Cell 1 Regional Coastal Monitoring Programme Analytical Report 10: 'Full Measures' Survey 2017

Northumberland County Council

March 2018

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Abbreviations and Acronyms

Acronym / Abbreviation	Definition
AONB	Area of Outstanding Natural Beauty
DGM	Digital Ground Model
HAT	Highest Astronomical Tide
LAT	Lowest Astronomical Tide
MHWN	Mean High Water Neap
MHWS	Mean High Water Spring
MLWS	Mean Low Water Neap
MLWS	Mean Low Water Spring
m	metres
ODN	Ordnance Datum Newlyn

Water Levels Used in Interpretation of Changes

Water Level Parameter	Water Level (m AOD) Berwick upon Tweed	Holy Island	North Sunderland
1 in 200 year	3.4	3.4	3.5
HAT	2.8	2.8	2.8
MHWS	2.2	2.4	2.4
MLWS	-1.9	-1.8	-1.7
Water Level Parameter	**Water Level (m AOD) Amble**	**Blyth**	**River Tyne**
1 in 200 year	3.5	3.6	3.7
HAT	3.1	3.1	3.1
MHWS	2.4	2.4	2.4
MLWS	-1.9	-1.8	-1.9

Source: *Scottish Border to River Tyne Shoreline Management Plan 2.* Royal Haskoning, May 2009.

Glossary of Terms

Term	Definition
Beach nourishment	Artificial process of replenishing a beach with material from another source.
Berm crest	Ridge of sand or gravel deposited by wave action on the shore just above the normal high water mark.
Breaker zone	Area in the sea where the waves break.
Coastal squeeze	The reduction in habitat area which can arise if the natural landward migration of a habitat under sea level rise is prevented by the fixing of the high water mark, e.g. a sea wall.
Downdrift	Direction of alongshore movement of beach materials.
Ebb-tide	The falling tide, part of the tidal cycle between high water and the next low water.
Fetch	Length of water over which a given wind has blown that determines the size of the waves produced.
Flood-tide	Rising tide, part of the tidal cycle between low water and the next high water.
Foreshore	Zone between the high water and low water marks, also known as the intertidal zone.
Geomorphology	The branch of physical geography/geology which deals with the form of the Earth, the general configuration of its surface, the distribution of the land, water, etc.
Groyne	Shore protection structure built perpendicular to the shore; designed to trap sediment.
Mean High Water (MHW)	The average of all high waters observed over a sufficiently long period.
Mean Low Water (MLW)	The average of all low waters observed over a sufficiently long period.
Mean Sea Level (MSL)	Average height of the sea surface over a 19-year period.
Offshore zone	Extends from the low water mark to a water depth of about 15 m and is permanently covered with water.
Storm surge	A rise in the sea surface on an open coast, resulting from a storm.
Swell	Waves that have travelled out of the area in which they were generated.
Tidal prism	The volume of water within the estuary between the level of high and low tide, typically taken for mean spring tides.
Tide	Periodic rising and falling of large bodies of water resulting from the gravitational attraction of the moon and sun acting on the rotating earth.
Topography	Configuration of a surface including its relief and the position of its natural and man-made features.
Transgression	The landward movement of the shoreline in response to a rise in relative sea level.
Updrift	Direction opposite to the predominant movement of longshore transport.
Wave direction	Direction from which a wave approaches.
Wave refraction	Process by which the direction of approach of a wave changes as it moves into shallow water.

Preamble

The Cell 1 Regional Coastal Monitoring Programme covers approximately 300km of the north east coastline, from the Scottish Border (just south of St. Abb's Head) to Flamborough Head in East Yorkshire. This coastline is often referred to as 'Coastal Sediment Cell 1' in England and Wales (Figure 1). Within this frontage, the coastal landforms vary considerably, comprising low-lying tidal flats with fringing salt marshes, hard rock cliffs that are mantled with glacial sediment to varying thicknesses, softer rock cliffs and extensive landslide complexes.

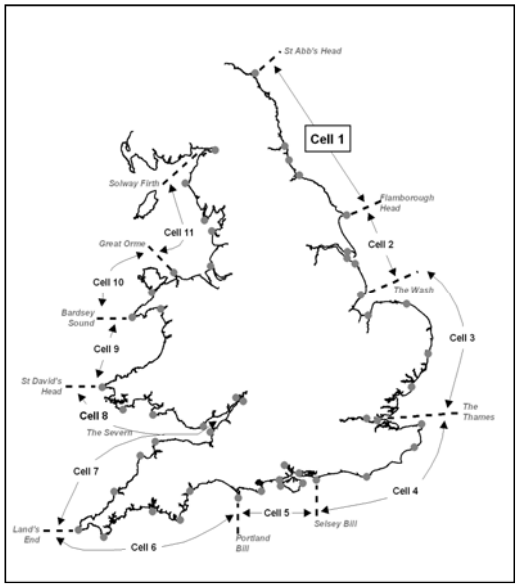


Figure 1 Sediment Cells in England and Wales

The work commenced with a three-year monitoring programme in September 2008 that was managed by Scarborough Borough Council on behalf of the North East Coastal Group. This initial phase has been followed by a five-year programme of work, which started in October 2011. The work is funded by the Environment Agency, working in partnership with the following organisations:

The main elements of the Cell 1 Regional Coastal Monitoring Programme involve:

- beach profile surveys
- topographic surveys
- cliff top recession surveys
- real-time wave data collection
- bathymetric and sea bed characterisation surveys
- aerial photography
- walk-over surveys

The beach profile surveys, topographic surveys and cliff top recession surveys are undertaken as a 'Full Measures' survey in autumn/early winter every year. Some of these surveys are then repeated the following spring as part of a 'Partial Measures' survey.

Each year, an Analytical Report is produced for each individual authority, providing a detailed analysis and interpretation of the 'Full Measures' surveys. This is followed by a brief Update Report for each individual authority, providing ongoing findings from the 'Partial Measures' surveys.

Annually, a Cell 1 Overview Report is also produced. This provides a region-wide summary of the main findings relating to trends and interactions along the entire Cell 1 frontage. To date the following reports have been produced:

Table 1 Analytical, Update and Overview Reports Produced to Date

Year		Full Measures		Partial Measures		Cell 1 Overview Report
		Survey	Analytical Report	Survey	Update Report	
1	2008/09	Sep-Dec 08	May 09	Mar-May 09		-
2	2009/10	Sep-Dec 09	Mar 10	Feb-Mar 10	Jul 10	-
3	2010/11	Aug-Nov 10	Feb 11	Feb-Apr 11	Aug 11	Sep 11
4	2011/12	Oct-Nov 11	Oct 12	Mar-May 12	Feb13	-
5	2012/13	Sep-Nov 12	Mar 13	Mar-Apr 13	Jun 13	
6	2013/2014	Sep-Oct 13	Feb 14	Mar-Apr 14	Jul 14	
7	2014/2015	Sep-Nov 14	Feb 15	Mar – Apr 15	Jul 15	
8	2015/2016	Sep–Dec 15	Feb 16	Mar-May 16	Jul 16	Jun 16
9	2016/2017	Aug-Nov 16	Mar 17	Feb-Apr 17	Jul 17	
10	2017/18	Sep-Dec 17	Mar 18 (*)			

(*) The present report is **Analytical Report 10** and provides an analysis of the 2017 Full Measures survey for Northumberland County Council's frontage.

In addition, separate reports are produced for other elements of the programme as and when specific components are undertaken, such as wave data collection, bathymetric and sea bed sediment data collection, aerial photography, and walk-over visual inspections.

For purposes of analysis, the Cell 1 frontage has been split into the sub-sections listed in the Table 2.

Table 2 Sub-divisions of the Cell 1 Coastline

Authority	Zone
Northumberland County Council	Spittal A
	Spittal B
	Goswick Sands
	Holy Island
	Bamburgh
	Beadnell Village
	Beadnell Bay
	Embelton Bay
	Boulmer
	Alnmouth Bay
	High Hauxley and Druridge Bay
	Lynemouth Bay
	Newbiggin Bay
	Cambois Bay
	Blyth South Beach
North Tyneside Council	Whitley Sands
	Cullercoats Bay
	Tynemouth Long Sands
	King Edward's Bay
South Tyneside Council	Littehaven Beach
	Herd Sands
	Trow Quarry (incl. Frenchman's Bay)
	Marsden Bay
Sunderland Council	Whitburn Bay
	Harbour and Docks
	Hendon to Ryhope (incl. Halliwell Banks)
Durham County Council	Featherbed Rocks
	Seaham
	Blast Beach
	Hawthorn Hive
	Blackhall Colliery
Hartlepool Borough Council	North Sands
	Headland
	Middleton
	Hartlepool Bay
Redcar & Cleveland Borough Council	Coatham Sands
	Redcar Sands
	Marske Sands
	Saltburn Sands
	Cattersty Sands (Skinningrove)
	Staithes
Scarborough Borough Council	Staithes
	Runswick Bay
	Sandsend Beach, Upgang Beach and Whitby Sands
	Robin Hood's Bay
	Scarborough North Bay
	Scarborough South Bay
	Cayton Bay
	Filey Bay

1. Introduction

1.1 Study Area

Northumberland County Council's frontage extends from the Scottish border in the north to Hartley, just south of Blyth, in the south. For the purposes of this report and for consistency with previous reporting, it has been sub-divided into 15 areas, namely:

- Sandstell Point (Spittal A)
- Spittal (Spittal B)
- Goswick Sands
- Holy Island
- Bamburgh
- Beadnell Village
- Beadnell Bay
- Embleton Bay
- Boulmer
- Alnmouth Bay
- High Hauxley and Druridge Bay
- Lynemouth Bay
- Newbiggin-by-the-Sea
- Cambois
- Blyth South Beach

1.2 Methodology

Along the Northumberland frontage, the following surveying is undertaken:

Full Measures survey annually each autumn comprising:

- Beach profile surveys along 78 transect lines (commenced 2002)
- Beach profile surveys along an additional ten transect lines (commenced 2007)
- Beach profile surveys along an additional 26 transect lines (commenced 2010)
- Topographic survey along Holy Island (commenced 2004)
- Topographic survey along Alnmouth Bay (commenced 2005)
- Topographic survey along Sandstell Point (commenced 2009)
- Topographic survey along Newbiggin Bay (commenced 2010)

Partial Measures survey annually each spring comprising:

- Beach profile surveys along 29 transect lines (commenced 2002)
- Beach profile surveys along an additional ten transect lines (commenced 2007)
- Beach profile surveys along an additional one transect line (commenced 2010)
- Beach profile surveys along an additional two transect lines (commenced 2011)
- Topographic survey along Alnmouth Bay (commenced 2005)
- Topographic survey along Sandstell Point (commenced 2009)
- Topographic survey along Newbiggin Bay (commenced 2010)

Cliff top survey (bi-annually) at:

- Cliff top survey at Lynemouth Bay (commenced 2008)
- Cliff top survey at Cambois Bay (Sandy Bay) (commenced 2008)
- Cliff top survey at Cambois Bay (Cambois) (commenced 2009)

Sand extent survey (bi-annually) at:

- Edge of sand survey at Newbiggin Bay, Spital Carrs, (commenced 2011 to determine potential adverse impact on foreshore SSSI of the Newbiggin beach recharge scheme)

For all cliff-top surveys prior to Full Measures 2011, the data was previously saved in '.kmz' format for plotting and visual comparison in GoogleEarth. This data has been visualised in GIS, which revealed the quality was variable and reliable interpretations of short-term cliff change could not be made. For the present and future surveys, the data will be plotted in GIS and change will qualified along a series of pre-defined transect lines. The resulting data on amount and rate of change is presented in tables and the survey results are compared.

The location of these surveys is shown in Figure 2. The Full Measures survey was undertaken on various dates along this frontage between 6th September and 6th December 2017. During this time, weather conditions varied considerably; refer to the survey reports for details of the weather conditions over this survey period.

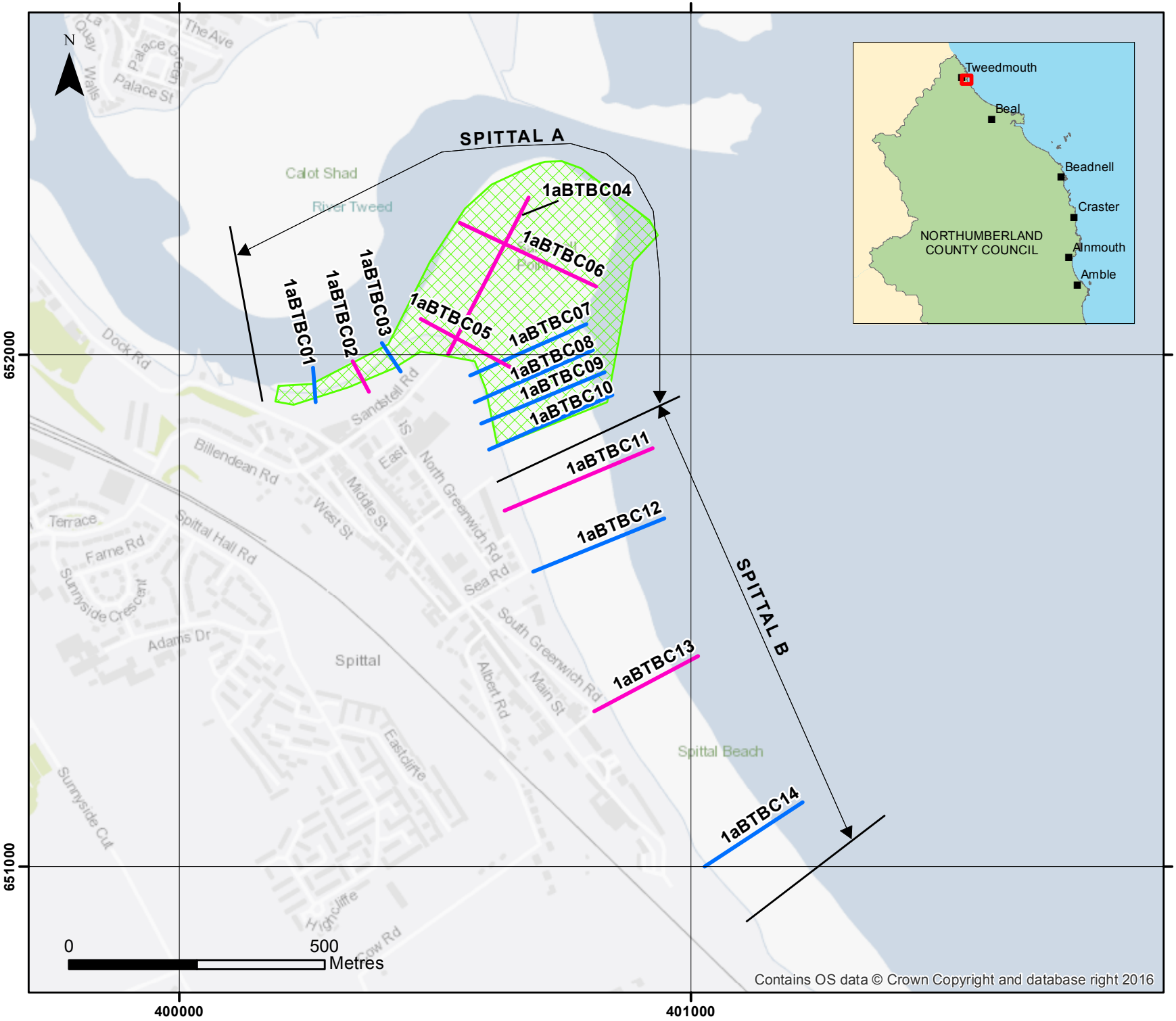
All data have been captured in a manner commensurate with the principles of the Environment Agency's *National Standard Contract and Specification for Surveying Services* and stored in a file format compatible with the software systems being used for the data analysis, namely SANDS and ArcGIS. This data collection approach and file format is comparable to that being used on other regional coastal monitoring programmes, such as in the South East and South West of England.

Upon receipt of the data from the survey team, they are quality assured and then uploaded onto the programme website for storage and availability to others and also input to SANDS and GIS for subsequent analysis.

The Analytical Report is then produced following a standard structure for each authority. This involves:

- description of the changes observed since the previous survey and an interpretation of the drivers of these changes (Section 2);
- documentation of any problems encountered during surveying or uncertainties inherent in the analysis (Section 3);
- recommendations for 'fine-tuning' the programme to enhance its outputs (Section 4); and
- providing key conclusions and highlighting any areas of concern (Section 5).

Data from the present survey are presented in a processed form in the Appendices.



Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 1

Northumberland County Council Frontage

Analytical Report
Topo Surveys

Drawing Scale at A4 1:10,000

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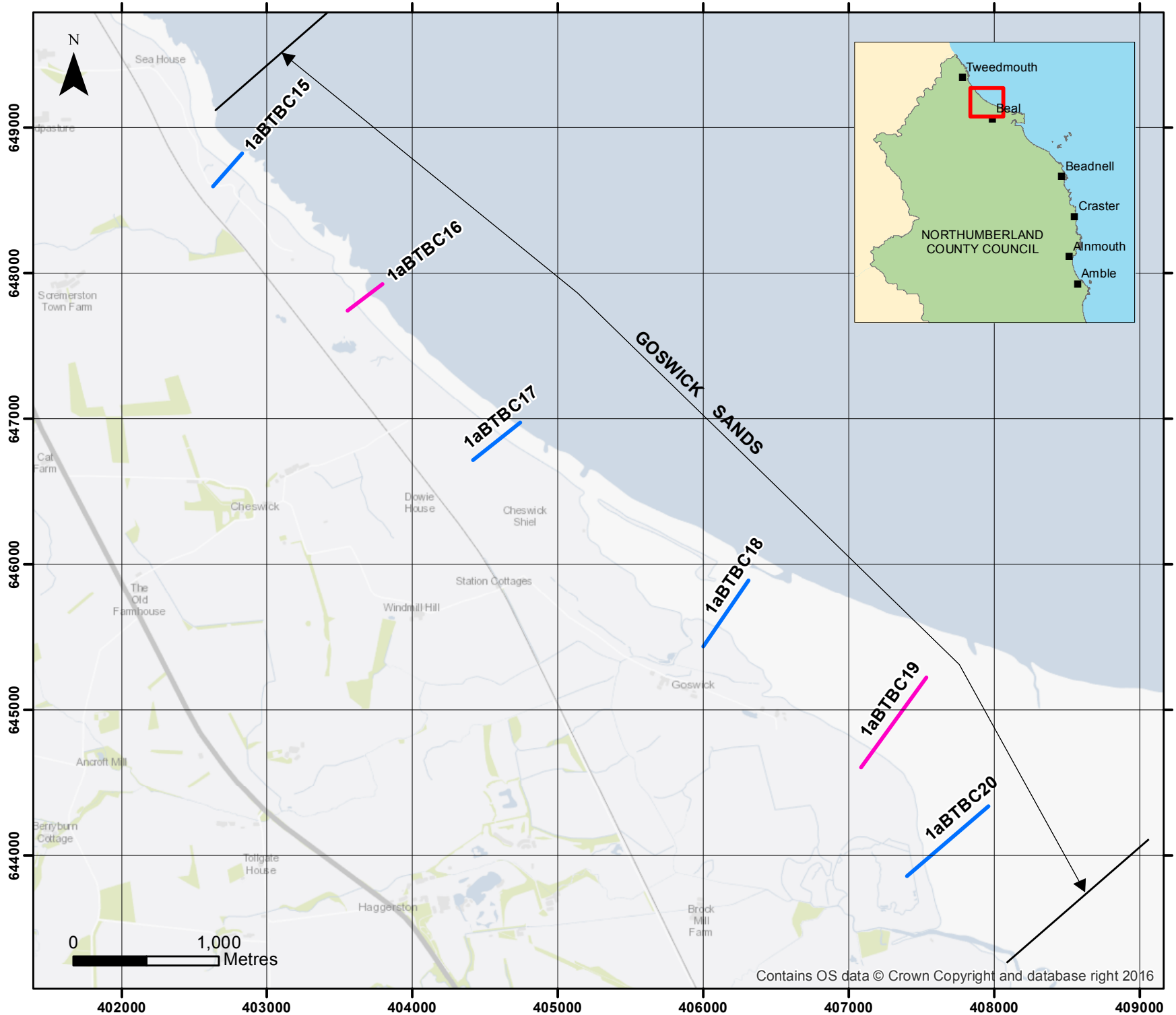

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 2

Northumberland County Council Frontage

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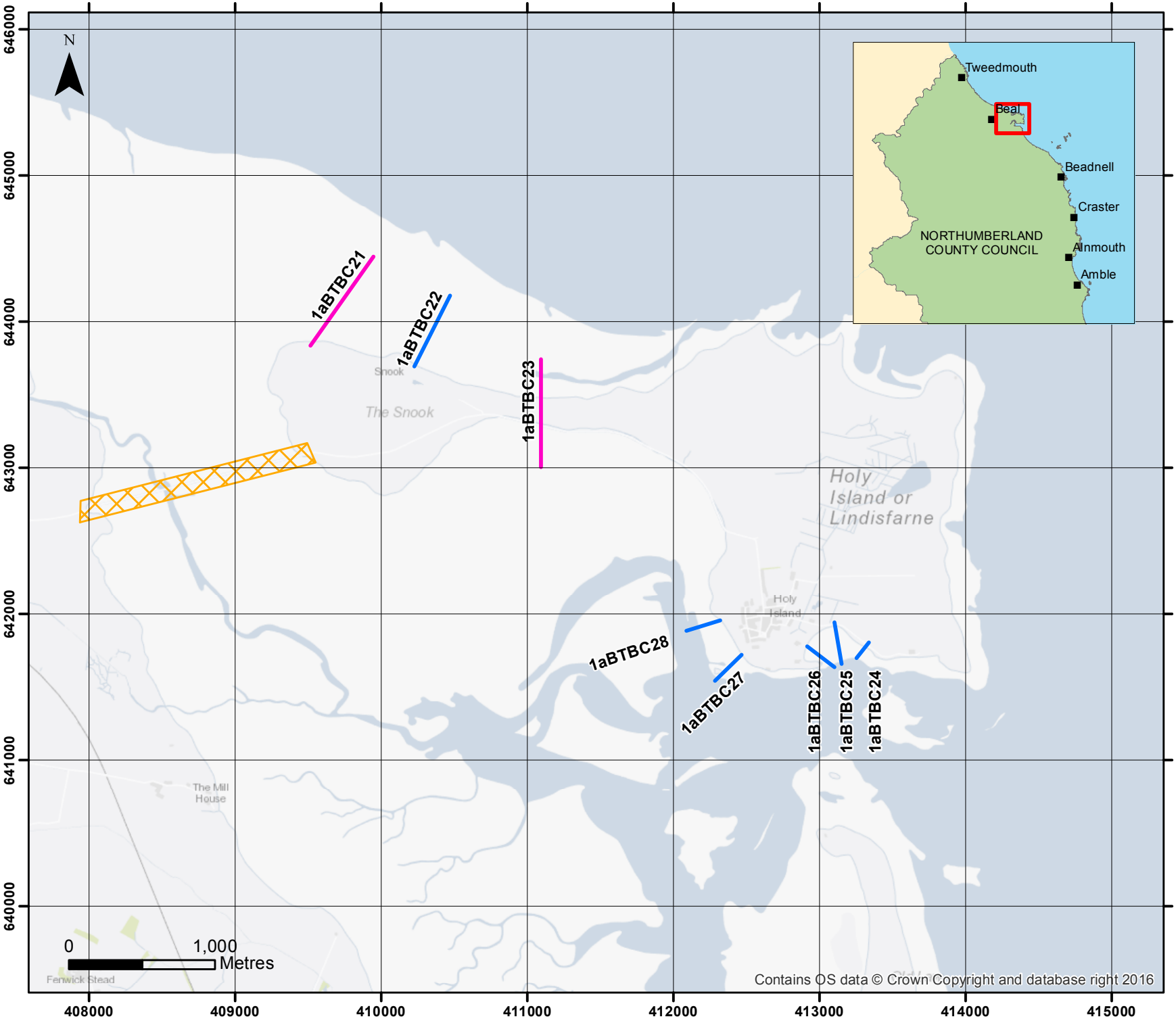

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 3

Northumberland County Council Frontage

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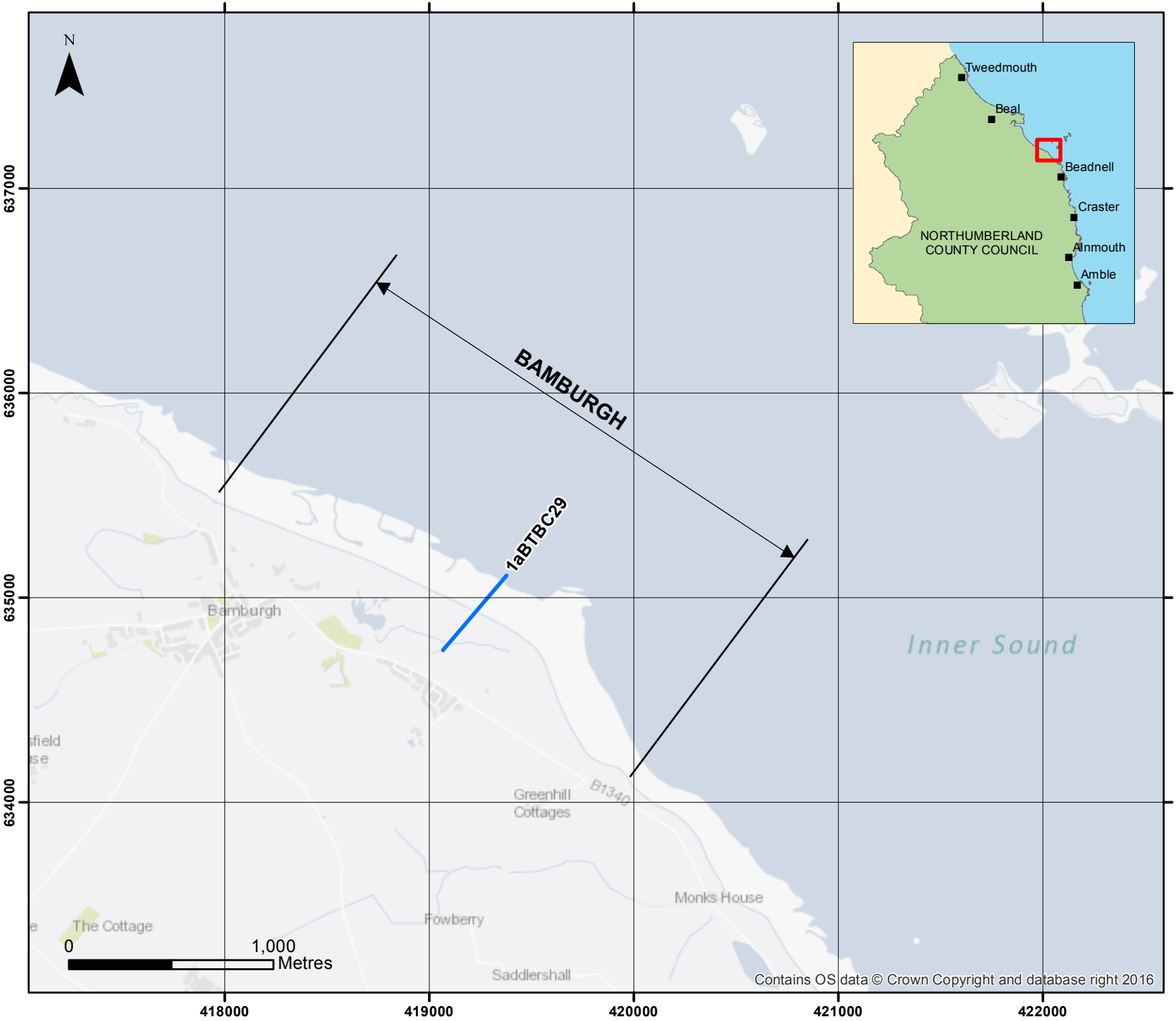

