

## 1. General information

| Location Plan:                                                                                                                                                                                                                                                                                      |  | Pwll Sea Wall               |                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------|------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                     |  | Assessment Date: 07/09/2020 |                                                                        |
|                                                                                                                                                                                                                                                                                                     |  | CARRS Exam ID:              | 12216666                                                               |
|                                                                                                                                                                                                                                                                                                     |  | Exam Type:                  | Detailed                                                               |
|                                                                                                                                                                                                                                                                                                     |  | Complete Survey:            | Yes                                                                    |
|                                                                                                                                                                                                                                                                                                     |  | Network Rail ELR:           | SWM2                                                                   |
|                                                                                                                                                                                                                                                                                                     |  | Structure Reference:        | 226 21.5                                                               |
|                                                                                                                                                                                                                                                                                                     |  | Mileage:                    | 226m 473yds 21chs                                                      |
|                                                                                                                                                                                                                                                                                                     |  | OS Ref:                     | 249300 , 200200                                                        |
|                                                                                                                                                                                                                                                                                                     |  | Operational Area:           | West Wales                                                             |
|                                                                                                                                                                                                                                                                                                     |  | Governing SMP2:             | Lavernock Point to St Ann's                                            |
|                                                                                                                                                                                                                                                                                                     |  | SMP2 Policy Unit:           | 12.1                                                                   |
|                                                                                                                                                                                                                                                                                                     |  | SMP2 Policy:                | 2025 = hold the line;<br>2055 = hold the line;<br>2105 = hold the line |
| <p>NOTE: This document has been prepared as an Asset Condition Survey Report for Network Rail. JBA Consulting accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.</p> |  |                             |                                                                        |

### 1.1. Type of structure and general description (to include key components and materials)

Pwll Sea Wall is situated between the towns of Llanelli and Burry Port, measuring approximately 2700m in length, with the railway situated at 0-5m from the defence crest. The asset has been wholly assessed under one section:

- Pwll Sea Wall A – The defence consists of a rock armour revetment built up against an older masonry wall. It features one track access point built into the rock armour, located 800m from the eastern end of the asset, it also features two unused slipways which form part of the old masonry sea wall, located at 77m and 2000m from the start of the asset. For the purpose of asset classification, the defence is considered to be a rock armour embankment with a masonry capping wall, conforming to CERD hierarchy.

The defence ties into a sand beach with fishtail breakwaters on the low mileage eastern extent, and on the high mileage end, the defence ties into a dilapidated outfall built into a vegetated shingle headland.

### 1.2. Summary of condition and critical defects

Pwll Sea Wall suffered severe damage from the 2013/14 storm events. Some repair works have been carried out between the 2019 and 2019 inspections (especially for the masonry capping wall). Since the survey undertaken in 2019, no significant changes were noted in 2020. The defence is considered to be in a poor condition as several critical defects, which threaten the longevity of the structure, still remain:

- Health and safety hazard: Algae on the track access steps and slipway currently cause a slipping hazard.
- The lower and upper trash screens at the outfall have failed; replace the trash screen and remove the existing ones.
- Considerable volumes of rock armour have been lost due to storm activity, exposing the masonry wall.
- Some localised damages to the masonry wall was observed (loss of bricks).
- Ineffective armouring solutions such as concrete sleepers, slag deposits and undersized rock have been used in place of rock armour. There is likely minimal protection offered by these armour types and will likely cause instability in the surrounding embankment.
- The concrete structure forming the eastern defence tie-in has failed, and in due time will compromise the integrity of the asset.

## 1.3. Access considerations

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Network Rail access requirement:                | No COSS                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Third party/adjacent landowner permissions:     | None necessary                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Nearest public highway:                         | A484                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Local guidance:                                 | The coastal defence can be accessed from the public beach at the start of the asset in the east. Beach access is not possible beyond 1000m from the start of the asset, and inspection work is required to take place from the railway. A track access point is available at approximately 800m from the start of the asset, and is accessible from both the beach and landward side of the railway. Low tide is required for inspection work. |
| Tide state during survey:                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Equipment required for access and examinations: | COSS required                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## 2. Structure information

| CERD Hierarchy | Asset Type | Major Elements     | Minor Elements    | Attributes |
|----------------|------------|--------------------|-------------------|------------|
| Section A      | Defence    | Embankment         | Capping Wall      | Masonry    |
|                | Defence    | Embankment         | Embankment Armour | Rock       |
|                | Structure  | Outfall over 0.45m | Screen            | N/A        |

|                                                                     |                                                                                                                                                                                                                                                                       |     |                 |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------------|
| General Description of Structure:                                   | Pwll Sea Wall is situated between the towns of Llanelli and Burry Port, measuring approximately 2700m in length, with the railway situated at 0-5m from the defence crest. The asset is an old sea wall with a rock armour revetment fronting it.                     |     |                 |
| Approx. defence length (m):                                         | 2700                                                                                                                                                                                                                                                                  |     |                 |
| Approx. co-ordinates from:                                          | 249246 , 200232                                                                                                                                                                                                                                                       | to: | 246671 , 200845 |
| As built drawing available:                                         | No                                                                                                                                                                                                                                                                    |     |                 |
| Linked to other Asset Types:                                        | None                                                                                                                                                                                                                                                                  |     |                 |
| NR Infrastructure protected:                                        | 2700m of SWM2 railway situated between 0 – 5m from the defence crest.                                                                                                                                                                                                 |     |                 |
| Assets type and ownership that the defence ties into at either end: | On the low mileage extent to the east, the defence ties into a beach system protected by two rock armour fishtail breakwaters. On the high mileage western extent, the defence ties into a dilapidated outfall structure and neighbouring vegetated shingle headland. |     |                 |

### 2.1. Topographic level information

|                                        | Defence (Section A) | Structure (Section A) |
|----------------------------------------|---------------------|-----------------------|
| Track level (mAOD)                     | 6.72 – 7.38 (LIDAR) | N/A                   |
| Crest level of primary defence (mAOD)  | 8.20 (GPS)          | N/A                   |
| Toe level of primary defence (mAOD)    | N/A                 | N/A                   |
| Approx. defence height above beach (m) | 7.50 (GPS)          | N/A                   |
| Upper beach level (mAOD)               | N/A                 | N/A                   |
| Lower beach level (mAOD)               | N/A                 | N/A                   |
| Approx. total beach height (m)         | N/A                 | N/A                   |
| Beach crest width (m)                  | N/A                 | N/A                   |
| Approx. beach gradient (1in ...)       | N/A                 | N/A                   |
| Upper beach composition                | N/A                 | N/A                   |
| Lower beach composition                | N/A                 | N/A                   |

### 2.2. Extreme sea level information

| Return Period | Extreme sea level (mAOD) | Extreme sea level + climate change (mAOD) |
|---------------|--------------------------|-------------------------------------------|
|---------------|--------------------------|-------------------------------------------|

# COASTAL ASSET CONDITION SURVEY REPORT



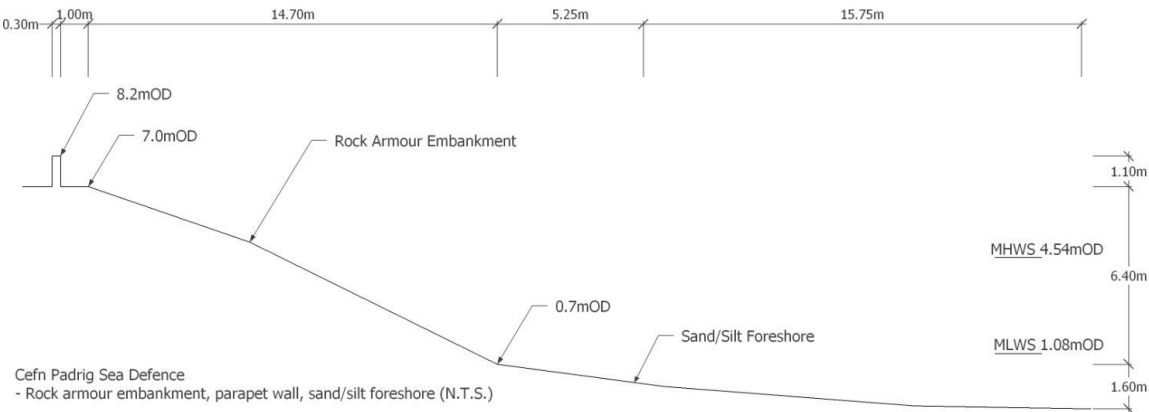
| Return Period | Extreme sea level (mAOD) | Extreme sea level + climate change (mAOD) |
|---------------|--------------------------|-------------------------------------------|
| 1             | 5.171 (2013)             | 6.000 (2115)                              |
| 5             | 5.341 (2013)             | 6.170 (2115)                              |
| 10            | 5.421 (2013)             | 6.250 (2115)                              |
| 20            | 5.491 (2013)             | 6.320 (2115)                              |
| 50            | 5.601 (2013)             | 6.430 (2115)                              |
| 100           | 5.671 (2013)             | 6.500 (2115)                              |
| 200           | 5.741 (2013)             | 6.570 (2115)                              |

3. Asset site sketch

Plan



Sketch





## 4. Visual Condition Survey

### Visual Condition Survey (Structure - Section A) Major Element - Outfall over 0.45m

| Minor Elements             | Photo No.                                                                                                                                    | Attributes and General Notes | Condition Grade | Weighting (1-9) | Overall (CG x W) |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------|-----------------|------------------|
| Screen                     | 34, 38                                                                                                                                       |                              | 3               | 1               | 3                |
|                            |                                                                                                                                              |                              |                 |                 |                  |
| Sum (W)                    |                                                                                                                                              |                              |                 | 1               |                  |
| Sum (CG x W)               |                                                                                                                                              |                              |                 |                 | 3                |
| <b>Overall Asset Grade</b> | <b>Sum of (Weight x Condition Grades) divided by sum of weightings. Unless weighting of 9 for any element, then condition grade is used.</b> |                              | <b>3</b>        |                 |                  |

### Visual Condition Survey (Defence - Section A) Major Element - Embankment

| Minor Elements             | Photo No.                                                                                                                                    | Attributes and General Notes                                                                              | Condition Grade | Weighting (1-9) | Overall (CG x W) |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------|-----------------|------------------|
| Capping Wall               | 35, 36, 37, 41, 42, 46                                                                                                                       | Masonry ((brick displacement, loss of mortar, lowering of crest, cracking).).                             | 3               | 4               | 12               |
| Embankment Armour          | 32, 33, 39, 40, 43, 44, 45                                                                                                                   | Rock ((extensive loss of blocks, major deformation/movement, undersized armour units, and steep slope).). | 4               | 9               | 36               |
|                            |                                                                                                                                              |                                                                                                           |                 |                 |                  |
| Sum (W)                    |                                                                                                                                              |                                                                                                           |                 | 13              |                  |
| Sum (CG x W)               |                                                                                                                                              |                                                                                                           |                 |                 | 48               |
| <b>Overall Asset Grade</b> | <b>Sum of (Weight x Condition Grades) divided by sum of weightings. Unless weighting of 9 for any element, then condition grade is used.</b> |                                                                                                           | <b>4*</b>       |                 |                  |

\*Condition grade has been overridden due to a weighting of 9 for a minor element.

