

# Aberdeen Greyhope Road Coastal Embankment

**Risk Assessment** 

18 April 2017

Aberdeen City Council

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## **Issue and Revision Record**

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## **1** Introduction

### 1.1 Background and Scope

A site walkover survey was undertaken at the Greyhope Road coastal embankment site on the 23<sup>rd</sup> January 2017 by two engineering geologists. The aims of the walkover surveys were to:

- Identify visual evidence of historical instability on the site associated with landslides;
- Identify potentially unstable areas and assess the risks these pose to adjacent roads and pathways and users;
- Highlight areas which require management / remediation.

#### Figure 1.1: Indicative Site Boundary



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The information gathered during the site walkover has informed a quantitative risk assessment, to classify the overall condition of the embankment and prioritise remedial actions required, with numbers assigned to risk level, impact, priority.

The objectives of this report are to:

- Summarise the findings of the site walkover and describe the baseline condition of the embankment, including locations of instability.
- Present the results of a slope stability risk assessment for the embankment, highlighting where management or remediation actions are required.
- Provide a priority level for remedial actions.
- Make recommendations for any immediate actions required.
- Make recommendations for a proposed strategy for continual monitoring of the embankment by Aberdeen City Council staff.

The results of the site walkover are presented in Appendix A.

### 1.2 Sources of Information

The following sources of information summarised below have been used to compile this report and are summarised in Section 2.

- MML Greyhope Desk Study (Ref.1)
- A guide to managing coastal erosion in beach/dune systems, SNH (Ref. 2)

### 2 Site Walkover Summary

#### 2.1 Site Walkover Results

A Site Walkover was completed by MML on 23<sup>rd</sup> January 2017. The results of the walkover are included in Appendix A.

The slopes in the north of the site are steep, generally between 45 and 70 degrees, and up to around 20m high. There are numerous current and historical slips along the slopes, typically shallow and acting within superficial deposits. The slips generally act from at or near the crest of the slope at the edge of Greyhope Road, and water piping is typically visible. Material from the slips has reached the footpath running around the coast at the base of the slopes. There are coastal defences in varying states of disrepair, along with breakwaters, along the shoreline. There is a drainage pipe coming out of the slope towards the north east that is causing scour.

As the slips tend to act at the crest of the slope, in places the road has been impacted, with ravelling of the road surface. Fences have been erected to prevent loading of the road edge. Additionally, fences have been erected on the road at the north west end of the site, west of the St Fittick's junction, where concrete blocks have been placed to stabilise an area experiencing undercutting and scour. The blocks appear unstable in places. There are sea defences in this area, comprising concrete revetment, in a state of collapse and have been covered in a layer of gabions, also in a state of disrepair.

The slopes in the east of the site at Greyhope Bay are typically 45 degrees and are experiencing instability at the tow, potentially due to wave action. Greyhope Road is set back from the crest of the slope in this area. Spoil consisting of brick, dressed stone and ceramic was observed on the beach, potentially associated with demolished cottages in the area. There is a drainage pipe coming out of the slope that is causing scour.

The slopes as they round the lighthouse promontory are steep, up to 70 degrees, and between 12 and 20m high. They are hummocky and composed of soil in the upper parts and rock in the lower, with rock outcrops visible along the shoreline. There have been recent slips in the area, one being on a saturated slope below the radar tower and one at the crest of the slope below the road, where fences have been erected.

The slopes in the south of the site are generally shallower than elsewhere on site, between 20 and 45 degrees, and with breaks in slope on bedrock. There are several historical structures and sea defences have been installed along this part of the shoreline, typically comprising concrete and masonry and in various states of disrepair. There is also a more recent revetment at the southernmost part of the site, with blocks having been plucked out by wave action.

A record geodatabase of each feature has been produced, including photographs, issued by CD. A plan showing the features at each site is included in Appendix A.

## 3 Slope Stability Risk Assessment Methodology

### 3.1 Strategy

Using published guidance (E. M. Lee and D. K. C. Jones, Landslide Risk Assessment, ICE 2014), the slopes have been assigned a category according to the level of risk to infrastructure and members of the public, by chainage groupings. The risk categories are from 1 to 5, with 1 being the lowest risk and 5 the highest.

This risk assessment method is quantitative, with the ratings based on engineering judgement. The risk assessment has been undertaken focusing on potential harm to users.

The following factors have been considered when assigning risk:

- Slope angle
- Consequence of failure
- Likelihood of failure
- Topography
- Groundwater
- Vegetative cover

Tables 1 and 2 demonstrate the ratings assigned to both likelihood of slope failure occurring and the consequences associated with failure.

The slopes have been assessed in terms of likelihood and consequence; these ratings are multiplied together to form a risk rating. The possible risk ratings are shown in the Risk Rating Matrix in Table 3, the ratings have been assigned a risk category from 1 to 5 indicated in Table 4. These risk categories inform prioritisation of any potential actions or remediation measures, with a High to Very High risk necessitating further investigation and a discussion of options / recommendations.

#### **Table 1: Probability Ratings**

| Likelihood                        | Rating |
|-----------------------------------|--------|
| Very unlikely                     | 1      |
| Unlikely                          | 2      |
| About as likely as not (Possible) | 3      |
| Likely                            | 4      |
| Very likely                       | 5      |

#### **Table 2: Consequence Ratings**

| Consequence                                                                                                                                                | Rating |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Minor: failed materials stop along the slope, no failure that would impact on infrastructure                                                               | 1      |
| Moderate: failed materials impact the foreshore, potential for failure to affect upslope footpaths                                                         | 2      |
| Serious: failure with debris/blocks reaching the foreshore, with the potential for damage to upslope footpaths / roads and injury to members of the public | 3      |

### Table 3: Risk Rating Matrix

|                                                                                                                                                                        |   | Likelihoo        | d        |          |        |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------|----------|----------|--------|----------------|
|                                                                                                                                                                        |   | Very<br>unlikely | Unlikely | Possible | Likely | Very<br>Likely |
| Consequence                                                                                                                                                            |   | 1                | 2        | 3        | 4      | 5              |
| Minor: failed materials stop along the slope, no failure that would impact on infrastructure                                                                           | 1 | 1                | 2        | 3        | 4      | 5              |
| Moderate: failed materials impact the foreshore, potential for failure to affect upslope footpaths                                                                     | 2 | 2                | 4        | 6        | 8      | 10             |
| Serious: failure with debris/blocks<br>reaching the foreshore, with the<br>potential for damage to upslope<br>footpaths / roads and injury to<br>members of the public | 3 | 3                | 6        | 9        | 12     | 15             |