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 4

Northumberland County Council Frontage

Analytical Report
Topo Surveys

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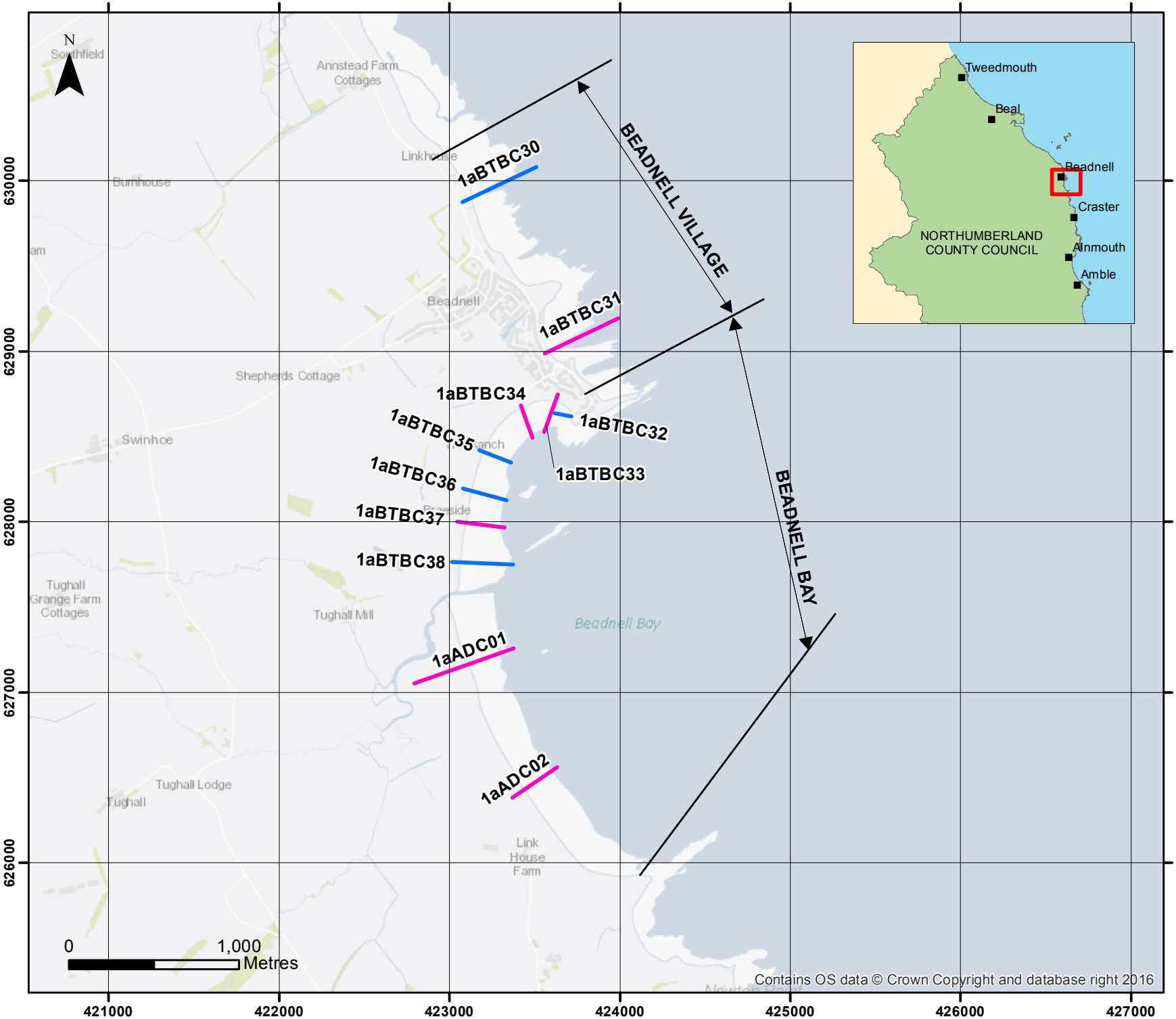

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 5

Northumberland County Council Frontage

Analytical Report
Topo Surveys

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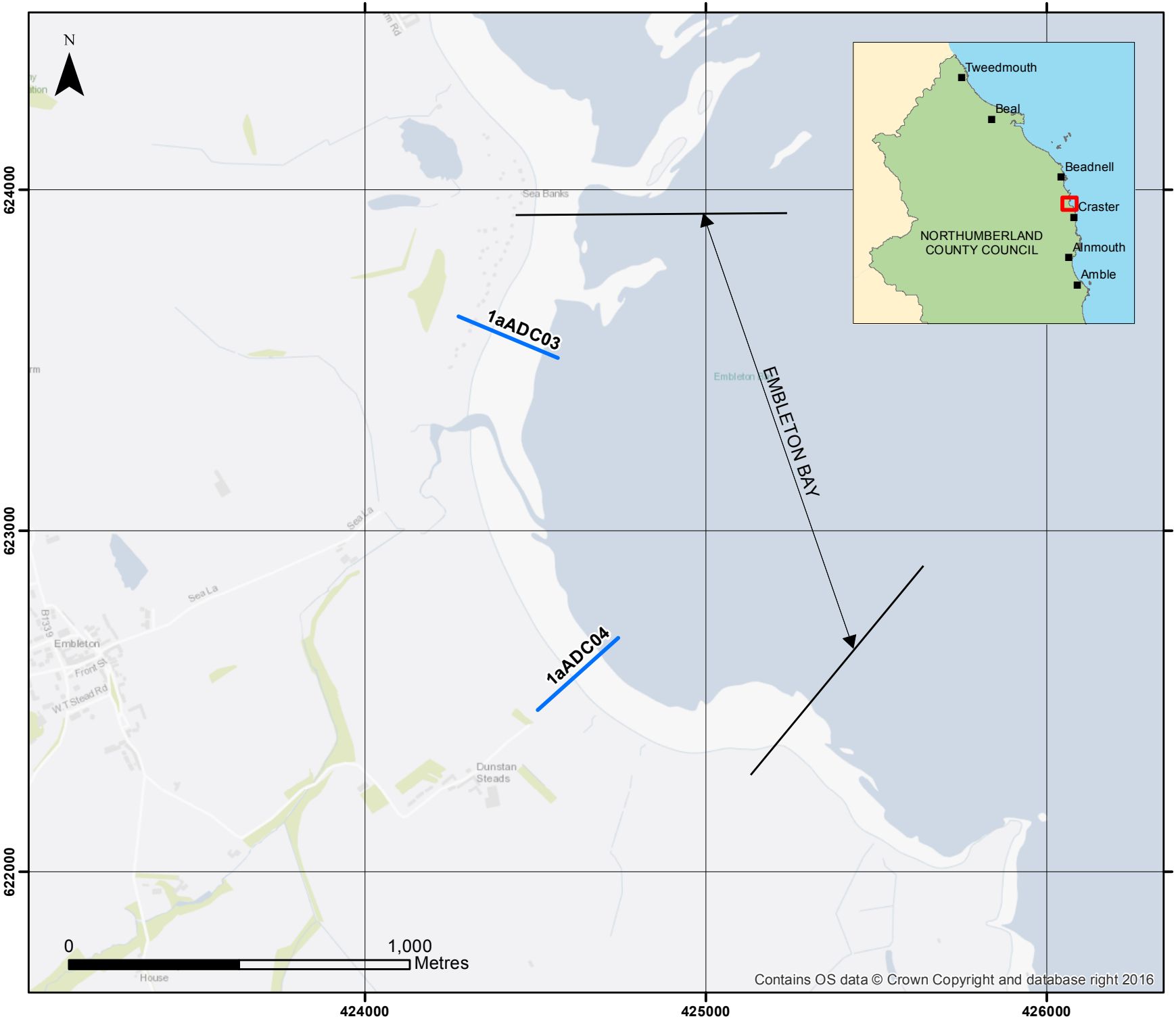

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 6

Northumberland County Council Frontage

Analytical Report
Topo Surveys

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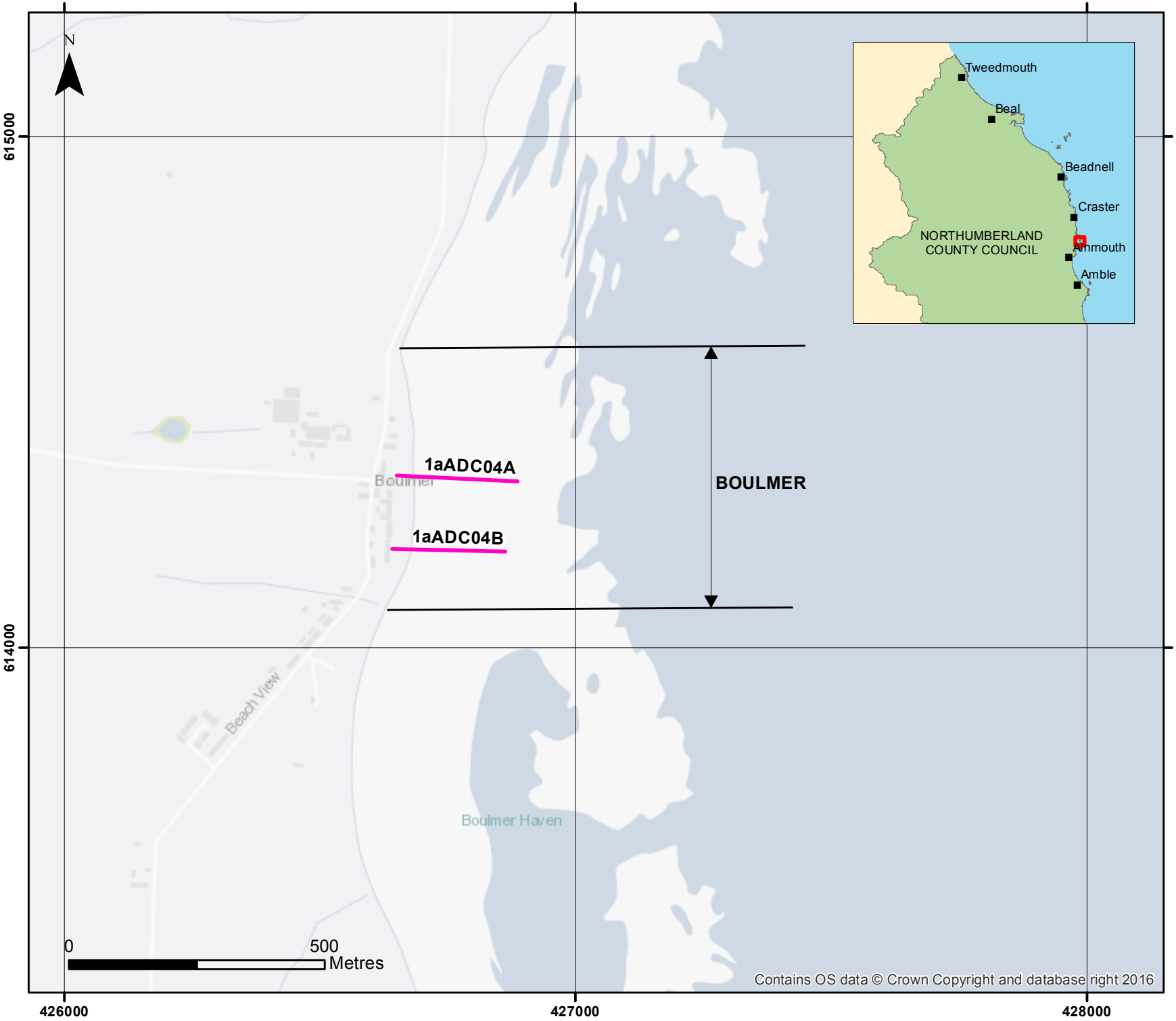

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 7

Northumberland County Council Frontage

Analytical Report
Topo Surveys

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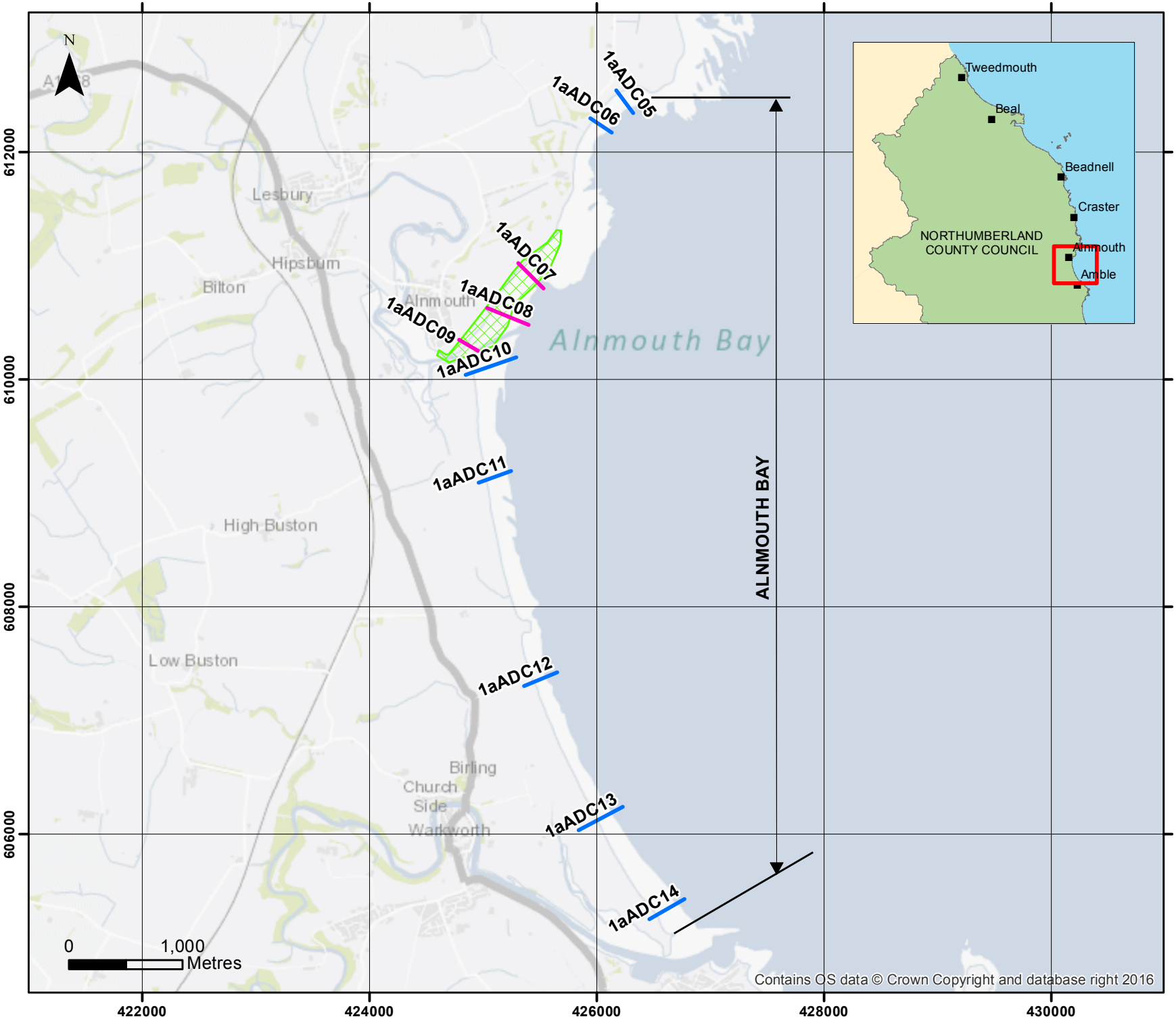

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 8

Northumberland County Council Frontage

Analytical Report
Topo Surveys

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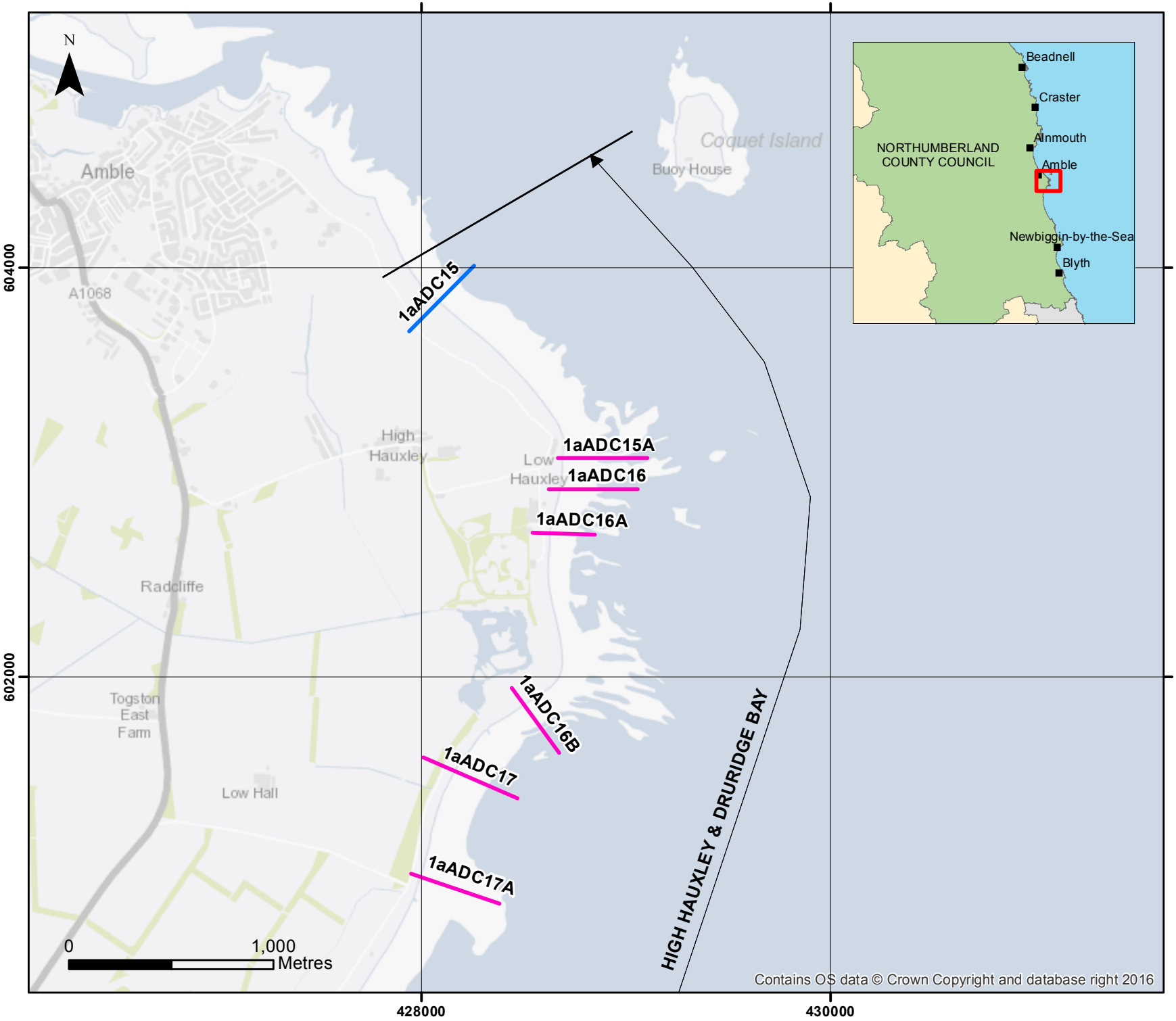

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 9

Northumberland County Council Frontage

Analytical Report
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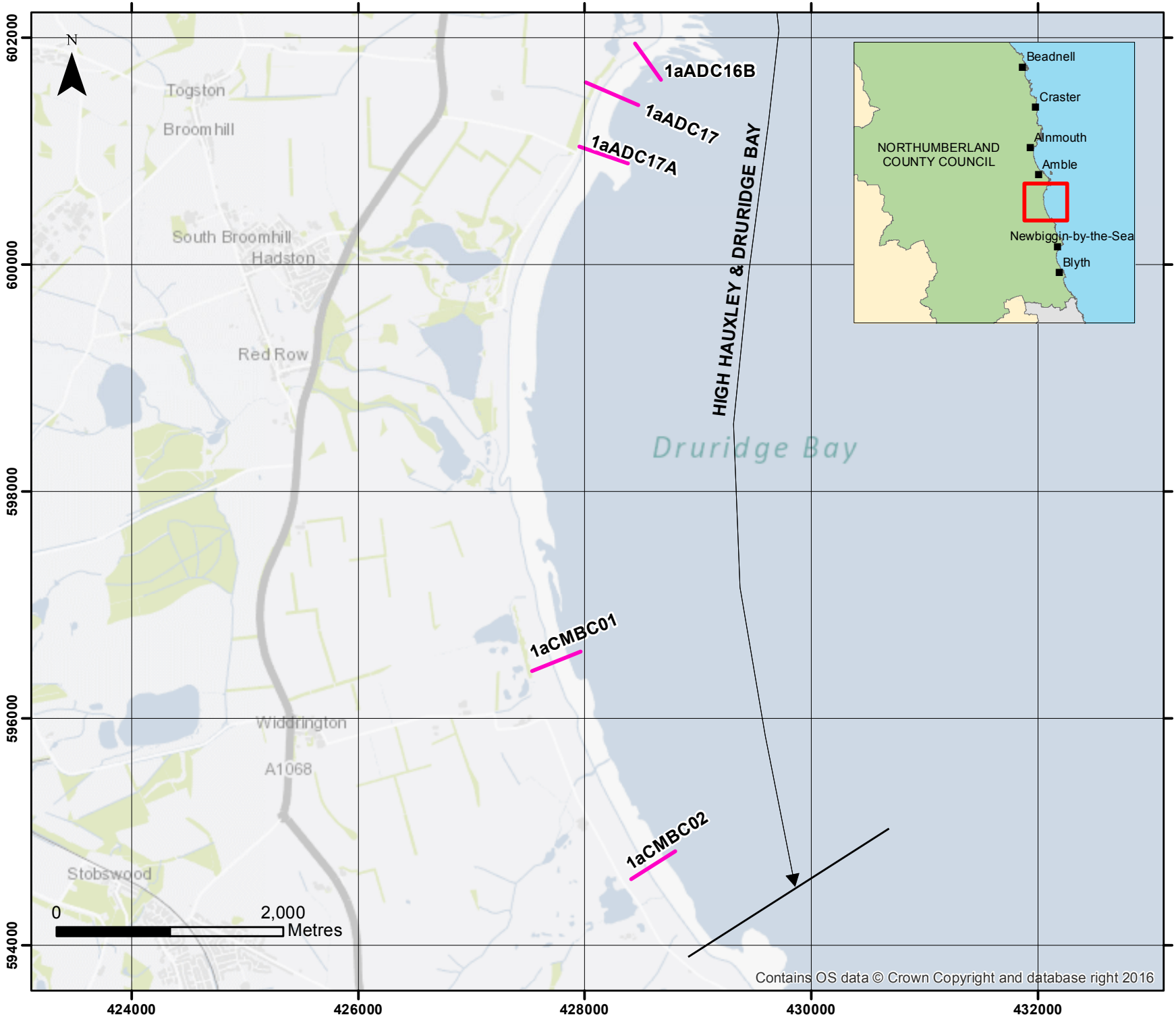

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 10

Northumberland County Council Frontage

Analytical Report
Topo Surveys

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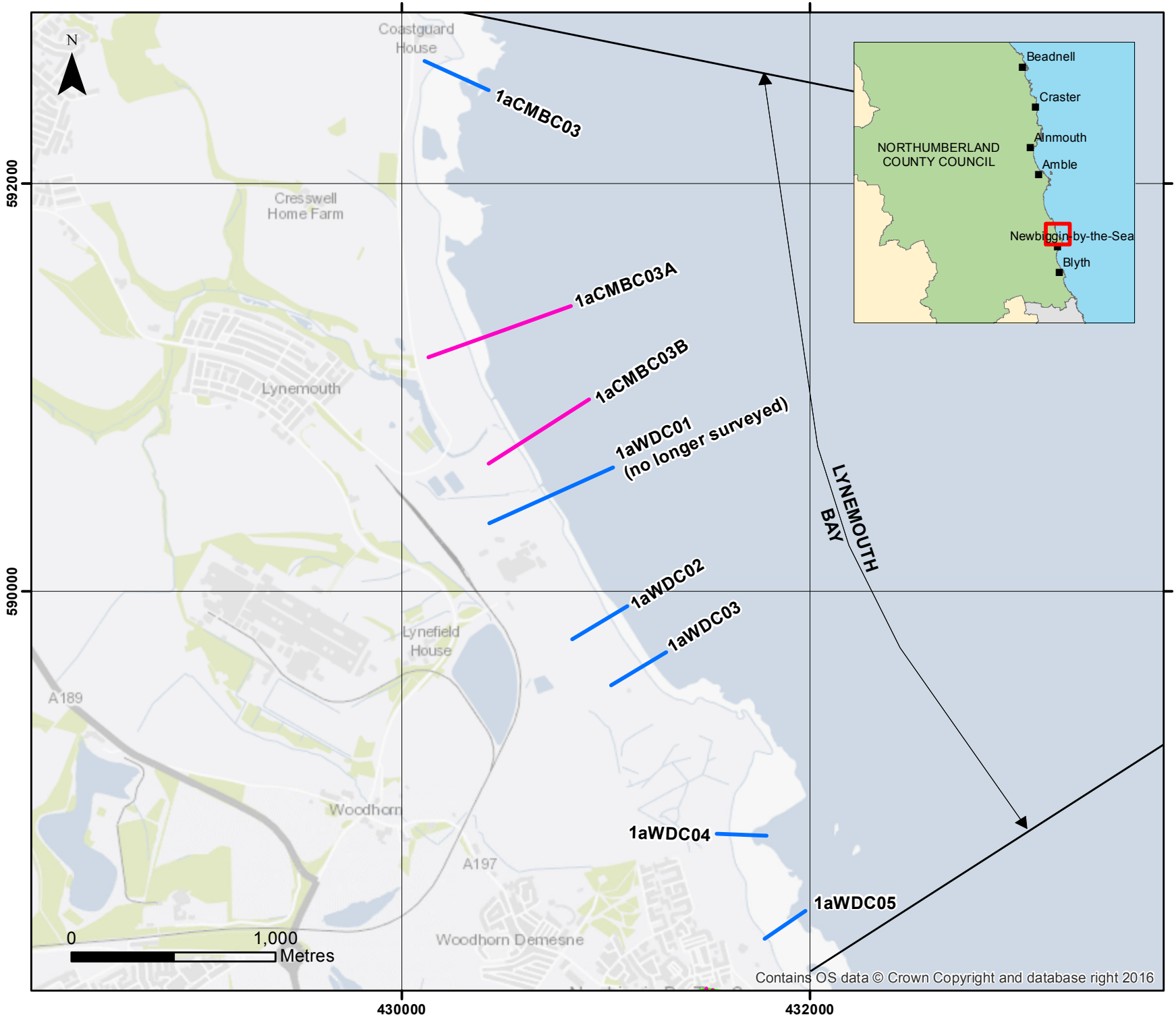

