

Technical note

Project:	Swansea Bay Campus	Client:	St Modwen Developments Ltd
Subject:	Rock Revetment Survey		
Date:	19 th August 2016		

Document history

Job number: 5104896			Document ref: 5104896-SBC-OUT-0192			
Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 1	For issue	NA	AW	RM	MP	19/08/16

Client signoff

Client	St. Modwen Developments Ltd
Project	Swansea University Bay Campus
Document title	Rock Revetment Inspection 2016
Job no.	5104896
Copy no.	1
Document reference	5104896-SBC-OUT-0192 – Rev1

Technical note

1. Introduction

An updated visual inspection of the sea defences fronting the new University Campus and the Transit site was undertaken on 8th August 2016 with the results shown on the plans included as appendices to this note. This technical note provides a record of changes since the second survey, undertaken in January 2014. The first survey was undertaken in December 2012.

The extent of the revetment inspected covered a distance of approximately 1,200m, including the area further west than the University Campus (the Transit site) extending to land owned by the Port of Swansea.

The photo figures used in the previous survey are updated and appended to this note. The photo figures of the two previous surveys are also appended to allow easy comparison of historic and recent photos. The figures included in this report show the locations of photos common to both the 2014 and 2016 inspections and the position of any 'new' photos taken in 2016 to capture additional points of particular interest. Notes contained in red boxes relate to observed changes from 2014 to 2016.

2. Observations

WESTERN END

This section of the sea defence comprises a concrete sea wall with a rock armour slope on its seaward side.

The changes from January 2014 to August 2016 can be summarised as follows:

1. During the survey in January 2014, additional damage was noted to the top of the base of the concrete wall. Two tabular sections of concrete had been displaced by wave action damaging the top of the base of the wall and these concrete pieces were found located seaward on the rock revetment. During the 2016 survey, this damage to the wall is still evident. The tabular concrete pieces could no longer be found on the revetment. They have most likely been moved or broken up due to wave action. This is evidenced in Sheet 1 - West, P20.
2. The rock armour revetment has generally slightly worsened since the previous inspection in 2014. The revetment has settled in places, with rocks moving from the central part of the slope to a lower level (evidenced in Sheet 1 - West, P16, P17, P22 and P23) and the elevation of the crest reducing. However based on a qualitative assessment, the relative number of rocks moving is not over a significant extent and therefore it is not thought that the effectiveness of the sea defence has been altered significantly.
3. The outfall at P13 is not currently visible and it is likely to be buried under sand forming a comparatively higher beach level. Based on visual observations alone it is hard to tell definitively if the beach level has increased locally or across a larger extent of beach foreshore.

EASTERN END

This section of the sea defence comprises a rock armour revetment along the frontage of the University Campus. Within the eastern part of this stretch, the campus boundary and revetment diverge with a dune area between the rock revetment and university site.

Technical note

The rock revetment was found to be in a largely similar condition to that previously observed in 2014. The changes from January 2014 to August 2016 can be summarised as follows:

1. There is localised change in the profile (slope) of the rock revetment. This can be seen in Sheet 2 – East, P2, P4 and P11.
2. The new outfall that was constructed as part of the university development appears to have remained largely unchanged since the previous inspection, but, the ground level on the landward side of the outfall has been built up since the previous inspection as the development has progressed. The crest of the rock revetment immediately to the east of the outfall also appears to have been moved/displaced since previous inspection. This could possibly be due to the ground works in the surrounding area. This is evidenced in Sheet 2 – East, P6.
3. The outfall identified as IP13 in the 2014 survey was found to be no longer operational in the 2016 survey, which may be due to its burial in sand. This can be evidenced in Sheet 2 – East, P5.
4. In 2014, it was observed that there had been some erosion of the dunes landward of the revetment. The area between revetment crest and dunes looked like they had been trafficked by construction plant. This was evidenced on Sheet 2 – East, photo references IP15, 16 and 21 of the 2014 survey. In 2016, the area behind the revetment no longer appears to be used for construction plant. An increased extent of land on the back of the revetment has been eroded and there appears to be steeper dune slopes. This is evidenced on Sheet 2 – East, P26.