### Table 4: Risk Categories and Recommended Actions

| Risk Category |       |                                          | Action               |  |  |
|---------------|-------|------------------------------------------|----------------------|--|--|
| Very Low      | 1-2   | Ļ                                        | None required        |  |  |
| Low           | 3-4   | N. N | None required        |  |  |
| Moderate      | 5-6   | l Du                                     | Management required  |  |  |
| High          | 7-10  | easi                                     | Remediation required |  |  |
| Very High     | 11-15 | Incr                                     | Remediation required |  |  |

## 4 Slope Stability Risk Assessment Results

#### 4.1 Risk Assessment Results

The results of the slope stability risk assessment are included in Table 5.

A prioritisation level has been applied to those areas requiring action (moderate to very high risk) of between 1 (highest priority) and 3 (lowest priority).

### Table 5: Greyhope Road Slope Stability Risk Assessment

| Chainage<br>(m) | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Grid<br>Reference<br>(centre) | Associated<br>Features<br>(Appendix<br>A) | Consequence<br>Rating | Likelihood<br>Rating | Risk<br>Rating | Risk<br>Category | Prioritisation |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------|-----------------------|----------------------|----------------|------------------|----------------|
| 0 to 100        | This area has short (1-4m)<br>slopes with a masonry / rock<br>sea defence on the beach,<br>below Greyhope Road. It is<br>considered possible that the<br>sea defence could fail,<br>impacting on the road.                                                                                                                                                                                                                                                            | NJ 9562 0542                  | 43, 92                                    | 3                     | 3                    | 12             | High             | 2              |
| 100 to 160      | This area has been previously<br>remediated using interlocking<br>concrete blocks to stabilise a<br>4m high slope below<br>Greyhope Road subject to<br>undercutting, potentially due<br>to scour. The concrete blocks<br>appear unstable in places and<br>could fail, affecting the road at<br>the crest and falling onto the<br>foreshore.                                                                                                                           | NJ 9574 0542                  | 93, 94                                    | 3                     | 4                    | 12             | Very High        | 1              |
| 160 to 200      | Gabion baskets have been<br>installed on top of an historical<br>collapsed sea defence. These<br>baskets are in poor condition,<br>being collapsed / burst<br>throughout. The gabions are<br>directly below Greyhope Road<br>and evidence of slope<br>instability can be seen<br>between the gabions and<br>road.                                                                                                                                                     | NJ 9577 0543                  | 51, 95                                    | 3                     | 3                    | 9              | High             | 1              |
| 200 to 500      | There are numerous recent<br>slips across this area on 60 to<br>70 degree soil slopes. The<br>slips often originate from the<br>edge Greyhope Road at the<br>crest of the slope, with sub<br>vertical back scarps. Fences<br>have been erected to protect<br>the road edge. The slope is<br>typically 7m high with between<br>15 and 60m <sup>3</sup> failed material<br>from slips. It is considered<br>that slope is very likely to<br>continue to fail, due to the | NJ 9591 0549                  | 1, 2, 63, 5, 65,<br>66, 67                | 3                     | 5                    | 15             | Very High        | 1              |

|                | steepness of the slopes and<br>soil pipes seen within the<br>topsoil in the back scarps.<br>This would have a significant<br>impact on the road.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |                                                                                   |   |   |    |           |   |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------|---|---|----|-----------|---|
| 500 to 650     | There are several historical<br>slips in this area,<br>characterised by vegetated<br>slopes with a break in slope<br>where material has been<br>deposited (35m <sup>3</sup> at Ch600).<br>Slopes are typically 8m high<br>and 45 to 55 degrees. There<br>is a small retaining wall at the<br>toe of the slope. It is<br>considered possible that this<br>area could fail in the future,<br>potentially affecting the road<br>at the crest, as well as<br>footpath below.                                                                                                                                                                    | NJ 9612 0562 | 68, 69, 70, 13,<br>14, 16, 72                                                     | 3 | 3 | 9  | High      | 1 |
| 650 to 950     | There are numerous recent<br>and historical slips present<br>across this area. Slopes are<br>between 8 and 20m high,<br>typically 50 degrees and<br>occasionally wet, with soil<br>pipes and springs. Between<br>approx. 25 to 120m <sup>3</sup> failed<br>material in slips. Several of<br>the slips originate from just<br>below the road, with fences<br>erected to protect the edge,<br>and have deposited material<br>onto the footpath below.<br>Additionally, scour has<br>occurred below a drainage<br>pipe. It is considered likely<br>this area will continue to fail,<br>potentially further affecting the<br>road and footpath. | NJ 9629 0567 | 73, 74 16, 21,<br>22, 23, 75, 76,<br>77, 78, 27, 79,<br>28, 80, 29, 81,<br>30, 31 | 3 | 5 | 15 | Very High | 1 |
| 950 to<br>1200 | The slopes in this area are<br>comprised of soil in the upper<br>parts and rock in the lower.<br>There is recent and historic<br>instability on the slopes<br>between Greyhope Road and<br>footpath mid slope, as well as<br>between the mid slope<br>footpath and footpath at the<br>toe of the slope. Slips of up to                                                                                                                                                                                                                                                                                                                      | NJ 9660 0574 | 32, 82, 33, 34,<br>83, 84, 85, 86,<br>37, 87                                      | 3 | 3 | 9  | High      | 1 |