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 11

Northumberland County Council Frontage

Analytical Report
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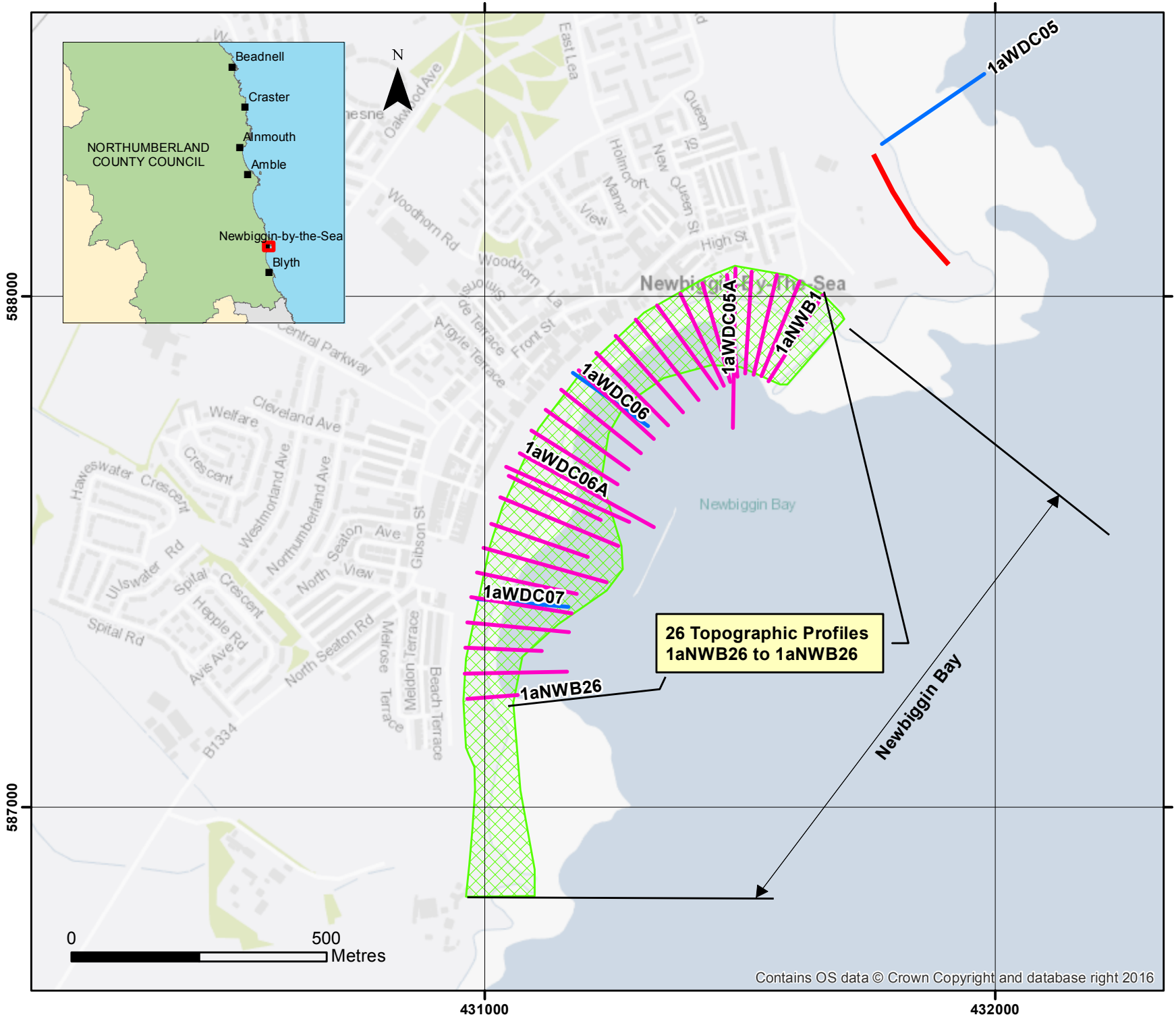

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly
- Cliff Top Edge Survey

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 12

Northumberland County Council Frontage

Analytical Report
Topo Surveys

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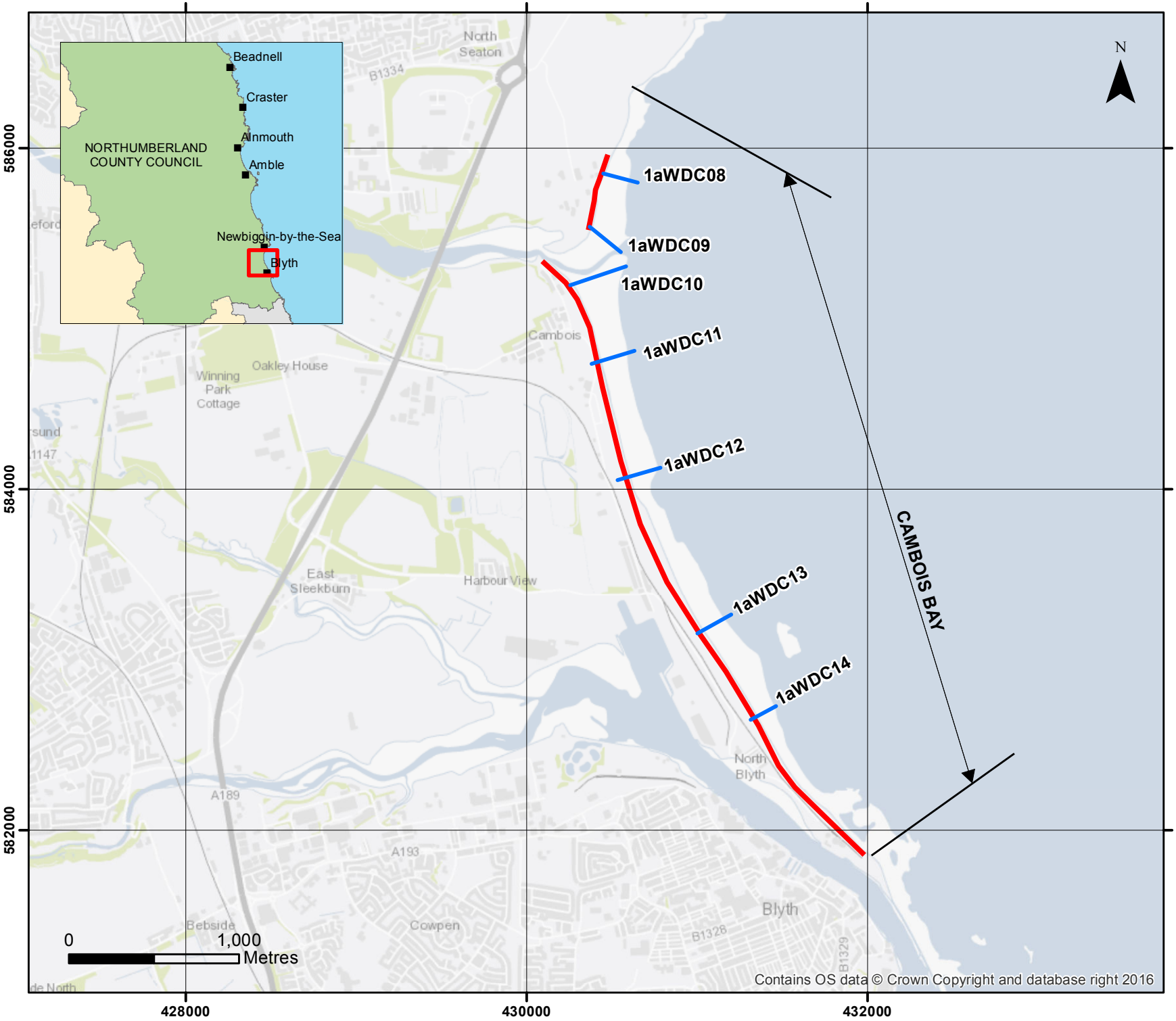

Key

SURVEY LOCATIONS

Topographic Profiles

- Annual
- Bi-Annual
- Cliff Top Edge Survey

Topographic Surveys

- 6 monthly
- yearly
- 5 yearly

(Indicative Survey Extents shown)

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Figure 2 - Map 13

Northumberland County Council Frontage

Analytical Report
Topo Surveys

Drawing Scale at A4 1:30,000

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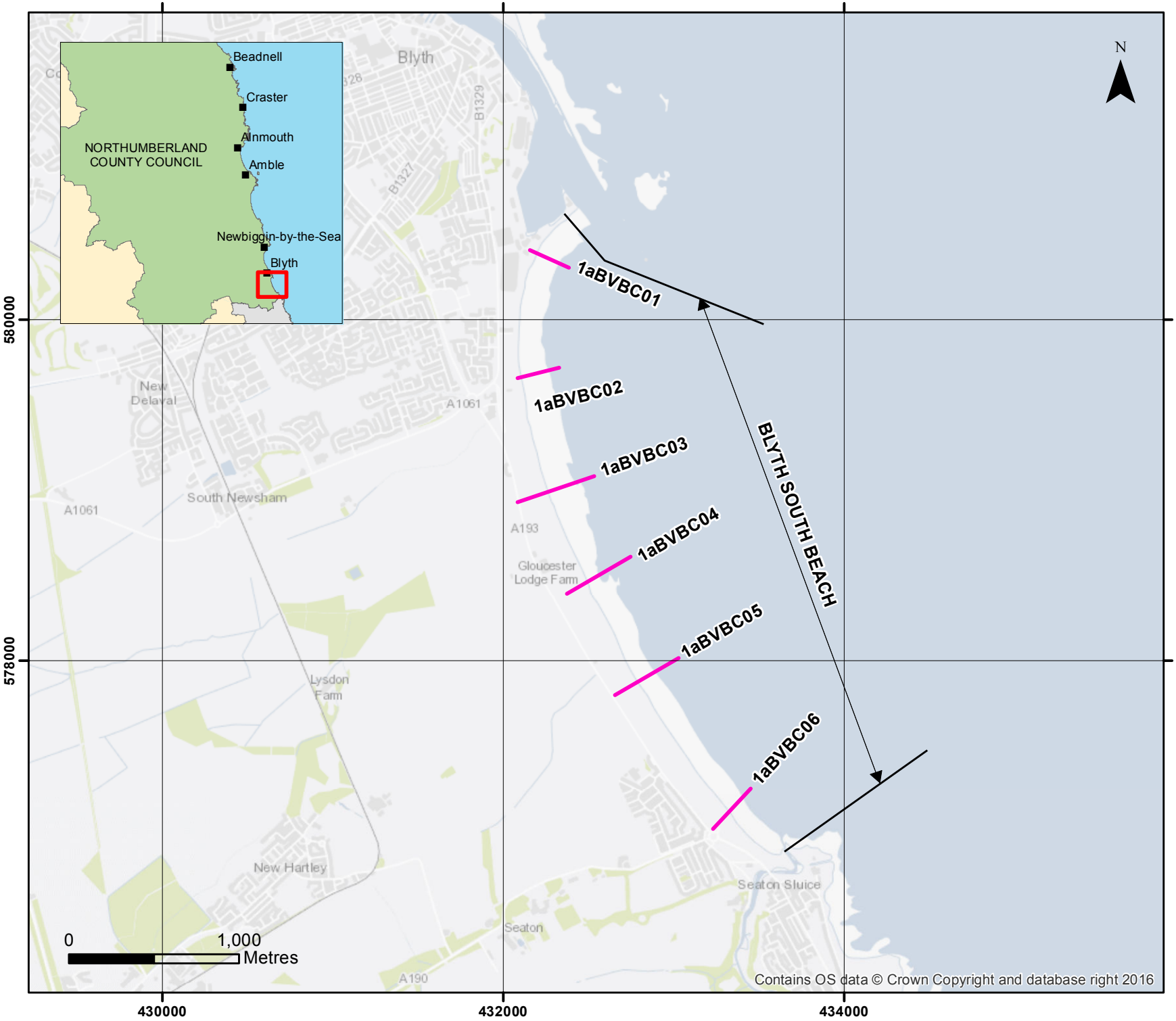

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Figure 2 - Map 14

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2. Analysis of Survey Data

2.1 Sandstell Point (Spittal A)

Survey Date	Description of Changes Since Last Survey	Interpretation
6th October 2017	**Beach Profiles:** Sandstell Point is covered by ten beach profile lines for the Full Measures survey (Appendix A). Profiles 1aBTBC02, 1aBTBC04, 1aBTBC05, and 1aBTBC06 were last surveyed during the Partial Measures Spring survey, 2017. Profiles 1aBTBC01, 1aBTBC03, and 1aBTBC7 to 10 were last surveyed during the Full Measures autumn survey 2016. Profiles **1aBTBC01** to **1aBTBC03** are located on the southern bank of the River Tweed in front of the dunes. At **1aBTBC01,** the dunes have remained mostly stable. Between 44m chainage and 57m there has been minor erosion of less than 0.2m. From chainage 57m to the end of the survey there has been accretion of up to 0.2m. Overall, the profile is at a medium level compared to the range recorded from previous surveys, except the toe of the beach, which is relatively high. At profile, **1aBTBC02** there has been little change in the dunes with accretion or erosion ≤0.1m. The beach levels at the toe of the dunes (chainage 41m to 43m) have increased by up to 0.4m. The rest of the profile shows erosion of up to 0.2m. The upper beach is at a medium level compared to the range recorded from previous surveys, however the lower beach is at a relatively low level. At profile **1aBTBC03,** the seaward face of the dunes between 50m and 65m chainage has accreted by up to 0.4m since the previous survey, and they have advanced by around 1.5m. The beach levels along the rest of the profile have decreased by up to 0.6m. Overall, the profile remains relatively high compared to the range recorded from previous surveys. Profiles **1aBTBC04** (longitudinal section) and **1aBTBC05** and **1aBTBC06** (both cross-sections) cover the spit at Sandstell Point. At profile **1aBTBC04**, there has been a small accumulation of 0.4m at the toe of the rock armour (chainage 10). Between chainage 40m and 130m there has been very little change. The position of the spit has moved landwards by around 10m but remained at a similar height. The toe of the spit has	Since the last survey, the dunes on south bank of River Tweed have remained unchanged, except at profile 1aBTBC03 where the dune front has advanced slightly, the beach sections of the profile generally show erosion and are at medium to high levels. There have been significant changes at the spit, with changes in the position of the berm. Rollover of sediment from the seaward side of the berm to the river side has occurred at the landward end, with the head of the spit showing seaward movement. There has been an increase in berm height. The pattern in the profiles along the open coast show a reversal in trend compared to the previous autumn survey, with general movement of sediment from the lower beach to the upper beach, suggesting movement of material onshore. **Longer term trends:** The dunes have remained stable over the past 12 years, and along the south bank of the River Tweed the seaward face of the dunes are the highest since surveys began (April 2002).

Survey Date	Description of Changes Since Last Survey	Interpretation
	accreted and extended seaward by around 15m. The most landward portion of the profile is at a relatively low level compared to the range recorded from previous surveys, as is the toe, but the central portion between chainage 150m and 260m is at a high level. Profiles **1aBTBC05** and **1aBTBC06** are transects across the spit, with the open sea on the left-hand side of the plot and the river channel to the right. At profile **1aBTBC05** there has been an increase in levels of up to 0.9m at the river side of the profile. The central berm crest at chainage 140m has moved riverwards by around 15m and dropped by 0.2m. On the seawards side there has been a drop in levels of up to 0.4m. Overall the berm crest is at a relatively low level compared to the range recorded from previous surveys, and is in a middle position. At profile **1aBTBC06**, the entire spit structure has moved seawards by 15-20m. The main berm crest at chainage 230m has increased in level by 0.4m and has moved seaward by 15m. The runnel at chainage 160m has deepened by 0.8m, and moved riverward by around 20m. The secondary berm crest at chainage 125m on the other side of the runnel has dropped in height by 0.7m. Overall the berm is at a high level compared to the range recorded by previous surveys and in a relatively seawards position. Profiles **1aBTBC07** to **1aBTBC10** are located along the open coast, at the intersection of the southern side of the spit at Sandstell Point and northern end of Spittal Beach. At profile **1aBTBC07**, between the rock revetment and 140m chainage beach levels have increased by up to 2.5m forming a berm with crest at chainage 80m. From chainage 140m to the end of the profile the toe of the beach has eroded by up to 1.2m. Overall, the upper beach is at a relatively high level compared to the range recorded on previous surveys whilst the lower beach is relatively low. This is the opposite of the pattern observed in the 2016 Full measures survey. At profile **1aBTBC08**, a similar pattern is observed with an increase in beach levels of up to 2.3m between 30m (toe of the rock revetment) and 125m chainage, and erosion of 1.1m seaward from there to the end of the profile. Overall, the upper beach is at a relatively high level compared to the range recorded on previous surveys whilst the lower beach is relatively low. Profile **1aBTBC09** again shows a similar pattern, with an increase in beach levels of up to 2.2m in front of the rock revetment as far as 100m chainage, and erosion of up to 1.4m seaward from there to	Changes in beach levels are generally within the bounds of previous surveys.

Survey Date	Description of Changes Since Last Survey	Interpretation
	chainage 190m. A lower beach berm has however formed at the toe of the beach with crest at chainage 200m. Overall, the upper and toe of the beach are at a relatively high level compared to the range recorded on previous surveys whilst the mid beach is relatively low. Profile **1aBTBC10** again shows a similar pattern, with an increase in beach levels of up to 2.0m in front of the rock revetment as far as 115m chainage, erosion of up to 0.6m between 115m and 175m chainage and accretion at the toe of the beach. Overall, the upper and toe of the beach are at a relatively high level compared to the range recorded on previous surveys whilst the mid beach is relatively low.	
September 2017	**Topographic Survey:** Due to the significant changes that have been observed from the beach profiles along the spit at Sandstell Point, and the three dimensional nature of these changes, a topographic survey was introduced to the monitoring programme in November 2011. The previous survey was undertaken for the Partial Measures survey in spring 2017. Data from the most recent topographic survey (Full Measures, autumn 2017) have been used to create a digital ground model (DGM) (Appendix B – Map 1) using a Geographical Information System (GIS). A difference plot has also been produced using the DGM (Appendix B – Map 5) produced from the last topographic survey and the present survey. The difference plot shows a general pattern of north-south aligned bands of change. There is a wide and of accretion running northwards from the upper beach in the south along the current alignment of the spit. On the seaward side there is a wide band of erosion, increasing in magnitude to the north. At the northern end of the spit there are additional patches of accretion and erosion seawards of the main erosion band. On the river side of the spit there has been very little change.	Together the changes shown in the topographic survey comparison indicate a redistribution of sediment across the spit over summer, resulting in a repositioning of the berm crest further towards the river mouth.

2.2 Spittal (Spittal B)

Survey Date	Description of Changes Since Last Survey	Interpretation
6th October 2017	**Beach Profiles:** Spittal B is covered by four beach profile lines for the Full Measures survey (Appendix A). Profiles 1aBTBC11 and 1aBTBC13 were last surveyed during the Partial Measures spring survey, 2017. Profiles 1aBTBC12 and 1aBTBC14 were last surveyed during the Full Measures autumn survey 2016. Profile **1aBTBC11** is located to the north of Spittal Beach. The upper beach shows accretion of up to 1.3m between chainage 10m and 130m. From chainage 130m to 210m there has been erosion of up to 0.4m. Seawards of chainage 210m the toe of the beach has extended seawards by around 30m. Overall, the profile is at a high level compared to the range recorded from previous surveys, with the sections between chainage 60m and 115m, and seawards of chainage 215m being the highest on record. Profile **1aBTBC12** shows accretion of 0.5m immediately at the toe of the seawall, but erosion of up to 1.2m across the upper beach between chainage 5m and 50m. Seawards of here to the end of the profile the beach levels have increased by up to 0.4m. Overall, the profile is at a medium-low level on the upper beach compared with the range recorded from previous surveys, but the highest on record between chainages 80m and 160m. Profile **1aBTBC13** shows an increase in levels of 0.4m at the toe of the seawall to chainage 35m. There has been erosion of up to 0.8m between chainage 35m and 105m. Seawards of here the toe of the beach has accreted, extending seawards by around 25m.Overall, the profile is at a medium-low level compared with the range recorded from previous surveys. At profile **1aBTBC14**, there has been erosion of up to 0.7m at the toe of the seawall to chainage 20m Between chainage 20m and 55m there has been accretion of up to 0.6m. Between chainage 55m and 125m there has been erosion of up to 0.6m, with the formation of a runnel at chainage 80m. There has been little change to the toe of the beach seawards of chainage 125m. Overall, the profile is at a medium level compared to the range recorded from previous surveys; from chainage 125m seawards the profile is the highest recorded.	Since the last survey, beach levels along Spittal have fluctuated, generally showing an increase immediately at the toe of the seawall with erosion through the mid beach and accretion at the toe of the beach. Overall, all the profiles show the beach is at a roughly medium level compared to previous surveys. **Longer term trends:** At all profile locations along Spittal Beach, the changes observed from the present survey are within the bounds of previous surveys, with the exception of the lowest part of the foreshore in profile 1aBTBC14 where levels continue to be at their highest.

2.3 Goswick Sands

Survey Date	Description of Changes Since Last Survey	Interpretation
5th November 2017	**Beach Profiles:** Goswick Sands are covered by six beach profile lines for the Full Measures survey (Appendix A. Profiles 1aBTBC16 and 1aBTBC19 were last surveyed during the partial measures spring survey, 2017. Profiles 1aBTBC15, 1aBTBC17 to 1aBTBC18, and 1aBTBC20 were last surveyed during the full measures autumn survey, 2016. The profiles along this frontage extend from **1aBTBC15** to **1aBTBC20** in a north to south direction. The seaward face of the dunes along the length of Goswick Sands has not changed form or position since the last survey (Partial Measures, spring 2017), with the exception of profiles 1aBTBC15 and 1aBTBC20 where the dunes have moved landward by less than 1m, and seen erosion of up to 0.2m across the rest of the dunes. At profile **1aBTBC15** there has been very little change along most of the profile, ±0.1m. On the lower foreshore from chainage, 245m there has been erosion of up to 1m, moving the toe of the beach landwards by around 25m. Overall, the profile is at a high level compared to the range recorded from previous surveys, with the section from chainage 245m seawards being the highest recorded. At profile **1aBTBC16,** there has been the formation of a small berm at the toe of the dunes through the accumulation of 0.4m of sand between chainages 50m and 70m. Between chainage 70m and 155m there has been only small amounts of accretion, less than 0.2m. Seawards of chainage 155m there has been erosion of the lower beach berm of up to 1.4m, moving the toe of the beach landwards by around 40m. Comparing the profile to the range recorded from previous surveys shows that the dunes are at their most seawards position, and whilst the upper and mid beach are at a relatively high level, the lower beach is at a relatively landward position. At profile **1aBTBC17,** there has been erosion at the toe of the dunes of up to 0.9m. The mid beach between chainage 295m and 370m has eroded by 0.6m, with the lower foreshore eroding to a lesser degree by less than 0.2m. The profile is at a medium level compared to the range recorded from previous surveys on the upper and mid beach, with the lower beach (370m seawards) being at a relative high level.	Beach level change has varied along the length of Goswick Sands since the last survey. Greater movement appears to have occurred in the north of the area, with erosion dominating. At the southern end of Goswick Sands, the beach has remained stable with no discernible change to the profile form or position. One notable exception is the movement of the barrier feature visible in the seaward end of profile 1aBTBC18 **Longer term trends:** The majority of change is a continuation of seasonal behaviour. The notable barrier feature developed further seaward in profile 1aBTBC18 in autumn 2015 had not attained its current height since 2003. Subsequent surveys show a gradual reduction in the feature's height and ongoing landward migration, a pattern which this survey shows repeating

Survey Date	Description of Changes Since Last Survey	Interpretation
	At profile **1aBTBC18** beach levels have changed very little as far as 400m chainage, with the two small island dunes at chainage 340m and 370m, having reduced in height by 0.3m-0.4m, and the appearance of a third one at chainage 320m. The crest of the barrier feature shown on the previous survey at chainage 500m has moved landwards by c.60m and dropped in height by 0.2m. Overall, the profile is at a relatively low level compared to the range recorded from previous surveys. At profile **1aBTBC19** there has been very little change across the full profile, limited to ±0.1m. Overall, the beach is at a medium level compared to the range recorded from previous surveys, however the lower foreshore from chainage 460m is the highest on record. At **1aBTBC20,** the beach has generally remained stable since the last survey, with erosion of 0.1m or less. The crest of the dune and the berm halfway down the front face of the dune have also reduced in level by 0.1m. Overall, the beach is at a medium-high level across most of its length compared to the range recorded from previous surveys.	

2.4 Holy Island

Survey Date	Description of Changes Since Last Survey	Interpretation
9th October 2017	**Beach Profiles:** Holy Island is covered by eight beach profile lines for the Full Measures surveys (Appendix A). Profiles 1aBTBC21 and 1aBTBC23 were last surveyed during the Partial Measures spring survey, 2017. Profiles 1aBTBC22, 1aBTBC24 to 1aBTBC28 were last surveyed during the Full Measures autumn survey, 2016. **1aBTBC21** to **1aBTBC23** are located on the northwest side of the island, along The Snook. **1aBTBC24** to **1aBTBC28** are located on the south side of the island in the vicinity of the castle and priory. **1aBTBC27** extends out to and across the small island upon which the remains of a chapel stand. At all profiles on the north side of the island, the dunes have not changed in form or position since the last survey. On the whole, beach levels have also remained largely the same since the last survey with only minor erosion in beach level observed (<0.1m). Overall, the profiles are at low-medium level compared to the range recorded from previous surveys. On the south of the island, profiles show very little change since the previous survey, with only minor erosion in beach level observed (<0.1m). Overall, the profiles are at a medium-low level compared to the range recorded from previous surveys.	The dunes, sandy foreshore and sand flats around The Snook on Holy Island have remained stable in both form and position since the last survey. On the south side of the island, the backshore and beach have remained stable since the last survey. **Longer term trends:** Generally, the trends observed in the present survey are a continuation of those observed in the past, with the dunes and beach retaining the same form and position. The exception to this is at profile 1aBTBC21, where the dune front and toe have advanced by c.20m through the accumulation of nearly 2m of sand since 2002, and 1aBTBC22 and 1aBTBC23, where the advance of the dune toe is similar but less pronounced.
October 2017	**Topographic Survey:** Holy Island causeway and the adjacent sand flats are covered by an annual topographic survey, which commenced in October 2004. The purpose of this survey was to determine whether raising the level of the causeway had any adverse impacts on the adjacent sand flats. Data from the most recent topographic survey (Full Measures, autumn 2017) have been used to create a DGM (Appendix B – Map 2) using a Geographical Information System (GIS). A difference plot has also been produced using the DGM (Appendix B – Map 6) produced from the last produced topographic survey (Full Measures, autumn 2016) and the present survey.	The topographic survey shows that the causeway has remained stable since the last survey.

Survey Date	Description of Changes Since Last Survey	Interpretation
	The difference plot shows overall stability with pockets of elevation change in the order of +/-0.5m. There are more patches of minor erosion than accretion, and the main area of change is in the vicinity of the South Low channel.	

2.6 Bamburgh

Survey Date	Description of Changes Since Last Survey	Interpretation
10th October 2017	**Beach Profiles:** Bamburgh is covered by one beach profile line for the Full Measures survey (Appendix A). Profile 1aBTBC29 was last surveyed during the Full Measures autumn survey, 2016. Profile **1aBTBC29** is located approximately 750m south-east of the castle. There have been no changes to the dunes. There has been a smoothing out of the profile, with depressions being infilled by up to 0.7m, and berms removed by up to 0.6m. Overall, the profile is at a medium level compared to the range recorded from previous surveys, except for the lower foreshore which is relatively low.	The dunes at Bamburgh have remained stable, and the beach shows a redistribution of material across the profile smoothing it out. **Longer term trends:** The 2016 profile shows that the seaward face of the dune is still near its most eroded position since 2004. The beach is at a medium level compared to earlier surveys.

2.7 Beadnell Village

Survey Date	Description of Changes Since Last Survey	Interpretation
8th October 2017	**Beach Profiles:** Beadnell Village is covered by two beach profile lines for the Full Measures survey (Appendix A). Profiles 1aBTBC31 was last surveyed during the Partial Measures spring survey, 2017. Profile 1aBTBC30 was last surveyed during the Full Measures autumn survey, 2016. **1aBTBC30** is around 300m to the north of the village. The dune has remained stable since the last survey. There has been little change along most of the beach profile, with changes limited to ±0.2m. There has been 0.4m of erosion immediately at the toe of the dunes, and seawards of chainage 180m the beach has been eroded by 0.4m, moving the toe of beach landwards by around 20m. Overall, the profile is at a relatively low level compared to the range recorded from previous surveys. **1aBTBC31** is in Nacker Hole and extends across the promenade and seawall. Since the last survey, there has been very little change in beach levels, restricted to ±0.1m change. Overall, the profile is at a medium level compared to the range recorded from previous surveys.	The dunes and beach to the south of Beadnell Village have generally remained stable. **Longer term trends:** The changes observed since the last survey are within the bounds of previous surveys albeit at relatively low levels

2.8 Beadnell Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
8th October 2017	**Beach Profiles:** Beadnell Bay is covered by nine beach profile lines for the Full Measures survey (Appendix A). Profiles 1aBTBC33 to 1aBTBC34, 1aBTBC37 and 1aADC01 to 1aDC02 were last surveyed during the Partial Measures spring survey, 2017. Profiles 1aBTBC32, 1aBTBC35 to 1aBTBC36 and 1aBTBC38 were last surveyed during the Full Measures autumn survey, 2016. **1aBTBC32** to **1aBTBC34** are located at the northern end of Beadnell Bay, in Beadnell Harbour. At profile **1aBTBC32**, the dune ridge has eroded slightly since the last survey by 0.1m. The raised feature at chainage 10 appears to be a boulder from the survey photos. The majority of the beach profile has undergone minor erosion of 0.1m, with the exception of chainage 25m to 45m which shows accretion of 0.1m. Overall, the profile is at a low-medium level compared with the range recorded from previous surveys, with the lower foreshore from chainage 65m seawards showing the lowest recorded levels. At profile **1aBTBC33**, the back of the dunes has remained stable since the last survey. The survey report notes '*middle of dunes missing due to dense vegetation*', as it did in the previous surveys, so the profile for the dune face has not been analysed any further. The beach has remained stable across the profile, with changes limited to ±0.1m. Overall, the profile is at a low-medium level compared with the range recorded from previous surveys, with some sections having the lowest recorded levels in particular the mid beach between chainage 125m and 175m. At profile **1aBTBC34**, the dune has reduced in height by up to 0.4m over its front face, though its position has remained unchanged since the previous survey. The upper and mid beach has seen accretion of up to 0.6m. The lower beach from chainage 130m has seen erosion of up to 0.4m. Overall, the profile is at a medium-high level compared with the range recorded from previous surveys. **1aBTBC35** to **1aBTBC38** are located between Burn Carrs and the outfall of Brunton Burn/Long Nanny. The dunes along this northern section of coast have remained stable since the last survey.	Along the length of Beadnell Bay, the dunes have remained stable. Beach levels generally remained stable throughout the bay with minor fluctuations indicating cross shore movement of sediment. **Longer term trends:** Along the length of Beadnell Bay, the majority of the dune and beach form are similar to those observed in the past and the profile form and position is within the bounds of previous surveys.