### 4.1. Asset condition grade summary

|                                  | Defence (Section A) | Structure (Section A) |
|----------------------------------|---------------------|-----------------------|
| Target condition grade           | 2                   | 2                     |
| Overall surveyed condition grade | 4                   | 3                     |
| Total time taken to reach CG1    | N/A                 | N/A                   |
| Total time taken to reach CG2    | N/A                 | N/A                   |
| Total time taken to reach CG3    | N/A                 | N/A                   |

# COASTAL ASSET CONDITION SURVEY REPORT



|                               |     |    |
|-------------------------------|-----|----|
| Total time taken to reach CG4 | N/A | 20 |
| Total time taken to reach CG5 | 8   | 40 |

## 4.2. Additional information

|                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General description and effect of any coastal erosion noted:                            | The River Loughor meanders into Pwll Sea Wall and travels along the length of the structure, providing a source of continual erosion to the riverbanks/foreshore of the structure.                                                                                                                                                                                                                                                                                                                                                    |
| General description and effect of any wave overtopping noted:                           | The storms of 2013/14 caused significant damage and eventual failure to the embankment capping wall. As a result, significant volumes of overtopping would have been experienced at the track level during this time. Repair works to rebuild the damaged sections of the capping wall were undertaken. However, some sections of the masonry capping wall are unprotected by the rock embankment, which is generally in poor condition due to the lack of interlocking. In addition, most of the rock units appear to be undersized. |
| General description and effect of any longshore / cross-shore sediment transport noted: | Longshore sediment transport occurs due to the flow of the River Loughor and the large tidal regime. On the low mileage eastern extent of the asset, the presence of rock armour fishtail breakwaters have encouraged the accretion of sediment. As such, the eastern end of the asset has a slightly higher beach/foreshore, as visible in satellite imagery.                                                                                                                                                                        |

# COASTAL ASSET CONDITION SURVEY REPORT



## 5. Identification of defects and recommendations

| Defect Ref No. | Defect Location (NGR) | Major Element | Minor Element     | Photo Ref                     | Severity | Probability | Risk Score | Below MHWS | Defect Description                                                                                                                                                  | Recommendations                                                                 | Defect Priority |
|----------------|-----------------------|---------------|-------------------|-------------------------------|----------|-------------|------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------|
| D1             | 248321, 200576        | Embankment    | Embankment Armour | 47, 48, 86, 97, 148, 149, 200 | 3        | 4           | 12         | True       | Undersized rock armour likely to be unstable and provide inadequate protection during storm events. There has been no change between the 2019 and 2020 inspections. | Remove and replace undersized rock armour.                                      | 14              |
| D2             | 248422, 200546        | Embankment    | Embankment Armour | 49, 120                       | 3        | 2           | 6          | True       | The hollow in the rock armour creates a localised weakness, compromising the stability of the embankment. No change between 2019 and 2020 inspections.              | Reshape rock armour embankment, replace and add additional armour if necessary. | 14              |
| D3             | 248481, 200537        | Embankment    | Embankment Armour | 50, 114, 199                  | 5        | 4           | 20         | True       | Algae covered steps providing slipping hazard. No change between 2019 and 2020 inspections.                                                                         | Remove by environmentally friendly methods such as pressure washing.            | 1               |
| D4             | 248427, 200576        | Embankment    | Capping Wall      | 51, 104, 180, 181, 182        | 2        | 2           | 4          | False      | Parapet wall is leaning towards the track. No change between the 2019 and 2020 inspections.                                                                         | Monitor and consider replacing or bracing the parapet wall.                     | 13              |

# COASTAL ASSET CONDITION SURVEY REPORT



| Defect Ref No. | Defect Location (NGR) | Major Element | Minor Element     | Photo Ref                                      | Severity | Probability | Risk Score | Below MHS | Defect Description                                                                                                                                                                                       | Recommendations                                                              | Defect Priority |
|----------------|-----------------------|---------------|-------------------|------------------------------------------------|----------|-------------|------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------|
| D5             | 249300, 200200        | Embankment    | Capping Wall      | 52, 53, 98, 105, 106, 164, 167                 | 2        | 3           | 6          | False     | Vegetation growth could weaken embankment armour and cause localised structural damage. Increased in severity between the 2019 and 2020 inspections as more vegetation and cracking in mortar was noted. | Remove vegetation, and repair any damage caused.                             | 6               |
| D6             | 248245, 200621        | Embankment    | Capping Wall      | 54, 112, 113, 192, 193                         | 5        | 2           | 10         | True      | Damaged and corroded trash screen. Both the lower and upper screens were found to be detached during the 2020 inspection.                                                                                | Replace the trash screen and remove the existing ones.                       | 1               |
| D7             | 249300, 200200        | Embankment    | Capping Wall      | 55, 56, 108, 109, 110, 194, 195, 196, 197, 198 | 2        | 3           | 6          | False     | Damaged parapet and capping. A section of the capping wall has been replaced between the 2019 and 2020 inspections. However, there are still missing blocks noted in the existing wall.                  | Repair damaged sections.                                                     | 4               |
| D8             | 248131, 200648        | Embankment    | Embankment Armour | 57, 102, 103, 145, 190                         | 3        | 2           | 6          | False     | Lack of rock armour, and ineffective repair measures. No change between 2019 and 2020 inspections.                                                                                                       | Remove ineffective armour solutions and replace embankment armour with rock. | 14              |
| D9             | 247769, 200725        | Embankment    | Embankment Armour | 58, 123                                        | 4        | 2           | 8          | False     | Lack of crest width on rock embankment, leading to instabilities in the defence. No change between 2019 and 2020 inspections.                                                                            | Monitor and consider re-profiling the rock embankment.                       | 8               |

# COASTAL ASSET CONDITION SURVEY REPORT



| Defect Ref No. | Defect Location (NGR) | Major Element | Minor Element     | Photo Ref                                            | Severity | Probability | Risk Score | Below MHS | Defect Description                                                                                                                                                  | Recommendations                                        | Defect Priority |
|----------------|-----------------------|---------------|-------------------|------------------------------------------------------|----------|-------------|------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------|
| D10            | 247725, 200734        | Embankment    | Embankment Armour | 59, 93, 94, 107, 137                                 | 4        | 2           | 8          | False     | Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.                                          | Place additional rock armour.                          | 14              |
| D11            | 247538, 200766        | Embankment    | Embankment Armour | 60, 87, 99, 100, 174                                 | 2        | 2           | 4          | False     | Evidence of possible subsidence on the embankment crest. Indication of early stages of more severe failure mechanisms. No change between 2019 and 2020 inspections. | Investigate and monitor potential subsidence.          | 11              |
| D12            | 249300, 200200        | Embankment    | Embankment Armour | 61, 62, 63, 89, 90, 96, 121, 156, 157, 161, 163, 168 | 4        | 2           | 8          | False     | Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.                                          | Replace rock armour.                                   | 8               |
| D13            | 247310, 200796        | Embankment    | Embankment Armour | 64, 95, 171                                          | 1        | 1           | 1          | True      | Algae covered access ramp providing slipping hazard. This defect has been addressed between 2019 and 2020 inspections.                                              | Close out defect.                                      | 9               |
| D14            | 247310, 200798        | Embankment    | Capping Wall      | 65, 101, 170                                         | 2        | 3           | 6          | True      | Open joints, if left unrepaired further deterioration of the wall is expected. No change between 2019 and 2020 inspections.                                         | Repoint missing and worn mortar between masonry units. | 5               |

# COASTAL ASSET CONDITION SURVEY REPORT



| Defect Ref No. | Defect Location (NGR) | Major Element      | Minor Element     | Photo Ref                  | Severity | Probability | Risk Score | Below MHWS | Defect Description                                                                                                                                                | Recommendations                                                     | Defect Priority |
|----------------|-----------------------|--------------------|-------------------|----------------------------|----------|-------------|------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|-----------------|
| D15            | 247201, 200813        | Outfall over 0.45m | Screen            | 66, 91, 92, 165, 166       | 1        | 1           | 1          | True       | Open joints, if left unrepaired further deterioration of the wall is expected. Between 2014 and 2020 this defect has been repaired.                               | Close out defect.                                                   | 15              |
| D16            | 246850, 200842        | Embankment         | Embankment Armour | 67, 141, 144               | 2        | 2           | 4          | False      | Signs of possible subsidence on the embankment armour. Indication of early stages of more severe failure mechanisms. No change between 2019 and 2020 inspections. | Investigate and monitor potential subsidence.                       | 11              |
| D17            | 249300, 200200        | Embankment         | Embankment Armour | 68, 80, 81, 117, 142       | 4        | 2           | 8          | True       | Embankment slope too steep by design standards. No change between 2019 and 2020 inspections.                                                                      | Monitor and consider re-profiling the rock embankment.              | 14              |
| D18            | 246719, 200845        | Embankment         | Embankment Armour | 69, 79, 138, 139, 140      | 4        | 3           | 12         | True       | Very poor condition of defence tie-in. Slightly increased in severity as the defect has further deteriorated between the 2019 and 2020 inspections.               | Remove derelict structure and replace with appropriate alternative. | 7               |
| D19            | 248806, 200444        | Embankment         | Embankment Armour | 131, 132, 133, 201, 202    | 1        | 1           | 1          | False      | Failed parapet wall sections. This defect has been repaired between 2014 and 2019.                                                                                | Close out defect.                                                   | 15              |
| D20            | 248629, 200487        | Embankment         | Embankment Armour | 70, 88, 116, 159, 160, 203 | 4        | 2           | 8          | True       | Non-standard and ineffective armour units. No change between 2019 and 2020 inspections.                                                                           | Remove and replace ineffective protection with rock armour.         | 14              |

