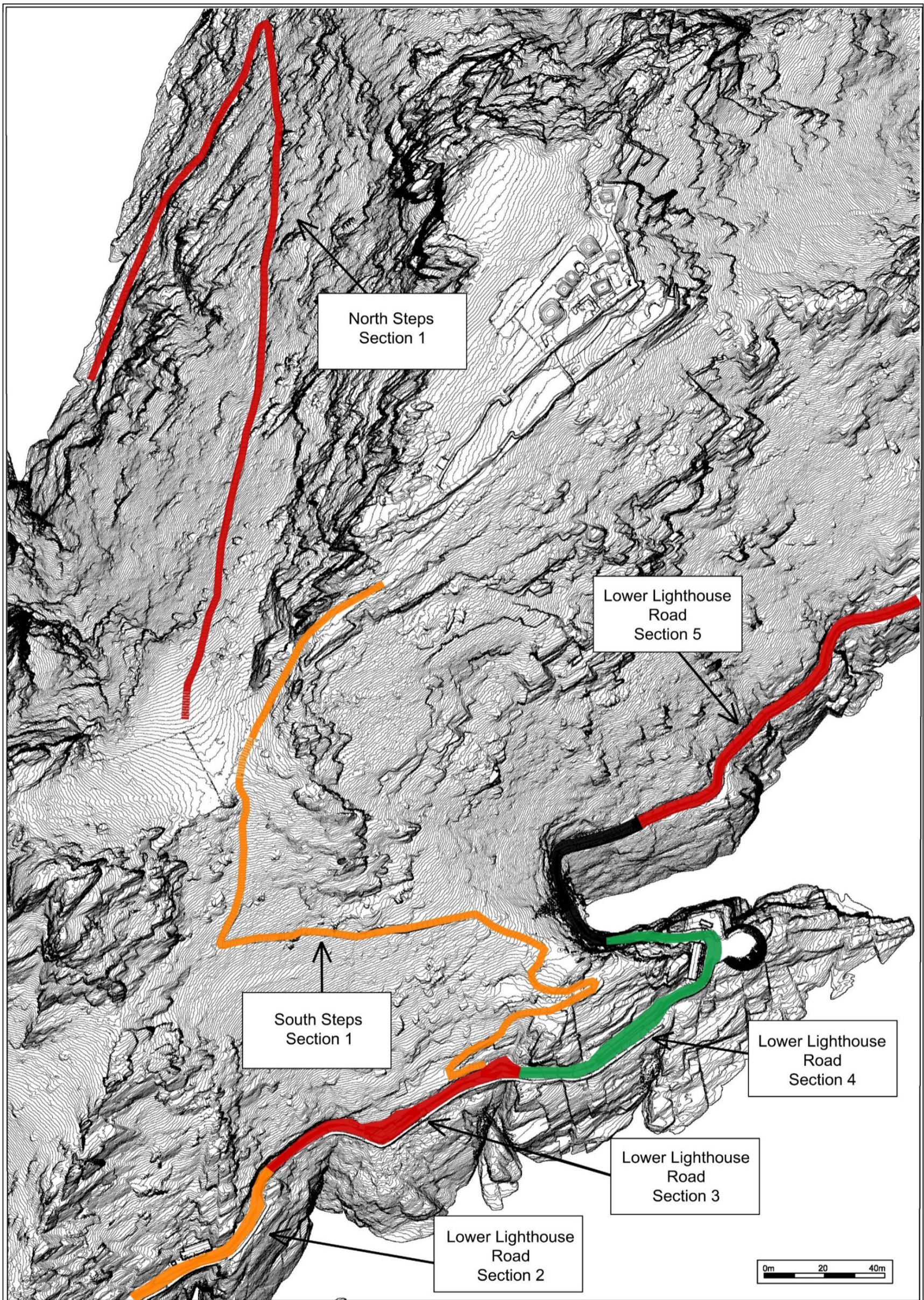