Survey Date	Description of Changes Since Last Survey	Interpretation
	At profile **1aBTBC35**, there has been alternating areas of accretion and erosion of up to 0.4m which have infilled depressions and removed berms, resulting in a smoother profile. There has been accretion between chainage 30m and 55m, and 100m and 160m. There has been erosion between 5m and 30m, 55m and 100m, and seawards from 160m. Overall, the profile is at a high level compared with the range recorded from previous surveys, with the areas of accretion giving the highest levels on record. At profile **1aBTBC36**, the profile has remained stable with changes generally limited to less than 0.2m. Erosion is the dominant process across most of the profile, with the exception of chainage 50m to 70m where there has been accretion of 0.2m. The toe of the beach has seen the most erosion with up to 0.5m, resulting in the toe moving landwards by around 15m. Overall, the profile is at a medium-high level compared with the range recorded from previous surveys. At profile **1aBTBC37**, the dunes have remained stable since the last survey. The beach has seen very little change limited to ±0.2m, with alternating areas of accretion and erosion. Accretion has occurred between chainages 20m and 35m, 65m and 115m, and 150m and 210m. Erosion has occurred between chainage 35m and 65m, 115m and 150m, and seawards of 210m. Overall the profile is at a medium-high level compared with the range recorded from previous surveys. At profile **1aBTBC38**, there has been erosion of up to 0.3m on the upper beach from chainage 10m to 95m, and on the lower beach seawards of chainage 160m. The middle beach has seen accretion of up to 0.6m between chainage 95m and 160m. The upper beach is at a low level compared with the range recorded from previous surveys, whilst the mid-lower beach is at a medium-high level. **1aADC01** and **1aADC02** are located south of the outfall of Brunton Burn/Long Nanny. The dunes have not changed form or position. At profile **1aADC01**, there has been a small amount of erosion of less than 0.2m in the dip between the two main dunes (chainage 20m to 105m), the rest of the dunes have remained stable in height and position. The upper beach at the toe of the dunes to chainage 310m has eroded by up to 0.6m. The rest of the profile has accreted by up to 0.2m. The upper beach is at a relatively low level compared with the range recorded from previous surveys, whilst the mid and lower beach is at a medium level.	

Survey Date	Description of Changes Since Last Survey	Interpretation
	At profile **1aADC02**, there has been a small amount of accretion at the toe of the dunes. There has been accretion of 0.2m through the middle of the beach between chainage 80m and 200m. The lower beach seawards of chainage 210m has eroded by up to 0.5m resulting in the toe of the beach moving landwards by around 35m. Overall, the profile is at a medium level compared with the range recorded from previous surveys, except for the toe which is at its lowest recorded level.	

2.9 Embleton Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
10th October 2017	**Beach Profiles:** Embleton Bay is covered by two beach profile lines for the Full Measures survey (Appendix A). Profiles 1aADC03 and 1aADC04 were last surveyed during the Full Measures autumn survey, 2016. **1aADC03** is located towards the north of the bay, north of Embleton Burn mouth. **1aADC04** is located towards the south of the bay. At profile **1aADC03,** the dunes have remained stable. The beach has remained largely stable with any changes predominantly accretion of up to 0.2m. Overall, the profile is at a medium-high level compared with the range recorded from previous surveys. At profile **1aADC04**, there has been some erosion of up to 0.5m on the front face of the dune since the previous survey. The majority of the beach has seen either very little change or accretion of up to 0.4m, including the formation of a berm at chainage 182m. The exception is the toe of the beach from chainage 285m which has eroded by up to 0.6m. The result is a more undulating profile. Overall, the profile is at a medium-low level compared with the range recorded from previous surveys.	The dunes at Embleton Bay are generally stable, with small amount of erosion on the lower dune face. The beach levels have generally increased slightly with the exception being the toe of profile 1aADC04 which shows erosion, possibly as a result of sediment being redistributed across the shoreline. **Longer term trends:** The dunes have remained stable over the longer term and beach levels are within the range of those surveyed since 2002. The beach levels have recovered towards more medium levels.

2.10 Boulmer

Survey Date	Description of Changes Since Last Survey	Interpretation
11th September 2017	**Beach Profiles:** Boulmer is covered by two beach profile lines for the Full Measures survey (Appendix A). These were added to the programme in October 2007. Profiles 1aADC04A to 1aADC04B were last surveyed during the Partial Measures spring survey, 2017. At profile **1aADC04A** there has been variable accretion and erosion of up to 0.3m across the beach. Between the rock armour and chainage 25m, and chainage 43m to 52m, there has been erosion of up to 0.1m. Between chainage 25m and 43m there has been accretion of up to 0.3m. The rock platform remains exposed from chainage 57m. Overall the profile is at i a medium-high level compared to the range recorded from previous surveys. At profile **1aADC04B** the pattern is reversed, with accretion of up to 0.3m between the rock armour and chainage 20m, and chainage 52m and 75m, and erosion of up to 0.2m between chainage 20m and 52m. The rock platform remains exposed from chainage 75m.. Overall, the profile is at a high level compared to the range recorded from previous surveys, with the section between chainage 11m and 20m being the highest on record.	The changes to beach profile are minimal, and show varying accretion and erosion indicating cross shore redistribution of sand. **Longer term trends:** Beach elevations are high in comparison to the long-term record of surveys.

2.11 Alnmouth Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
11th September & 21st October 2017	**Beach Profiles:** Alnmouth Bay is covered by ten beach profile lines for the Full Measures survey (Appendix A). Profiles 1aADC07 to 1aADC09 were last surveyed during the Partial Measures spring survey, 2017. Profiles 1aADC05, 1aADC06 and 1aADC10 to 1aADC14 were last surveyed during the Full Measures autumn survey, 2016. **1aADC05** and **1aADC06** are located in the small pocket beach that is situated between the rock outcrops of Seaton Point and Marden Rocks. At profile **1aADC05**, the cliffs have remained stable since the last survey. There has been variable erosion and accretion across the beach resulting in a smoother profile with a shallower gradient compared to the previous survey, with the exception of the toe of the beach which has steepened considerably from chainage 178m. There has been erosion of up to 0.4m between the cliff toe and chainage 50m. From chainage 50m to 70m the runnel which was present on the previous survey has been infilled by 0.3m. Between chainage 70m and 125m there has been erosion of up to 0.2m. From chainage 125m to 183m there has been accretion of up to 0.3m. Overall the beach is at a medium level compared to the range recorded from previous surveys. At profile **1aADC06**, there has been erosion across the upper foreshore of up to 0.4m. The middle beach between chainage 60m and 120m shows very little change. The lower beach from chainage 120m shows accretion of up to 0.4m. The toe of the beach from chainage 185m has eroded by 0.3m. The majority of the beach is at a medium level compared to the range recorded from previous surveys, however between chainage 40m and 50m it is the lowest on record. **1aADC07**, **1aADC08** and **1aADC09** are located to the north of Alnmouth Bay between Marden Rocks and the mouth of the River Aln Estuary. At profile **1aADC07**, the dunes have remained stable since the last survey. The upper beach has increased in level by 0.2m from the dunes to chainage 95m. Between chainage 95m and 195m there has been erosion of up to 0.5m. There has been accretion from chainage 195m seawards with the large bar at chainage 210m previously seen in the 2016 surveys having reformed with accretion of	To the north of Alnmouth Bay, the dune cliffs and beach levels have remained relatively stable with a limited amount of sediment redistributed across the beach. At the centre of bay, north of the mouth of the River Aln Estuary, the dunes have remained stable since the last survey. Since the last survey, the beach has shown some mobility with the movement of the bar in the lower foreshore at 1aADC07 and migration of the river channel at profile 1aADC09. Immediately south of the mouth of the River Aln, there has been a mixture of erosion and accretion with the upper foreshore tending to show accretion whilst the lower foreshore has undergone erosion. The result of the cross-shore movement of material has been a general smoothing out of the profiles. **Longer term trends:** The cliffs in the far north of the bay have retreated slowly since 2002, by around 1m in total. The dunes have generally demonstrated long-term stability. Changes in beach profile form and position observed since the last survey are generally within the bounds of previous surveys, with the majority of profiles being at a medium-high level although the lower foreshore in the south is low in some profiles.

Survey Date	Description of Changes Since Last Survey	Interpretation
	0.5m. The profile is at a medium level through the upper and middle of the profile compared to the range recorded on previous surveys, with the lower beach being the highest on record from chainage 210 seawards. At profile **1aADC08,** the dunes have remained stable since the previous survey and there has been varying amounts of accretion and erosion across the profile. There has been accretion of 0.1m from the dunes to chainage 20m and between chainage 70m and 100m, with more significant accretion on the lower beach of up to 0.7m seawards of chainage 155m. There has been erosion of up to 0.4m between chainage 20m and 70m, and 100m and 155m. Overall, the profile is at a medium level compared to the range recorded from previous surveys. At profile **1aADC09**, the dunes have remained stable since the previous survey. Between the dunes and chainage 35m there has been very little change. Between chainage 35m and 90m the profile is dominated by accretion of up to 0.4m forming a berm at chainage 43m. Seaward of 90m chainage, the profile descends into the Aln channel which has migrated approximately 15m landward since the previous survey. Overall, the profile is at a medium level compared to the range recorded from previous surveys and the Aln channel is at a relatively landward position. **1aADC10** to **1aADC14** are located between the south bank of the River Aln Estuary and the north breakwater of Warkworth Harbour at the mouth of the estuary of the River Coquet. At profile **1aADC10**, the upper beach profile has been smoothed out with accretion and erosion of up to 0.5m between chainage 15m and 120m. The lower beach berm has moved landwards by around 60m to chainage 140m. A second lower beach berm is starting to form at chainage 300m. Overall the profile is at a high level compared to the range recorded from previous surveys, particularly at the two berms. At profile **1aADC11**, there has been erosion at the toe of the dunes of up to 0.5m, though the dunes themselves have remained stable. The upper beach to chainage 110m is dominated by accretion of up to 0.8m. There is an area of 0.2m of erosion in the mid beach between chainage 110m and 150m. Seawards of chainage 150m the lower beach also shows accretion of 0.2m. The overall effect has been to smooth out the profile, and the upper beach now has a shallower gradient compared to the previous survey. Overall the profile is at a high level compared to the range recorded from previous surveys with the lower beach from chainage 195m being the highest level on record.	

Survey Date	Description of Changes Since Last Survey	Interpretation
	At profile **1aADC12**, the dune face has remained stable since the previous survey. The upper beach to chainage 140m has generally undergone accretion of up to 0.3m, except for between chainage 45m and 70m where the berm has been removed. Seawards of chainage 140m there has been very little change, limited to ±0.1m. The overall effect is a smoother profile. . Overall, the profile is at a relatively high level compared to the range recorded from previous surveys particularly between chainage 120m and 140m, and 185m and 200m which have the highest levels on record. At profile **1aADC13**, the dunes and dune face have remained stable since the last survey. From the dune toe (147m) to chainage 160 there has been erosion of up to 0.4m. Between chainage 160m and 255m there has been accretion of up to 0.9m. Seawards of chainage 255m there has been erosion of 0.2m. Overall the profile is at a medium level compared to the range recorded from previous surveys, though the toe of the beach from chainage 325m is relatively lows. At profile **1aADC14**, there has been a small amount of accretion on the seaward face of the foredune of up to 0.2m. There has been accretion across the upper and mid beach of up to 1m, which has buried the small berm recorded on the previous survey. From chainage 185m seawards there has been erosion of up to 0.3m. The upper beach has the highest recorded levels to chainage 125m, whilst the lower beach from chainage 220m is the lowest recorded level.	
September 2017	**Topographic Survey:** The northern part of Alnmouth Bay (to the north of the River Aln Estuary) is covered by a bi-annual topographic survey, which commenced in April 2005. Data from the most recent topographic survey (Full Measures, autumn 2017) have been used to create a DGM (Appendix B – Map 3) using GIS. A difference plot has also been produced using the DGM (Appendix B – Map 7) comparing the last produced topographic survey (Partial Measures, Spring 2017) with the present survey. The difference plot shows patchy areas of accretion and erosion, with little discernible pattern. The centre of the bay is dominated by accretion, as is the beach opposite the village. The northern edge of the Aln channel shows the greatest magnitude of change, with erosion being dominant. .	The findings of the topographic survey show patchy areas of accretion and erosion, with little discernible pattern.

2.12 High Hauxley & Druridge Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
12th September & 22nd October 2017	**Beach Profiles:** High Hauxley to Druridge Bay is covered by nine beach profile lines for the Full Measures survey (Appendix A). Four of these (with 'A' or 'B' suffixes) were added to the programme in October 2007.All except 1aADC15 are resurveyed every 6-months. Profile **1aADC15** extends across the extensive dunes at Amble Links and foreshore. There has been some minor erosion of the dunes of up to 0.2m since the last survey (Full Measures, autumn 2016). There has been erosion at the berm at the toe of the dunes of up to 0.3m. Between chainage 113m and 147m there has been a small amount of erosion of up to 0.2m. Seawards of chainage 147m there has been erosion of up to 0.4m. Overall, the profile is at a medium level compared to the range recorded from previous surveys. **1aADC15A**, **1aADC16** and **1aADC16A** are located around Hauxley Haven. At all locations, the dunes has remained stable since the last survey (Partial Measures, Spring 2017). At profile **1aADC15A**, there has been accretion of up to 0.3m between the toe of the dune and chainage 40m, forming a small berm at chainage 25m. Between chainage 40m and 140m there has been very little chainage, limited to ±0.1m. Seawards of chainage 140m there has been erosion of up to 0.2m. Overall, the profile is at a medium-low level compared to the range recorded from previous surveys. At profile **1aADC16**, a small berm has formed on the upper beach at chainage 75m, with up to 0.4m of accretion. Between chainage 87m and 122m there has been erosion of up to 0.4m. Between chainage 122m and 180m there has been accretion of 0.2m. From chainage 180m seawards there has been erosion of up to 0.6m, steepening the toe of the beach and bringing it landwards by around 50m. The upper beach is at a relatively high level compared to the range recorded from previous surveys, whilst the profile from chainage 90m seawards is at a medium-low level with the section between chainage 180m to 220m being the lowest on record. At profile **1aADC16A**, there has been no change at the toe of the rock revetment to chainage 93m. There has been accretion of up to 0.2m between chainage 93m and 135m, forming a berm at chainage 112m. Seawards of chainage 135m there has been erosion of up to 0.4m. The profile is at a	At High Hauxley (profile 1aADC15), the dune has undergone some minor erosion. There has been some erosion of the beach toe. At Hauxley Haven (profiles 1aADC15A to 1aADC16), the dunes have remained stable since the last survey. The upper beach has shown accretion with the lower beach showing erosion. In Druridge Bay, there has been varying amounts of erosion and accretion across the profiles suggesting a redistribution of material across the beach, with a general trend of erosion in the north of the bay and accretion in the south suggesting there may have been some longshore movement southwards. **Longer term trends:** At High Hauxley, Hauxley Haven and north and south Druridge Bay, the dunes have remained stable except for limited changes at the dune toe. The beach levels are mostly within the bounds of previous surveys.

Survey Date	Description of Changes Since Last Survey	Interpretation
	medium level compared to the range recorded from previous surveys, except for the lower beach which is relatively low. **1aADC16B**, **1aADC17** and **1aADC17A** are located to the north of Druridge Bay, between Bondi Carrs and Hadston Carrs and extend seawards from Togston Links. At all locations, the dunes have remained stable since the last survey (Partial Measures, spring 2017). At profile **1aADC16B**, there has been accretion of up to 0.2m infilling some of the rock exposures. Overall, the profile is at a medium level compared to the range recorded from previous surveys. At profile **1aADC17**, there has been erosion of up to 0.4m at the toe of the dunes to chainage 60m. A small berm has formed in the profile at chainage 60m with accretion of up to 0.2m to chainage 155m. Seawards of chainage 155m there has been erosion of up to 0.3m. Overall, the profile is at a medium-high level compared to the range recorded from previous surveys, except for the upper beach between chainage 40m and 55m which has the lowest recorded levels. At profile **1aADC17A**, the majority of the profile is dominated by erosion of up to 0.2m, with the exception of chainage 95m to 120m which shows accretion of up to 0.2m. Overall, the profile is at a medium level compared to the range recorded from previous surveys. **1aCMBC01** and **1aCMBC02** are located in the southern section of Druridge Bay. At profile **1aCMBC01**, the dunes appear to have experienced minor erosion of 0.1m. The upper beach has accreted by up to 0.8m to chainage 225. Between chainage 225m and 295m there has been erosion of up to 1.8m, due to the berm previously surveyed at chainage 260m moving landwards to chainage 205m. Seawards of chainage 295m there has been accretion of up to 1.2m, moving the toe of the beach seawards by around 50m. The upper beach is relatively high compared to the range recorded from previous surveys, whilst the rest of the beach is at a medium level. At profile **1aCMBC02**, the dune has remained stable since the previous survey. There has been accretion across the upper beach to chainage 260m of up to 0.4m. Seawards of 260m there has been erosion of up to 0.4m. Overall, the profile is at a medium level compared to the range recorded from previous surveys.	

2.13 Lynemouth Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
8th September & 22nd October 2017	**Beach Profiles:** Lynemouth Bay is covered by six beach profile lines for the Full Measures survey (Appendix A). Profiles CMBC03A and CMBC03B were added to the programme in October 2007. Profiles 1aCMBC03a to 1aWDC01were last surveyed during the Partial Measures spring survey, 2017. Profiles 1aCMBC01 and 1aWDC02 to 1aWDC05 were last surveyed during the Full Measures autumn survey, 2016. **1aCMBC03** is located just to the south of Snab Point. The profile extends across the cliff and the rock platform below. The profile has not changed since the last survey indicating a stable cliff and rocky foreshore. **1aCMBC03A** is located opposite Lynemouth and extends across the extensive slag banks before reaching the foreshore. The slag bank has not experienced any change since the last survey (Partial Measures, spring 2017) and changes to the beach level are minimal, limited to ±0.2m. The upper beach to chainage 102m and the toe of the beach seawards of chainage 147m have experienced accretion, whilst the mid-lower foreshore has experienced erosion between chainages 102m and 147m Overall, most of the profile is at a low level compared to the range recorded from previous surveys, with chainage 110m to 145m being the lowest recorded level for that section. The lower foreshore however seawards of chainage 155m is at a more medium level. **1aCMBC03B** is located to the north of Lynemouth Power Station and extends across the extensive slag banks before reaching the foreshore. The process of slag bank erosion has been progressively ongoing for some years. Since the last survey, the top of the slag bank has retreated by about 0.5m, which is the smallest recorded retreat since autumn 2009. There has been erosion on the upper beach to chainage 10m of 0.2m. Seawards of chainage 10m there has been accretion of up to 0.7m. Overall, the profile is at a relatively low level compared to the range recorded from previous surveys. Profile **1aWDC01** extends from seaward of the rock revetment down to low water across the extensive slag banks. This profile is no longer measured.	To the south of Snab Point, the shoreline has not changed in form or position since the last survey. Opposite Lynemouth, the slag bank has remained stable, with erosion in the mid-beach dropping it to its lowest recorded level. To the north of the power station, the slag bank has remained largely stable. The beach has undergone little change, however it is at a relatively low level. To the south of the power station, between Lyne Sands and Beacon Point, 1aWDC02 has accreted whilst 1aWDC03 has eroded indicating a possible northwards movement of sediment. Between Beacon Point and Newbiggin Point there has been variable accretion and erosion across the profiles. **Longer term trends:** To the south of Snab Point, the changes observed from the present beach profiles are within the bounds of previous surveys. Opposite Lynemouth, the slag bank has demonstrated a long term trend of stability. The changes in beach profile form and position observed since the last survey are generally within the bounds of previous surveys. To the north of the power station, the slag bank has continued to erode and the beach has level has also

Survey Date	Description of Changes Since Last Survey	Interpretation
	1aWDC02 is located to the south of the Power Station. The beach face has advanced seawards by around 5m. However, the crest has retreated landwards by around 10m, and widened considerably. The beach has undergone accretion of up to 0.5m on the seaward side, and up to 1m on the landward side of the beach crest compared to the levels of the previous survey. The erosion on the lower foreshore (seawards of chainage 200m) is less severe being less than 0.5m. The profile of the beach face is at a relatively low level compared to the range recorded from previous surveys. **1aWDC03** is located to the south of the Power Station and to the north of Beacon Point. There has been accretion on the landward side of the berm of up to 0.5m. The seaward face of the berm has moved landwards by around 10m, with beach levels dropping by up to 1.2m.. The berm remains in roughly the same position as the previous three surveys, the last change in form being between the Full Measures 2012 and Full Measures 2013 survey. The landward face and crest of the berm are the highest recorded levels, whilst the seawards face is at a relatively landwards position compared to the range recorded from previous surveys. **1aWDC04** and **1aWDC05** are located between Beacon Point and Newbiggin Point. At profile **1aWDC04**, the dunes have remained stable. The profile shows the dune face remains steep. There has been erosion at the toe of the dunes with the loss of up to 0.9m, to chainage 42m. There has been accretion of up to 0.5m between chainage 42m and 67m. Between chainage 67m and 100m there has been erosion of up to 0.4m. Between 100m and the boulders at chainage 145m there has been some accretion of up to 0.3m which has covered up around 20m of previously exposed boulders. Overall, the profile is at a medium-high level compared to the range recorded from previous surveys. At **1aWDC05**, the cliffed section has remained stable. The upper beach between chainage 10m and 27m has accreted by up to 0.4m. The lower beach between chainage 27m and 38m has eroded by up to 0.3m. This is the opposite pattern to the previous year. Seaward of chainage 38m the rock platform remains unchanged. Overall, the profile is at a medium-low level compared to the range recorded from previous surveys.	fallen, indicating that this section of shoreline has returned to its normal trend of progressive erosion of the slag bank cliff and beach. To the south of the power station, the prominent berm crest has increased a little in height, but has retained the same general form since 2013. At the southern end of the bay, between Beacon Point and Newbiggin Point, the changes in beach profile form and position observed place the current beach levels at medium levels relative to earlier surveys dating back to 2002.

Survey Date	Description of Changes Since Last Survey	Interpretation
October 2017	**Cliff-top Survey:** Cliff top survey data collected for baseline survey (autumn, 2008), the previous Partial Measures survey (spring 2016) and the present Full Measures survey (autumn, 2017) is presented in this report. The cliff top survey is carried out as a continuous cliff edge line survey at the Newbiggin Caravan Park at Newbiggin Point. The results from the cliff top monitoring are anticipated to have an accuracy of ±0.2m due to the technique used. Furthermore, problems in precisely locating the cliff top, due to vegetation growth or the indistinct form of the cliff top, have also affected the data quality. There has been very little change in the position of the cliff top since the previous survey in Spring 2017 and the previous Full Measures survey in Autumn 2016.	Since the last survey there has been no significant movement recorded. **Longer term trends:** Since surveys began in October 2008, cliff movement has been greatest in the north of the survey area with up to 2.7m of cliff top retreat, whilst the central and southern parts of the survey area have shown less movement with retreat of less than 1m.

2.14 Newbiggin-by-the-Sea

Survey Date	Description of Changes Since Last Survey	Interpretation
8th September 2017	**Beach Profiles:** Newbiggin-by-the-Sea is covered by four beach profile lines for the Full Measures survey (Appendix A). Two of these, profiles WDC05A and WDC06A, were added to the programme in October 2007 specifically to help assess the performance of the capital scheme involving beach replenishment and construction of an offshore breakwater. Profiles 1aWDC05A and 1aWDC06A were last surveyed during the Partial Measures spring survey, 2017. Profiles 1aWDC06 and 1aWDC07 were last surveyed during the Full Measures autumn survey, 2016. In addition, a further 26 profiles (1aNWB1 to 1aNWB26) have been surveyed since September 2010 as part of a topographic survey of Newbiggin Bay. These profiles are not individually described. Beach profiling works were completed here in September 2012. Four areas were re-profiled; 2 sections to the east of profile **1aWDC05A**, one section at **1aWDC06A** and a narrow section at the top of **1aWDC07.** **1aWDC05A** is in the north of Newbiggin Bay. There has been erosion at the toe of the seawall of 0.4m. Between chainage 13m and 25m there has been slight accretion of 0.1m. From chainage 25m to 40m there has been erosion of up to 0.3m. Between chainage 40m an 50m there has been accretion of up to 0.3m. From chainage 50m to the exposed rock at chainage 115m there has been accretion of up to 0.3m, with an additional 15m of rock platform being covered compared to the previous survey. The upper beach is at a high level compared to the range recorded from previous surveys, whilst the lower beach is at a medium-low level. **1aWDC06** is located in the centre of the northern part of Newbiggin Bay, between the two breakwaters. There has been very little chainage on the upper beach to chainage 30m. There has been erosion across the rest of the beach profile of up to 0.4m. Overall, the profile is at a medium level compared to the range recorded from the previous surveys.	Since the last survey, the beach at Newbiggin-by-the-Sea has remained stable. **Longer term trends:** Data since monitoring began in May 2002 reflects the change in beach width resulting from the beach nourishment scheme implemented at Newbiggin-by-the-Sea. This change is also reflected in the beach profile plot in Appendix A. The changes in beach profile form and position observed since the last survey are within the bounds of previous surveys. Compared to the record of earlier surveys, the beaches are at medium/high levels, with the upper beach being particularly high, indicating that there is a net transfer of sediment towards the back of the beach.

Survey Date	Description of Changes Since Last Survey	Interpretation
	1aWDC06A is located in the centre of Newbiggin Bay, behind the offshore breakwater. There has been very little change from the seawall to the berm at chainage 60m. The seaward face of the berm (chainage 70m to 105m) has accreted by up to 0.4m, moving seawards by around 3m. Changes between chainage 105m and 210m are limited to less than ±0.2m. Seawards of chainage 210m there has been erosion of up to 0.4m, removing the lower beach berm at chainage 245m.. Overall the profile is at a medium-high level compared to the range recorded from previous surveys. **1aWDC07** is located towards the south of Newbiggin Bay. There has been very little change on the upper beach to chainage 25m. Between chainage 25m and 70m there has been erosion of 0.2m, steepening the beach slightly. Seawards of chainage 70m there has been accretion of up to 0.3m. Overall, the profile is at a medium-high level compared to the range recorded from previous.	
November 2017	**Topographic Survey:** Newbiggin-by-the-Sea is covered by bi-annual topographic survey, which commenced in September 2010. The surveys are planned to help assess the performance of a capital scheme constructed in 2007, which involved beach replenishment and construction of an offshore breakwater. Prior to incorporation in the programme, these surveys were undertaken on occasions between 2007 and 2010 as part of the scheme development. Data from the most recent topographic survey (Full Measures, autumn 2017) have been used to create a DGM (Appendix B – Map 4) using a GIS. A difference plot has also been produced using the DGM (Appendix B – Map 8) produced from the last produced topographic survey (Partial Measures, spring 2017) and the present survey. The topographic survey shows patchy areas of both gain and loss across the beach; however, the magnitude of the changes is generally low. Overall accretion is more dominant than erosion, particularly in the north and centre. The largest area of accretion is in the lee of the central breakwater.	The topographic survey shows areas of both gain and loss across the beach of generally low magnitude. Overall there are more areas of accretion than erosion.