# COASTAL ASSET CONDITION SURVEY REPORT



| Defect Ref No. | Defect Location (NGR) | Major Element | Minor Element     | Photo Ref                       | Severity | Probability | Risk Score | Below MHWS | Defect Description                                                                                                                                                                                                        | Recommendations                                        | Defect Priority |
|----------------|-----------------------|---------------|-------------------|---------------------------------|----------|-------------|------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------|
| D21            | 248824, 200415        | Embankment    | Embankment Armour | 71, 115, 169                    | 2        | 1           | 2          | True       | Expelled rock armour units. No change between 2019 and 2020 inspections.                                                                                                                                                  | Monitor and replace if further rocks are expelled.     | 10              |
| D22            | 248865, 200399        | Embankment    | Embankment Armour | 72, 73, 122, 205                | 4        | 2           | 8          | False      | Exposed wall section. No change between 2019 and 2020 inspections.                                                                                                                                                        | Replace rock armour.                                   | 8               |
| D23            | 248999, 200350        | Embankment    | Capping Wall      | 75, 74, 111, 124, 204, 206, 207 | 2        | 3           | 6          | True       | Open joints, if left unrepaired further deterioration of the wall is expected. This defect has been repaired between the 2014 and 2020 inspections. However, multiple repointing repairs were found to be broken in 2020. | Repoint missing and worn mortar between masonry units. | 2               |
| D24            | 249030, 200339        | Embankment    | Capping Wall      | 76, 125, 208                    | 1        | 1           | 1          | False      | Severe damage to wall. Between the 2019 and 2020 inspections, the defect has been repaired.                                                                                                                               | Close out defect                                       | 15              |
| D25            | 249140, 200293        | Embankment    | Capping Wall      | 77, 127, 128, 129, 210          | 2        | 3           | 6          | False      | This defect has been crudely repaired between 2014 and 2020 inspections with concrete sandbags. The repair is failing.                                                                                                    | Monitor and rebuild if repairs and bricks are lost.    | 5               |

# COASTAL ASSET CONDITION SURVEY REPORT



| Defect Ref No. | Defect Location (NGR) | Major Element | Minor Element     | Photo Ref              | Severity | Probability | Risk Score | Below MHWS | Defect Description                                                                                                                                                                                                                                   | Recommendations                                                                   | Defect Priority |
|----------------|-----------------------|---------------|-------------------|------------------------|----------|-------------|------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------|
| D26            | 249230, 200243        | Embankment    | Capping Wall      | 78, 134, 135, 136, 211 | 2        | 2           | 4          | False      | Poor defence tie-in. Increased in severity between the 2014 and 2019 inspections, with additional damage to the capping wall. The capping wall has been repaired between the 2019 and 2020 inspections, but there is still a loss of grouting areas. | Repair open joints.                                                               | 12              |
| D27            | 246838, 200842        | Embankment    | Embankment Armour | 82, 83, 84, 85         | 2        | 2           | 4          | False      | Minor subsidence and undermining of ballast, but no evidence of failure on sea wall. No change between the 2019 and 2020 inspections.                                                                                                                | Inspect wall retaining fill and track ballast for voiding, repair as appropriate. | 3               |
| D28            | 246896, 200472        | Embankment    | Embankment Armour | 118, 119, 213          | 3        | 2           | 6          | True       | Poor interlocking between rock armour units. There has been no change between the 2019 and 2020 inspections.                                                                                                                                         | Monitor the asset.                                                                | 10              |
| D29            | 249068, 200323        | Embankment    | Capping Wall      | 126, 130, 212          | 2        | 3           | 6          | False      | Open joints and missing blockwork at the capping wall. No change between the 2019 and 2020 inspections.                                                                                                                                              | Replace and repoint missing blocks / open joints.                                 | 3               |
| D30            | 246833, 200844        | Embankment    | Embankment Armour | 143                    | 2        | 3           | 6          | False      | Wash out of ballast                                                                                                                                                                                                                                  | Install a ballast retaining structure.                                            | 6               |
| D31            | 246867, 200841        | Embankment    | Embankment Armour | 146, 147               | 2        | 2           | 4          | True       | Voids in rock armour being filled with expelled ballast.                                                                                                                                                                                             | Monitor and install a ballast retaining structure if required.                    | 6               |

# COASTAL ASSET CONDITION SURVEY REPORT



| Defect Ref No. | Defect Location (NGR) | Major Element | Minor Element     | Photo Ref                                   | Severity | Probability | Risk Score | Below MHWS | Defect Description                                        | Recommendations                                            | Defect Priority |
|----------------|-----------------------|---------------|-------------------|---------------------------------------------|----------|-------------|------------|------------|-----------------------------------------------------------|------------------------------------------------------------|-----------------|
| D32            | 246902, 200840        | Embankment    | Embankment Armour | 150, 151, 155, 162, 172, 173, 175, 176, 183 | 4        | 2           | 8          | False      | Large gaps between rock armour and crest of masonry wall. | Fill gaps to prevent health and safety hazard.             | 1               |
| D33            | 246968, 200833        | Embankment    | Embankment Armour | 152, 153, 158                               | 1        | 3           | 3          | True       | Fracturing in rocks.                                      | Monitor fractures and replace rocks if required.           | 14              |
| D34            | 246976, 200833        | Embankment    | Embankment Armour | 154                                         | 2        | 4           | 8          | False      | Cracked coping.                                           | Repair or replace coping.                                  | 12              |
| D35            | 247603, 200757        | Embankment    | Capping Wall      | 177, 178                                    | 2        | 3           | 6          | False      | Bulging wall.                                             | Monitor movement of wall.                                  | 11              |
| D36            | 247652, 200750        | Embankment    | Embankment Armour | 179                                         | 2        | 2           | 4          | False      | Dumped blast furnace slag.                                | Remove the material and replace with suitable graded rock. | 14              |
| D37            | 247870, 200708        | Embankment    | Capping Wall      | 184, 185, 186, 187, 188                     | 1        | 2           | 2          | False      | Voids in crest approx. 300x300mm                          | Fill void to prevent it from getting larger.               | 11              |
| D38            | 248059, 200667        | Embankment    | Embankment Armour | 189, 191                                    | 2        | 2           | 4          | False      | Dumped blast furnace slag.                                | Remove the material and replace with suitable graded rock  | 14              |
| D39            | 249082, 200320        | Embankment    | Capping Wall      | 209                                         | 2        | 3           | 6          | False      | Loss of grout between coping and wall.                    | Repair cap and wall connection.                            | 5               |

# COASTAL ASSET CONDITION SURVEY REPORT



## 6. Health and safety check

### Health and Safety Check (Structure - Section A)

|                                                                                                                              |    | Photos and Notes |
|------------------------------------------------------------------------------------------------------------------------------|----|------------------|
| <b>Handrails</b>                                                                                                             |    |                  |
| Are handrails necessary?                                                                                                     | No |                  |
| Are handrails present?                                                                                                       | No |                  |
| Are handrails secured?                                                                                                       | -  |                  |
| Handrail construction material                                                                                               | -  |                  |
| Are handrails corroded?                                                                                                      | -  |                  |
| Is handrail paint in good condition?                                                                                         | -  |                  |
| <b>Ladders / Steps</b>                                                                                                       |    |                  |
| Are ladders / steps necessary for access?                                                                                    | No |                  |
| Are ladder / steps present?                                                                                                  | No |                  |
| Steps construction material                                                                                                  | -  |                  |
| Are steps in good condition?                                                                                                 | -  |                  |
| Are steps free of algae growth?                                                                                              | -  |                  |
| Are ladders secured?                                                                                                         | -  |                  |
| Are ladders corroded?                                                                                                        | -  |                  |
| Is ladder paint in good condition?                                                                                           | -  |                  |
| <b>Ramps and walkways</b>                                                                                                    |    |                  |
| Are ramps and walkways necessary for access?                                                                                 | No |                  |
| Are ramps and walkways present?                                                                                              | No |                  |
| Ramp construction material                                                                                                   | -  |                  |
| Are ramps in good condition?                                                                                                 | -  |                  |
| Are ramps free of algae growth?                                                                                              | -  |                  |
| <b>Safety Harness Attachments</b>                                                                                            |    |                  |
| Are attachments necessary for inspection?                                                                                    | No |                  |
| Are attachments present?                                                                                                     | No |                  |
| Are attachments in good condition?                                                                                           | -  |                  |
|                                                                                                                              |    |                  |
| <b>Summary of health and safety items</b><br>Debris or security screen has failed allowing unauthorised access into culvert. |    |                  |

| Health and Safety Check (Defence - Section A)                                                                      |     |                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------|
|                                                                                                                    |     | Photos and Notes                                                                                    |
| <b>Handrails</b>                                                                                                   |     |                                                                                                     |
| Are handrails necessary?                                                                                           | Yes |                                                                                                     |
| Are handrails present?                                                                                             | No  |                                                                                                     |
| Are handrails secured?                                                                                             | -   |                                                                                                     |
| Handrail construction material                                                                                     | -   |                                                                                                     |
| Are handrails corroded?                                                                                            | -   |                                                                                                     |
| Is handrail paint in good condition?                                                                               | -   |                                                                                                     |
| <b>Ladders / Steps</b>                                                                                             |     |                                                                                                     |
| Are ladders / steps necessary for access?                                                                          | Yes | Presence of algae growth on access steps – further details are contained within defects D3 and D13. |
| Are ladder / steps present?                                                                                        | Yes |                                                                                                     |
| Steps construction material                                                                                        | -   |                                                                                                     |
| Are steps in good condition?                                                                                       | Yes |                                                                                                     |
| Are steps free of algae growth?                                                                                    | No  |                                                                                                     |
| Are ladders secured?                                                                                               | No  |                                                                                                     |
| Are ladders corroded?                                                                                              | No  |                                                                                                     |
| Is ladder paint in good condition?                                                                                 | No  |                                                                                                     |
| <b>Ramps and walkways</b>                                                                                          |     |                                                                                                     |
| Are ramps and walkways necessary for access?                                                                       | No  |                                                                                                     |
| Are ramps and walkways present?                                                                                    | Yes |                                                                                                     |
| Ramp construction material                                                                                         | -   |                                                                                                     |
| Are ramps in good condition?                                                                                       | No  |                                                                                                     |
| Are ramps free of algae growth?                                                                                    | No  |                                                                                                     |
| <b>Safety Harness Attachments</b>                                                                                  |     |                                                                                                     |
| Are attachments necessary for inspection?                                                                          | No  |                                                                                                     |
| Are attachments present?                                                                                           | No  |                                                                                                     |
| Are attachments in good condition?                                                                                 | -   |                                                                                                     |
|                                                                                                                    |     |                                                                                                     |
| <b>Summary of health and safety items</b><br>Algae covered access steps is a critical slip hazard for beach users. |     |                                                                                                     |