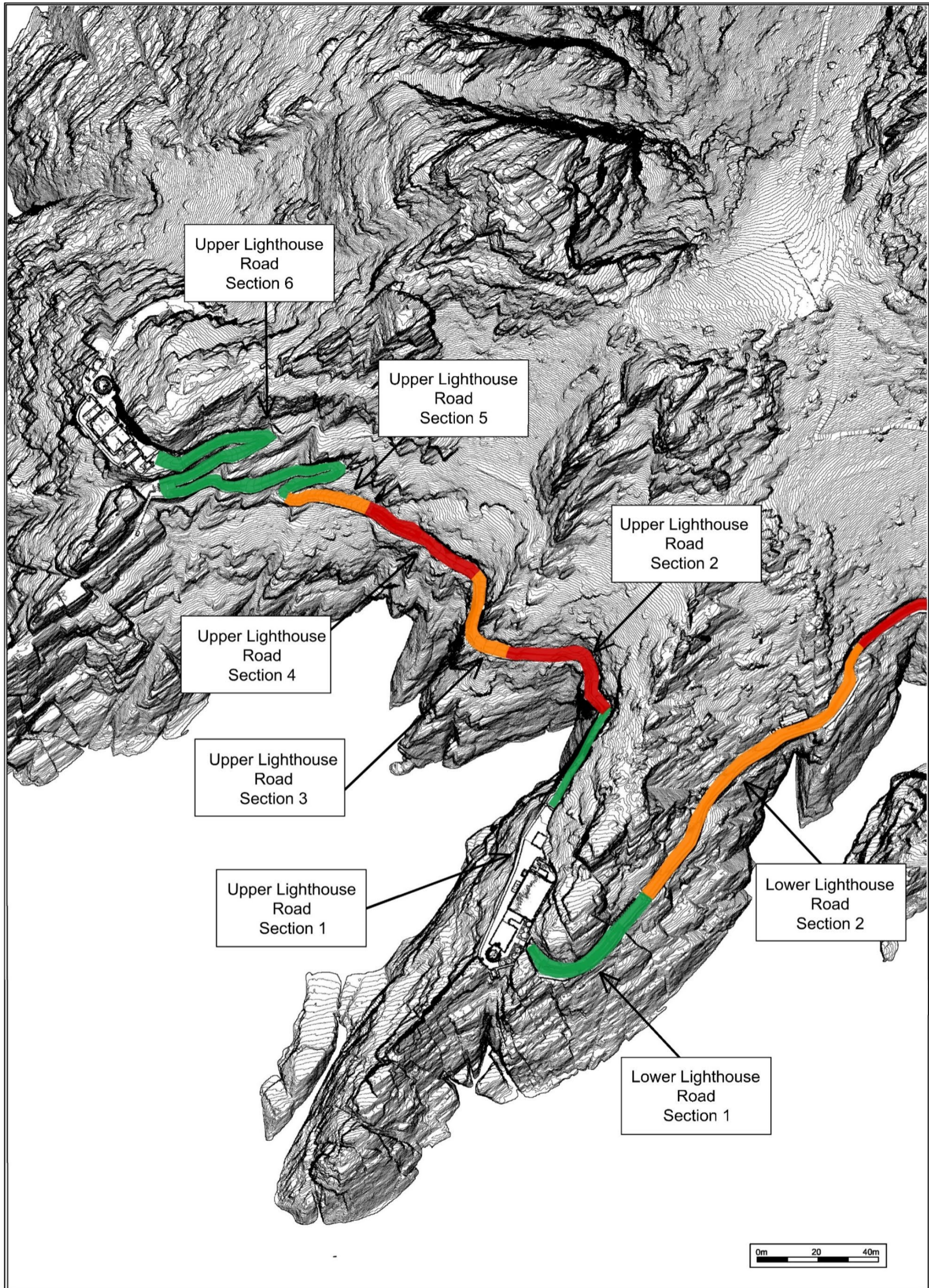