Survey Date	Description of Changes Since Last Survey	Interpretation
November 2017	**Sand Extent Survey**: Spital Carrs is located to the south of Newbiggin Bay and is covered by a bi-annual sand extent survey, which commenced in 2012. The survey was designed to address concerns that the beach recharge scheme undertaken in the Newbiggin Bay may have impacts on the Spital Carrs SSSI and SPA if sand from the recharge scheme moves to the south. The sand extent survey therefore identifies the boundary of the sand beach on the rock platform. Data from the most recent sand extent survey (Full Measures, autumn 2017) has been plotted onto aerial imagery (refer to Appendix D – Map 1). The plot shows that there is variable advance and retreat of the limit of sand cover between the spring 2017 and the autumn 2017 survey. There has been no change in the north and centre, very limited advance in the centre and more pronounced advance in the south relative to the spring 2017 survey.	Since the last survey, there has been some movement of the sand extent in the south. Since 2014, there has been a trend in the south of the survey area for advance in the summer as shown in the autumn survey, which is then removed by winter storms, as shown by the spring surveys. **Longer term trends:** Review of the sand extent surveys shows the sand front has oscillated by a small amount with no net trend.

2.15 Cambois Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
7th September 2017	**Beach Profiles:** Cambois Bay is covered by seven beach profile lines for the Full Measures survey (Appendix A). Profiles. All profiles are resurveyed every 12-months. **1aWDC08** and **1aWDC09** are located to the north of the River Wansbeck estuary in front of Sandy Bay Caravan Park. **1aWDC08** extends from the cliff across the rock revetment onto the foreshore. There has been erosion at the toe of the revetment by 0.6m, exposing more of the revetment. There has also been erosion between chainage 70m and 120m. A small berm has formed on the upper beach at chainage 60m, however this is below the level of the beach on the previous survey. There has been accretion of up to 1m on the lower foreshore, pushing the toe of the beach approximately 50m seawards, Overall, the profile is at a medium-high level compared to the previous surveys, with the lower foreshore from chainage 120m being the highest on record. **1aWDC09** extends from the cliffs at the very southern end of the Caravan Park. The cliff remains unchanged since the previous survey. There has been 0.2m of erosion between the toe of the cliff and the exposure of boulders and chainage 30m. There are now two small berms present in the profile at chainages 50m and 160m, whereas the previous survey had one berm at chainage 80m. The toe of the beach has eroded by up to 0.6m, from chainage 200m seawards. Overall, the profile is at a medium-high level compared to the range recorded from previous surveys, apart from the lower foreshore which is low. Profiles **1aWDC10** to **1aWDC14** are all located along Cambois Bay, between the River Wansbeck and River Blyth estuaries. **1aWDC10** is located on the southern side of the Wansbeck Estuary, just to the south of Cambois House. There appears to have been some minor movement on the cliff face, though it has not affected the position of the cliff edge. The majority of the beach profile has accreted by up to 1.9m, extending the face of the beach around 30m seawards. A berm has formed on the lower foreshore	To the north of the River Wansbeck, the cliffs remain unchanged since the previous survey and there has been variable erosion and deposition throughout the beach profiles, but they remain relatively high compared to earlier surveys. To the south of the Wansbeck Estuary, there has been some minor movements on the face of the dune cliffs. Upper beach levels have generally increased, and there has been berm formation in both the upper and lower beach. At the southernmost extent of Cambois Bay, beach levels have generally dropped, leaving profiles at a relatively low level. **Longer term trends:** Beach profiles in the north of the survey area are at higher levels compared to those in the south, suggesting a north-south movement of sediment or a greater input of sediment (possibly from the River Wansbeck) in the north of the survey area. The till and dune cliffs show progressive erosion.

Survey Date	Description of Changes Since Last Survey	Interpretation
	at chainage 130m. The toe of the beach seawards of chainage 185m shows erosion of 0.2m. Overall, the profile is at a medium-high level compared to the range recorded from previous surveys. **1aWDC11** extends across the rock revetment fronting the now disused foundry. The profile has been smoothed out and has a shallower gradient compared to the previous year. There has been erosion of up to 0.3m from the foot of the revetment to chainage 70m, and between chainage 105m and 145m. Between chainages 70m and 105m there has been accretion of up to 0.3m. Seawards of chainage 145m there has been accretion of up to 0.9m, which has advanced the toe of the beach around 30m seawards. The profile is at its highest recorded level over much of its length compared to the previous surveys. **1aWDC12** is situated approximately mid-way along Cambois Bay. Since the last survey (Full Measures, autumn 2016), there has been some slippage on the face of the dune cliffs but the cliff edge position is unaffected. The upper beach has been eroded by up to 0.4m from the dunes to chainage 80m. There has been a small area of 0.2m of accretion between chainage 80m and 105m. Between chainage 105m and 220m there has been erosion of up to 0.3m. The toe of the beach seawards of chainage 220m shows minor accretion of 0.2m. Overall the profile is at a medium level compared to the range recorded from previous surveys. At **1aWDC13** is located to the centre-south of Cambois Bay. There has been no change to the dune cliff face. The profile has been smoothed out with alternating accretion and erosion of up to 0.2m between the dunes and chainage 100m. Seawards of chainage 100m there has been erosion of up to 1.0m, with the low bar being removed. Whilst the upper beach is at a medium level compared to the range recorded from previous surveys, the lower beach from chainage 75m is at its lowest recorded level. **1aWDC14** is located to the south of Cambois Bay, at North Blyth. There has been slippage on the cliff face with the cliff edge retreating by 0.5m. The beach is dominated by erosion, with losses of up to 0.5m, revealing more of the rock/boulders beneath the sand. Overall, the profile is at a low level compared to the range recorded from previous surveys.	

Survey Date	Description of Changes Since Last Survey	Interpretation
November 2017	**Cliff-top Survey:** Cliff top survey data collected for baseline survey (spring, 2009), the previous Partial Measures survey (Spring 2017) and the present Full Measures survey (autumn, 2017) is presented in this report. The cliff top survey is carried out as a continuous cliff edge line survey in two locations within Cambois Bay; at Sandy Bay Caravan Park to the north of the River Wansbeck estuary, and Cambois Bay from south of the River Wansbeck to the breakwater at the southern end of the bay. The results from the cliff top monitoring are anticipated to have an accuracy of ±0.2m due to the technique used. Furthermore, problems in precisely locating the cliff top, due to vegetation growth or the indistinct form of the cliff top, have also affected the data quality. There has been very little change in the position of the cliff top at Sandy Bay Caravan Park since the previous survey in Spring 2017 along the majority of the survey length. There appears to have been a small amount of erosion of around 1.4m along a short section (<10m) of cliff halfway between the northern end of the survey limit and the slipway in the middle of the caravan park. A c.10m length of cliff in the centre of the survey area (immediately to the north of the most southerly perpendicular access road within the caravan park) appears to have retreated by up to 2m. There is another c.10m section of cliff which shows retreat of up to 1.5m, which is located opposite the turning circle at the end of the access road in the caravan park, this section of cliff also showed retreat in the 2017 Partial Measures survey. There are numerous small areas (<10m) of retreat around all of the Cambois Bay frontage of up to 1m. The 665m section of cliff behind the rock armour at the disused foundry site in the north shows apparent consistent retreat of up to 0.5m (though up to 1m in some short sections). The undefended frontage from the beach access point opposite the roundabout at the start of the spit feature at the tidal basin of the River Blyth, southwards for around 250m shows consistent retreat of 0.5m to 2m, with retreat of up to 4m around a 10m section immediately adjacent to the beach access point at the northern end.	Since the last survey in April 2017, there has been very little change in cliff top position recorded for Sandy Bay Caravan Park. Cambois Bay appears to have been relatively active along its full frontage with numerous small areas of retreat of up to 1m, with several longer sections showing consistent erosion of up to 2m. **Longer term trends:** At Sandy Bay Caravan Park the cliff top retreat has been more significant in the southern part of the survey area with up to 9m of erosion since 2007, whilst the northern part has eroded by c.1-3m. In Cambois Bay, the area of greatest cliff top retreat since the surveys began in 2009 is the centre of the bay opposite Ridley Terrace, Cambois, where up to 14m of erosion has occurred. The north and south of the bay have retreat more typically c.1-5m.

2.16 Blyth South Beach

Survey Date	Description of Changes Since Last Survey	Interpretation
6th September 2017	**Beach Profiles:** Blyth South Beach is covered by six beach profile lines for the Full Measures survey (Appendix A). All profiles are resurveyed every 6-months. **1aBVBC01** is located towards the north of South Beach, in front of the area of land owned by Port of Blyth. There have been no significant changes to the position and form of the dunes since the last survey (Partial Measures, spring 2017). There has been accretion of up to 0.2m on the upper beach to chainage 80m. Between chainage 80m and 110m there has been erosion of up to 0.2m. Between chainage 110m and 145m there has been accretion of up to 0.3m. The toe of the beach seawards of chainage 145m has eroded by up to 0.7m. Overall, the profile is at a medium level compared to the range recorded from previous surveys. There has been varying amounts of erosion and accretion across the profile at **1aBVBC02.** The upper beach has accreted by up to 0.4m from the seawall to chainage 35m. There has been erosion of up to 0.4m between chainage 35m and 60m. Seaward of chainage 60m there has been varying amounts of accretion up to 0.3m in depth. Overall, the profile is generally at a medium level compared to the range recorded from previous surveys, though is relatively low and high in a couple of places. At **1aBVBC03** there have been no significant changes to the position and form of the dunes since the last survey (Partial Measures, spring 2017), which remain at their most landward extent since 2002. There has been accretion of 0.4m on the upper beach between chainage 85m and 110m. Between chainage 110m and 180m there has been erosion of up to 0.5m. Seawards of chainage 180m there has been accretion of 0.2m. Whilst the upper beach is at a medium level compared to the range recorded from previous surveys, the lower beach is relatively high. At **1aBVBC04,** there have been no significant changes to the position and form of the dunes since the last survey (Partial Measures, spring 2017). The crest of the berm in the upper beach at chainage 60m has increased by 0.5m with the seaward face extending seaward by around 5m. A depression has formed at chainage 95m, through the erosion of up to 0.8m. Seaward of chainage 115m there	Since the last survey, the dunes and dune face at Blyth South Beach have remained largely stable, retaining the same form and position. Beach profiles have changed, there has been variable accretion and erosion, with a general trend for accretion on the upper beach. The profiles are all generally at a relatively medium level, however the lower beach in the more southern profiles tends to be relatively low. **Longer term trends:** At Blyth South Beach, the dunes have generally demonstrated a long-term trend of stability. The changes in beach profile form and position observed since the last survey are within the bounds of previous surveys, however in the central and southern parts of the bay, the upper beach is at a medium level and the lower beach relatively low, leaving a steeper beach in the middle foreshore.

Survey Date	Description of Changes Since Last Survey	Interpretation
	has been accretion of up to 0.4m. Overall, the profile is at medium-high level compared to the range recorded from previous surveys. At **1aBVBC05,** there have been no significant changes to the position and form of the dunes since the last survey (Partial Measures, spring 2017). There has been accretion on the upper beach of up to 0.4m to chainage 110m. Seawards of chainage 110m there has been erosion of up to 0.7m. The upper beach is at a medium level compared to the range recorded from previous surveys, whilst the lower beach is at a more medium-low level. At profile **1aBVBC06,** there has been some minor erosion on the front face of the dunes of less than 0.2m since the last survey (Partial Measures, Spring 2017). There has been accretion of up to 0.6m at the toe of the dunes. Between chainage 118m and 180m there has been erosion of up to 1.1m. Seawards of chainage 110m there has been accretion of up to 0.3m. The upper beach is at a medium level compared to the range recorded from previous surveys, whilst the lower beach is at a relatively low level.	

4. Problems Encountered and Uncertainty in Analysis

Individual Profiles

- At profile BTBC07 and BTBC08, the offshore extent the survey report indicates that the profiles end at a lagoon, but the survey photographs indicate they end at open sea. This is possibly a note retained from earlier reports.
- At profiles BTBC18 to BTBC23, the survey report states that the offshore extent of the survey is limited by a drain. This drain is likely a runnel which separates the barrier feature in the lower foreshore from the rest of the beach.
- At profile BTBC33, there are gaps in the section (at the location of the middle of dunes) due to dense vegetation. This needs to be taken into account when assessing the profile data as the levels in these measurement gaps will not be reliable.
- At profiles ADC05 and ADC06 there was unsafe loose material prevented the survey of the cliff face.
- At profile ADC08 and ADC09, the profile ends at the river.
- At profile ADC16, the surveyors noted that they were unable to survey the start of the section as access was denied by the homeowner.
- At profile ADC16A, there are gaps in section due to vegetation cover. This needs to be taken into account when assessing the profile data as the levels in these measurement gaps will not be reliable.
- At profile ADC16B, the section starts at new fence.
- Profile WDC01 is no longer measured.

Topographic Survey

No issues reported.

Cliff Top Surveys

Cambois, Newbiggin, and Sandy Bay cliff tops have now been combined into one survey area.

At Cambois Bay, the surveyors noted that very thick dense vegetation at north end of the cliffs hindered surveying. This was also noted in previous reports (Full Measures, autumn 2011, Partial Measures, spring 2012, Partial Measures spring 2014, Full Measures autumn 2014, Partial Measures spring 2015, Full Measures autumn 2015, Partial Measures spring 2016, Full Measures 2016, and Partial Measures 2017).

5. Recommendations for 'Fine-tuning' the Monitoring Programme

No changes are recommended at the present time.

6. Conclusions and Areas of Concern

- At Sandstell Point (Spittal A), the recorded profiles and topographic survey present no causes for concern.
- At Spittal (Spittal B), the recorded profiles present no causes for concern.
- At Goswick Sands, the recorded profiles present no causes for concern. The barrier feature in the seaward end of profile 1aBTBC18 shows movement and is likely to be a cyclical feature.
- At Holy Island, the recorded profiles and topographic survey present no causes for concern.
- At Bamburgh, the recorded profiles present no causes for concern.
- At Beadnell Village, the recorded profiles present no causes for concern.
- At Beadnell Bay, the recorded profiles present no causes for concern.

- At Embleton Bay, the dune toe and beach levels are continuing to recover.There is no cause for concern
- At Boulmer, the recorded profiles present no cause for concern.
- At Alnmouth Bay, the beach levels are continuing to recover and are now at medium-high level generally, the exception is the lower foreshore in the south which is relatively low. As such, there is no cause for concern but this issue should be reviewed in the 2018 Full Measures report.
- At High Hauxley & Druridge Bay, the Hauxley Haven profiles continue to be at low levels in their most seaward extents, with some accretion on the upper beach. These do not necessarily indicate a cause for concern but further surveys should be monitored specifically for any indications of accelerated recession of the cliff/dune toe.
- At Lynemouth Bay, the recorded profiles and cliff top survey present no causes for concern.
- At Newbiggin-by-the-Sea, profile remain at medium-high levels and there have been no adverse impacts on the SSSI at Spital Carrs.At Cambois Bay, the beach and cliffs have been relatively active, however there are no causes for concern at present but this issue should be reviewed in the next report.
- At Blyth South Beach, the profiles are generally at a medium level, though the lower beach in the south is relatively low. However, the recorded profiles present no causes for concern.

Appendices

Appendix A

Beach Profiles

The following sediment feature codes are used on some profile plots:

Code	Description
S	Sand
M	Mud
G	Gravel
GS	Gravel & Sand
MS	Mud & Sand
B	Boulders
R	Rock
SD	Sea Defence
SM	Saltmarsh
W	Water Body
GM	Gravel & Mud
GR	Grass
D	Dune (non-vegetated)
DV	Dune (vegetated)
F	Forested
X	Mixture
FB	Obstruction
CT	Cliff Top
CE	Cliff Edge
CF	Cliff Face
SH	Shell
ZZ	Unknown

Beach Profile

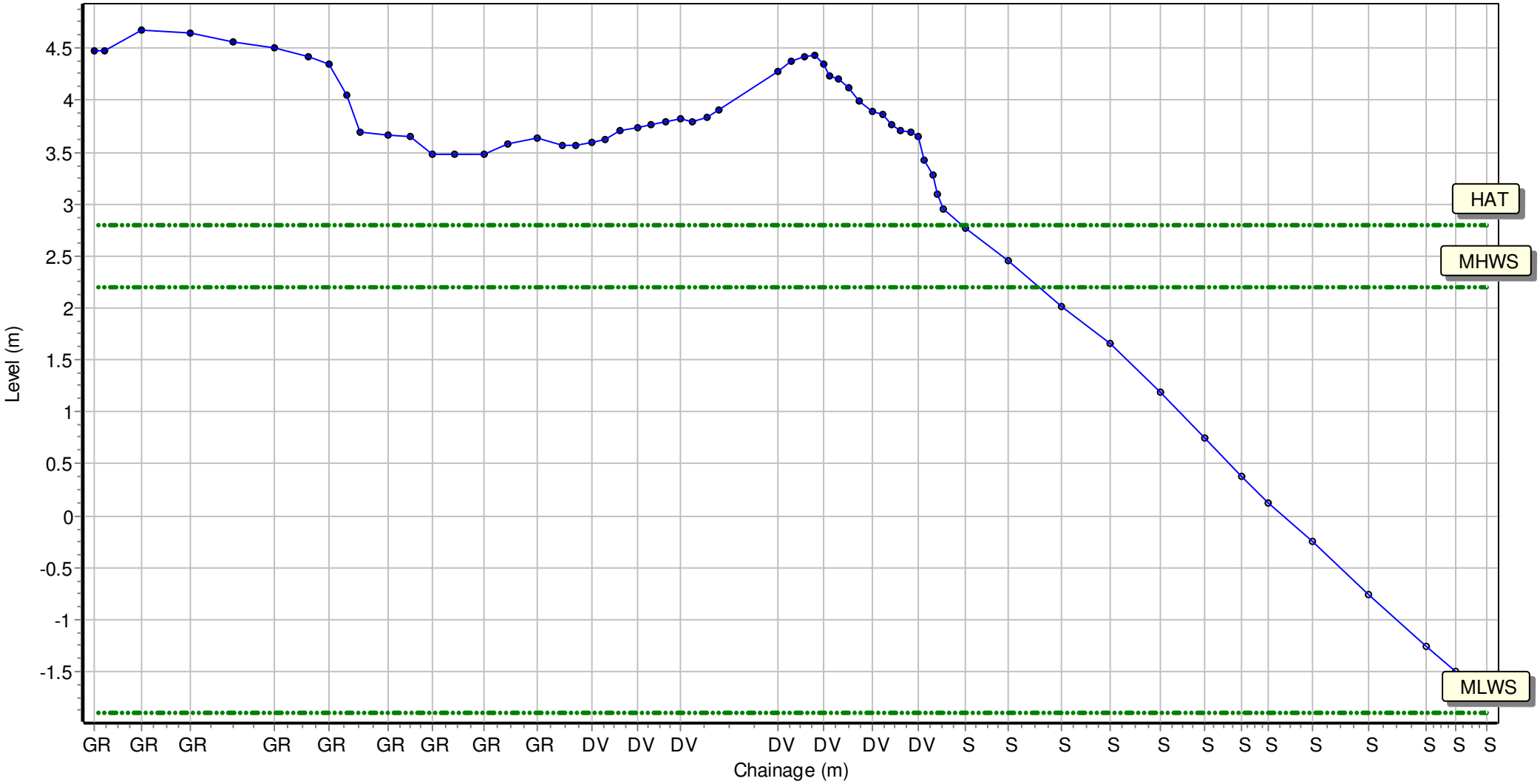
Location: **1aBTBC01**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400275.192 **Northing:** 651875.262 **Profile Bearing:** 347 ° from North



Beach Profile

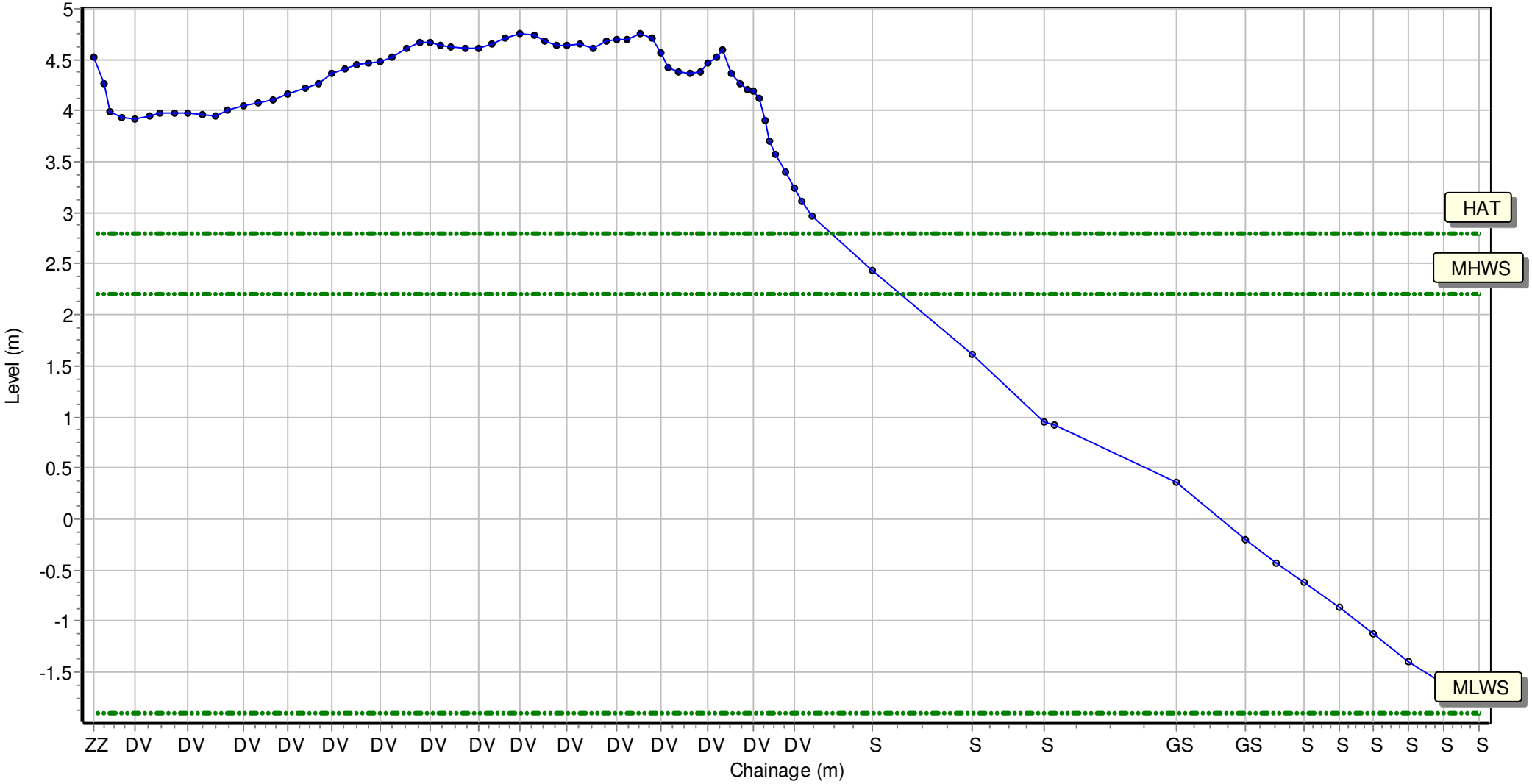
Location: **1aBTBC02**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400388.132 **Northing:** 651916.302 **Profile Bearing:** 334 ° from North



Beach Profile

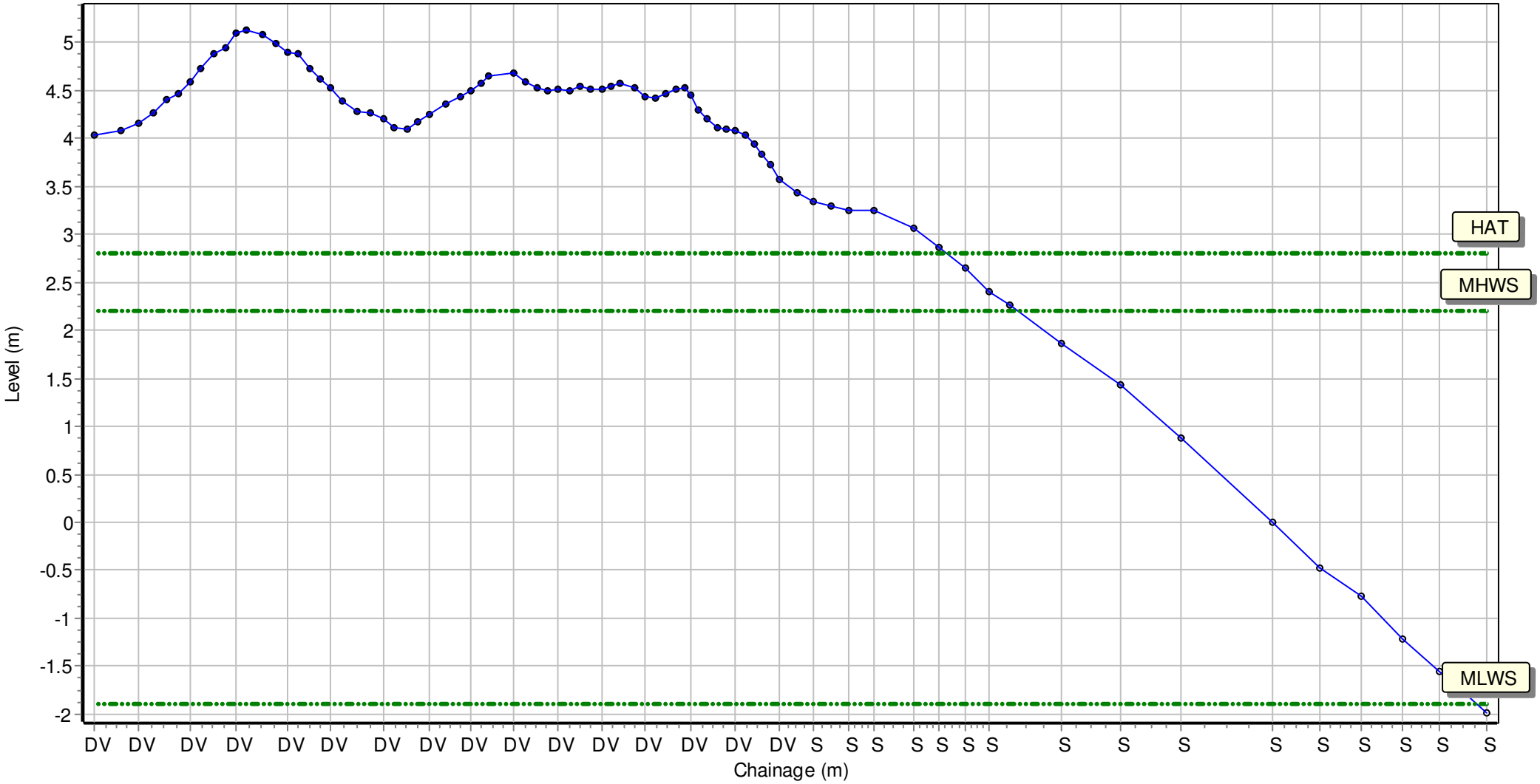
Location: **1aBTBC03**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400455.187 **Northing:** 651937.742 **Profile Bearing:** 330 ° from North