## 7. Asset Assessment

### 7.1. Recommended works

**Band A: Emergency works** (Defect posing an immediate safety hazard. Immediate action required.)

| Defect Ref No. | Works Category          | Recommendations                                                      | Recommended Closure Date | Latest Status            |
|----------------|-------------------------|----------------------------------------------------------------------|--------------------------|--------------------------|
| D3             | Brickwork/Stone Repairs | Remove by environmentally friendly methods such as pressure washing. |                          | Active Defect (Approved) |
| D6             | Culvert Repairs         | Replace the trash screen and remove the existing ones.               |                          | Active Defect (Approved) |
| D24            | Brickwork/Stone Repairs | Close out defect                                                     |                          | Active Defect (Approved) |

**Band B: Short-term remedial works** (Defect posing a potential safety hazard. Work recommended within 12 month period.)

| Defect Ref No. | Works Category          | Recommendations                                             | Recommended Closure Date | Latest Status            |
|----------------|-------------------------|-------------------------------------------------------------|--------------------------|--------------------------|
| D4             | Brickwork/Stone Repairs | Monitor and consider replacing or bracing the parapet wall. |                          | Active Defect (Approved) |
| D9             | Brickwork/Stone Repairs | Monitor and consider re-profiling the rock embankment.      |                          | Active Defect (Approved) |
| D17            | Foundation Works        | Monitor and consider re-profiling the rock embankment.      |                          | Active Defect (Approved) |
| D21            | Brickwork/Stone Repairs | Monitor and replace if further rocks are expelled.          |                          | Active Defect (Approved) |
| D23            | Brickwork/Stone Repairs | Repoint missing and worn mortar between masonry units.      |                          | Active Defect (Approved) |
| D25            | Brickwork/Stone Repairs | Monitor and rebuild if repairs and bricks are lost.         |                          | Active Defect (Approved) |
| D28            | Brickwork/Stone Repairs | Monitor the asset.                                          |                          | Active Defect            |
| D29            | Brickwork/Stone Repairs | Replace and repoint missing blocks / open joints.           |                          | Active Defect            |
| D30            | Brickwork/Stone Repairs | Install a ballast retaining structure.                      |                          | Active Defect            |
| D32            | Brickwork/Stone Repairs | Fill gaps to prevent health and safety hazard.              |                          | Active Defect            |
| D33            | Brickwork/Stone Repairs | Monitor fractures and replace rocks if required.            |                          | Active Defect            |
| D35            | Brickwork/Stone Repairs | Monitor movement of wall.                                   |                          | Active Defect            |
| D37            | Other                   | Fill void to prevent it from getting larger.                |                          | Active Defect            |

**Band C: Medium-term remedial works** (Defect posing a potential safety hazard. Work recommended within 12 to 30 month period.)

| Defect Ref No. | Works Category | Recommendations | Recommended Closure Date | Latest Status |
|----------------|----------------|-----------------|--------------------------|---------------|
|----------------|----------------|-----------------|--------------------------|---------------|

# COASTAL ASSET CONDITION SURVEY REPORT



|     |                         |                                                                              |  |                          |
|-----|-------------------------|------------------------------------------------------------------------------|--|--------------------------|
| D5  | Foundation Works        | Remove vegetation, and repair any damage caused.                             |  | Active Defect (Approved) |
| D7  | Brickwork/Stone Repairs | Repair damaged sections.                                                     |  | Active Defect (Approved) |
| D8  | Brickwork/Stone Repairs | Remove ineffective armour solutions and replace embankment armour with rock. |  | Active Defect (Approved) |
| D12 | Brickwork/Stone Repairs | Replace rock armour.                                                         |  | Active Defect (Approved) |
| D13 | Other                   | Close out defect.                                                            |  | Active Defect (Approved) |
| D14 | Brickwork/Stone Repairs | Repoint missing and worn mortar between masonry units.                       |  | Active Defect (Approved) |
| D15 | Concrete Repairs        | Close out defect.                                                            |  | Active Defect (Approved) |
| D16 | Foundation Works        | Investigate and monitor potential subsidence.                                |  | Active Defect (Approved) |
| D18 | Brickwork/Stone Repairs | Remove derelict structure and replace with appropriate alternative.          |  | Active Defect (Approved) |
| D22 | Brickwork/Stone Repairs | Replace rock armour.                                                         |  | Active Defect (Approved) |
| D26 | Brickwork/Stone Repairs | Repair open joints.                                                          |  | Active Defect (Approved) |
| D31 | Brickwork/Stone Repairs | Monitor and install a ballast retaining structure if required.               |  | Active Defect            |
| D34 | Concrete Repairs        | Repair or replace coping.                                                    |  | Active Defect            |
| D39 | Concrete Repairs        | Repair cap and wall connection.                                              |  | Active Defect            |

**Band D: Long-term maintenance works** (Defect resulting in long-term deterioration of structure or affecting performance. Work recommended within 30 to 48 month period.)

| Defect Ref No. | Works Category          | Recommendations                                                                 | Recommended Closure Date | Latest Status            |
|----------------|-------------------------|---------------------------------------------------------------------------------|--------------------------|--------------------------|
| D1             | Brickwork/Stone Repairs | Remove and replace undersized rock armour.                                      |                          | Active Defect (Approved) |
| D2             | Brickwork/Stone Repairs | Reshape rock armour embankment, replace and add additional armour if necessary. |                          | Active Defect (Approved) |
| D10            | Brickwork/Stone Repairs | Place additional rock armour.                                                   |                          | Active Defect (Approved) |
| D11            | Brickwork/Stone Repairs | Investigate and monitor potential subsidence.                                   |                          | Active Defect (Approved) |
| D19            | Brickwork/Stone Repairs | Close out defect.                                                               |                          | Active Defect (Approved) |

# COASTAL ASSET CONDITION SURVEY REPORT



|     |                         |                                                                                   |  |                          |
|-----|-------------------------|-----------------------------------------------------------------------------------|--|--------------------------|
| D20 | Brickwork/Stone Repairs | Remove and replace ineffective protection with rock armour.                       |  | Active Defect (Approved) |
| D27 | Brickwork/Stone Repairs | Inspect wall retaining fill and track ballast for voiding, repair as appropriate. |  | Active Defect            |
| D36 | Brickwork/Stone Repairs | Remove the material and replace with suitable graded rock.                        |  | Active Defect            |
| D38 | Brickwork/Stone Repairs | Remove the material and replace with suitable graded rock                         |  | Active Defect            |