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|              |    | 15m <sup>3</sup> material. The upper<br>slope is typically 4m high.<br>There is scour/instability due<br>to a water pipe within the<br>slope. It is considered likely<br>that the slope will continue to<br>fail, potentially affecting the<br>footpaths and road.                                                                                                                                                                                                                        |              |                       |   |   |   |      |   |
|--------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------|---|---|---|------|---|
| 1200<br>1600 | to | A soil slip has occurred at the<br>toe of a slope; however, the<br>majority of the slopes appear<br>stable. The road is set back<br>from the crest of the slope and<br>is considered to be at low risk.<br>There is spoil on the beach,<br>potentially associated with<br>demolished cottages. Any<br>further instability may<br>potentially affect informal<br>footpaths at the crest of the<br>slope.                                                                                   | NJ 9686 0550 | 88, 38, 40, 89,<br>91 | 1 | 3 | 3 | Low  | - |
| 1600         |    | There is a pipe with scour<br>occurring within the slope.<br>This is below the road and it is<br>considered that this could<br>affect the road if the scour<br>continues.                                                                                                                                                                                                                                                                                                                 | NJ 9697 0542 | 90                    | 3 | 3 | 9 | High | 2 |
| 1600<br>1800 | to | The slope in this area are<br>hummocky and formed of soil<br>and rock. The slopes appear<br>generally stable. The road is<br>set back in this area and is<br>considered to be at low risk.                                                                                                                                                                                                                                                                                                | NJ 9705 0542 | 96                    | 2 | 2 | 4 | Low  | - |
| 1800         |    | There have been some recent<br>slips in soil material on the<br>12m high slope below a radar<br>tower, with water visible in the<br>failed areas and approx. 80m <sup>3</sup><br>volume of material failed.<br>Concrete is visible in the<br>deposited material at the toe<br>of the slope. The road is set<br>back in this area; however, as<br>the slopes are likely to<br>continue to fail and there are<br>structures above it would be<br>considered prudent to monitor<br>movement. | NJ 9719 0543 | 54, 55, 97            | 2 | 4 | 8 | High | 2 |

| 1800<br>2000 | to | The slopes in this area appear<br>to be generally stable and are<br>formed of soil in the upper<br>parts and rock in the lower,<br>with outcrops visible. There<br>are some minor slips of soil<br>material on rock visible below<br>a foghorn. There is an outfall<br>building and sea defences<br>present. The road is set back<br>in this area and is considered<br>to be at low risk.                         | NJ 9724 0536 | 9                       | 2 | 2 | 4  | Low       | - |
|--------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------|---|---|----|-----------|---|
| 2000<br>2100 | to | A slip has occurred within soil<br>on a 10m high, 20 to 35<br>degree slope directly below<br>the road, with approx 8m <sup>3</sup><br>material. The slip appears to<br>have been caused by surface<br>/ near surface water.<br>Temporary barriers have been<br>erected at the side of the road.<br>It is considered that this slip<br>could deteriorate, potentially<br>affecting the road above.                 | NJ 9717 0522 | 99, 100                 | 3 | 4 | 12 | Very High | 1 |
| 2100<br>2600 | to | The slopes in this area appear<br>to be generally stable and are<br>formed of soil in the upper<br>parts and rock in the lower,<br>with outcrops visible. There<br>are concrete and masonry sea<br>defences and some ruined<br>buildings at the toe. The road<br>is at the crest of the slope;<br>however, the lack of apparent<br>historical instability suggests<br>this area is low risk to<br>infrastructure. | NJ 9688 0508 | 59, 102, 60, 61,<br>103 | 2 | 2 | 4  | Low       | - |
| 2600         |    | There has been damage to<br>the revetment defences, with<br>blocks having been plucked<br>out. This should be repaired<br>to prevent further damage.                                                                                                                                                                                                                                                              | NJ 9663 0499 | 62, 104                 | 2 | 3 | 6  | Moderate  | 2 |

10

### 4.2 Recommendations

It is recommended that potential mitigation and remedial measures are considered for those high and very high risk areas to prevent damage to infrastructure. Management and monitoring measures are considered to mitigate potential risk for the identified moderate risk areas.

It is understood that Greyhope Road from the Lighthouse (Ch1900) to the junction with St Fittick's Road (Ch2750) is to be closed and widened as part of works associated with the development of Nigg Bay. This requires all traffic to use the road to the north, where instability has already impacted on road suitability / usage.

It is not known how the Contractor for the road widening works proposes to mitigate landslide risk, given landslides have occurred in this area.

#### 4.2.1 Immediate Actions

Immediate actions that may be undertaken at the site include setting up fixed monitoring points on the slope and road along the northern slopes to monitor movement. This is considered to be a significant risk and it is recommended that visual inspection is undertaken regularly i.e. every two weeks and after periods of extended rainfall. Particularly as it is now the only access to Torry Battery and the lighthouses

This intensive monitoring will allow the slopes and Greyhope Road to be properly assessed and managed while a hard engineering solution is considered. Additionally, it may help an informed decision to be made as to the nature and extent of remedial works.

#### 4.2.2 Proposed Strategy for Continual Monitoring

As well as the intensive monitoring along the northern slopes, it is considered that fixed monitoring points could be installed at various locations along the crest and face of the slopes around the site to monitor for movement, checked either by traditional topographic survey methods or by aerial photogrammetry / point cloud survey, at regular intervals.

ACC may also wish to undertake a visual inspection at regular intervals to identify any slope changes, based on the photographs provided by MML and any subsequent ACC visits, as well as after any periods of extended heavy rainfall when slope instability is more likely.

## **5** References

- 1. MML Desk Study, 378926 Donmouth Phase I Desk Study, Rev B, March 2017
- 2. SNH, 'A guide to managing coastal erosion in beach/dune systems', dated October 2000. [online- http://www.snh.org.uk/publications/on-line/heritagemanagement/erosion/index.shtml]

## A. Site Walkover Results

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Figure A: Site Walkover Results



|                                           | <u> </u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                           | Location Map         Key to Symbols         • Current Instability         • Historic Instability         • Observation         • Structure         + Chainage (m)         Site Boundary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| nor                                       | A 17/02/2017 KY Draft for Comment SEY AM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Ente                                      | Kev         Date         Drawn         Description         Ch'k'd         App'd           Mott         MacDonald         House         House |
|                                           | M     8-10 Sydenham Road       Croydon, CR0 2EE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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|                                           | Client<br>Aberdeen City Council<br>Marischal College<br>Broad Street<br>Aberdeen<br>AB10 1AB<br>Title<br>Aberdeen Coastal Embankments<br>Greyhope Road<br>Site Walkover Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                           | DrawnK YoungCoordinationK YoungGIS CheckJ IronsApprovedA Martin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                           | Scale at A1 Status Rev Security<br>1:2.500 DRA A STD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 450 500                                   | Drawing Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| © Crown Copyright and database right 2016 | 378926-MMD-00-GR-GIS-001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