Beach Profile

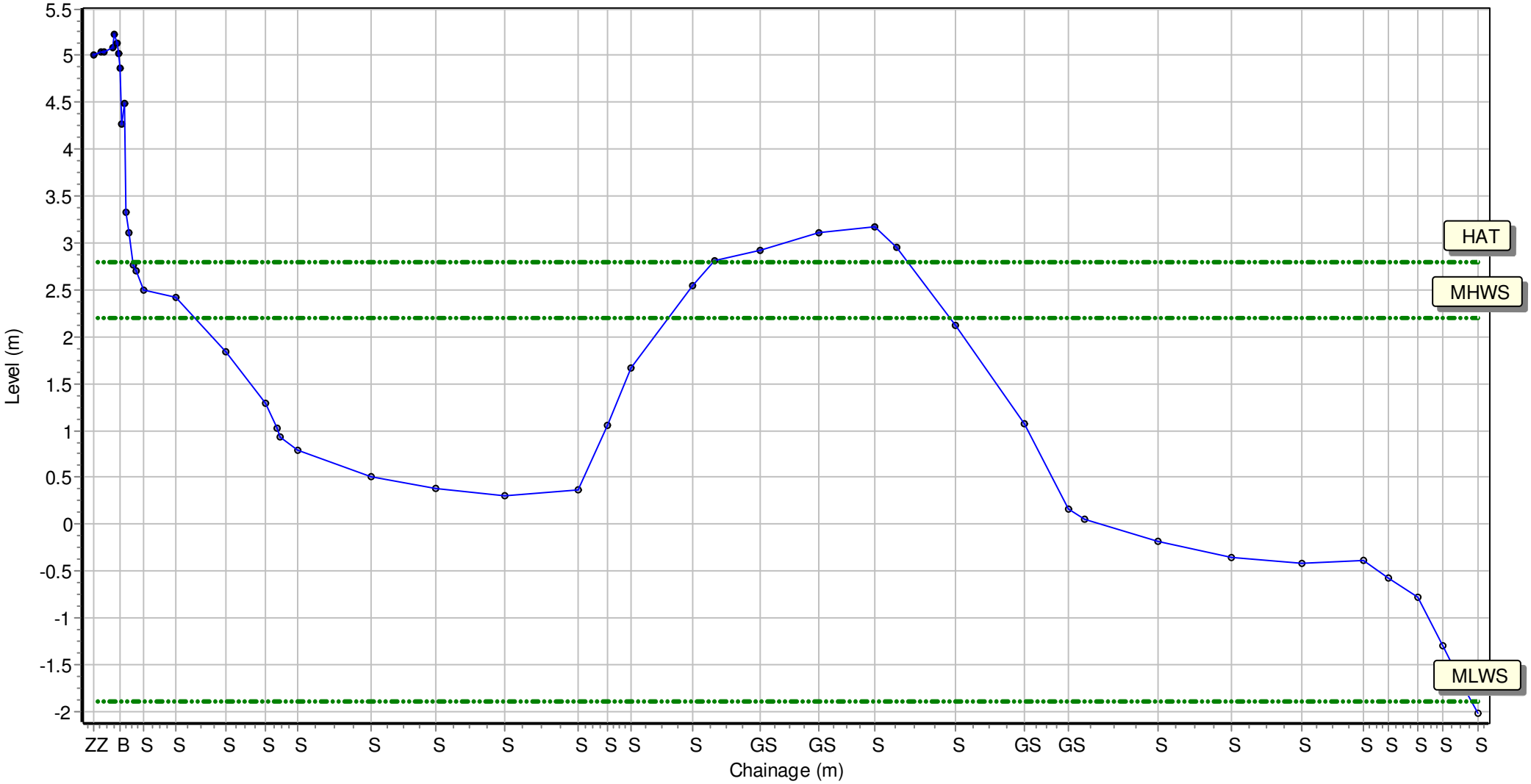
Location: **1aBTBC04**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400531.615 **Northing:** 652001.966 **Profile Bearing:** 27 ° from North



Beach Profile

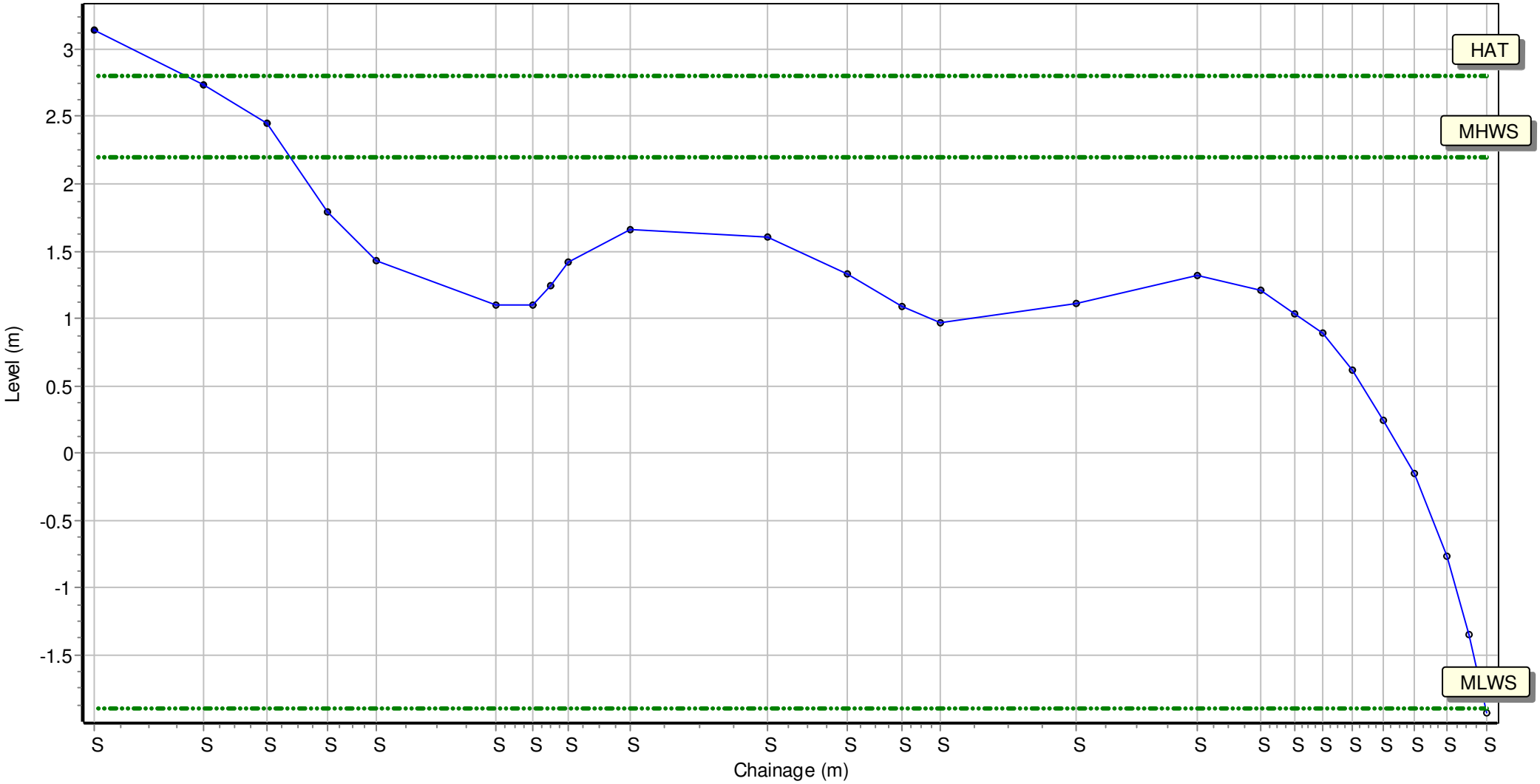
Location: **1aBTBC05**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400678.665 **Northing:** 651969.27 **Profile Bearing:** 298 ° from North



Beach Profile

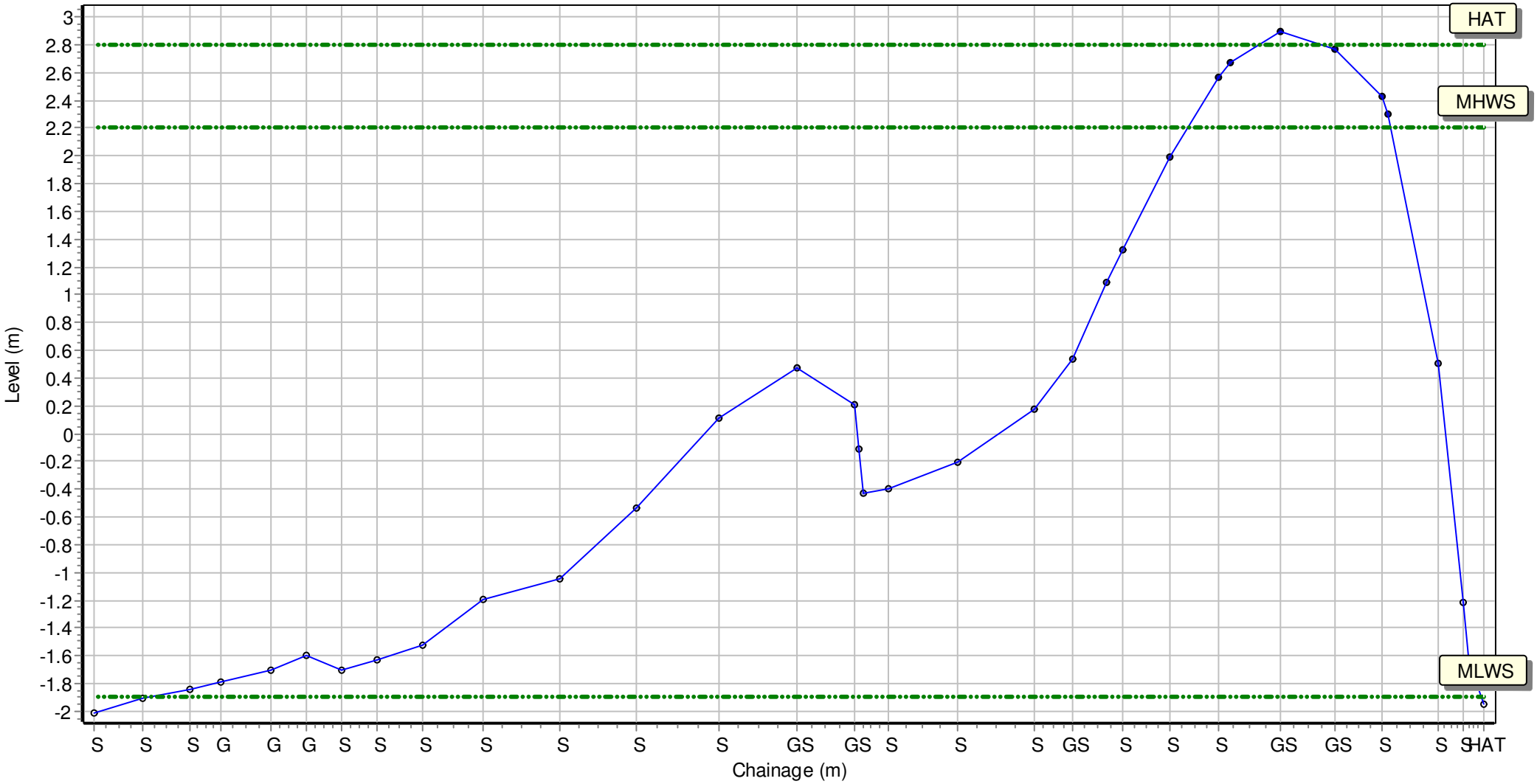
Location: **1aBTBC06**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400825.582 **Northing:** 652135.224 **Profile Bearing:** 295 ° from North



Beach Profile

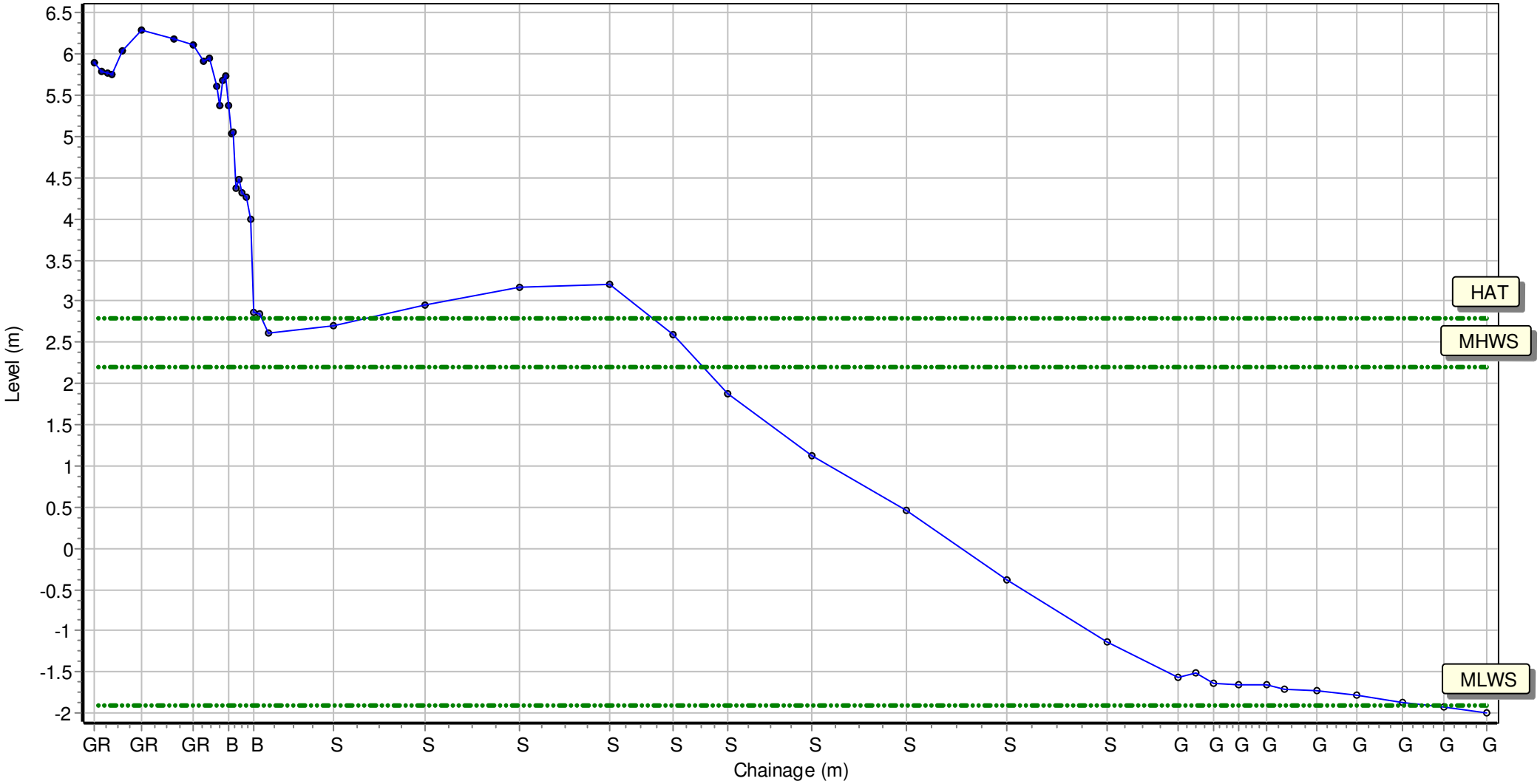
Location: **1aBTBC07**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400559.428 **Northing:** 651953.804 **Profile Bearing:** 67 ° from North



Beach Profile

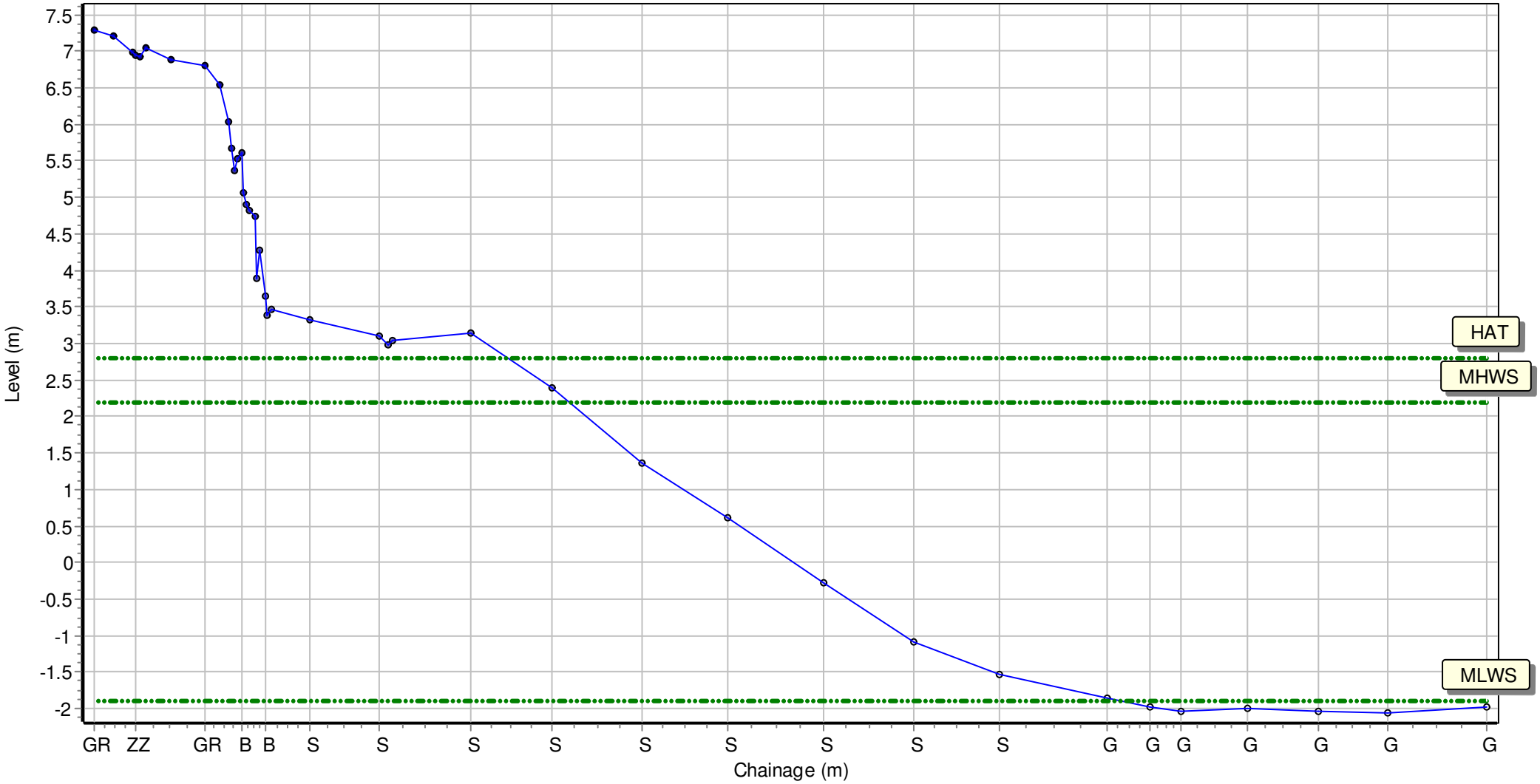
Location: **1aBTBC08**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400568.995 **Northing:** 651908.786 **Profile Bearing:** 68 ° from North



Beach Profile

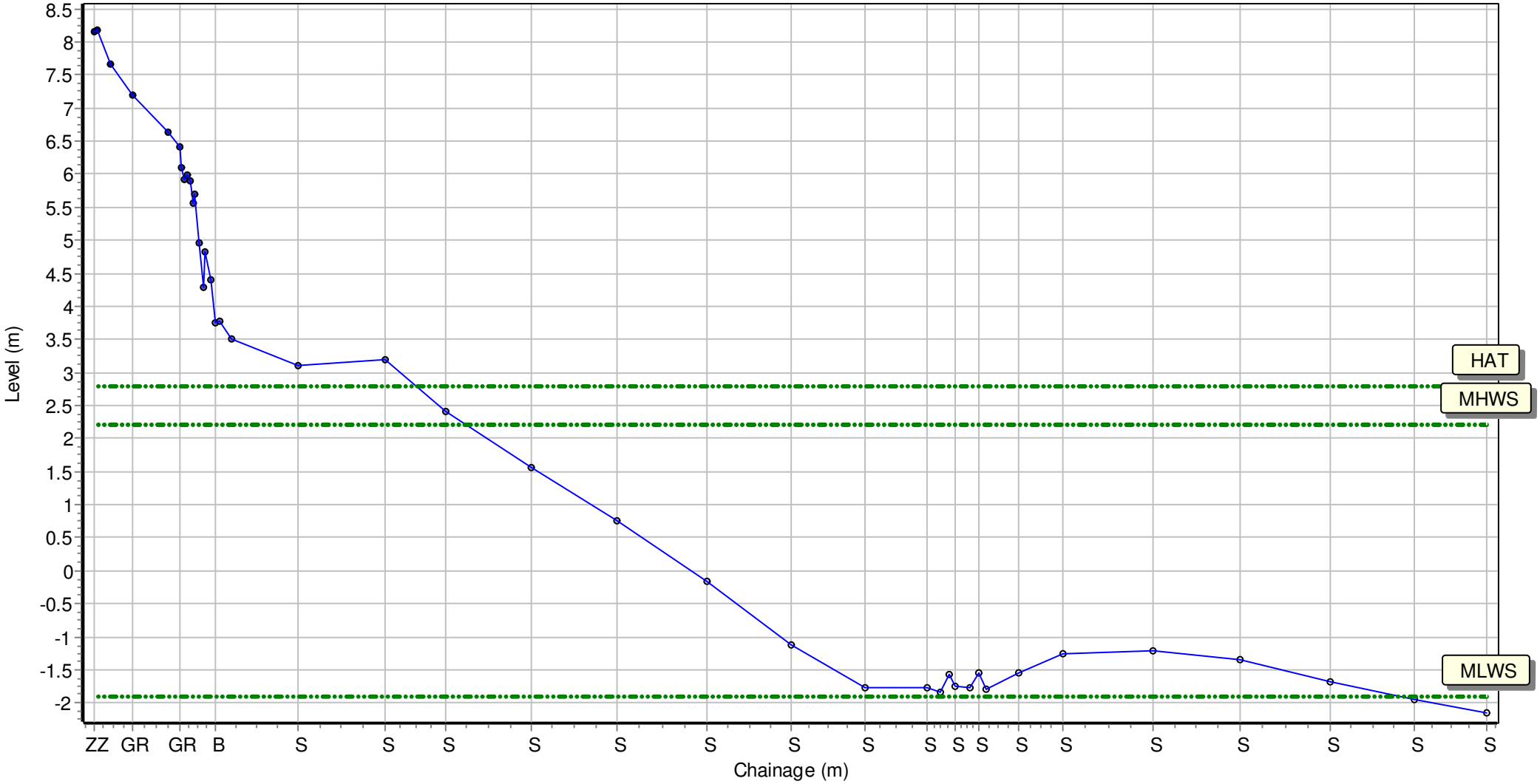
Location: **1aBTBC09**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400587.135 **Northing:** 651868.576 **Profile Bearing:** 70 ° from North



Beach Profile

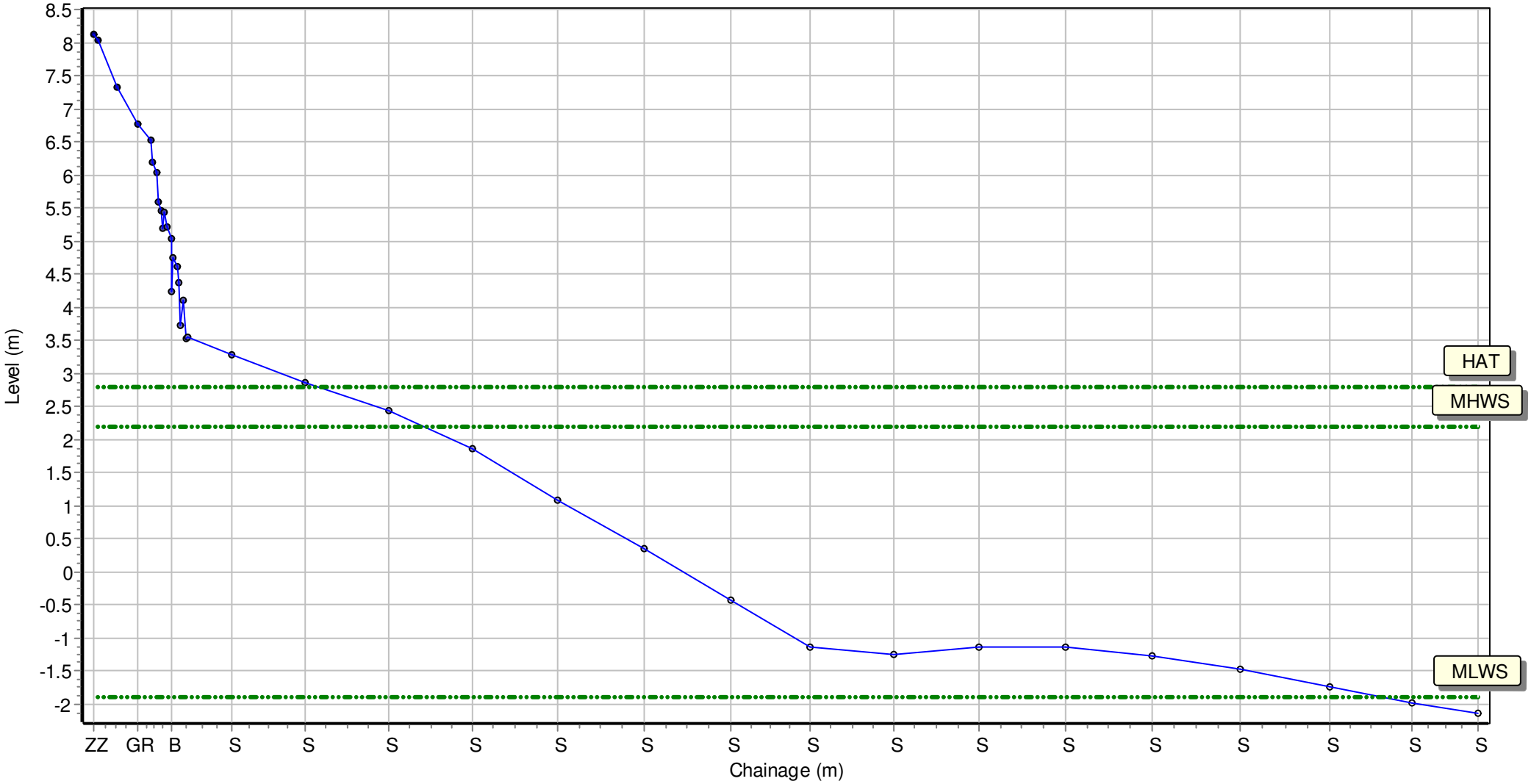
Location: **1aBTBC10**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400603.233 **Northing:** 651816.609 **Profile Bearing:** 69 ° from North