Figure 1. Skellig Michael - East.



A = Most Potential **B** = Moderate Potential **C** = Least Potential **■** = Existing Canopy

Figure 2. Skellig Michael - Central.



A = Most Potential **B** = Moderate Potential **C** = Least Potential ■ = Existing Canopy

Figure 3. Skellig Michael - West.

Appendix 2

Photographs of Assessment Sections



Photograph 01. Upper Lighthouse Road – Section 1.



Photograph 02. Upper Lighthouse Road – Section 2.



Photograph 03. Upper Lighthouse Road – Section 3.



Photograph 04. Upper Lighthouse Road – Section 4.



Photograph 04. Upper Lighthouse Road – Section 5.



Photograph 05. Upper Lighthouse Road – Section 6.



Photograph 06. Lower Lighthouse Road – Section 1.



Photograph 07. Lower Lighthouse Road – Section 2.



Photograph 08. Lower Lighthouse Road – Section 3.



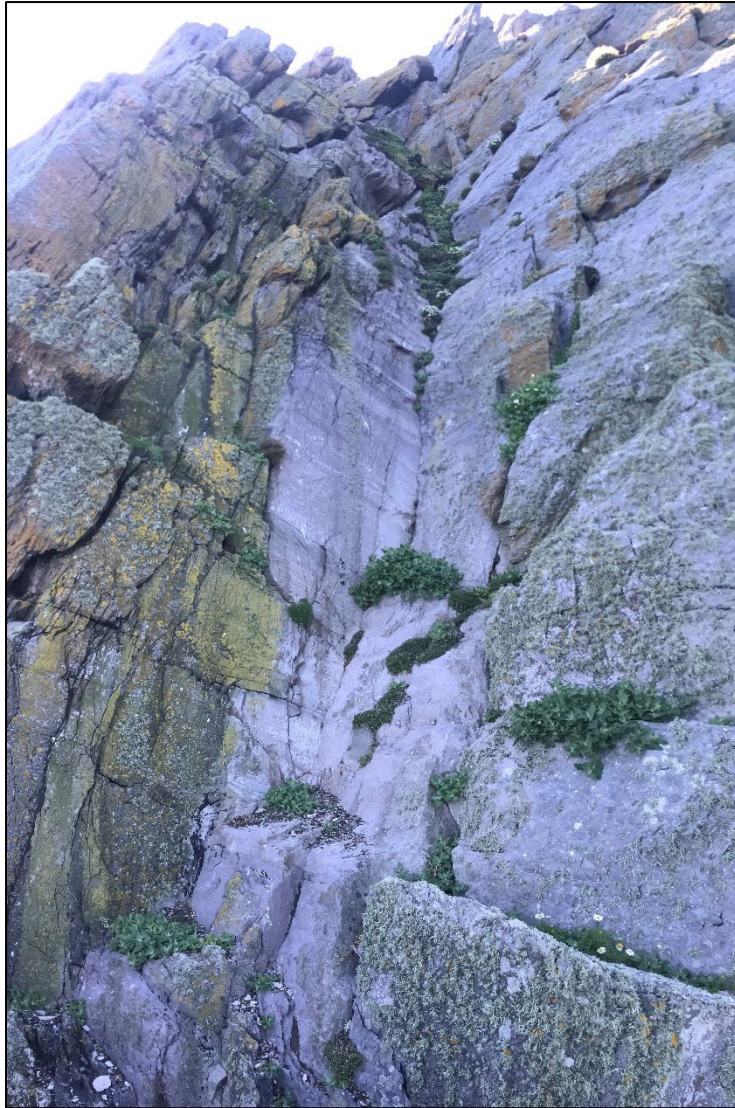
Photograph 09. Lower Lighthouse Road – Section 4.



Photograph 10. Lower Lighthouse Road – Section 5.



Photograph 11. Lower Lighthouse Road – Section 6.