3. Conclusions

The condition of the revetment observed although variable has remained intact.

Technical note

Appendices

1. Figures for Inspection, August 2016

A3_Swansea_Bay_NA_Site_Survey_Aug2016_Photo_sheet1

A3_Swansea_Bay_NA_Site_Survey_Aug2016_Photo_sheet2

2. Figures from Inspection, January 2014

A3_Swansea_Bay_AW_Site_Survey_Jan2014_Photo_sheet1

A3_Swansea_Bay_AW_Site_Survey_Jan2014_Photo_sheet2

3. Figures from Inspection, November 2012

A3_Swansea_Bay_AW_Site_Survey_Nov 2012_Photo_sheet1

A3_Swansea_Bay_AW_Site_Survey_Nov 2012_Photo_sheet2

Technical note

Appendix 1 - Figures for Inspection, August 2016



P23 (Prev 469) - Easterly View

Two areas of reduced crest elevation;
worse condition since previous inspection

Eastings 269032
Northings 192805



P21 (Prev IP1) - Westerly View

Strong smell of diesel

Eastings 269052
Northings 192806



P 20 (Prev IP5) South Westerly View

Tabular shaped concrete pieces
located on the rock revetment
are no longer present.

Eastings 269089
Northings 192807



P17 (New) - North-easterly View

Worse slope failure exposing
a large amount of the vertical wall.
Bits of masonry in rock.

Eastings 269219
Northings 192754



P15 (Prev IP7) - Northerly View

A lot of the smaller historic beach
material (cobbles) has been washed
away or buried by higher beach level.

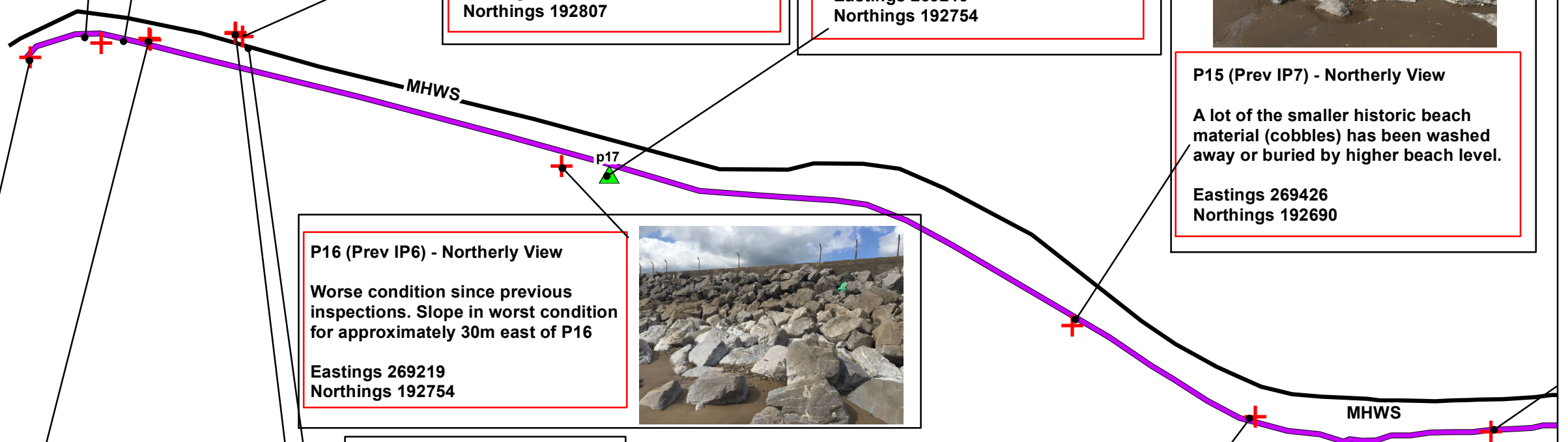
Eastings 269426
Northings 192690



P24 (Prev 468) - Westerly View

Western extremity of revetment
and survey.