## Appendix 1 – Photographs

### Asset Structure Photos

**Photo number: 1**

No photo available

**Photo number: 2**

No photo available

**Photo number: 3**

**Date Taken:**  
10/12/2019 09:52



## Section Photos

Section A  
Photo number: 4



Section A  
Photo number: 5



**Section A**  
**Photo number: 6**



**Section A**  
**Photo number: 7**



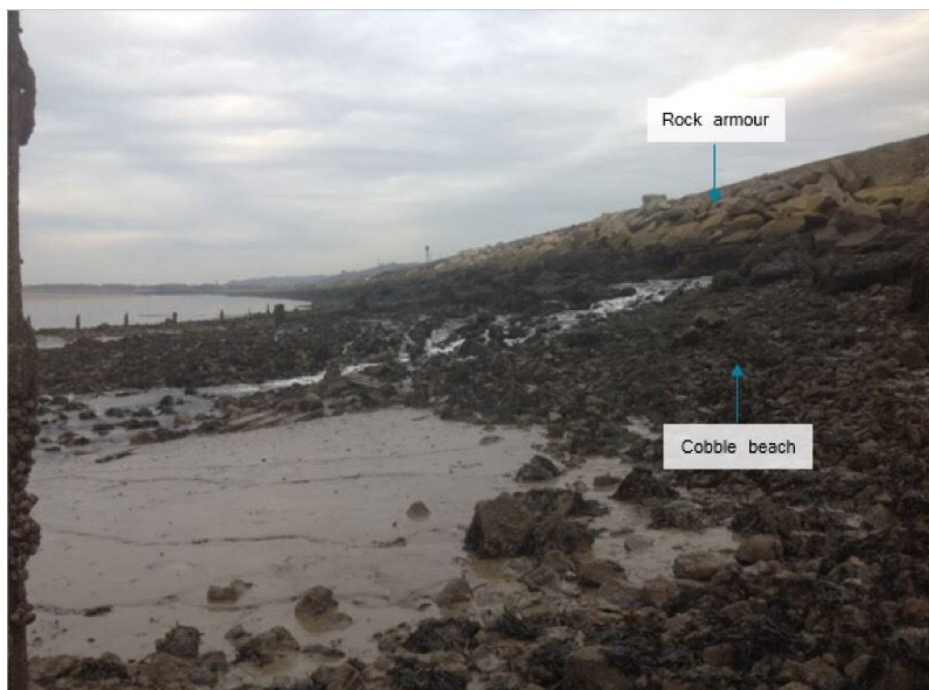
**Section A**  
**Photo number: 8**



**Section A**  
**Photo number: 9**



**Section A**  
**Photo number: 10**



**Section A**  
**Photo number: 11**



**Section A**  
**Photo number: 12**

**Date Taken:**  
10/12/2019 09:53



**Section A**  
**Photo number: 13**

**Date Taken:**  
10/12/2019 10:18



**Section A**  
**Photo number: 14**

**Date Taken:**  
10/12/2019 10:57



**Section A**  
**Photo number: 15**

**Date Taken:**  
10/12/2019 11:37



**Section A**  
**Photo number: 16**

**Date Taken:**  
10/12/2019 11:37



**Section A**  
**Photo number: 17**

**Date Taken:**  
10/12/2019 11:46



Section A  
Photo number: 18

Date Taken:  
07/09/2020 15:22



Section A  
Photo number: 19

Date Taken:  
07/09/2020 15:22



Section A  
Photo number: 20

Date Taken:  
07/09/2020 15:22



Section A  
Photo number: 21

Date Taken:  
07/09/2020 15:22



Section A  
Photo number: 22

Date Taken:  
07/09/2020 15:22



Section A  
Photo number: 23

Date Taken:  
07/09/2020 15:47



Section A  
Photo number: 24

Date Taken:  
07/09/2020 15:47



Section A  
Photo number: 25

Date Taken:  
07/09/2020 16:23



Section A  
Photo number: 26

Date Taken:  
07/09/2020 16:24



Section A  
Photo number: 27

Date Taken:  
07/09/2020 16:35



Section A  
Photo number: 28

Date Taken:  
07/09/2020 17:11



Section A  
Photo number: 29

Date Taken:  
07/09/2020 17:11



**Section A**  
**Photo number: 30**

**Date Taken:**  
07/09/2020 17:15



**Section A**  
**Photo number: 31**

**Date Taken:**  
07/09/2020 17:22



## Element Survey Photos

**Section A**  
**Capping Wall**  
**Photo number: 35**

**Date Taken:**  
10/12/2019 10:31



**Section A**  
**Capping Wall**  
**Photo number: 36**

**Date Taken:**  
10/12/2019 11:03



**Section A**  
**Capping Wall**  
**Photo number: 37**

**Date Taken:**  
10/12/2019 11:46



**Section A**  
**Capping Wall**  
**Photo number: 41**

**Date Taken:**  
07/09/2020 16:31



**Section A**  
**Capping Wall**  
**Photo number: 42**

**Date Taken:**  
07/09/2020 16:32



**Section A**  
**Capping Wall**  
**Photo number: 46**

**Date Taken:**  
07/09/2020 16:48



**Section A**  
**Embankment**  
**Armour**  
**Photo number: 32**



**Section A**  
**Embankment**  
**Armour**  
**Photo number: 33**

**Date Taken:**  
10/12/2019 09:58



**Section A**  
**Embankment**  
**Armour**  
**Photo number: 39**

**Date Taken:**  
07/09/2020 16:17



**Section A**  
**Embankment**  
**Armour**  
**Photo number: 40**

**Date Taken:**  
07/09/2020 16:17



**Section A  
Embankment  
Armour  
Photo number: 43**

**Date Taken:**  
07/09/2020 16:37



**Section A  
Embankment  
Armour  
Photo number: 44**

**Date Taken:**  
07/09/2020 16:37



**Section A**  
**Embankment**  
**Armour**  
**Photo number: 45**

**Date Taken:**  
07/09/2020 16:41



**Section A**  
**Screen**  
**Photo number: 34**

**Date Taken:**  
10/12/2019 10:19



**Section A**  
**Screen**  
**Photo number: 38**

**Date Taken:**  
07/09/2020 15:57



## Defect Photos

### Section A Embankment Armour

**Defect Ref: D1**

#### Description:

Undersized rock armour likely to be unstable and provide inadequate protection during storm events. There has been no change between the 2019 and 2020 inspections.

**Photo number: 47**



### Section A Embankment Armour

**Defect Ref: D1**

#### Description:

Undersized rock armour likely to be unstable and provide inadequate protection during storm events. There has been no change between the 2019 and 2020 inspections.

**Photo number: 48**



**Section A  
Embankment  
Armour**

**Defect Ref: D1**

**Description:**

Undersized rock armour likely to be unstable and provide inadequate protection during storm events. There has been no change between the 2019 and 2020 inspections.

**Photo number: 86**

**Date Taken:**

10/12/2019 10:06



**Section A  
Embankment  
Armour**

**Defect Ref: D1**

**Description:**

Undersized rock armour likely to be unstable and provide inadequate protection during storm events. There has been no change between the 2019 and 2020 inspections.

**Photo number: 97**

**Date Taken:**

10/12/2019 10:27



**Section A  
Embankment  
Armour**

**Defect Ref: D1**

**Description:**

Undersized rock armour likely to be unstable and provide inadequate protection during storm events. There has been no change between the 2019 and 2020 inspections.

**Photo number: 148**

**Date Taken:**

07/09/2020 15:40



**Section A  
Embankment  
Armour**

**Defect Ref: D1**

**Description:**

Undersized rock armour likely to be unstable and provide inadequate protection during storm events. There has been no change between the 2019 and 2020 inspections.

**Photo number: 149**

**Date Taken:**

07/09/2020 15:40



**Section A  
Embankment  
Armour**

**Defect Ref: D1**

**Description:**

Undersized rock armour likely to be unstable and provide inadequate protection during storm events. There has been no change between the 2019 and 2020 inspections.

**Photo number: 200**

**Date Taken:**

07/09/2020 16:53



**Section A  
Embankment  
Armour**

**Defect Ref: D2**

**Description:**

The hollow in the rock armour creates a localised weakness, compromising the stability of the embankment. No change between 2019 and 2020 inspections.

**Photo number: 49**



**Section A  
Embankment  
Armour**

**Defect Ref: D2**

**Description:** The hollow in the rock armour creates a localised weakness, compromising the stability of the embankment. No change between 2019 and 2020 inspections.

**Photo number: 120**

**Date Taken:**  
10/12/2019 11:19



**Section A  
Embankment  
Armour**

**Defect Ref: D3**

**Description:** Algae covered steps providing slipping hazard. No change between 2019 and 2020 inspections.

**Photo number: 50**



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D3**  
**Description:** Algae covered steps providing slipping hazard. No change between 2019 and 2020 inspections.  
**Photo number: 114**

**Date Taken:**  
10/12/2019 11:09



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D3**  
**Description:** Algae covered steps providing slipping hazard. No change between 2019 and 2020 inspections.  
**Photo number: 199**

**Date Taken:**  
07/09/2020 16:52



**Section A**  
**Capping Wall**  
**Defect Ref: D4**  
**Description:** Parapet wall is leaning towards the track. No change between the 2019 and 2020 inspections.  
**Photo number: 51**



**Section A**  
**Capping Wall**  
**Defect Ref: D4**  
**Description:** Parapet wall is leaning towards the track. No change between the 2019 and 2020 inspections.  
**Photo number: 104**

**Date Taken:**  
10/12/2019 10:37



**Section A**  
**Capping Wall**  
**Defect Ref: D4**  
**Description:** Parapet wall is leaning towards the track. No change between the 2019 and 2020 inspections.  
**Photo number: 180**

**Date Taken:**  
07/09/2020 16:19



**Section A**  
**Capping Wall**  
**Defect Ref: D4**  
**Description:** Parapet wall is leaning towards the track. No change between the 2019 and 2020 inspections.  
**Photo number: 181**

**Date Taken:**  
07/09/2020 16:19



**Section A**  
**Capping Wall**  
**Defect Ref: D4**  
**Description:** Parapet wall is leaning towards the track. No change between the 2019 and 2020 inspections.  
**Photo number: 182**

**Date Taken:**  
07/09/2020 16:19



**Section A**  
**Capping Wall**  
**Defect Ref: D5**  
**Description:** Vegetation growth could weaken embankment armour and cause localised structural damage. Increased in severity between the 2019 and 2020 inspections as more vegetation and cracking in mortar was noted.  
**Photo number: 52**



## Section A

### Capping Wall

Defect Ref: D5

#### Description:

Vegetation growth could weaken embankment armour and cause localised structural damage. Increased in severity between the 2019 and 2020 inspections as more vegetation and cracking in mortar was noted.

Photo number: 53



## Section A

### Capping Wall

Defect Ref: D5

#### Description:

Vegetation growth could weaken embankment armour and cause localised structural damage. Increased in severity between the 2019 and 2020 inspections as more vegetation and cracking in mortar was noted.

Photo number: 98

#### Date Taken:

10/12/2019 10:33



## Section A

### Capping Wall

Defect Ref: D5

#### Description:

Vegetation growth could weaken embankment armour and cause localised structural damage. Increased in severity between the 2019 and 2020 inspections as more vegetation and cracking in mortar was noted.

Photo number: 105

Date Taken:

10/12/2019 10:39



## Section A

### Capping Wall

Defect Ref: D5

#### Description:

Vegetation growth could weaken embankment armour and cause localised structural damage. Increased in severity between the 2019 and 2020 inspections as more vegetation and cracking in mortar was noted.

Photo number: 106

Date Taken:

10/12/2019 10:39



## Section A

### Capping Wall

Defect Ref: D5

#### Description:

Vegetation growth could weaken embankment armour and cause localised structural damage. Increased in severity between the 2019 and 2020 inspections as more vegetation and cracking in mortar was noted.

Photo number: 164

#### Date Taken:

07/09/2020 15:54



## Section A

### Capping Wall

Defect Ref: D5

#### Description:

Vegetation growth could weaken embankment armour and cause localised structural damage. Increased in severity between the 2019 and 2020 inspections as more vegetation and cracking in mortar was noted.

Photo number: 167

#### Date Taken:

07/09/2020 15:58



**Section A**  
**Capping Wall**  
**Defect Ref: D6**  
**Description:**  
Damaged and corroded trash screen. Both the lower and upper screens were found to be detached during the 2020 inspection.  
**Photo number: 54**



**Section A**  
**Capping Wall**  
**Defect Ref: D6**  
**Description:**  
Damaged and corroded trash screen. Both the lower and upper screens were found to be detached during the 2020 inspection.  
**Photo number: 112**

**Date Taken:**  
10/12/2019 11:00



**Section A**  
**Capping Wall**  
**Defect Ref: D6**  
**Description:**  
Damaged and corroded trash screen. Both the lower and upper screens were found to be detached during the 2020 inspection.  
**Photo number: 113**

**Date Taken:**  
10/12/2019 11:00



**Section A**  
**Capping Wall**  
**Defect Ref: D6**  
**Description:**  
Damaged and corroded trash screen. Both the lower and upper screens were found to be detached during the 2020 inspection.  
**Photo number: 192**

**Date Taken:**  
07/09/2020 16:42



**Section A**  
**Capping Wall**  
**Defect Ref: D6**  
**Description:**  
Damaged and corroded trash screen. Both the lower and upper screens were found to be detached during the 2020 inspection.  
**Photo number: 193**

**Date Taken:**  
07/09/2020 16:42



**Section A**  
**Capping Wall**  
**Defect Ref: D7**  
**Description:**  
Damaged parapet and capping. A section of the capping wall has been replaced between the 2019 and 2020 inspections. However, there are still missing blocks noted in the existing wall.  
**Photo number: 55**



**Section A**  
**Capping Wall**  
**Defect Ref: D7**  
**Description:**  
Damaged parapet and capping. A section of the capping wall has been replaced between the 2019 and 2020 inspections. However, there are still missing blocks noted in the existing wall.  
**Photo number: 56**



**Section A**  
**Capping Wall**  
**Defect Ref: D7**  
**Description:**  
Damaged parapet and capping. A section of the capping wall has been replaced between the 2019 and 2020 inspections. However, there are still missing blocks noted in the existing wall.  
**Photo number: 108**

**Date Taken:**  
10/12/2019 10:50



**Section A**  
**Capping Wall**  
**Defect Ref: D7**  
**Description:**  
Damaged parapet and capping. A section of the capping wall has been replaced between the 2019 and 2020 inspections. However, there are still missing blocks noted in the existing wall.  
**Photo number: 109**

**Date Taken:**  
10/12/2019 10:51



**Section A**  
**Capping Wall**  
**Defect Ref: D7**  
**Description:**  
Damaged parapet and capping. A section of the capping wall has been replaced between the 2019 and 2020 inspections. However, there are still missing blocks noted in the existing wall.  
**Photo number: 110**

**Date Taken:**  
10/12/2019 10:53



**Section A**  
**Capping Wall**  
**Defect Ref: D7**  
**Description:**  
Damaged parapet and capping. A section of the capping wall has been replaced between the 2019 and 2020 inspections. However, there are still missing blocks noted in the existing wall.  
**Photo number: 194**