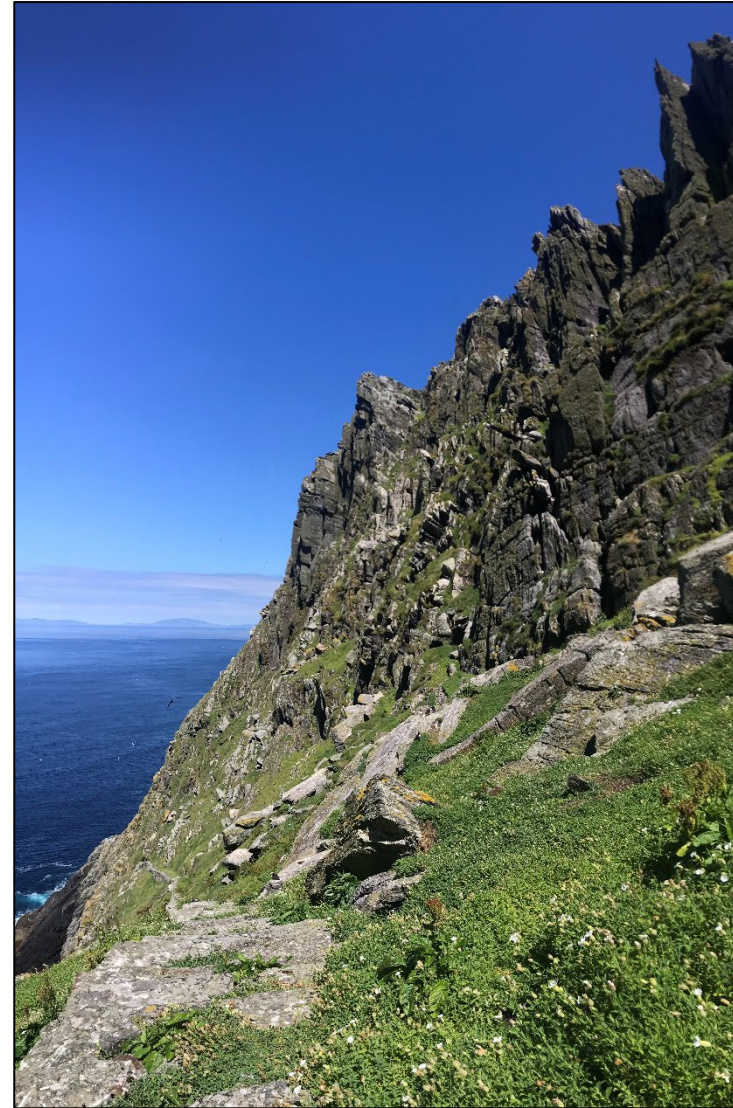
Photograph 12. Lower Lighthouse Road – Section 7.



Photograph 13. East Steps – Section 1.



Photograph 14. East Steps – Section 2.



Photograph 15. North Steps.

Appendix 3

- (a) Assessment Criteria and Sub-Categories**
- (b) Summary Tables**

(A) Assessment Criteria and Sub-Categories

Table 1. Bedrock – Source (Type 1).

Criterion	Sub-Category	Score
Rock Type	Rhyolite	1
	Sandstone	2
	Siltstone	3
Bedding Planes	Low Exposure	1
	Moderate Exposure	2
	High Exposure	3
Cleavage Planes	Low Exposure	1
	Moderate Exposure	2
	High Exposure	3
Joint Planes	Low Exposure	1
	Moderate Exposure	2
	High Exposure	3

Table 2. Overburden – Source (Type 2).

Criterion	Sub-Category	Score
Soil	Low Extent	1
	Moderate Extent	2
	High Extent	3
Scree	Low Extent	1
	Moderate Extent	2
	High Extent	3
Weathered Rock	Low Extent	1
	Moderate Extent	2
	High Extent	3

Table 3. Source – Pathways –Receiver.

Criterion	Sub-Category	Score
Source Type – Bedrock	Low Extent	1
	Moderate Extent	2
	High Extent	3
Source Type – Overburden	Low Extent	1
	Moderate Extent	2
	High Extent	3
Height Above Receiver	Adjacent to Receiver	1
	Up to 50m Above Receiver	2
	Over 50m Above Receiver	3
Nature of Pathway	Indirect	1
	Direct – fault/joint plane	2
	Direct - vertical	3
Protection of Receiver	>10m Rock Wall Protection	1
	5m-10m Rock Wall Protection	2
	Low Protection – High Exposure	3

**(B) Rockfall Potential – Lighthouse Road/Steps
Assessment Sheet – Skellig Michael (July 2022) – Summary Tables**

Upper Lighthouse Road

Section	Score				Potential Type
	Source (Type 1)	Source (Type 2)	Pathways	Total	
1	6	0	6	12	Least Potential
2	9	7	15	31	Most Potential
3	8	1	8	17	Moderate Potential
4	9	7	15	31	Most Potential
5	8	1	9	18	Moderate Potential
6	7	0	7	14	Least Potential