#### Table A: Site Walkover Features

| I         Current Instability         Transferrand lique kith road at life cred of days         Res sign           2         Current Instability         View of sign         Sign understability         New of sign         New of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Number | Classification       | Feature                             | Description                                                                                                   |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------|-----------|
| 2         Current Instanciny         Yene of allo         Sec 1           5         Current Instanciny         Were of allo         Bit orderating the stope of the oxide one constance of one c                                                                     | 1      | Current Instability  | Start of extensive instability      | Translational slip with road at the crest of slope                                                            | No slip r |
| 5     Current Instability     Historic Instability     Big understanding design of Incred, Ser Nackscarp, Sen Na          | 2      | Current Instability  | View of slip                        | See 1                                                                                                         |           |
| 13     Hittob: Indiacity     Hittob: Call of Schwarding       14     Observation     Keer of stages       15     Hittob: Indiacity     East of rocket house       16     Hittob: Indiacity     Reservation       17     Observation     Weer of water stage       18     Observation     New of water stage       19     Observation     New of water stage       10     Observation     New of water stage       12     Current Instability     Reservation       13     Observation     Sign behaviors inform       14     Observation     Sign behaviors inform       15     Observation     Sign behaviors inform       16     Observation     Faculat lefter on stage       17     Methor: Instability     Filter on stage       18     Observation     Corrent lessibility     Filter on stage       19     Observation     Faculat lefter on stage     Sign behaviors inform       10     Observation     Filter on stage     Sign behaviors inform       19     Observation     New of stoge       10     Observation     New of stoge <td>5</td> <td>Current Instability</td> <td>View of slip</td> <td>Slip undercutting the edge of the road, 0.5m backscarp, 8m high slope, approx.20m3 material</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5      | Current Instability  | View of slip                        | Slip undercutting the edge of the road, 0.5m backscarp, 8m high slope, approx.20m3 material                   |           |
| 14     Otherwaten     Were of select     W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 13     | Historic Instability | Historic slip                       | Beneath road, 7m wide, 7.4m high slope, 0.7m backscarp, 35m3 deposited material                               |           |
| 16     Hators Instability     East of roder house     Potom Instability     Locking water days       17     Observation     View of water days     Potom Instability     Locking water days       18     Observation     View of water days     Potos head, 2014 Photos actarp 17 Photos 17 Photo                                                                                                                              | 14     | Observation          | View of slopes                      |                                                                                                               |           |
| 17     Observation     View of water dags     Chicking water dags       18     Observation     View of water dags     Possible sight our hange, 20 min which, approx. 120 min which, a                                                           | 16     | Historic Instability | East of rocket house                | Potential historic slip, fully vegetated, break in slope                                                      |           |
| 18     Observation     Vero of valuer and pail for versing 37 minit phase kases 17 min versi, export 18 minit phase 18 min the minit pha | 17     | Observation          | View of water edge                  | Looking west                                                                                                  |           |
| 21     Current instabiliy     Resert sip     Pesable slight own hang. 3 mingh back scap 1.7m mingh back scap 1.7          | 18     | Observation          | View of water edge                  | Looking east                                                                                                  |           |
| 22     Current Instability     Repert site     Natural stage 50 degrees, site score hanging, See 2       23     Observation     Stope       24     Current Instability     Site score hange of the score                                                                                          | 21     | Current Instability  | Recent slip                         | Possible slight over hang. 7.9m high back scarp 1.7m 9m wide, approx. 120m3                                   |           |
| 28     Otherwarden     Weine Mooking and T       29     Otherwarden Instability     Silp features Historic and recert     Weine Mooking and T       20     Otherwarden     Convent Instability     Silp features Historic and recert     Silp features Historic and recert       20     Otherwarden     Convent Instability     Silp features Historic and recert     Silp features Historic and recert       21     Otherwarden     Silp features Historic and recert     Silp features Historic And recert     Silp features Historic And recert       22     Otherwarden Instability     Silp features Historic And recert     Silp features Historic And recert     Silp features Historic And recert And                                                                                                                                                                                                                                                                                          | 22     | Current Instability  | Recent slip                         | Natural slope 50 degrees, slip is over hanging. See 21                                                        |           |
| 27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 23     | Observation          | Slope                               | View looking east                                                                                             |           |
| 28     Outree Instability     Silp detures inscio and needed     Verse inscional of the second of           | 27     | Current Instability  | Recent slip                         | View from base of 79                                                                                          |           |
| 29       Observation       Charart Instability       Charart Instability       Patient of Active                                 | 28     | Current Instability  | Slip features historic and recent   | View from base of 79                                                                                          |           |
| 30     Observation     Faulted rock     Faulted rock     2 mit       31     Current Instability     Reservation     2 mit       32     Historic Instability     Reservation     2 mit       33     Historic Instability     Reservation     2 mit       34     Observation     Reservation     2 mit       37     Historic Instability     Reservation     2 mit       34     Observation     1 mit     2 mit       35     Current Instability     Reservation     2 mit       36     Observation     Reservation     2 mit       37     Mitsoric Instability     Reservation     2 mit       36     Current Instability     Reservation     2 mit       37     Observation     Poorty vegetiated slope     2 mit       36     Current Instability     Poorty vegetiated slope     2 mit       37     Current Instability     Reservation     2 mit       38     Current Instability     Reservation     2 mit       39     Current Instability     Reservation     2 mit       30     Current Instability     Reservation     2 mit       30     Current Instability     Reservation     2 mit       30     Current Instability     Reservation     2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 29     | Observation          | Coastal defence                     |                                                                                                               |           |