**Date Taken:**  
07/09/2020 16:43



**Section A**  
**Capping Wall**  
**Defect Ref: D7**  
**Description:**  
Damaged parapet and capping. A section of the capping wall has been replaced between the 2019 and 2020 inspections. However, there are still missing blocks noted in the existing wall.  
**Photo number: 195**

**Date Taken:**  
07/09/2020 16:43



**Section A**  
**Capping Wall**  
**Defect Ref: D7**  
**Description:**  
Damaged parapet and capping. A section of the capping wall has been replaced between the 2019 and 2020 inspections. However, there are still missing blocks noted in the existing wall.  
**Photo number: 196**

**Date Taken:**  
07/09/2020 16:44



**Section A**  
**Capping Wall**  
**Defect Ref: D7**  
**Description:**  
Damaged parapet and capping. A section of the capping wall has been replaced between the 2019 and 2020 inspections. However, there are still missing blocks noted in the existing wall.  
**Photo number: 197**

**Date Taken:**  
07/09/2020 16:45



**Section A**  
**Capping Wall**  
**Defect Ref: D7**  
**Description:** Damaged parapet and capping. A section of the capping wall has been replaced between the 2019 and 2020 inspections. However, there are still missing blocks noted in the existing wall.  
**Photo number: 198**

**Date Taken:**  
07/09/2020 16:45



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D8**  
**Description:** Lack of rock armour, and ineffective repair measures. No change between 2019 and 2020 inspections.  
**Photo number: 57**



**Section A  
Embankment  
Armour**

**Defect Ref: D8**

**Description:** Lack of rock armour, and ineffective repair measures. No change between 2019 and 2020 inspections.

**Photo number: 102**

**Date Taken:**

10/12/2019 10:36



**Section A  
Embankment  
Armour**

**Defect Ref: D8**

**Description:** Lack of rock armour, and ineffective repair measures. No change between 2019 and 2020 inspections.

**Photo number: 103**

**Date Taken:**

10/12/2019 10:36



**Section A  
Embankment  
Armour**

**Defect Ref: D8**

**Description:** Lack of rock armour, and ineffective repair measures. No change between 2019 and 2020 inspections.

**Photo number: 145**

**Date Taken:**

07/09/2020 15:37



**Section A  
Embankment  
Armour**

**Defect Ref: D8**

**Description:** Lack of rock armour, and ineffective repair measures. No change between 2019 and 2020 inspections.

**Photo number: 190**

**Date Taken:**

07/09/2020 16:36



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D9**  
**Description:** Lack of crest width on rock embankment, leading to instabilities in the defence. No change between 2019 and 2020 inspections.  
**Photo number: 58**



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D9**  
**Description:** Lack of crest width on rock embankment, leading to instabilities in the defence. No change between 2019 and 2020 inspections.  
**Photo number: 123**

**Date Taken:**  
10/12/2019 11:26



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D10**  
**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.  
**Photo number: 59**



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D10**  
**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.  
**Photo number: 93**



**Date Taken:**  
10/12/2019 10:21

**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D10**  
**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.  
**Photo number: 94**

**Date Taken:**  
10/12/2019 10:21



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D10**  
**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.  
**Photo number: 107**

**Date Taken:**  
10/12/2019 10:40



**Section A  
Embankment  
Armour**

**Defect Ref: D10**

**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.

**Photo number: 137**

**Date Taken:**

07/09/2020 15:26



**Section A  
Embankment  
Armour**

**Defect Ref: D11**

**Description:** Evidence of possible subsidence on the embankment crest. Indication of early stages of more severe failure mechanisms. No change between 2019 and 2020 inspections.

**Photo number: 60**



**Section A  
Embankment  
Armour**

**Defect Ref: D11**

**Description:**

Evidence of possible subsidence on the embankment crest. Indication of early stages of more severe failure mechanisms. No change between 2019 and 2020 inspections.

**Photo number: 87**

**Date Taken:**

10/12/2019 10:10



**Section A  
Embankment  
Armour**

**Defect Ref: D11**

**Description:**

Evidence of possible subsidence on the embankment crest. Indication of early stages of more severe failure mechanisms. No change between 2019 and 2020 inspections.

**Photo number: 99**

**Date Taken:**

10/12/2019 10:34



**Section A  
Embankment  
Armour**

**Defect Ref: D11**

**Description:**

Evidence of possible subsidence on the embankment crest. Indication of early stages of more severe failure mechanisms. No change between 2019 and 2020 inspections.

**Photo number: 100**

**Date Taken:**

10/12/2019 10:34



**Section A  
Embankment  
Armour**

**Defect Ref: D11**

**Description:**

Evidence of possible subsidence on the embankment crest. Indication of early stages of more severe failure mechanisms. No change between 2019 and 2020 inspections.

**Photo number: 174**

**Date Taken:**

07/09/2020 16:11



**Section A  
Embankment  
Armour**

**Defect Ref: D12**

**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.

**Photo number: 61**



**Section A  
Embankment  
Armour**

**Defect Ref: D12**

**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.

**Photo number: 62**



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D12**  
**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.  
**Photo number: 63**



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D12**  
**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.  
**Photo number: 89**

**Date Taken:**  
10/12/2019 10:15



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D12**  
**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.  
**Photo number: 90**

**Date Taken:**  
10/12/2019 10:16



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D12**  
**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.  
**Photo number: 96**

**Date Taken:**  
10/12/2019 10:25



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D12**  
**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.  
**Photo number: 121**

**Date Taken:**  
10/12/2019 11:22



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D12**  
**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.  
**Photo number: 156**

**Date Taken:**  
07/09/2020 15:46



**Section A  
Embankment  
Armour**

**Defect Ref: D12**

**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.

**Photo number: 157**

**Date Taken:**

07/09/2020 15:46



**Section A  
Embankment  
Armour**

**Defect Ref: D12**

**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.

**Photo number: 161**

**Date Taken:**

07/09/2020 15:50



**Section A  
Embankment  
Armour**

**Defect Ref: D12**

**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.

**Photo number: 163**

**Date Taken:**

07/09/2020 15:52



**Section A  
Embankment  
Armour**

**Defect Ref: D12**

**Description:** Isolated lack of rock armour. Masonry wall exposed to increased wave loading. No change between 2019 and 2020 inspections.

**Photo number: 168**

**Date Taken:**

07/09/2020 16:00



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D13**  
**Description:** Algae covered access ramp providing slipping hazard. This defect has been addressed between 2019 and 2020 inspections.  
**Photo number: 64**



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D13**  
**Description:** Algae covered access ramp providing slipping hazard. This defect has been addressed between 2019 and 2020 inspections.  
**Photo number: 95**

**Date Taken:**  
10/12/2019 10:24



**Section A  
Embankment  
Armour**

**Defect Ref: D13**

**Description:** Algae covered access ramp providing slipping hazard. This defect has been addressed between 2019 and 2020 inspections.

**Photo number: 171**

**Date Taken:**

07/09/2020 16:05



**Section A  
Capping Wall**

**Defect Ref: D14**

**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. No change between 2019 and 2020 inspections.

**Photo number: 65**



**Section A**  
**Capping Wall**  
**Defect Ref: D14**  
**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. No change between 2019 and 2020 inspections.  
**Photo number: 101**

**Date Taken:**  
10/12/2019 10:34



**Section A**  
**Capping Wall**  
**Defect Ref: D14**  
**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. No change between 2019 and 2020 inspections.  
**Photo number: 170**

**Date Taken:**  
07/09/2020 16:05



## Section A Screen

### Defect Ref: D15

**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. Between 2014 and 2020 this defect has been repaired.

**Photo number: 66**



## Section A Screen

### Defect Ref: D15

**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. Between 2014 and 2020 this defect has been repaired.

**Photo number: 91**

### Date Taken:

10/12/2019 10:19



## Section A

### Screen

**Defect Ref: D15**

**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. Between 2014 and 2020 this defect has been repaired.

**Photo number: 92**

**Date Taken:**

10/12/2019 10:19



## Section A

### Screen

**Defect Ref: D15**

**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. Between 2014 and 2020 this defect has been repaired.

**Photo number: 165**

**Date Taken:**

07/09/2020 15:57



## Section A

### Screen

#### Defect Ref: D15

**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. Between 2014 and 2020 this defect has been repaired.

**Photo number: 166**

**Date Taken:**

07/09/2020 15:57



## Section A

### Embankment

### Armour

#### Defect Ref: D16

**Description:** Signs of possible subsidence on the embankment armour. Indication of early stages of more severe failure mechanisms. No change between 2019 and 2020 inspections.

**Photo number: 67**



**Section A  
Embankment  
Armour**

**Defect Ref: D16**

**Description:** Signs of possible subsidence on the embankment armour. Indication of early stages of more severe failure mechanisms. No change between 2019 and 2020 inspections.

**Photo number: 141**

**Date Taken:**  
07/09/2020 15:30



**Section A  
Embankment  
Armour**

**Defect Ref: D16**

**Description:** Signs of possible subsidence on the embankment armour. Indication of early stages of more severe failure mechanisms. No change between 2019 and 2020 inspections.

**Photo number: 144**

**Date Taken:**  
07/09/2020 15:35



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D17**  
**Description:**  
Embankment slope  
too steep by design  
standards. No change  
between 2019 and  
2020 inspections.  
**Photo number: 68**



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D17**  
**Description:**  
Embankment slope  
too steep by design  
standards. No change  
between 2019 and  
2020 inspections.  
**Photo number: 80**

**Date Taken:**  
10/12/2019 10:02



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D17**  
**Description:**  
Embankment slope  
too steep by design  
standards. No change  
between 2019 and  
2020 inspections.  
**Photo number: 81**

**Date Taken:**  
10/12/2019 10:02



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D17**  
**Description:**  
Embankment slope  
too steep by design  
standards. No change  
between 2019 and  
2020 inspections.  
**Photo number: 117**

**Date Taken:**  
10/12/2019 11:14



**Section A  
Embankment  
Armour**

**Defect Ref: D17**

**Description:**

Embankment slope too steep by design standards. No change between 2019 and 2020 inspections.

**Photo number: 142**

**Date Taken:**

07/09/2020 15:31



**Section A  
Embankment  
Armour**

**Defect Ref: D18**

**Description:** Very poor condition of defence tie-in. Slightly increased in severity as the defect has further deteriorated between the 2019 and 2020 inspections.

**Photo number: 69**



**Section A  
Embankment  
Armour**

**Defect Ref: D18**

**Description:** Very poor condition of defence tie-in. Slightly increased in severity as the defect has further deteriorated between the 2019 and 2020 inspections.

**Photo number: 79**

**Date Taken:**

10/12/2019 09:56



**Section A  
Embankment  
Armour**

**Defect Ref: D18**

**Description:** Very poor condition of defence tie-in. Slightly increased in severity as the defect has further deteriorated between the 2019 and 2020 inspections.