Beach Profile

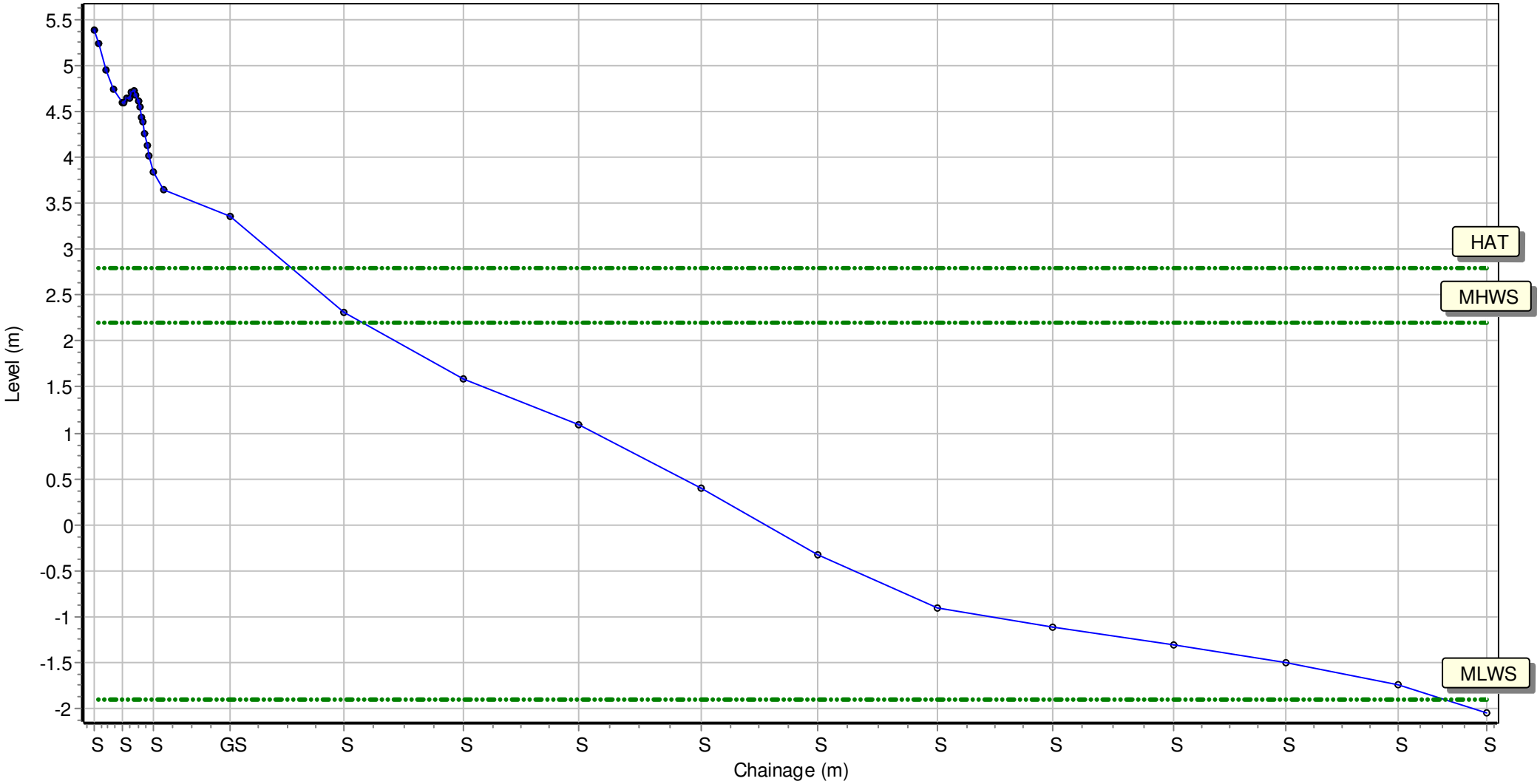
Location: **1aBTBC11**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400638.037 **Northing:** 651699.812 **Profile Bearing:** 66 ° from North



Beach Profile

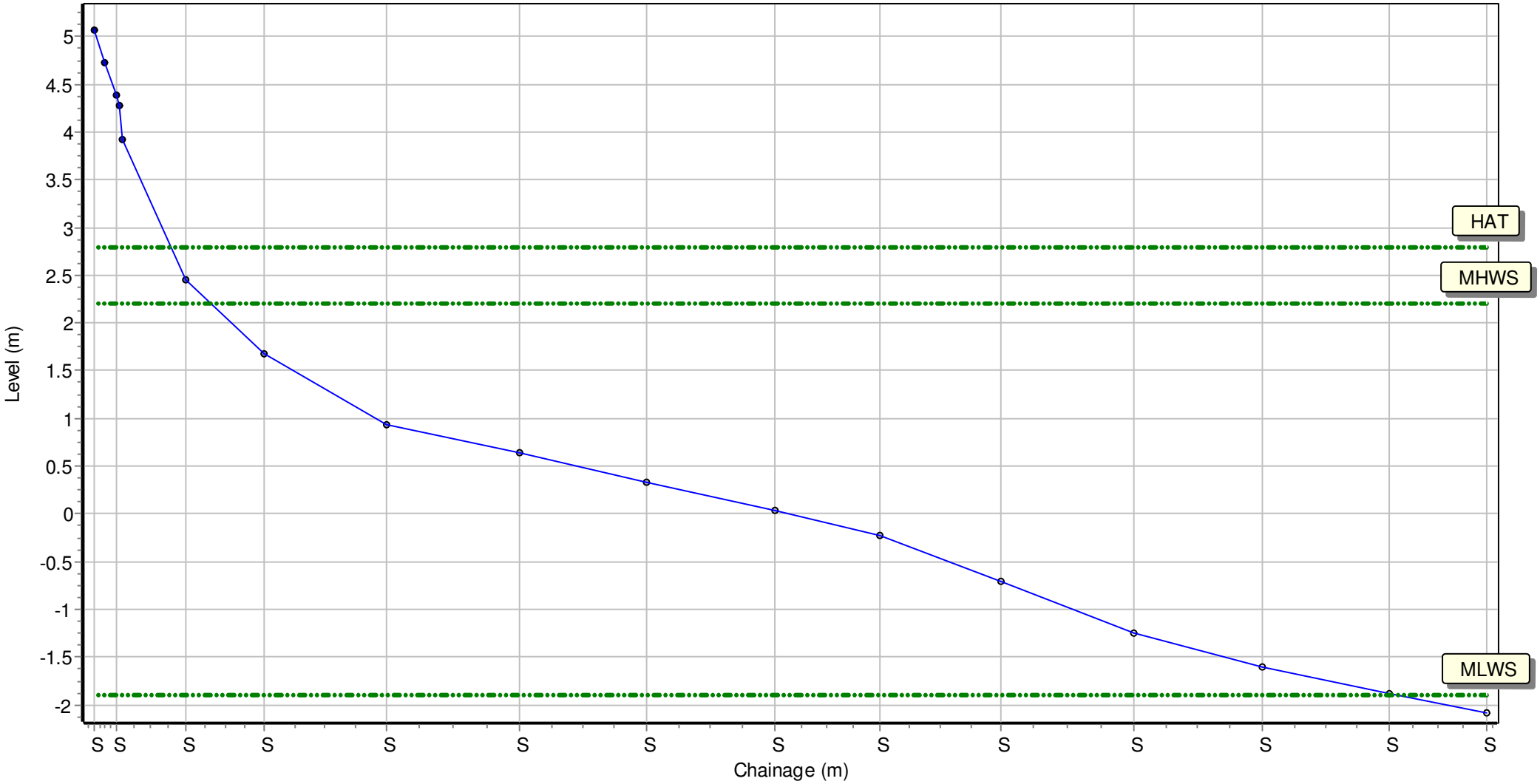
Location: **1aBTBC12**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400693.518 **Northing:** 651579.795 **Profile Bearing:** 63 ° from North



Beach Profile

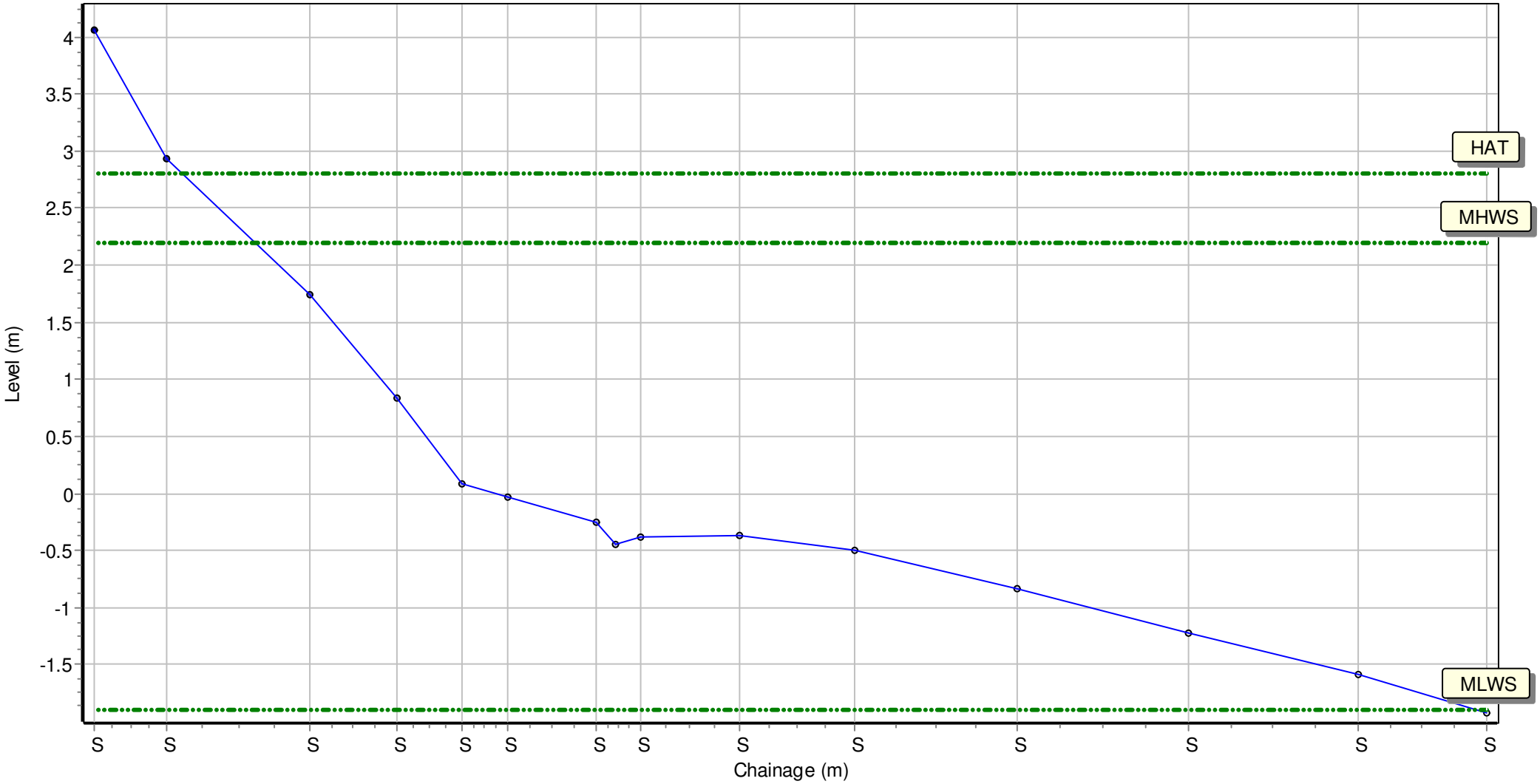
Location: **1aBTBC13**

Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 400820.787 **Northing:** 651312.459 **Profile Bearing:** 65 ° from North



Beach Profile

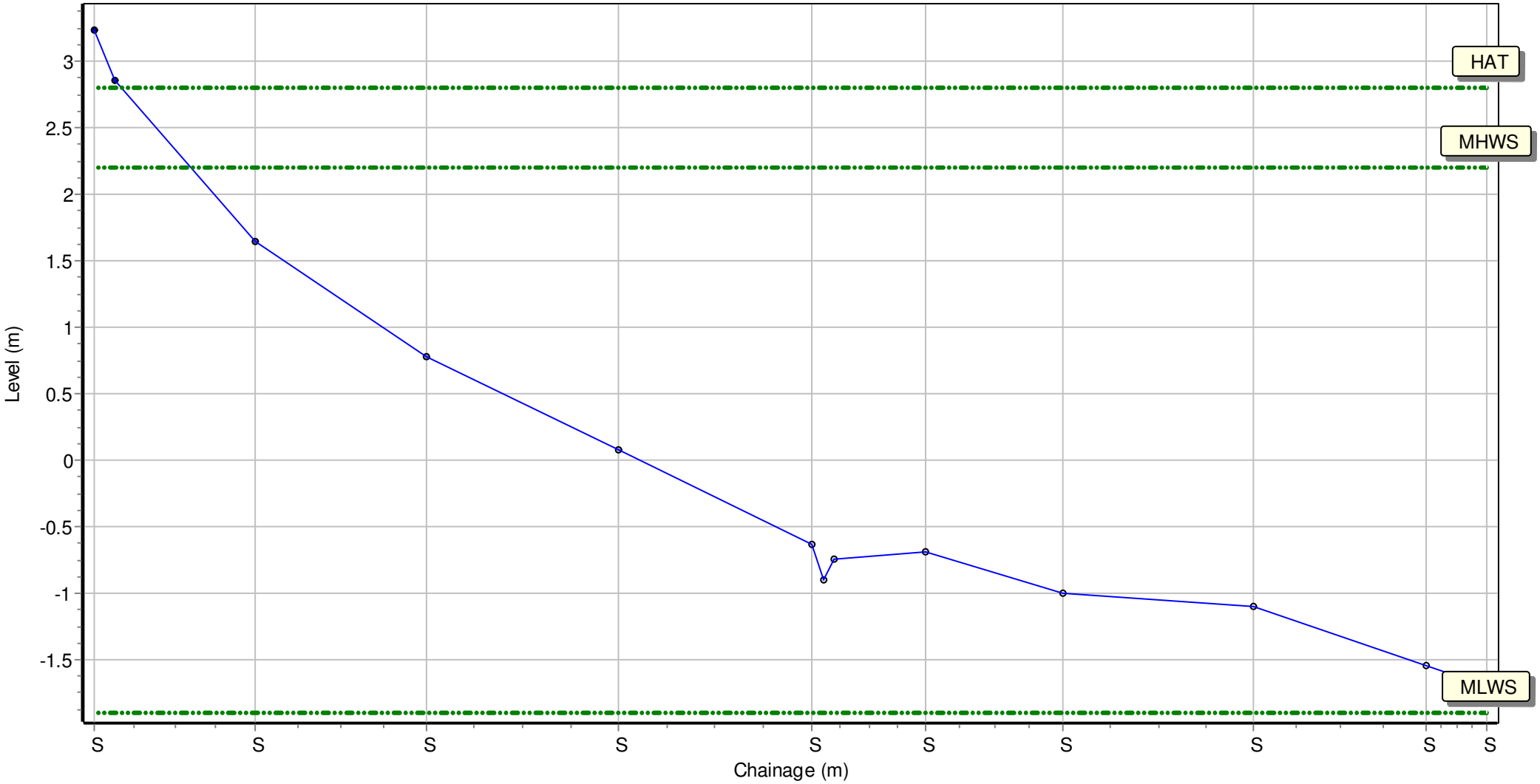
Location: **1aBTBC14**

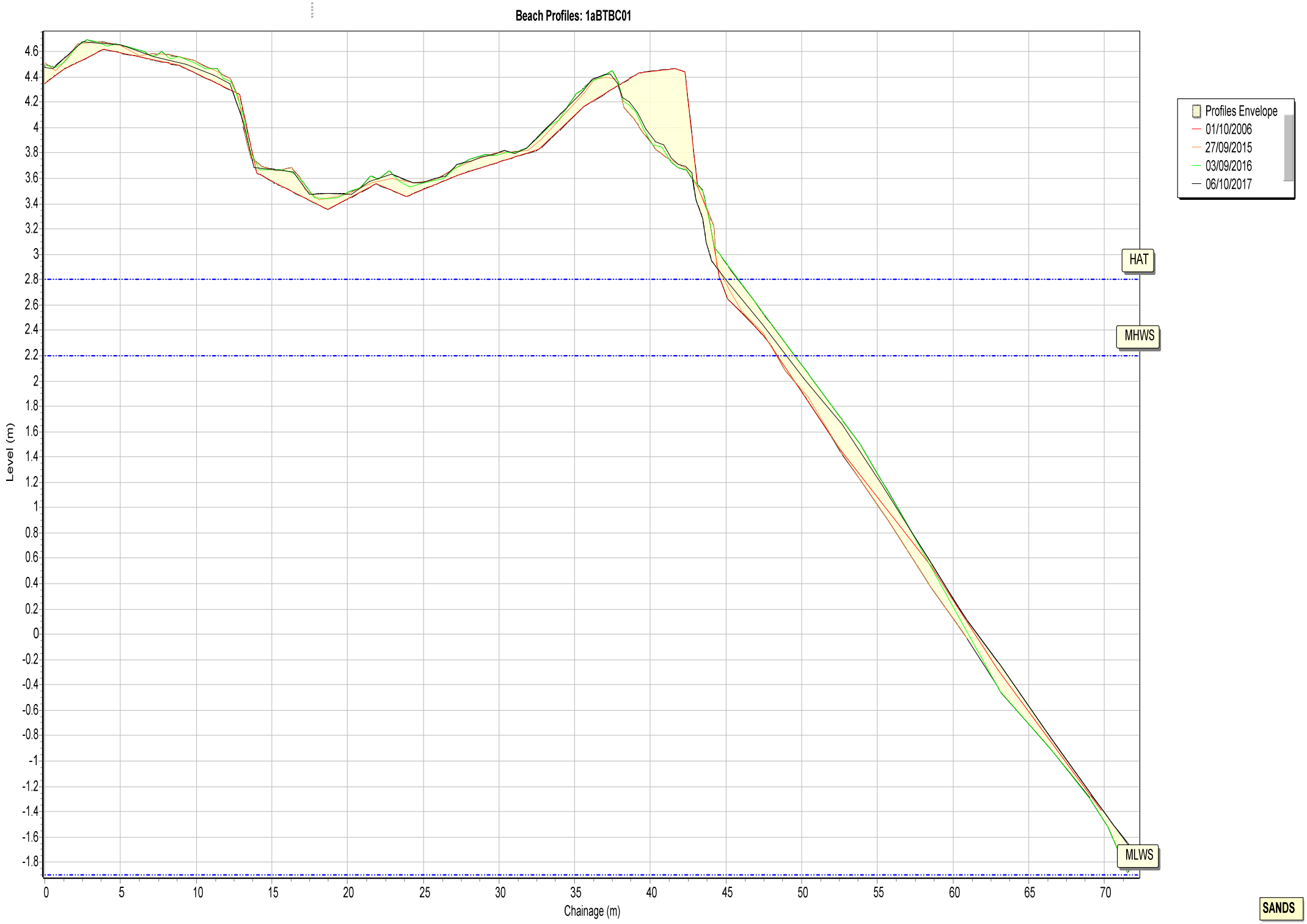
Date: 06/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 401030.513 **Northing:** 651003.409 **Profile Bearing:** 60 ° from North

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Profiles Envelope
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27/09/2015
03/09/2016
06/10/2017
HAT
MHWS
MLWS
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Level (m)
Chainage (m)
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4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
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20
25
30
35
40
45
50
55
60
65
70


Beach Profiles: 1aBTBC02
Profiles Envelope
01/04/2006
03/09/2016
03/03/2017
06/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
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2.4
2.2
2
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1.6
1.4
1.2
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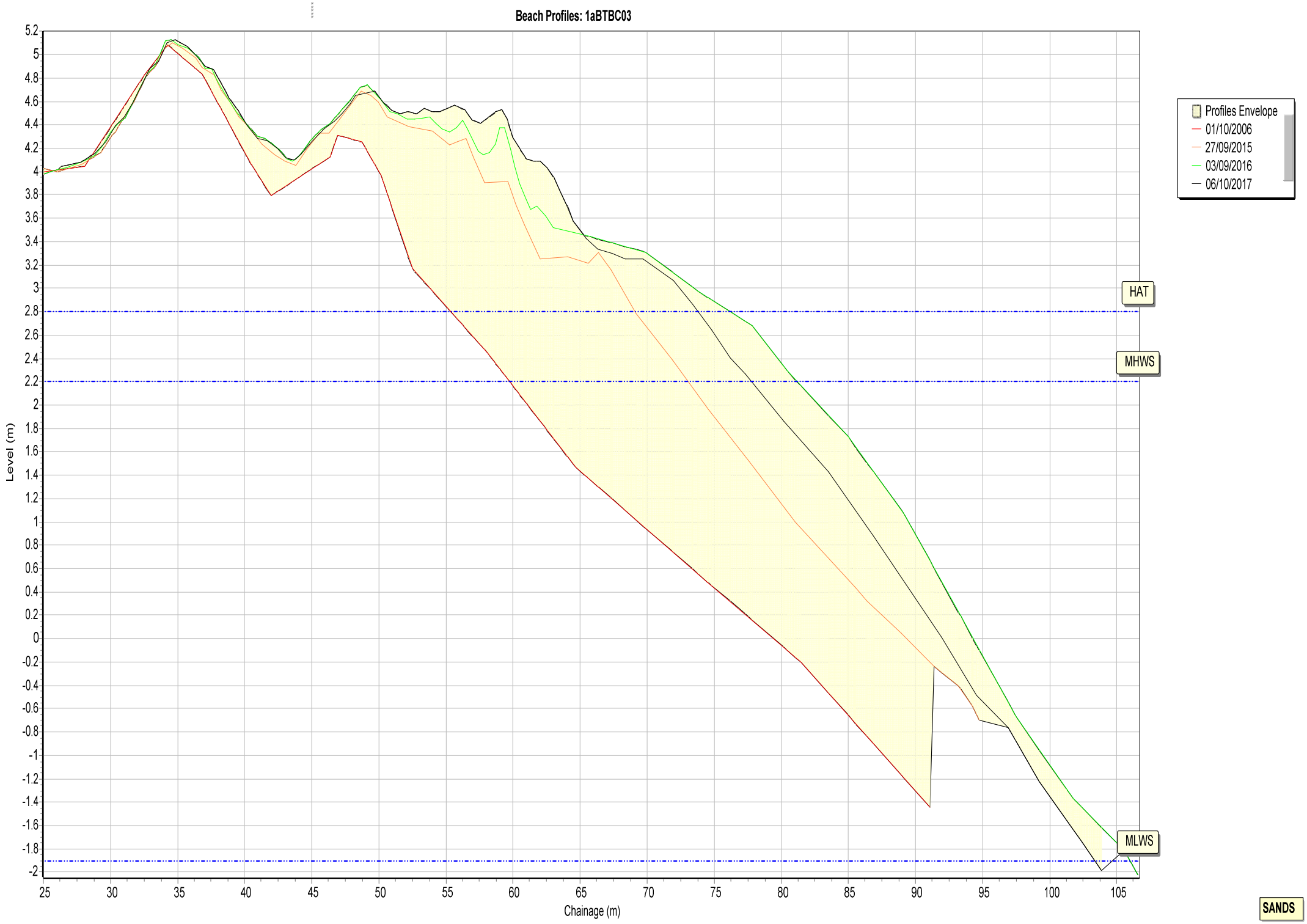
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MHWS
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Chainage (m)
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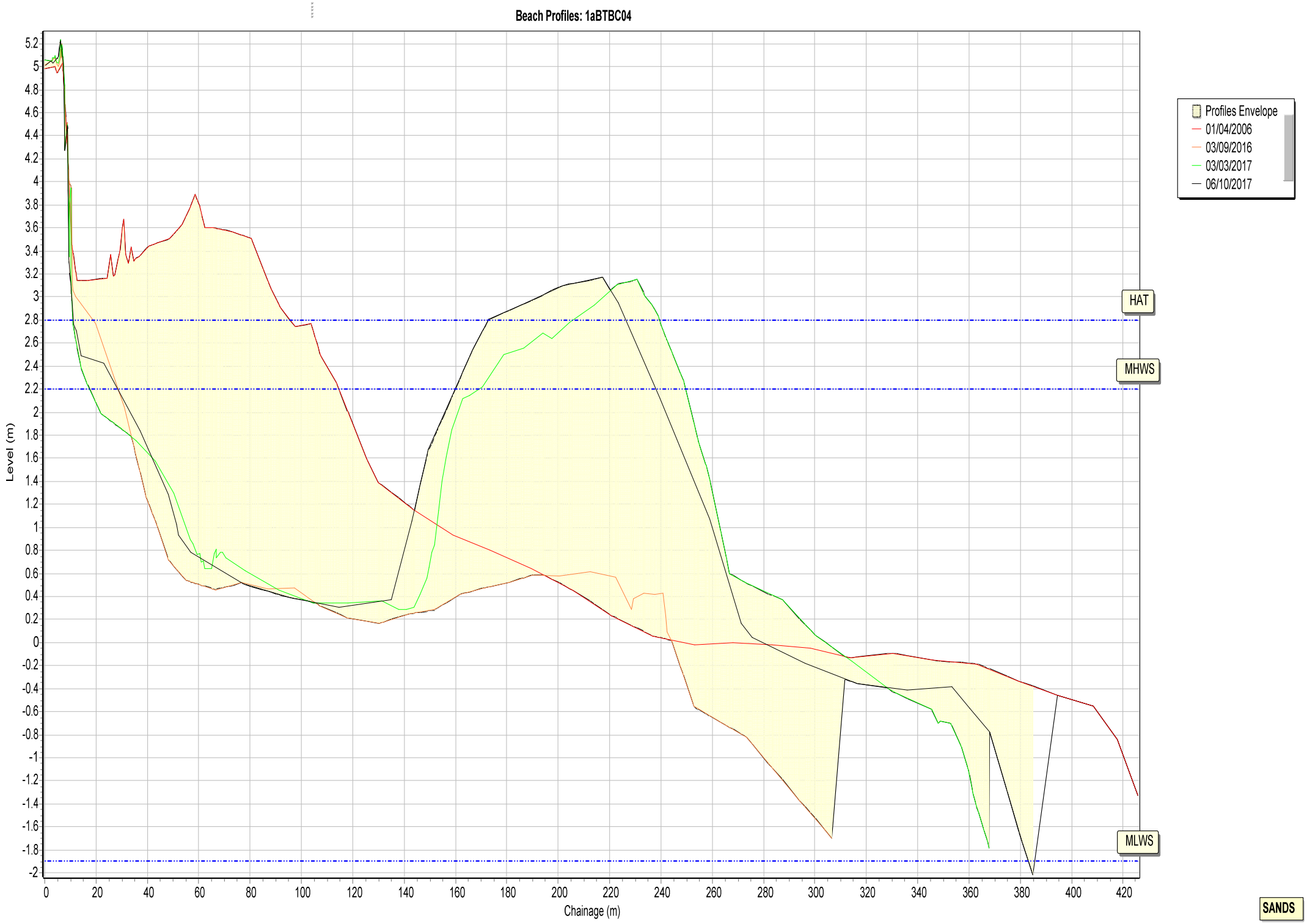
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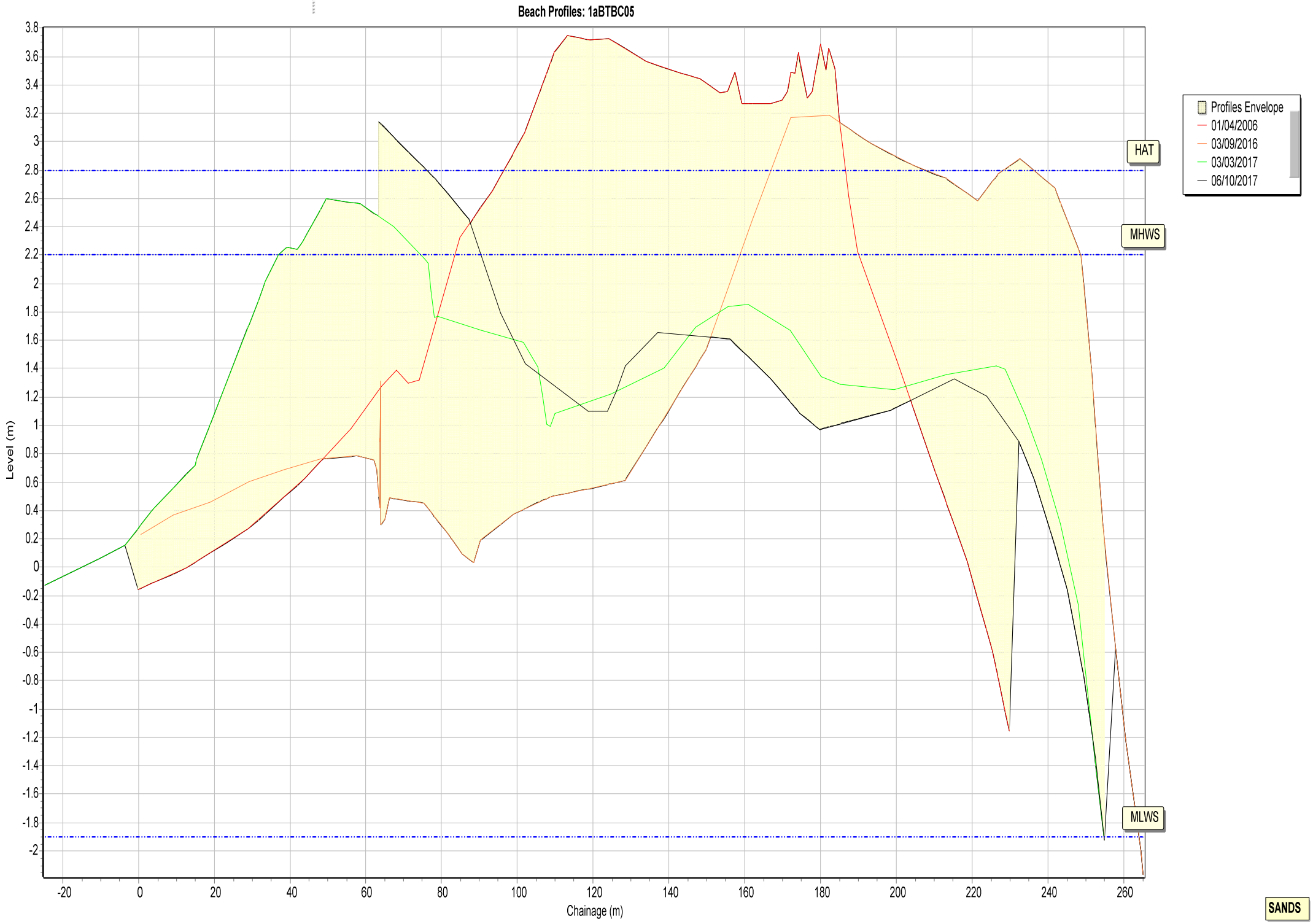
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Profiles Envelope
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03/09/2016
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MHWS
MLWS
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SANDS