| 31     Current Instability     Recent alianty     Percent alianty     Percent alianty       22     Historic Instability     Mistoric Instability     Fully equated potential historic alianty       23     Historic Instability     Wistoric Netability     Fully equated potential historic alianty       24     Observation     Generation alianty     Fully equated potential historic Stability     Fully equated potential historic Stability       24     Observation     Generation alianty     Fully equated potential historic Stability     Fully equated potential historic Stability       24     Observation     Observation     Current Instability     Fully equated potential historic Stability     Fully equated potential historic Stability       25     Current Instability     Observation     Fully equated potential historic Stability     Fully equated potential historic Stability       26     Current Instability     Stability of Stability equated potential historic Stability     Fully equated potential historic Stability     Fully equated potential historic Stability       27     Current Instability     Stability of Stability     Fully equated potential historic Stability     Fully equated potential historic Stability       28     Current Instability     Stability of Stability     Fully equated potential historic Stability     Fully equated potential historic Stability       29     Current Instability     Stability of Stability <td>30</td> <td>Observation</td> <td>Faulted rock</td> <td>Faulted rock at shoreline</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 30     | Observation          | Faulted rock                        | Faulted rock at shoreline                                                                                     |           |
| 32       Historic Instability       Historic Instability       Historic Instability       Historic Instability       New of slop         33       Observation       New of slop       Instantion       New of slop       New of slop       New of slop       Instantion       New of slop       New o                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 31     | Current Instability  | Recent slip                         | Approx. 100m3 material                                                                                        | 9.2m hi   |
| 38       Historic Instability       View of slope       See 32         44       Observation       View of slope       See 32         58       Current Instability       Historic Isig between read and path       Stor Am high slip, 0.5m backscarp, approx. 9m3 material       See 32         58       Current Instability       Metsoric Isig between read and path       Stor Am high slip face. Demolition rubble on beach       See 32         54       Observation       Vegetated Slope       Current Instability       See 32         54       Observation       Metando slope       See 32       See 32         55       Current Instability       Slop forsiol       See 32       See 32         56       Ourrent Instability       Slop forsiol       See 32       See 32         57       Current Instability       Slop forsiol       See 32       See 32         58       Ourrent Instability       Slop forsiol       See 32       See 32         59       Ourrent Instability       Slop forsiol       See 32       See 32         50       Current Instability       Slop forsiol       See 32       See 32         50       Current Instability       Slop forsiol       See 32       See 32       See 32         51       Observation<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 32     | Historic Instability | Historic slip                       | Fully vegetated potential historic slip                                                                       |           |
| 34     Observation     Historic Instability       75     Historic Instability     Historic Instability       76     Observation     Site of                                                                                 | 33     | Historic Instability | View of slope                       | See 32                                                                                                        |           |
| 37       Historic Instability       Historic slip between road and path       31 to 4m high slip. 0.5m backcacpr. approx. 9m 3 material         38       Current Instability       Observation       Up to 4m high slip. 0.5m backcacpr. approx. 9m 3 material         49       Observation       Vegetated Slope       Current Instability       Current Instability         43       Observation       Photo to the east       Photo to the east         54       Observation       Pooly vegetated slope       Current Instability       Of dam of the photo to the east         55       Current Instability       Observation       Slop of solits       12 m high slope with superficial slips, up to 10m wide at base, approx. 80m3 material, damp, radm to tow approx       Of dam of the photos looking east and west         56       Current Instability       Slop of solit       12 m high slope with superficial slips, up to 10m wide at base, approx. 80m3 material, damp, radm to tow approx       0 dam of the photos looking east and west         57       Current Instability       Slop of solit       12 m high slope with superficial slips, up to 10m wide at base, approx. 80m3 material, slope solit         58       Current Instability       Banage of sea wall       12 m high slope with superficial slips       12 m backscarp, 5m wide, approx. 40m3         59       Current Instability       Slop of solit       Discrely beneath road, 1.2 m backscarp, 5m wide, solpp, tor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 34     | Observation          | view of slope                       |                                                                                                               |           |
| 38       Current Instability       Up to 4m high slip face. Demolition rubble on beach         40       Observation       Vegtetat Slopes         42       Observation       Photo to the cast         51       Observation       Photo to the cast         52       Current Instability       Photo to the cast         53       Current Instability       Slopes         54       Observation       Photory vegetated slope         55       Current Instability       Slopes and rulend building         60       Observation       Slopes and rulend building         61       Observation       Slopes and rulend building         62       Current Instability       Baseavalidefences         63       Current Instability       Damage of seaw all         64       Observation       Slopes start         65       Current Instability       Slopes start         66       Current Instability       Slopes start         67       Current Instability       Slopes start         68       Observation       Concret Instability       Slopes start         69       Observation       Concret Instability       Slopes start         61       Observation       Concret Instability       Slope start     <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 37     | Historic Instability | Historic slip between road and path | 3 to 4m high slip, 0.5m backscarp, approx. 9m3 material                                                       |           |
| 40       Observation       Vegtated Slope       Conservation       Photo the cast       Photo Phot                                                                                                                                                                                                                                                | 38     | Current Instability  | Slip                                | Up to 4m high slip face. Demolition rubble on beach                                                           |           |
| 42       Observation       Slopes         43       Observation       Mamade slope       Small slope in front of SEPA building       Image state sta                                                                             | 40     | Observation          | Vegetated Slope                     | Looking north                                                                                                 |           |
| 43       Observation       Manade slope       Step 200       Step 200 <t< td=""><td>42</td><td>Observation</td><td>Slopes</td><td>Photo to the east</td><td></td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 42     | Observation          | Slopes                              | Photo to the east                                                                                             |           |