Eastings 269003
Northings 192799



P16 (Prev IP6) - Northerly View

Worse condition since previous
inspections. Slope in worst condition
for approximately 30m east of P16

Eastings 269219
Northings 192754



P22 (Prev IP2) - Easterly View

Rock slope has failed,
reducing in height and
slipping out at the toe;
condition has worsened
since last inspection
and a small number of rocks
have been lost off the face.

Eastings 269052
Northings 192806



P18 (Prev IP3) - Westerly View

Rock slope has failed, reducing
in height and slipping out at the toe.

Eastings 269086
Northings 192792



P19 (Prev IP4) - Easterly View

Removal of the base of the
concrete wall by wave action.

Eastings 269087
Northings 192792



P14 (Prev IP8) - North-easterly View

Smaller rock present to the west,
packing improves.

Eastings 269501
Northings 192653



P13 (Prev IP9) - Northerly View

Outfall (defunct). Part of outfall
either removed for buried by
change in beach level.

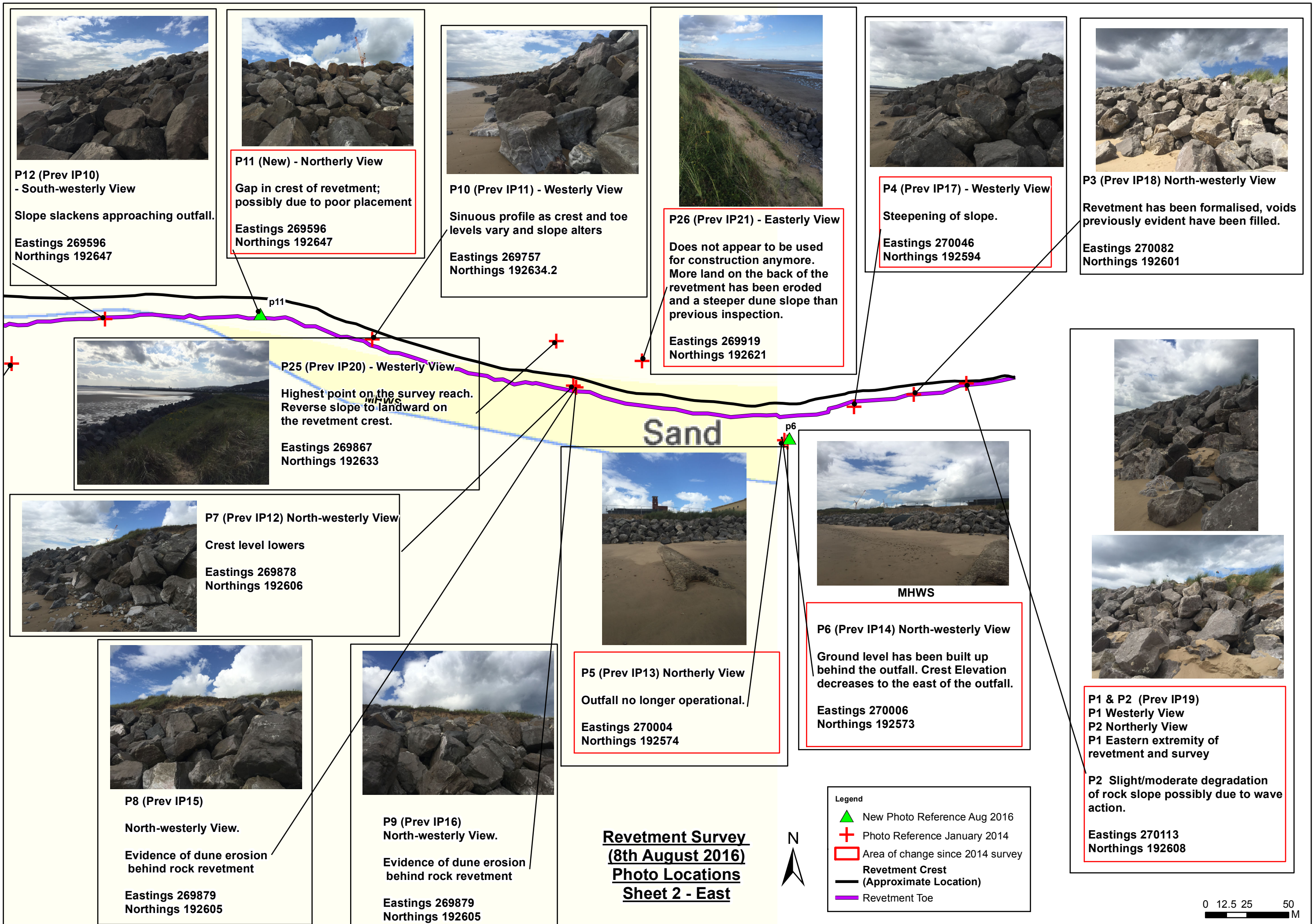
Eastings 269540
Northings 192620

- Legend**
- ▲ New Photo Reference Aug 2016
 - ✚ Photo reference January 2014
 - Area of change since 2014 survey
 - Revetment Crest (Approximate Location)
 - Revetment Toe



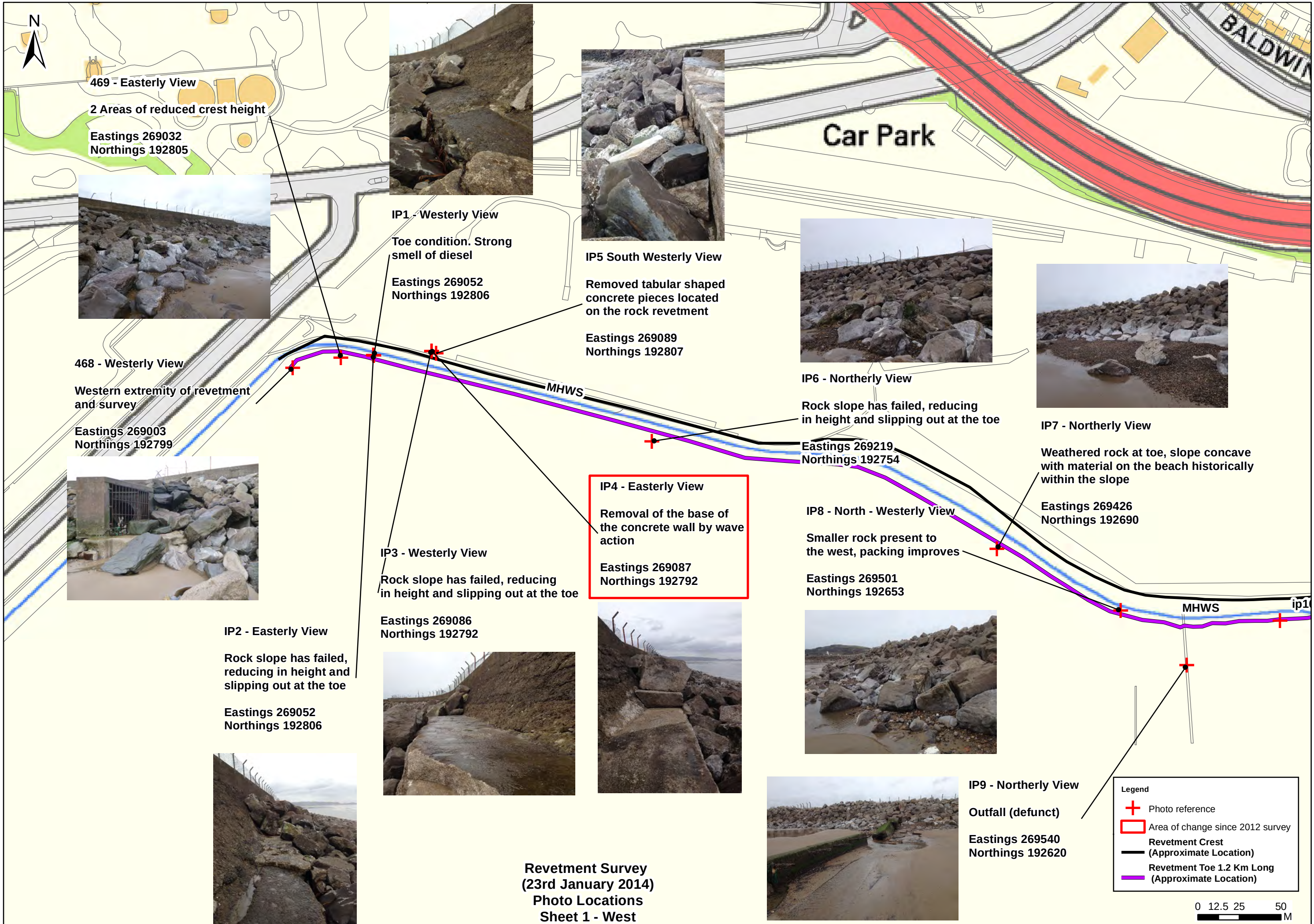
**Revetment Survey
(8th August 2016)
Photo Locations
Sheet 1 - West**