Lower Lighthouse Road

Section	Score				Potential Type
	Source (Type 1)	Source (Type 2)	Pathways	Total	
1	8	0	6	14	Least Potential
2	10	2	9	21	Moderate Potential
3	11	6	13	30	Most Potential
4	7	0	6	13	Least Potential
5	10	9	15	34	Most Potential
6	7	1	6	14	Least Potential
7	10	4	9	23	Moderate Potential

Least Potential 0-15; Moderate Potential 16-24; High Potential 25-36.

East Steps

Section	Score				Potential Type
	Source (Type 1)	Source (Type 2)	Pathways	Total	
1	6	0	6	12	Least Potential
2	4	3	13	22	Moderate Potential

South Steps

Section	Score				Potential Type
	Source (Type 1)	Source (Type 2)	Pathways	Total	
1	5	5	12	22	Moderate Potential

North Steps

Section	Score				Potential Type
	Source (Type 1)	Source (Type 2)	Pathways	Total	
1	10	7	16	32	Most Potential

Least Potential 0-15; Moderate Potential 16-24; High Potential 25-36.

Appendix 4

Rockfall Potential Impact Assessment Sheets

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Upper Lighthouse Road

Sheet No. 1 of 6

Bedrock

Feature	Description	Score
Nature	Thick Siltstone/Purple – little exposure as running along strike.	3
Bedding	Clean/blasted. 090/23, 100/18.	1
Cleavage	Blasted/wavy/clean – dominant exposure. 060/78S.	1
Joints	Blasted up to 10m – clean. “Exposed” 150/80E, 120/78E, 148/82E; dominant.	1

Overburden

Feature	Description	Score
Soil	N/A	-
Scree	N/A	-
Weathered Rock	N/A	-

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	No weathered loose material.	0
Type - Overburden	N/A	-
Height Above Receiver	Clean – adjacent to 10m. <50m (blasted faces).	2
Nature of Pathway	Direct.	3
Protection of Receiver	Dipping of cleavage plane to southeast allows added local protection – up to 10m wall protection.	1

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **11**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Upper lighthouse screen zone

Sheet No. 2 of 6

Bedrock

Feature	Description	Score
Nature	Siltstone – below and above scree slope.	3
Bedding	Moderate at high level, cleavage slabs on top of scree slope from upper. 085/22E.	2
Cleavage	Deep weathering on high exposure – cleavage “edges”. 060/80SE.	3
Joints	Very little exposure – only at blast level. 140/73W.	1

Overburden

Feature	Description	Score
Soil	Thin cover on top of thick.	1
Scree	Thick soliflucted glacial scree/moderated Siltstone chips to large cleavage slabs.	3
Weathered Rock	Blasted below – highly weathered above scree.	3

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	Extreme mix on island.	3
Type - Overburden	Extreme mix on island.	3
Height Above Receiver	Scree up to col. Bedrock up to lesser South Peak.	3
Nature of Pathway	Direct – vertical rockfall and scree fall protection.	3
Protection of Receiver	None – scree slope direct to receiver.	3

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **31**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Upper lighthouse

Sheet No. 3 of 6

Bedrock

Feature	Description	Score
Nature	Siltstone.	3
Bedding	Little exposure. 160/10E.	1
Cleavage	Blasted surfaces to 5m. Clean – higher exposures weathered. 058/72S.	3
Joints	Little exposure.	1

Overburden

Feature	Description	Score
Soil	Patches of thin soil/vegetated.	1
Scree	N/A	-
Weathered Rock	N/A	-

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	Siltstone bedrock.	3
Type - Overburden	N/A	-
Height Above Receiver	Up to little South Peak, however cleavage slabs will fall to scree zone 1 or 2.	3
Nature of Pathway	No direct pathway cleavage spine.	0
Protection of Receiver	Moderate blast zone c. 5m.	2

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL 17

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Upper lighthouse, upper scree zone