| 51       Observation       Poorly vegetated slope         54       Current Instability       21m high slope with superficial slips, up to 10m wide at base, approx.80m3 material, damp, case at one at tower above       0 d and tower above         55       Current Instability       Slip of soils       21m high slope with superficial slips, up to 10m wide at base, approx.80m3 material, damp, case at one at tower above       0 de and tower above         55       Current Instability       Slopes and ruined building       Photos looking east and west       2 material stability         60       Observation       Observation       Structure       2 material stability       2 material stability         61       Observation       Seawall/defences       2 material stability       2 materi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 43     | Observation          | Manmade slope                       | Small slope in front of SEPA building                                                                         |           |
| 54       Current Instability       Slip of solis       12m high slope with superficial slips, up to 10m wide at base, approx. 80m3 material, damp, rada (Super above Cover and Cover above Cover above Cover C                        | 51     | Observation          | Poorly vegetated slope              |                                                                                                               | -         |
| 55Current InstabilitySlip of soilsSee 5459ObservationSlopes and ruined buildingPhotos looking east and west60StructureRetaining feature in slope61ObservationSeawall/defences62Current InstabilityDamage of sea wall63Current InstabilityDamage of sea wall64Current InstabilityDamage of sea wall65Current InstabilityObservation66Current InstabilitySurface Slip67Current InstabilitySurface Slip68ObservationConcret rock protection69ObservationConcret rock protection70ObservationPlucked stone from sea defence71Historic InstabilityRocket house72Historic InstabilityFresh slip73Current InstabilitySlipe74ObservationSteep slope75ObservationSteep slope76Current InstabilityStep slope76ObservationStep slope77ObservationStep slope76 <td>54</td> <td>Current Instability</td> <td>Slip of soils</td> <td>12m high slope with superficial slips, up to 10m wide at base, approx. 80m3 material, damp, radar tower above</td> <td>Old and</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 54     | Current Instability  | Slip of soils                       | 12m high slope with superficial slips, up to 10m wide at base, approx. 80m3 material, damp, radar tower above | Old and   |
| 59ObservationSlopes and ruined buildingPhotos looking east and west60StructureRetaining feature in slope61ObservationSeawall/defences62Current InstabilityDamage of sea wall63Current InstabilityOffice of sea wall64Current InstabilityOffice of sea wall65Current InstabilitySurge of sea wall66Current InstabilitySurge of sea wall67Current InstabilitySurge of sea wall68ObservationSurdece Slip69ObservationConcrete rock protection69ObservationConcrete rock protection70ObservationPlucked stone from sea defence71Historic InstabilitySlip72Historic InstabilitySlip73ObservationFresh slip74ObservationStee pslop75ObservationStee pslop76Current InstabilitySlip71ObservationStee pslop72ObservationStee pslop73ObservationStee pslop74ObservationStee pslop75ObservationSlip76Current InstabilitySlip76ObservationStee pslop76ObservationStee pslop76ObservationSlip76ObservationSlip76ObservationSlip76ObservationSlip76 <td>55</td> <td>Current Instability</td> <td>Slip of soils</td> <td>See 54</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 55     | Current Instability  | Slip of soils                       | See 54                                                                                                        |           |
| 60StructureRetaining feature in slope61ObservationSeawall/defences62Current InstabilityDamage of sea wall63Current InstabilityDamage of sea wall64Current InstabilityDamage of sea wall65Current InstabilityObservation66Current InstabilitySurface Slip67Current InstabilitySurface Slip68ObservationConcrete rock protection69ObservationConcrete rock protection70ObservationPlucked stone from sea defence72Historic InstabilitySlip73Current InstabilitySlip74ObservationStep slope75ObservationStep slope76Current InstabilityStep slope76Current InstabilityStep slope76Current InstabilityStep slope76Current InstabilityStep slope76ObservationStep slope76Current InstabilityStep slope76Current InstabilityStep slope76Current InstabilityStep slope76ObservationStep slope76Current InstabilityStep slope76Current InstabilityStep slope76Current InstabilityStep slope77ObservationStep slope78ObservationStep slope79ObservationStep slope70Observation <td>59</td> <td>Observation</td> <td>Slopes and ruined building</td> <td>Photos looking east and west</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 59     | Observation          | Slopes and ruined building          | Photos looking east and west                                                                                  |           |
| 61ObservationSeawall/defences62Current InstabilityDamage of sea wall63Current InstabilityView of Slip65Current InstabilityView of Slip66Current InstabilitySurface Slip67Current InstabilitySurface Slip68ObservationConcrete rock protection69ObservationConcrete rock protection69ObservationConcrete rock protection70ObservationPlucked stone from sea defence71Historic InstabilityRocket house72Historic InstabilityRocket house74Current InstabilityStep slope75ObservationStep slope76Current InstabilityStep slope76Current InstabilityRocket house77Current InstabilityStep slope78ObservationStep slope79ObservationStep slope74Current InstabilityStep slope75ObservationStep slope76Current InstabilityStep slope77ObservationStep slope78ObservationStep slope79ObservationStep slope70ObservationView looking west71Current InstabilityStep slope72ObservationStep slope73ObservationStep slope74ObservationStep slope75ObservationStep slope <td>60</td> <td>Structure</td> <td>Retaining feature in slope</td> <td></td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 60     | Structure            | Retaining feature in slope          |                                                                                                               |           |
| 62Current InstabilityDamage of sea wall63Current InstabilityView of SlipScarp from slip at road edge. 60-70 deg and sub vert. See 565Current InstabilitySlipDirectly beneath road, 1.2 m backscarp, 7m high with runout of deposited material, approx. 40m366Current InstabilitySurface Slip6.3m high with 1.9m exposed backscarp, 5m wide, approx. 60m3, continues round corner67Current InstabilityConcrete rock protectionSlumped materials visible, translational. See 6668ObservationConcrete rock protectionStep Slep70ObservationRetaining Wall8.6m high slope, 1m high wall, 45 to 55 degrees71Historic InstabilityRocket houseBreak in slope, potential historic slip, fully vegetated73Current InstabilitySlipSlep Slep74Current InstabilityStep slopeView looking west75ObservationStep slopeView looking west76Current InstabilityStep slopeView looking west                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 61     | Observation          | Seawall/defences                    |                                                                                                               |           |
| 63Current InstabilityView of SlipScarp from slip at road edge. 60-70 deg and sub vert. See 565Current InstabilitySlipDirectly beneath road, 1.2 m backscarp, 7m high with runout of deposited material, approx. 40m366Current InstabilitySurface Slip6.3m high with 1.9m exposed backscarp, 5m wide, approx. 60m3, continues round corner67Current InstabilitySlipSlipmed materials visible, translational. See 6668ObservationConcrete rock protection69ObservationConcrete rock protection69ObservationPlucked stone from sea defence70ObservationPlucked stone from sea defence72Historic InstabilityRocket house73Current InstabilitySlip74Current InstabilityStep slope75ObservationSteep slope76Current InstabilityStep slope77ObservationSteep slope78ObservationSteep slope79ObservationSteep slope70ObservationSteep slope71Current InstabilitySteep slope72ObservationSteep slope73ObservationSteep slope74ObservationSteep slope75ObservationSteep slope76Current InstabilitySteep slope77ObservationSteep slope78ObservationStep slope79ObservationSteep slope71Observation </td <td>62</td> <td>Current Instability</td> <td>Damage of sea wall</td> <td></td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 62     | Current Instability  | Damage of sea wall                  |                                                                                                               |           |