**Photo number: 138**

**Date Taken:**

07/09/2020 15:27



**Section A  
Embankment  
Armour**

**Defect Ref: D18**

**Description:** Very poor condition of defence tie-in. Slightly increased in severity as the defect has further deteriorated between the 2019 and 2020 inspections.

**Photo number: 139**

**Date Taken:**

07/09/2020 15:28



**Section A  
Embankment  
Armour**

**Defect Ref: D18**

**Description:** Very poor condition of defence tie-in. Slightly increased in severity as the defect has further deteriorated between the 2019 and 2020 inspections.

**Photo number: 140**

**Date Taken:**

07/09/2020 15:28



**Section A  
Embankment  
Armour**

**Defect Ref: D19**

**Description:** Failed  
parapet wall sections.  
This defect has been  
repaired between  
2014 and 2019.

**Photo number: 131**

**Date Taken:**

10/12/2019 11:40



**Section A  
Embankment  
Armour**

**Defect Ref: D19**

**Description:** Failed  
parapet wall sections.  
This defect has been  
repaired between  
2014 and 2019.

**Photo number: 132**

**Date Taken:**

10/12/2019 11:41



**Section A  
Embankment  
Armour**

**Defect Ref: D19**

**Description:** Failed  
parapet wall sections.  
This defect has been  
repaired between  
2014 and 2019.

**Photo number: 133**

**Date Taken:**

10/12/2019 11:41



**Section A  
Embankment  
Armour**

**Defect Ref: D19**

**Description:** Failed  
parapet wall sections.  
This defect has been  
repaired between  
2014 and 2019.

**Photo number: 201**

**Date Taken:**

07/09/2020 16:56



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D19**  
**Description:** Failed  
parapet wall sections.  
This defect has been  
repaired between  
2014 and 2019.  
**Photo number: 202**

**Date Taken:**  
07/09/2020 16:56



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D20**  
**Description:** Non-  
standard and  
ineffective armour  
units. No change  
between 2019 and  
2020 inspections.  
**Photo number: 70**



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D20**  
**Description:** Non-standard and ineffective armour units. No change between 2019 and 2020 inspections.  
**Photo number: 88**

**Date Taken:**  
10/12/2019 10:14



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D20**  
**Description:** Non-standard and ineffective armour units. No change between 2019 and 2020 inspections.  
**Photo number: 116**

**Date Taken:**  
10/12/2019 11:14



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D20**  
**Description:** Non-standard and ineffective armour units. No change between 2019 and 2020 inspections.  
**Photo number: 159**

**Date Taken:**  
07/09/2020 15:48



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D20**  
**Description:** Non-standard and ineffective armour units. No change between 2019 and 2020 inspections.  
**Photo number: 160**

**Date Taken:**  
07/09/2020 15:48



**Section A  
Embankment  
Armour  
Defect Ref: D20  
Description:** Non-  
standard and  
ineffective armour  
units. No change  
between 2019 and  
2020 inspections.  
**Photo number: 203**

**Date Taken:**  
07/09/2020 17:00



**Section A  
Embankment  
Armour  
Defect Ref: D21  
Description:** Expelled  
rock armour units. No change  
between 2019 and  
2020 inspections.  
**Photo number: 71**



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D21**  
**Description:**  
Expelled rock armour  
units. No change  
between 2019 and  
2020 inspections.  
**Photo number: 115**

**Date Taken:**  
10/12/2019 11:11



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D21**  
**Description:**  
Expelled rock armour  
units. No change  
between 2019 and  
2020 inspections.  
**Photo number: 169**

**Date Taken:**  
07/09/2020 16:01



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D22**  
**Description:**  
Exposed wall section.  
No change between  
2019 and 2020  
inspections.  
**Photo number: 72**



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D22**  
**Description:**  
Exposed wall section.  
No change between  
2019 and 2020  
inspections.  
**Photo number: 73**



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D22**  
**Description:**  
Exposed wall section.  
No change between  
2019 and 2020  
inspections.  
**Photo number: 122**

**Date Taken:**  
10/12/2019 11:23



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D22**  
**Description:**  
Exposed wall section.  
No change between  
2019 and 2020  
inspections.  
**Photo number: 205**

**Date Taken:**  
07/09/2020 17:04



**Section A**  
**Capping Wall**  
**Defect Ref: D23**  
**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. This defect has been repaired between the 2014 and 2020 inspections. However, multiple repointing repairs were found to be broken in 2020.  
**Photo number: 75**



**Section A**  
**Capping Wall**  
**Defect Ref: D23**  
**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. This defect has been repaired between the 2014 and 2020 inspections. However, multiple repointing repairs were found to be broken in 2020.  
**Photo number: 74**



**Section A**  
**Capping Wall**  
**Defect Ref: D23**  
**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. This defect has been repaired between the 2014 and 2020 inspections. However, multiple repointing repairs were found to be broken in 2020.  
**Photo number: 111**

**Date Taken:**  
10/12/2019 10:54



**Section A**  
**Capping Wall**  
**Defect Ref: D23**  
**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. This defect has been repaired between the 2014 and 2020 inspections. However, multiple repointing repairs were found to be broken in 2020.  
**Photo number: 124**

**Date Taken:**  
10/12/2019 11:27



**Section A**  
**Capping Wall**  
**Defect Ref: D23**  
**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. This defect has been repaired between the 2014 and 2020 inspections. However, multiple repointing repairs were found to be broken in 2020.  
**Photo number: 204**

**Date Taken:**  
07/09/2020 17:02



**Section A**  
**Capping Wall**  
**Defect Ref: D23**  
**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. This defect has been repaired between the 2014 and 2020 inspections. However, multiple repointing repairs were found to be broken in 2020.  
**Photo number: 206**

**Date Taken:**  
07/09/2020 17:06



**Section A**  
**Capping Wall**  
**Defect Ref: D23**  
**Description:** Open joints, if left unrepaired further deterioration of the wall is expected. This defect has been repaired between the 2014 and 2020 inspections. However, multiple repointing repairs were found to be broken in 2020.  
**Photo number: 207**

**Date Taken:**  
07/09/2020 17:08



**Section A**  
**Capping Wall**  
**Defect Ref: D24**  
**Description:** Severe damage to wall. Between the 2019 and 2020 inspections, the defect has been repaired.  
**Photo number: 76**



**Section A**  
**Capping Wall**  
**Defect Ref: D24**  
**Description:** Severe damage to wall. Between the 2019 and 2020 inspections, the defect has been repaired.  
**Photo number: 125**

**Date Taken:**  
10/12/2019 11:29



**Section A**  
**Capping Wall**  
**Defect Ref: D24**  
**Description:** Severe damage to wall. Between the 2019 and 2020 inspections, the defect has been repaired.  
**Photo number: 208**

**Date Taken:**  
07/09/2020 17:09



**Section A**  
**Capping Wall**  
**Defect Ref: D25**  
**Description:** This defect has been crudely repaired between 2014 and 2020 inspections with concrete sandbags. The repair is failing.  
**Photo number: 77**



**Section A**  
**Capping Wall**  
**Defect Ref: D25**  
**Description:** This defect has been crudely repaired between 2014 and 2020 inspections with concrete sandbags. The repair is failing.  
**Photo number: 127**

**Date Taken:**  
10/12/2019 11:35



**Section A**  
**Capping Wall**  
**Defect Ref: D25**  
**Description:** This defect has been crudely repaired between 2014 and 2020 inspections with concrete sandbags. The repair is failing.  
**Photo number: 128**

**Date Taken:**  
10/12/2019 11:36



**Section A**  
**Capping Wall**  
**Defect Ref: D25**  
**Description:** This defect has been crudely repaired between 2014 and 2020 inspections with concrete sandbags. The repair is failing.  
**Photo number: 129**

**Date Taken:**  
10/12/2019 11:36



## Section A

### Capping Wall

**Defect Ref: D25**

**Description:** This defect has been crudely repaired between 2014 and 2020 inspections with concrete sandbags. The repair is failing.

**Photo number: 210**

**Date Taken:**

07/09/2020 17:12



## Section A

### Capping Wall

**Defect Ref: D26**

**Description:** Poor defence tie-in. Increased in severity between the 2014 and 2019 inspections, with additional damage to the capping wall. The capping wall has been repaired between the 2019 and 2020 inspections, but there is still a loss of grouting areas.

**Photo number: 78**



**Section A**  
**Capping Wall**  
**Defect Ref: D26**  
**Description:** Poor defence tie-in. Increased in severity between the 2014 and 2019 inspections, with additional damage to the capping wall. The capping wall has been repaired between the 2019 and 2020 inspections, but there is still a loss of grouting areas.  
**Photo number: 134**

**Date Taken:**  
10/12/2019 11:44



**Section A**  
**Capping Wall**  
**Defect Ref: D26**  
**Description:** Poor defence tie-in. Increased in severity between the 2014 and 2019 inspections, with additional damage to the capping wall. The capping wall has been repaired between the 2019 and 2020 inspections, but there is still a loss of grouting areas.  
**Photo number: 135**

**Date Taken:**  
10/12/2019 11:45



**Section A**  
**Capping Wall**  
**Defect Ref: D26**  
**Description:** Poor defence tie-in. Increased in severity between the 2014 and 2019 inspections, with additional damage to the capping wall. The capping wall has been repaired between the 2019 and 2020 inspections, but there is still a loss of grouting areas.  
**Photo number: 136**

**Date Taken:**  
10/12/2019 11:45



**Section A**  
**Capping Wall**  
**Defect Ref: D26**  
**Description:** Poor defence tie-in. Increased in severity between the 2014 and 2019 inspections, with additional damage to the capping wall. The capping wall has been repaired between the 2019 and 2020 inspections, but there is still a loss of grouting areas.  
**Photo number: 211**

**Date Taken:**  
07/09/2020 17:17



**Section A  
Embankment  
Armour**

**Defect Ref: D27**

**Description:** Minor subsidence and undermining of ballast, but no evidence of failure on sea wall. No change between the 2019 and 2020 inspections.

**Photo number: 82**

**Date Taken:**

10/12/2019 10:04



**Section A  
Embankment  
Armour**

**Defect Ref: D27**

**Description:** Minor subsidence and undermining of ballast, but no evidence of failure on sea wall. No change between the 2019 and 2020 inspections.

**Photo number: 83**

**Date Taken:**

10/12/2019 10:04



**Section A  
Embankment  
Armour**

**Defect Ref: D27**

**Description:** Minor subsidence and undermining of ballast, but no evidence of failure on sea wall. No change between the 2019 and 2020 inspections.