Sheet No. 4 of 6

Bedrock

Feature	Description	Score
Nature	Siltstone.	3
Bedding	No low exposure – high on South Peak and Lesser Peak.	2
Cleavage	No exposure at low scree level. High on South peak and Lesser Peak.	2
Joints	No exposure at low scree level. High on South Peak and Lesser Peak.	2

Overburden

Feature	Description	Score
Soil	Cover of soil on top of scree/better than sheet no. 2 of 6; past agriculture here.	1
Scree	Heavy glacial – soliflucted zone – large cleavage slabs in base of scree.	3
Weathered Rock	On top of soil level at height.	3

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	Extreme mix on island.	3
Type - Overburden	Extreme mix on island.	3
Height Above Receiver	Scree up to South Peak col. Bedrock on South Peak and Lesser Peak.	3
Nature of Pathway	Direct – vertical rockfall and scree fall potential.	3
Protection of Receiver	None – scree slope direct to receiver.	3

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **31**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Upper lighthouse road

Sheet No. 5 of 6

Bedrock

Feature	Description	Score
Nature	Siltstone.	3
Bedding	Little exposed at road level. 040/26S.	1
Cleavage	Blasted surfaces up to 5m at higher exposures weathered cleavage ends. 063/81S.	3
Joints	No material exposure hackly cleavage blast.	1

Overburden

Feature	Description	Score
Soil	Patches of thin soil/vegetated.	1
Scree	N/A	-
Weathered Rock	N/A	-

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	N/A	-
Type - Overburden	N/A	-
Height Above Receiver	Up to 5m blasted. Up to high South Peak.	3
Nature of Pathway	Direct pathway. Cleavage spine.	3
Protection of Receiver	None.	3

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **18**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Upper lighthouse road

Sheet No. 6 of 6

Bedrock

Feature	Description	Score
Nature	Siltstone.	3
Bedding	Clean in blast zone – little exposure – above as dominant. Cleavage face. 095/22NE.	1
Cleavage	Clean in blast zone – clean/semi-weathered above. 057/75S.	2
Joints	Little exposure of clean surfaces, except at lighthouse. The dominant joint plane at the old lighthouse runs 130/65E. This overhangs the building also. 147/75E, 170/73W.	1

Overburden

Feature	Description	Score
Soil	N/A	-
Scree	N/A	-
Weathered Rock	N/A	-

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	No material source.	-
Type - Overburden	No material source.	-
Height Above Receiver	Blasted clean faces and adjacent. <50m at top. Height advantage.	2
Nature of Pathway	Direct.	3
Protection of Receiver	>10m rock wall. Each level protected by one above and short clean cleavage face.	1

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **14**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Lower Lighthouse Road adjacent to lighthouse

Sheet No. 1 of 7

Bedrock

Feature	Description	Score
Nature	Siltstone.	3
Bedding	100/17E. Low exposure.	1
Cleavage	060/70°. Strong south sloping feature – 70° – set back from road – clean fare.	3
Joints	165/85°	1

Overburden

Feature	Description	Score
Soil	N/A	-
Scree	N/A	-
Weathered Rock	N/A	-

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	Clean siltstone – level faces.	1
Type - Overburden	N/A	-
Height Above Receiver	Adjacent and up to 50m above.	2
Nature of Pathway	Direct pathway – clean surfaces – joint places.	2
Protection of Receiver	Rock protection – blasted cleavage plane 070° to south >10m.	1

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **14**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Lower Lighthouse Road at OPW toilets/guides huts

Sheet No. 2 of 7

Bedrock

Feature	Description	Score
Nature	Siltstone	3
Bedding	125/5°E. Moderate exposure.	2
Cleavage	063/76S. Moderate exposure.	2
Joints	135/65°E. Strong joint plane faces. Strong cleavage faces.	3

Overburden

Feature	Description	Score
Soil	N/A	-
Scree	N/A	-
Weathered Rock	Cleavage slabs on ledges in joint plane zones.	2

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	Cleavage slabs. Moderate extent.	2
Type - Overburden	N/A	-
Height Above Receiver	<50m.	1
Nature of Pathway	Exposed joint planes.	3
Protection of Receiver	None.	3