| 65Current InstabilitySlipDirectly beneath road, 1.2 m backscarp, 7m high with runout of deposited material, approx. 40m366Current InstabilitySurface Slip6.3m high with 1.9m exposed backscarp, 5m wide, approx. 60m3, continues round corner67Current InstabilitySlipSlumped materials visible, translational. See 6668ObservationConcrete rock protection69ObservationConcrete rock protection8.6m high slope, 1m high wall, 45 to 55 degrees70ObservationPlucked stone from sea defence71Historic InstabilityRocket houseBreak in slope, potential historic slip, fully vegetated73Current InstabilityFresh slipSee 21. 7.9 high, 1.7m high backscarp, 9m wide, soil pipes, wet surface, 50 deg slope, overhanging scarp74ObservationStep slopeView looking west75ObservationStep slopeView looking west76Current InstabilitySlip21.5m high, 7m slip, 0.5m backscarp, approx. 75m3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 63     | Current Instability  | View of Slip                        | Scarp from slip at road edge. 60-70 deg and sub vert. See 5                                                   |           |
| 66Current InstabilitySurface Slip6.3m high with 1.9m exposed backscarp, 5m wide, approx. 60m3, continues round corner67Current InstabilitySlipSlupped materials visible, translational. See 6668ObservationConcrete rock protection69ObservationRetaining Wall8.6m high slope, 1m high wall, 45 to 55 degrees70ObservationPlucked stone from sea defence72Historic InstabilityRocket house73Current InstabilitySlip74Current InstabilitySlep slope75ObservationSteep slope76Current InstabilitySlip71SlipSlip72ObservationSteep slope74ObservationSteep slope75ObservationSlip76Current InstabilitySlip77SlipSlip78ObservationSlip79SlipSlip70Slip71Slip72Observation73Observation74Slip75Observation76Current Instability77Slip78Observation79Slip70Slip71Slip72Slip73Slip74Slip75Slip76Slip77Slip78Slip79Slip79Slip <td< td=""><td>65</td><td>Current Instability</td><td>Slip</td><td>Directly beneath road, 1.2 m backscarp, 7m high with runout of deposited material, approx. 40m3</td><td></td></td<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 65     | Current Instability  | Slip                                | Directly beneath road, 1.2 m backscarp, 7m high with runout of deposited material, approx. 40m3               |           |
| 67Current InstabilitySlipSlumped materials visible, translational. See 6668ObservationConcrete rock protection69ObservationRetaining Wall8.6m high slope, 1m high wall, 45 to 55 degrees70ObservationPlucked stone from sea defence72Historic InstabilityRocket house73Current InstabilitySlip74Current InstabilityFresh slip<br>Steep slope75ObservationStep slope76Current InstabilitySlip71SlipSlip72ObservationSteep slope75ObservationSlip76Current InstabilitySlip77SlipSlip78SlipSlip79SlipSlip76Current InstabilitySlip77SlipSlip78Slip79SlipSlip76Slip76Slip77Slip78Slip79Slip76Slip77Slip78Slip79Slip79Slip70Slip71Slip72Slip73Slip74Slip75Slip76Slip77Slip78Slip79Slip79Slip79Slip79Slip79 </td <td>66</td> <td>Current Instability</td> <td>Surface Slip</td> <td>6.3m high with 1.9m exposed backscarp, 5m wide, approx. 60m3, continues round corner</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 66     | Current Instability  | Surface Slip                        | 6.3m high with 1.9m exposed backscarp, 5m wide, approx. 60m3, continues round corner                          |           |
| 68ObservationConcrete rock protection69ObservationRetaining Wall8.6m high slope, 1m high wall, 45 to 55 degrees70ObservationPlucked stone from sea defence72Historic InstabilityRocket house73Current InstabilitySlip74Current InstabilitySteep slope<br>overhanging scarp75ObservationSteep slope76Current InstabilitySlip71SlipSlip72ObservationSteep slope75ObservationSlip76Current InstabilitySlip77SlipSlip78SlipSlip79SlipSlip76SlipSlip75Slip76Slip77Slip78Slip79Slip75Slip76Slip77Slip78Slip79Slip79Slip70Slip71Slip72Slip73Slip74Slip75Slip76Slip77Slip78Slip79Slip79Slip70Slip71Slip72Slip73Slip74Slip75Slip75Slip75Slip75Slip <td>67</td> <td>Current Instability</td> <td>Slip</td> <td>Slumped materials visible, translational. See 66</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 67     | Current Instability  | Slip                                | Slumped materials visible, translational. See 66                                                              |           |
| 69ObservationRetaining Wall8.6m high slope, 1m high wall, 45 to 55 degrees70ObservationPlucked stone from sea defence72Historic InstabilityRocket houseBreak in slope, potential historic slip, fully vegetated73Current InstabilitySlip1-2 m high ret. wall74Current InstabilityFresh slipSee 21. 7.9 high, 1.7m high backscarp, 9m wide, soil pipes, wet surface, 50 deg slope, overhanging scarp75ObservationSteep slopeView looking west76Current InstabilitySlip21.5m high, 7m slip, 0.5m backscarp, approx. 75m3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 68     | Observation          | Concrete rock protection            |                                                                                                               |           |
| 70ObservationPlucked stone from sea defence72Historic InstabilityRocket houseBreak in slope, potential historic slip, fully vegetated73Current InstabilitySlip1-2 m high ret. wall74Current InstabilityFresh slipSee 21. 7.9 high, 1.7m high backscarp, 9m wide, soil pipes, wet surface, 50 deg slope,<br>overhanging scarp75ObservationSteep slopeView looking west76Current InstabilitySlip21.5m high, 7m slip, 0.5m backscarp, approx. 75m3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 69     | Observation          | Retaining Wall                      | 8.6m high slope, 1m high wall, 45 to 55 degrees                                                               |           |
| 72Historic InstabilityRocket houseBreak in slope, potential historic slip, fully vegetated73Current InstabilitySlip1-2 m high ret. wall74Current InstabilityFresh slipSee 21. 7.9 high, 1.7m high backscarp, 9m wide, soil pipes, wet surface, 50 deg slope,<br>overhanging scarp75ObservationSteep slopeView looking west76Current InstabilitySlip21.5m high, 7m slip, 0.5m backscarp, approx. 75m3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 70     | Observation          | Plucked stone from sea defence      |                                                                                                               |           |
| 73Current InstabilitySlip1-2 m high ret. wall74Current InstabilityFresh slipSee 21. 7.9 high, 1.7m high backscarp, 9m wide, soil pipes, wet surface, 50 deg slope,<br>overhanging scarp75ObservationSteep slopeView looking west76Current InstabilitySlip21.5m high, 7m slip, 0.5m backscarp, approx. 75m3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 72     | Historic Instability | Rocket house                        | Break in slope, potential historic slip, fully vegetated                                                      |           |
| 74Current InstabilityFresh slipSee 21. 7.9 high, 1.7m high backscarp, 9m wide, soil pipes, wet surface, 50 deg slope,<br>overhanging scarp75ObservationSteep slopeView looking west76Current InstabilitySlip21.5m high, 7m slip, 0.5m backscarp, approx. 75m3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 73     | Current Instability  | Slip                                | 1-2 m high ret. wall                                                                                          |           |
| 75     Observation     Steep slope     View looking west       76     Current Instability     Slip     21.5m high, 7m slip, 0.5m backscarp, approx. 75m3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 74     | Current Instability  | Fresh slip                          | See 21. 7.9 high, 1.7m high backscarp, 9m wide, soil pipes, wet surface, 50 deg slope,<br>overhanging scarp   |           |
| 76 Current Instability Slip 21.5m high, 7m slip, 0.5m backscarp, approx. 75m3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 75     | Observation          | Steep slope                         | View looking west                                                                                             |           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 76     | Current Instability  | Slip                                | 21.5m high, 7m slip, 0.5m backscarp, approx. 75m3                                                             |           |