**Photo number: 84**

**Date Taken:**

10/12/2019 10:05



**Section A  
Embankment  
Armour**

**Defect Ref: D27**

**Description:** Minor subsidence and undermining of ballast, but no evidence of failure on sea wall. No change between the 2019 and 2020 inspections.

**Photo number: 85**

**Date Taken:**

10/12/2019 10:05



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D28**  
**Description:** Poor interlocking between rock armour units. There has been no change between the 2019 and 2020 inspections.  
**Photo number: 118**

**Date Taken:**  
10/12/2019 11:17



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D28**  
**Description:** Poor interlocking between rock armour units. There has been no change between the 2019 and 2020 inspections.  
**Photo number: 119**

**Date Taken:**  
10/12/2019 11:17



**Section A  
Embankment  
Armour**

**Defect Ref: D28**

**Description:** Poor interlocking between rock armour units. There has been no change between the 2019 and 2020 inspections.

**Photo number: 213**

**Date Taken:**

07/09/2020 17:21



**Section A  
Capping Wall**

**Defect Ref: D29**

**Description:** Open joints and missing blockwork at the capping wall. No change between the 2019 and 2020 inspections.

**Photo number: 126**

**Date Taken:**

10/12/2019 11:32



**Section A**  
**Capping Wall**  
**Defect Ref: D29**  
**Description:** Open joints and missing blockwork at the capping wall. No change between the 2019 and 2020 inspections.  
**Photo number: 130**

**Date Taken:**  
10/12/2019 11:37



**Section A**  
**Capping Wall**  
**Defect Ref: D29**  
**Description:** Open joints and missing blockwork at the capping wall. No change between the 2019 and 2020 inspections.  
**Photo number: 212**

**Date Taken:**  
07/09/2020 17:18



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D30**  
**Description:** Wash  
out of ballast  
**Photo number: 143**

**Date Taken:**  
07/09/2020 15:35



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D31**  
**Description:** Voids in  
rock armour being  
filled with expelled  
ballast.  
**Photo number: 146**

**Date Taken:**  
07/09/2020 15:39



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D31**  
**Description:** Voids in rock armour being filled with expelled ballast.  
**Photo number: 147**

**Date Taken:**  
07/09/2020 15:39



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D32**  
**Description:** Large gaps between rock armour and crest of masonry wall.  
**Photo number: 150**

**Date Taken:**  
07/09/2020 15:40



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D32**  
**Description:** Large gaps between rock armour and crest of masonry wall.  
**Photo number: 151**

**Date Taken:**  
07/09/2020 15:42



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D32**  
**Description:** Large gaps between rock armour and crest of masonry wall.  
**Photo number: 155**

**Date Taken:**  
07/09/2020 15:44



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D32**  
**Description:** Large gaps between rock armour and crest of masonry wall.  
**Photo number: 162**

**Date Taken:**  
07/09/2020 15:52



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D32**  
**Description:** Large gaps between rock armour and crest of masonry wall.  
**Photo number: 172**

**Date Taken:**  
07/09/2020 16:06



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D32**  
**Description:** Large gaps between rock armour and crest of masonry wall.  
**Photo number: 173**

**Date Taken:**  
07/09/2020 16:08



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D32**  
**Description:** Large gaps between rock armour and crest of masonry wall.  
**Photo number: 175**

**Date Taken:**  
07/09/2020 16:14



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D32**  
**Description:** Large gaps between rock armour and crest of masonry wall.  
**Photo number: 176**

**Date Taken:**  
07/09/2020 16:14



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D32**  
**Description:** Large gaps between rock armour and crest of masonry wall.  
**Photo number: 183**

**Date Taken:**  
07/09/2020 16:22



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D33**  
**Description:**  
Fracturing in rocks.  
**Photo number: 152**

**Date Taken:**  
07/09/2020 15:43



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D33**  
**Description:**  
Fracturing in rocks.  
**Photo number: 153**

**Date Taken:**  
07/09/2020 15:44



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D33**  
**Description:**  
Fracturing in rocks.  
**Photo number: 158**

**Date Taken:**  
07/09/2020 15:47



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D34**  
**Description:**  
Cracked coping.  
**Photo number: 154**

**Date Taken:**  
07/09/2020 15:44



**Section A**  
**Capping Wall**  
**Defect Ref: D35**  
**Description:** Bulging  
wall.  
**Photo number: 177**

**Date Taken:**  
07/09/2020 16:15



**Section A**  
**Capping Wall**  
**Defect Ref: D35**  
**Description:** Bulging  
wall.  
**Photo number: 178**

**Date Taken:**  
07/09/2020 16:15



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D36**  
**Description:**  
Dumped blast furnace  
slag.  
**Photo number: 179**

**Date Taken:**  
07/09/2020 16:17



**Section A**  
**Capping Wall**  
**Defect Ref: D37**  
**Description:** Voids in  
crest approx.  
300x300mm  
**Photo number: 184**

**Date Taken:**  
07/09/2020 16:28



**Section A**  
**Capping Wall**  
**Defect Ref: D37**  
**Description:** Voids in  
crest approx.  
300x300mm  
**Photo number: 185**

**Date Taken:**  
07/09/2020 16:28



**Section A**  
**Capping Wall**  
**Defect Ref: D37**  
**Description:** Voids in  
crest approx.  
300x300mm  
**Photo number: 186**

**Date Taken:**  
07/09/2020 16:29



**Section A**  
**Capping Wall**  
**Defect Ref: D37**  
**Description:** Voids in  
crest approx.  
300x300mm  
**Photo number: 187**

**Date Taken:**  
07/09/2020 16:29



**Section A**  
**Capping Wall**  
**Defect Ref: D37**  
**Description:** Voids in  
crest approx.  
300x300mm  
**Photo number: 188**

**Date Taken:**  
07/09/2020 16:30



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D38**  
**Description:**  
Dumped blast furnace  
slag.  
**Photo number: 189**

**Date Taken:**  
07/09/2020 16:34



**Section A**  
**Embankment**  
**Armour**  
**Defect Ref: D38**  
**Description:**  
Dumped blast furnace  
slag.  
**Photo number: 191**

**Date Taken:**  
07/09/2020 16:39



**Section A**  
**Capping Wall**  
**Defect Ref: D39**  
**Description:** Loss of  
grout between coping  
and wall.  
**Photo number: 209**

**Date Taken:**  
07/09/2020 17:11



## Appendix 2 – Asset descriptors

| Asset Type      | Major Element    | Minor Elements             | Attributes                                                         |
|-----------------|------------------|----------------------------|--------------------------------------------------------------------|
| Defence         | Embankment       | Apron                      | Stone, concrete, masonry                                           |
|                 |                  | Capping Wall               | Stone, concrete, masonry                                           |
|                 |                  | Modular Blocks             | Concrete                                                           |
|                 |                  | Drainage                   | Pipe, masonry, Concrete Headline                                   |
|                 |                  | Gabions                    | Gabions                                                            |
|                 |                  | Natural                    | Vegetated, un-vegetated                                            |
|                 |                  | Pitching                   | Stone, Concrete, Masonry                                           |
|                 |                  | Armour                     | Rock, concrete                                                     |
|                 |                  | Toe                        | As above                                                           |
| Defence         | Wall             | Apron                      | Stone, concrete, masonry                                           |
|                 |                  | Parapet / Capping          | Stone, concrete, masonry, timber                                   |
|                 |                  | Wall section               | Stone, concrete, masonry, timber, sheet piles                      |
|                 |                  | Armour                     | Rock, concrete                                                     |
|                 |                  | Drainage                   |                                                                    |
|                 |                  | Toe                        | Concrete, natural, rock                                            |
| Defence         | Cliff / Slope    | Drainage                   |                                                                    |
|                 |                  | Face protection            | Netting, pinning, other                                            |
|                 |                  | Infill                     | Stone, concrete, masonry                                           |
|                 |                  | Natural                    | Vegetated, un-vegetated                                            |
|                 |                  | Toe                        |                                                                    |
| Beach Structure | Groyne           | Capping Beam               | Concrete, timber (whaling)                                         |
|                 |                  | Piles                      | Steel, timber                                                      |
|                 |                  | Groyne main section        | Rock, stone, masonry, timber (planking), concrete                  |
|                 |                  | Groyne landward connection | Rock, stone, masonry, timber (planking), concrete                  |
|                 |                  | Groyne – seaward roundhead | Rock, stone, masonry, timber (planking), concrete                  |
|                 |                  | Sheet piling               | Steel                                                              |
|                 |                  |                            |                                                                    |
| Beach Structure | Breakwater       | Capping Beam               | Concrete                                                           |
|                 |                  | Breakwater Section         | Stone, masonry, concrete                                           |
| Land            | Salt Marsh       | Salt marsh edge            | Vegetation (loss or growth), reduction in area                     |
|                 |                  | Channel / creeks           | Channels or creeks becoming wider, loss of vegetation on edge etc. |
| Land            | Tidal Flats      | Mudflats                   | Reduction in area                                                  |
|                 |                  | Channel                    | Channels becoming wider, changing course etc.                      |
| Land            | Sand Dune        | Crest                      | sand                                                               |
|                 |                  | Front face                 | sand                                                               |
| Land            | Beach            | Crest                      | Shingle, sand, cobbles, mixed                                      |
|                 |                  | Front face                 | Shingle, sand, cobbles, mixed                                      |
| Structure       | Outfall (>0.45m) | Outfall pipe               |                                                                    |
|                 |                  | Upstream headwall          |                                                                    |
|                 |                  | Downstream headwall        |                                                                    |
|                 |                  | Apron                      |                                                                    |
|                 |                  | Frame                      |                                                                    |
|                 |                  | Screen                     |                                                                    |
|                 |                  | Penstock                   |                                                                    |
|                 |                  | Flap valve                 |                                                                    |

## Appendix 3 – EA Condition Grades

10 Environment Agency Condition Assessment Manual

### 2.0 Visual inspection condition grades

The condition grading and descriptions given below are the standards adopted by the Environment Agency. The five condition grades, ranging from ‘very good’ to ‘very poor’, remain as before. However, the descriptions have been redefined, compared to the previous versions of the Condition Assessment Manual, to reflect condition according to flood defence performance.

#### 2.1 General assessment

| Grade | Rating    | Description                                                                                        |
|-------|-----------|----------------------------------------------------------------------------------------------------|
| 1     | Very Good | Cosmetic defects that will have no effect on performance                                           |
| 2     | Good      | Minor defects that will not reduce the overall performance of the asset                            |
| 3     | Fair      | Defects that could reduce performance of the asset                                                 |
| 4     | Poor      | Defects that would significantly reduce the performance of the asset. Further investigation needed |
| 5     | Very Poor | Severe defects resulting in complete performance failure                                           |