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **21**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Lower Lighthouse Road at OPW huts/lower steps

Sheet No. 3 of 7

Bedrock

Feature	Description	Score
Nature	Sandstone/Siltstone – 2m shoulder blast zone low.	2
Bedding	070/45S. At height – towards receiver.	3
Cleavage	070/76S. At height – towards receiver.	3
Joints	140/76E. At height.	3

Overburden

Feature	Description	Score
Soil	Extensive in col zone/partial elsewhere.	3
Scree	Thin/beneath the soil.	1
Weathered Rock	Moderate distribution of large cleavage slabs especially at height.	2

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	High extent.	3
Type - Overburden	Scree/soil – moderate extent.	2
Height Above Receiver	Full. >50m.	3
Nature of Pathway	NB: Col “fault” zone (zone of fractal rock).	2
Protection of Receiver	None. Blast rock at 2m high.	3

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL 30

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Lower Lighthouse Road at helipad

Sheet No.4 of 7

Bedrock

Feature	Description	Score
Nature	Sandstone/Siltstone.	2
Bedding	Flat bed clean surfaces – low exposure.	1
Cleavage	068/68S. Clean, dipping to south – high exposure.	3
Joints	165/88°. Clean, surfaces – low exposure.	1

Overburden

Feature	Description	Score
Soil	N/A	-
Scree	N/A	-
Weathered Rock	Small number of cleavage slabs settled – N/A,	-

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	Clean section – no material loose.	-
Type - Overburden	N/A	-
Height Above Receiver	<25m.	2
Nature of Pathway	Direct – joint/cleavage plane.	2
Protection of Receiver	5m high blast wall protection.	2

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **13**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Cross Cove, Lower Lighthouse Road

Sheet No. 5 of 7

Bedrock

Feature	Description	Score
Nature	Rhyolite. Volcanic in core of Cross Cove and halfway on face under monastery.	1
Bedding	040/29S. Clean low exposed high under monastery.	3
Cleavage	069/83S. Clean low – blast zone, exposed high under monastery.	3
Joints	157/79S. Clean low – blast zone exposed high under monastery.	3

Overburden

Feature	Description	Score
Soil	Above Cross Cove and rhyolitic slope.	3
Scree	Two levels on top of rhyolitic slope (and Cross Cover) and lower Rhyolite.	3
Weathered Rock	Large cleavage slabs – multi-level.	3

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	High and extensive.	3
Type - Overburden	High and extensive.	3
Height Above Receiver	>50m.	3
Nature of Pathway	Scree slope and joint planes x 4.	3
Protection of Receiver	No natural protection. Assessment assumes no new canopy in place (July 2022).	3

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **34**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Lower Lighthouse Road cleavage wall

Sheet No. 6 of 7

Bedrock

Feature	Description	Score
Nature	Sandstone.	2
Bedding	Clean – Continues reasonably flat in the zone. Low exposure.	1
Cleavage	Clean. 068/85S. High exposure.	3
Joints	Clean strong. (1) 115/60S, (2) 135/68S – low exposure.	1

Overburden

Feature	Description	Score
Soil	N/A	-
Scree	N/A	-
Weathered Rock	Very local/minor.	1

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	Moderate extent.	2
Type - Overburden	N/A	-
Height Above Receiver	<50m. Note shelf above this to provide protection.	1
Nature of Pathway	Joint/cleavage planes.	2
Protection of Receiver	15m+ protection of cleavage wall/clean/blasted.	1

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **14**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: Lower Lighthouse Road chain-link/landing

Sheet No. 7 of 7

Bedrock

Feature	Description	Score
Nature	Siltstone.	3
Bedding	071/35N. Clean below/moderate weathered exposure at height.	2
Cleavage	065/82S. Clean in blast zone, heavily weathered at height.	3
Joints	140/71E. Clean in blast zone, moderately weathered at height.	2

Overburden

Feature	Description	Score
Soil	N/A	-
Scree	Cleavage slabs – ‘end of island’ at height.	2
Weathered Rock	At height – moderate extent.	2

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	Weathered bedrock up top; high extent.	3
Type - Overburden	N/A	-
Height Above Receiver	50m.	3
Nature of Pathway	Direct – joint planes.	2
Protection of Receiver	High blast walls locally.	