0 12.5 25 50
M



Technical note

Appendix 2 - Figures from Inspection, January 2014





IP10 - South Westerly View

Slope slackens approaching outfall

Eastings 269596
Northings 192647



IP11 - Westerly View

Sinuuous profile as crest and toe levels vary and slope alters

Eastings 269757
Northings 192634.2



IP21 Easterly View

Area looks to have been trafficked by construction plant, possible mechanical cause of dune face failing

Eastings 269919
Northings 192621

IP14 North Westerly View

New outfall construction, part of site development

Eastings 270006
Northings 192573



IP18 North Westerly View

Revetment has been formalised, voids previously evident have been filled.

Eastings 270082
Northings 192601



IP20 Westerly View

Highest point on the survey reach. Reverse slope to landward on the revetment crest

Eastings 269867
Northings 192633



IP12 Westerly View

Crest level lowers

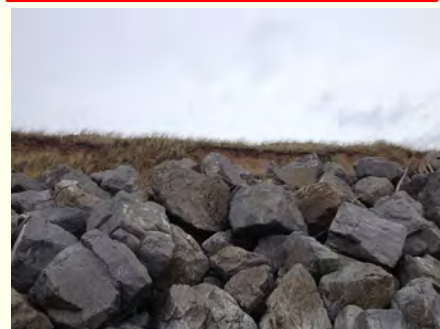
Eastings 269878
Northings 192606

IP15

North-westerly View.

Evidence of dune erosion behind rock revetment

Eastings 269879
Northings 192605



IP 16

North-westerly View.

Evidence of dune erosion behind rock revetment

Eastings 269879
Northings 192605



Sand

IP13 North Westerly View

Outfall (operational)