Comment

material accumulations, 6.4m high, 15m3 material, slope angle 60 to 70. Materials topsoil over clay bound sand.

Materials topsoil over clayey sand

thin topsoil over very clayey soil with cobbles and boulders.

igh. soil pipes. 2.5m back scarp. top soil sand and very sandy clay

3 to 4m high, flat area beneath to path No receptor and flat land above with no land use

Condition ok

nd recent slips. 12m high. Slips superficial. Concrete at the base in blocks.

300mm topsoil over clayey sand.

Materials v.clayey sand, debris at base, within last year Adjacent to public footpath

| Number | Classification       | Feature                         | Description                                                                                                                                    |            |
|--------|----------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| 77     | Historic Instability | Historic slip                   | See 77                                                                                                                                         |            |
| 78     | Historic Instability | Spring and historic slip        | Fully vegetated, from mid slope, 5m high, 10m wide, approx. 25m3                                                                               |            |
| 79     | Current Instability  | Slip                            | 9.1 m high slope, 5m wide scarp, approx. 50m3 material, at edge of road                                                                        |            |
| 80     | Observation          | Coastal defences and breakwater |                                                                                                                                                |            |
| 81     | Current Instability  | Slip                            | See 31, overhanging, toe wall hidden under material                                                                                            |            |
| 82     | Structure            | Pipe                            | Instability below pipe due to scour                                                                                                            |            |
| 83     | Observation          | View of slope                   | Looking west and south                                                                                                                         |            |
| 84     | Observation          | Rock                            | 16m high slope                                                                                                                                 |            |
| 85     | Current Instability  | Instability below path          | 5m high, 5m wide, 0.6m backscarp, approx. 15m3 material                                                                                        |            |
| 86     | Historic Instability | Historic slip                   | See 86                                                                                                                                         |            |
| 87     | Observation          | View of slope                   |                                                                                                                                                |            |
| 88     | Current Instability  | Slip                            | See 38                                                                                                                                         |            |
| 89     | Observation          | Photo north and south           |                                                                                                                                                |            |
| 90     | Structure            | Pipe                            |                                                                                                                                                |            |
| 91     | Observation          | Hummocky slope                  |                                                                                                                                                |            |
| 92     | Current Instability  | Remediation of outfalls         | 4m high slope, concrete interlocking blocks                                                                                                    |            |
| 93     | Current Instability  | Concrete slope with damage      | Underscour/plucking evident                                                                                                                    |            |
| 94     | Current Instability  | Start of gabions                | Condition poor, 4 gabions high, coated wire                                                                                                    |            |
| 95     | Current Instability  | End of gabions                  | Condition poor                                                                                                                                 |            |
| 96     | Historic Instability | Historic Slip                   |                                                                                                                                                |            |
| 97     | Current Instability  | Slip                            | See 54                                                                                                                                         |            |
| 98     | Historic Instability | Small slips below foghorn       |                                                                                                                                                |            |
| 99     | Current Instability  | Slip                            | See 100                                                                                                                                        |            |
| 100    | Current Instability  | Slip                            | 1-1.5m high backscarp, 2m high 3m wide, approx. 8m3 material deposition, 10m high slope,<br>halfway down slope, 5-6m wide, directly under road |            |
| 102    | Observation          | Slopes and ruined building      |                                                                                                                                                |            |
| 103    | Structure            | Retaining feature in slope      |                                                                                                                                                |            |
| 104    | Observation          | Sea wall/ defences              | Photos looking east and west                                                                                                                   | No slip ma |

Comment

| Distance from road                                                                             |
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|                                                                                                |
|                                                                                                |
| In poor condition and requires addressing                                                      |
|                                                                                                |
| Photos looking west, south and east                                                            |
| Photos looking south west east and showing gabion damage                                       |
|                                                                                                |
|                                                                                                |
|                                                                                                |
| Water                                                                                          |
| Superficial clip on rock                                                                       |
| Supericial sip of fock                                                                         |
|                                                                                                |
|                                                                                                |
| aterial accumulations, 6.4m high, slope angle 60 to 70. Materials topsoil over clay bound sand |

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