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL 22

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: East Steps (Top)

Sheet No. 1 of 2

Bedrock

Feature	Description	Score
Nature	Siltstone.	3
Bedding	180/24E. Tight. Very little exposure.	1
Cleavage	062/82S. Tight. Clean cleavage.	1
Joints	Low exposure.	1

Overburden

Feature	Description	Score
Soil	N/A	-
Scree	N/A	-
Weathered Rock	N/A	-

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	N/A	-
Type - Overburden	Cleavage slabs – few in number.	1
Height Above Receiver	<50m. This location 'under' high cleavage. Direct fall beneath.	1
Nature of Pathway	Direct vertical immediately adjacent. Mitigation: elevated position on island.	1
Protection of Receiver	None. However potential for overshoot, given the steep slope adjacent.	3

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **12**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: East Steps

Sheet No. 2 of 2

Bedrock

Feature	Description	Score
Nature	Dominant Rhyolite in mid-position. Note narrow footpath c. 1m. Small target – wide vegetative slope – c. 50m wide.	1
Bedding	Bedrock hard. Rhyolite to either side – wide “valley” feature. Little exposure until lower 30-40m.	1
Cleavage	No access – steep slope – at margins.	1
Joints	No access – steep slope – at margins.	1

Overburden

Feature	Description	Score
Soil	High extent, moderately thick – extensive vegetation.	3
Scree	Low extent – very steep slope.	1
Weathered Rock	Low level of exposed weathered rock on vegetated slope. Moderate level on rock bluff to north – low level on bluff to south.	1

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	Bedrock from monastery zone.	2
Type - Overburden	Weathered cleavage slabs on vegetative slope.	2
Height Above Receiver	Extensive track from monastery to pier at c. 70% >50m.	3
Nature of Pathway	Direct on surface vegetation.	3
Protection of Receiver	None – narrow pathway c. 1m wide exposed for much of length to rockfall – save for cleavage bluffs at lower end which provide protection from upper falls – but source of rockfall in own right.	3

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **22**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: South Steps

Sheet No. 1 of 1

Bedrock

Feature	Description	Score
Nature	Sandstone.	2
Bedding	Low exposure – notable at height.	1
Cleavage	Low exposure – notable at height and margins.	1
Joints	Low exposure.	1

Overburden

Feature	Description	Score
Soil	Moderate extent, especially in central zone.	2
Scree	Moderate extent, especially in central zone.	2
Weathered Rock	Low extent, especially in central zone.	1

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	Sandstone – moderate extent.	2
Type - Overburden	Cleavage slabs – moderate extent.	2
Height Above Receiver	Over 50m above receiver either side of col.	3
Nature of Pathway	Wide – fault zone – direct.	2
Protection of Receiver	None. Open at all levels.	3

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

TOTAL **22**

Rockfall Potential – Lighthouse Road/Steps Assessment Sheet – Skellig Michael (July 2022)

Location: North Steps

Sheet No. 1 of 1

Bedrock

Feature	Description	Score
Nature	Sandstone dominated (with thick Rhyolite band).*	0
Bedding	High exposure.	3
Cleavage	High exposure.	3
Joints	One major c180/80W. One dominant exposed to east of the saddle fault zone. Moderate general exposure.	0

Overburden

Feature	Description	Score
Soil	Heavy at col, embedded clasts, moderate extent on dominant joint plane.	2
Scree	At col, low extent on joint plane. Also heavy in central fault zone. Could affect lower dog-leg.	2
Weathered Rock	Heavy at col, and on lesser joint plane edges.	3

Source – Pathways - Receiver

Nature of Source	Description	Score
Source - Bedrock	High extent.	3
Type - Overburden	High extent.	3
Height Above Receiver	High to very high joint plane (>150m).	3
Nature of Pathway	Direct. Numerous cleavage/joint intersection plane conduits.	3
Protection of Receiver	None.	3

Rockfalls are a characteristic feature of the island and may occur at any location at any time.

* Essentially a long range – trending to 020° of steps 1-1.5m wide – short return section at base to water level.

TOTAL **32**