Eastings 270004
Northings 192574



IP17 Westerly View

Example of poor packing density and large number of voids throughout

Eastings 270046
Northings 192594



IP19 Westerly View

Eastern extremity of revetment and survey

Eastings 270113
Northings 192608



Revetment Survey
(23rd January 2014)
Photo Locations
Sheet 2 - East

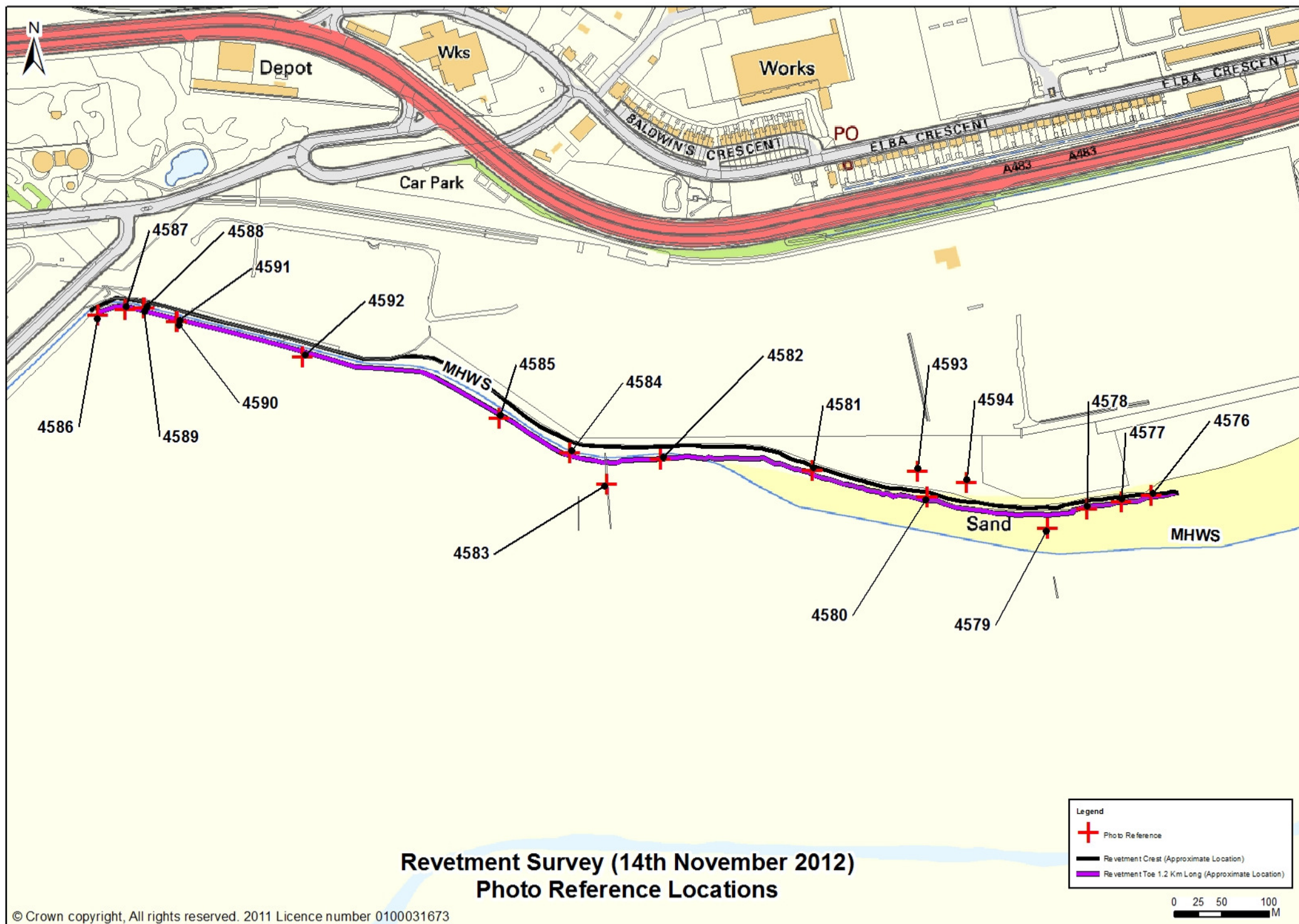
Legend

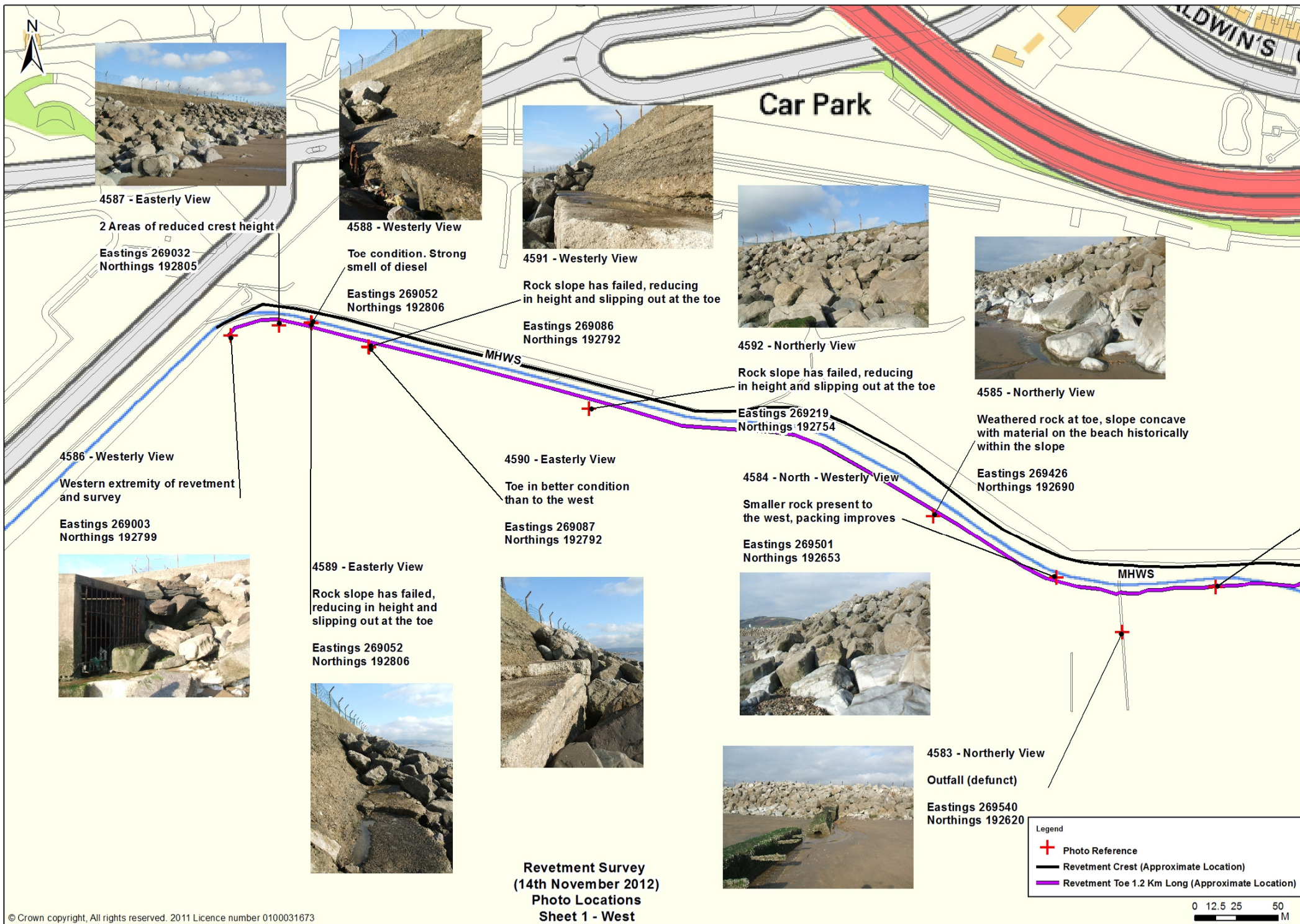
- + Photo reference
- Area of change since 2012 survey
- Revetment Crest (Approximate Location)
- Revetment Toe 1.2 Km Long (Approximate Location)

0 12.5 25 50
M

Technical note

Appendix 3 - Figures from Inspection, November 2012







4582 - South Westerly View

Slope slackens
approaching outfall

Eastings 269596
Northings 192647



4581 - Westerly View

Sinuous profile as crest
and toe levels vary and
slope alters

Eastings 269757
Northings 192634.2



4594 North Westerly View

Reverse slope to landward on
the revetment crest, plateau area
between rock and dunes

Eastings 269919
Northings 192621
Reverse slope to landward on
the revetment crest, plateau area
between rock and dunes



4577 North Westerly View

Gap in revetment, triangular
in shape, 1 layer thick

Eastings 270082
Northings 192601



4593 Westerly View

Highest point on the survey reach.
Reverse slope to landward on
the revetment crest

Eastings 269867
Northings 192633



4580 Westerly View

Crest level lowers

Eastings 269878
Northings 192606



4579 North Westerly View

Outfall (operational)

Eastings 270004
Northings 192574



4578 South Westerly view

Example of poor packing
density and large number
of voids throughout

Eastings 270046
Northings 192594



4576 Westerly View

Eastern extremity of
revetment and survey

Eastings 270113
Northings 192608

MHWS

Sand

MHWS

Revetment Survey
(14th November 2012)
Photo Locations
Sheet 2 - East

Legend

- Photo Reference
- Revetment Crest (Approximate Location)
- Revetment Toe 1.2 Km Long (Approximate Location)

0 12.5 25 50
M