Beach Profiles: 1aBTBC06
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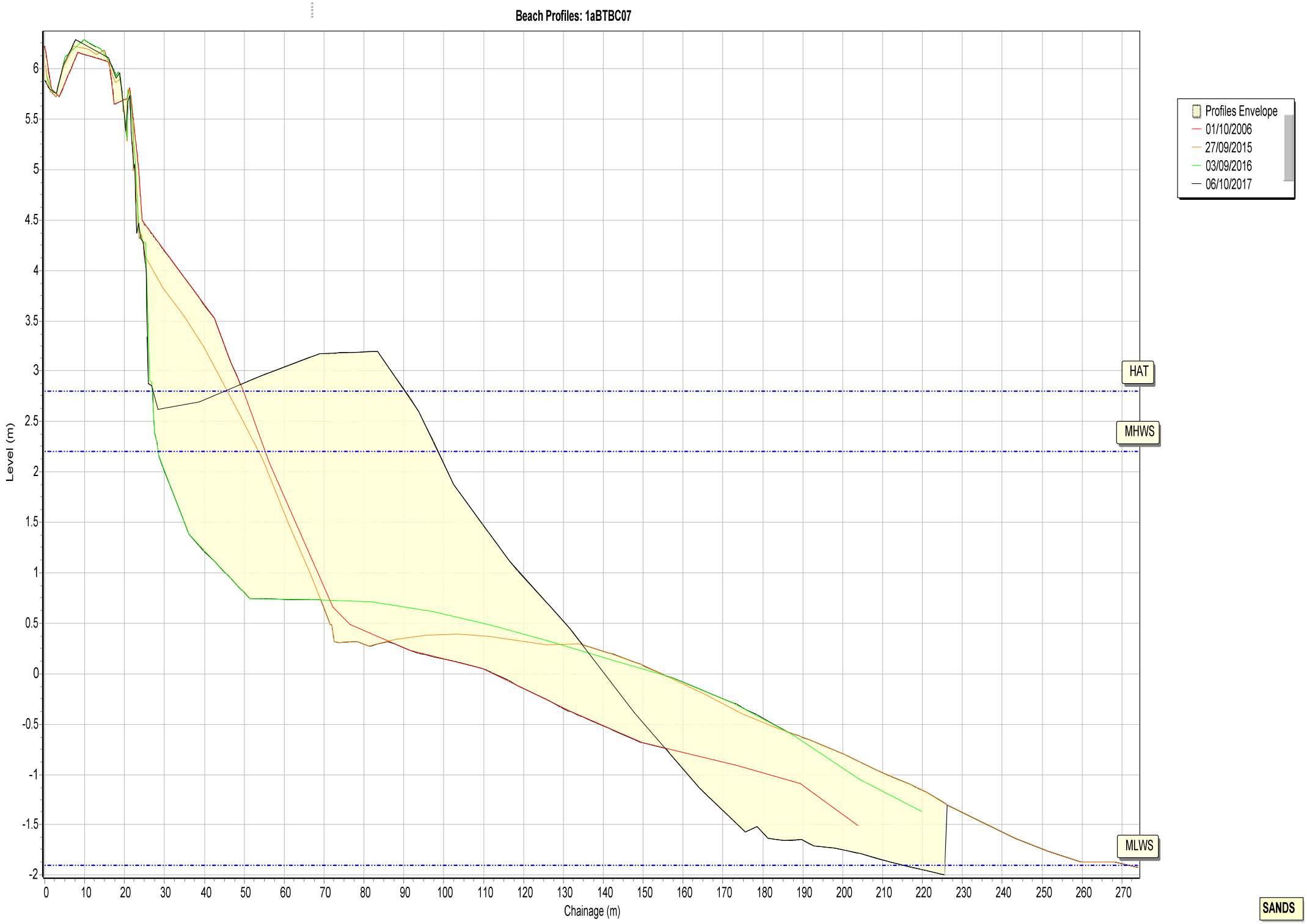
Level (m)
Chainage (m)
SANDS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Profiles Envelope
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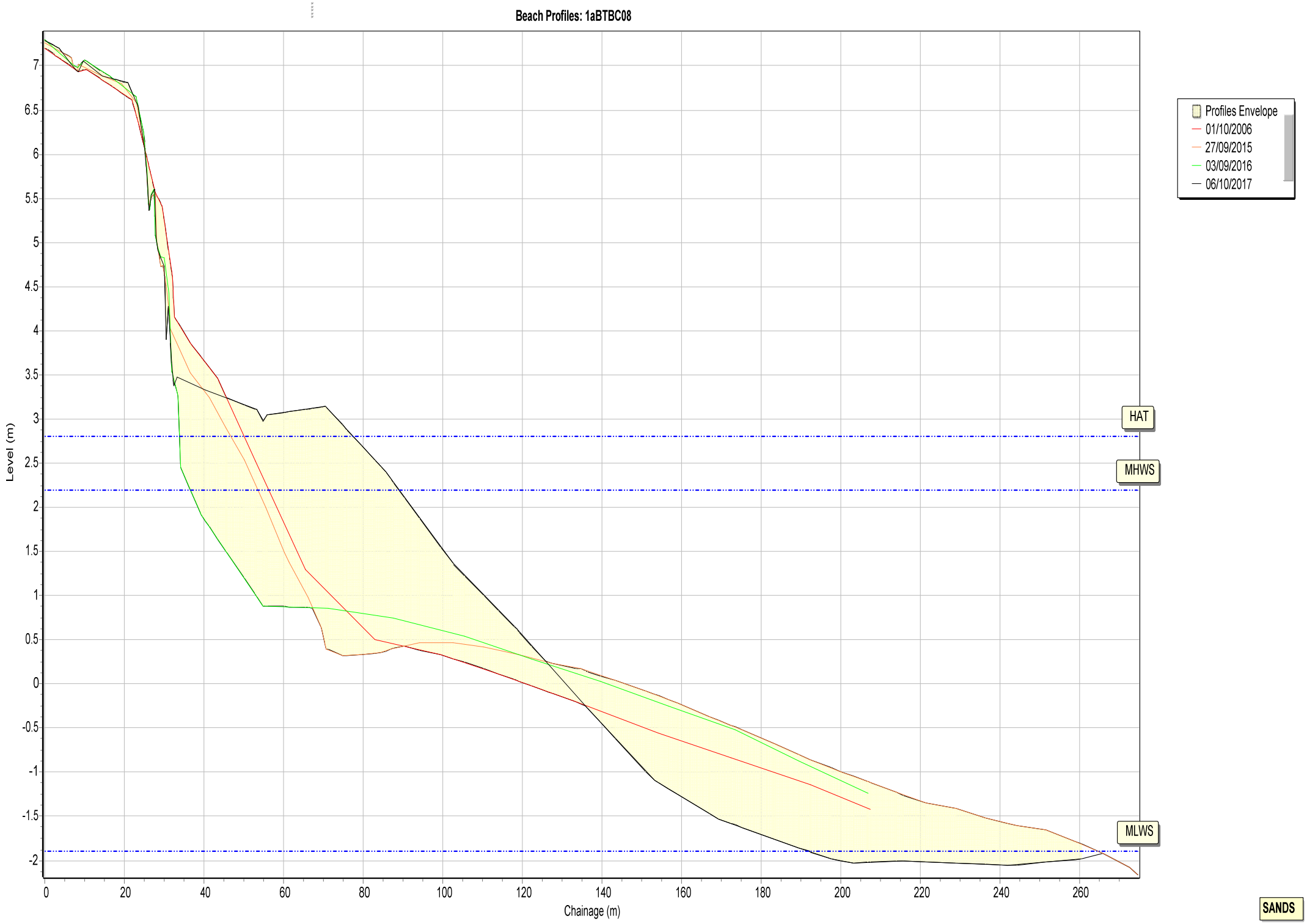
03/09/2016
06/10/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS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27/09/2015
03/09/2016
06/10/2017
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MHWS
MLWS
Level (m)
Chainage (m)
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
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80
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240
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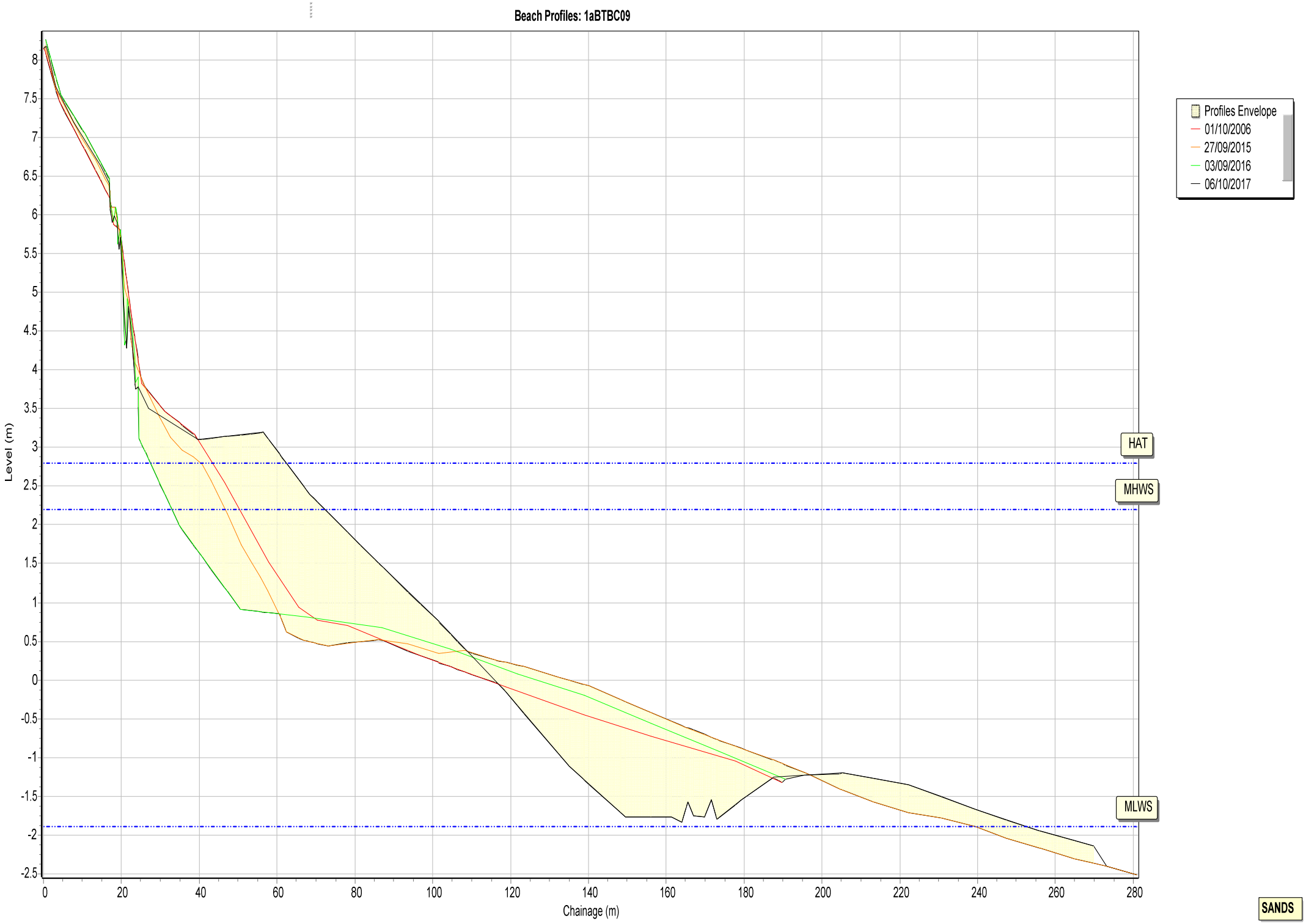
SANDS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Profiles Envelope
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27/09/2015
03/09/2016
06/10/2017
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MLWS
SANDS
Level (m)
Chainage (m)
8
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7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
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-1
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240
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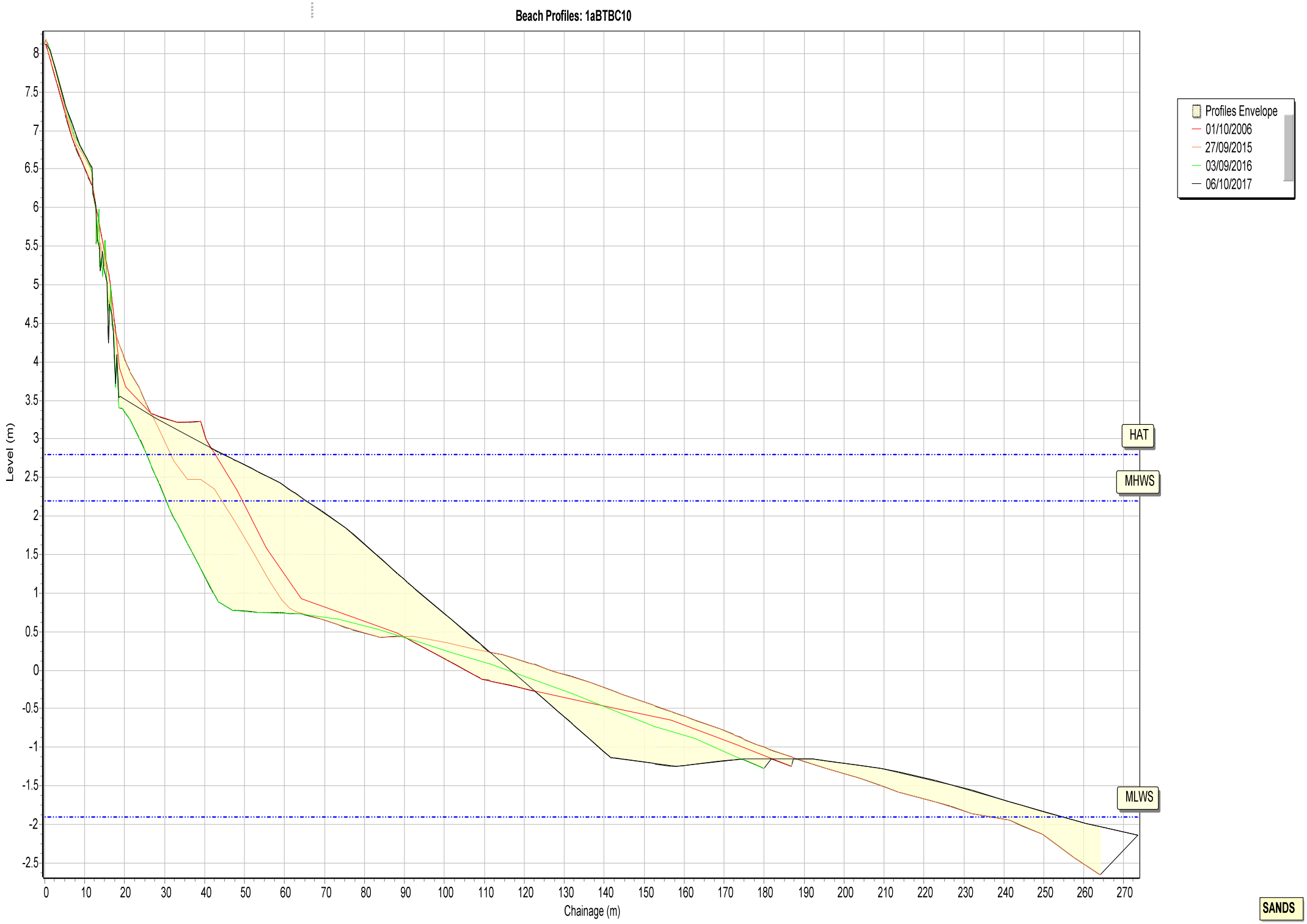
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03/09/2016
06/10/2017
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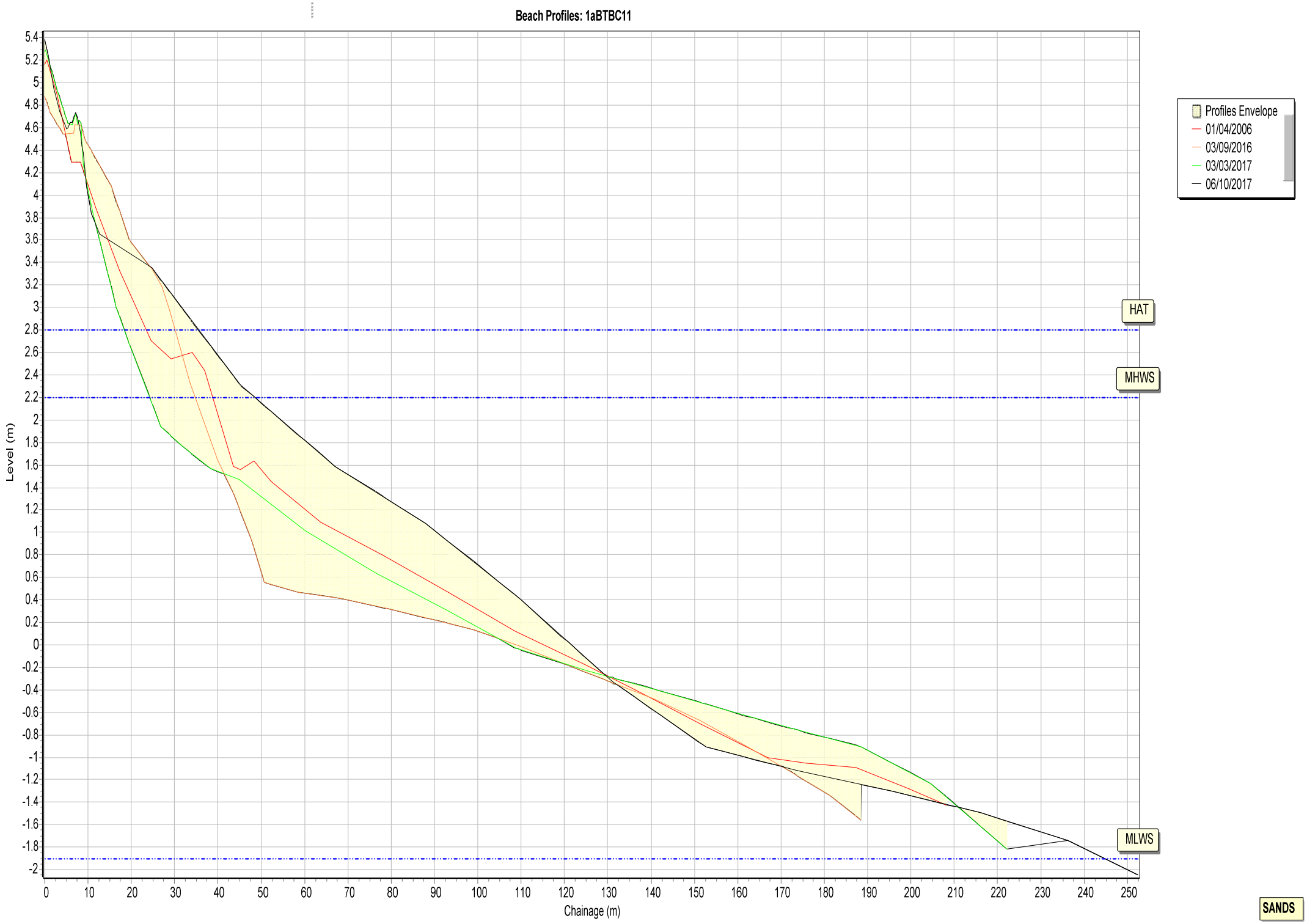
MLWS
Level (m)
Chainage (m)
SANDS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06/10/2017
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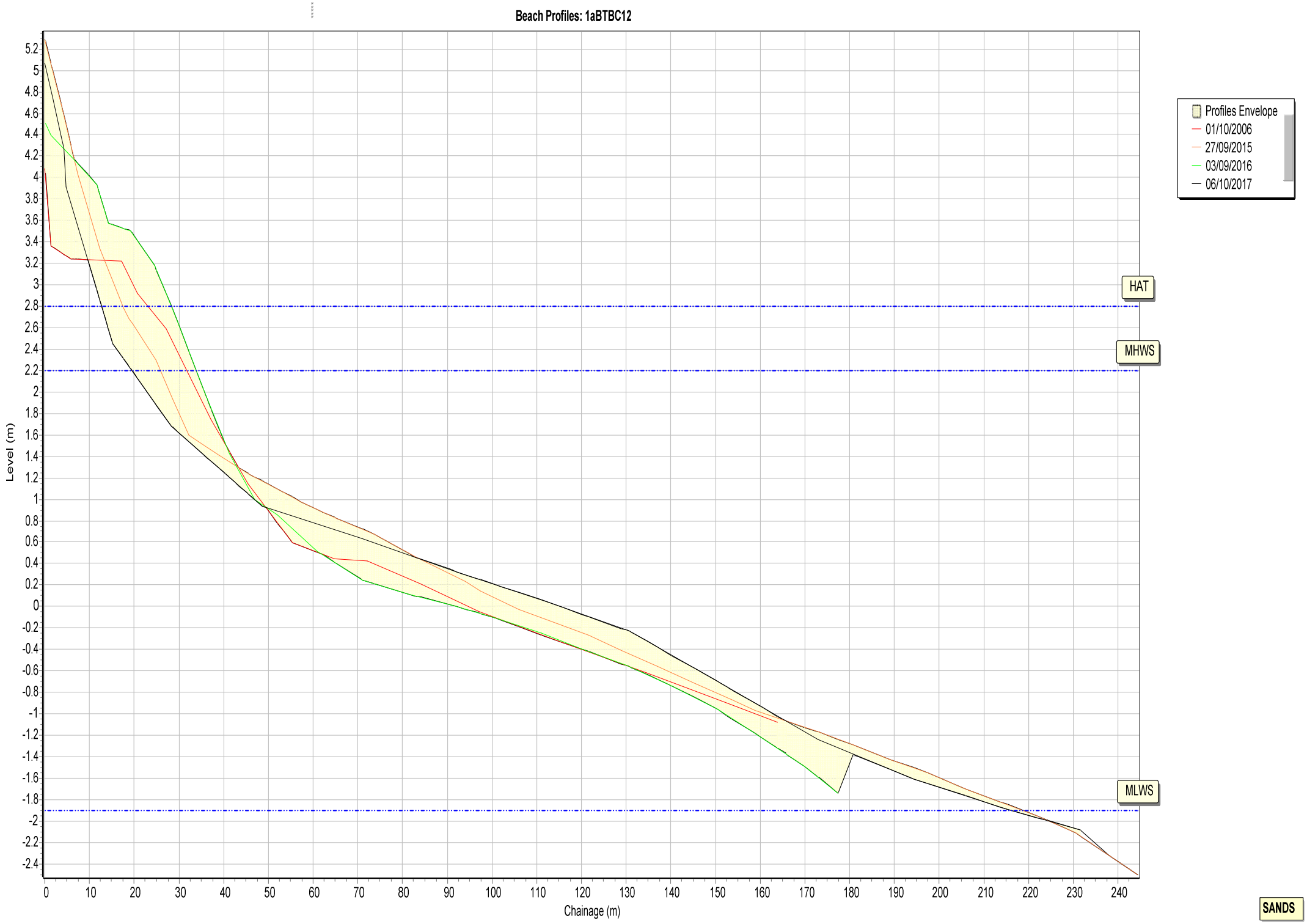
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aBTBC12
Profiles Envelope
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03/09/2016
06/10/2017
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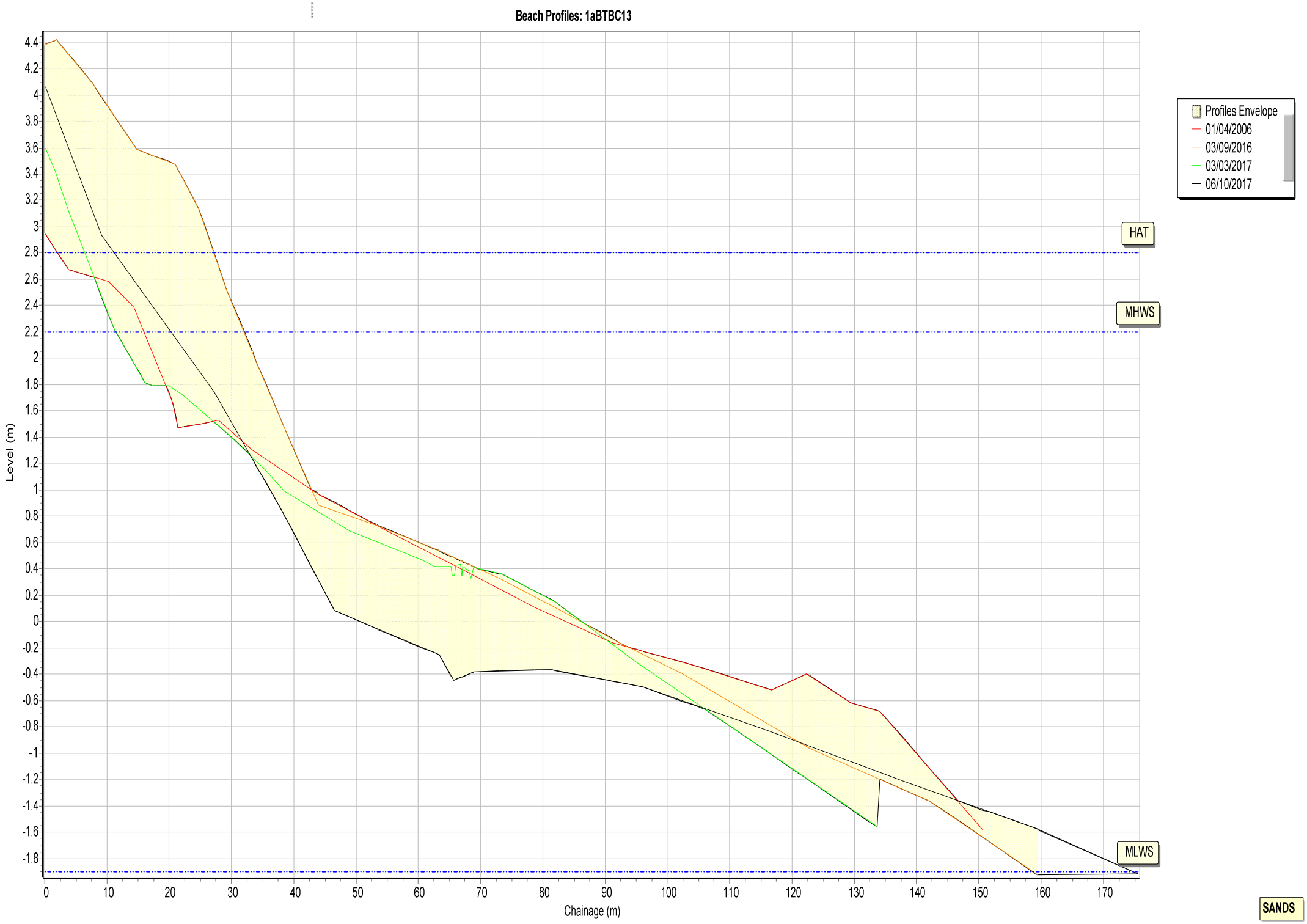
MLWS
Level (m)
Chainage (m)
SANDS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03/03/2017
06/10/2017
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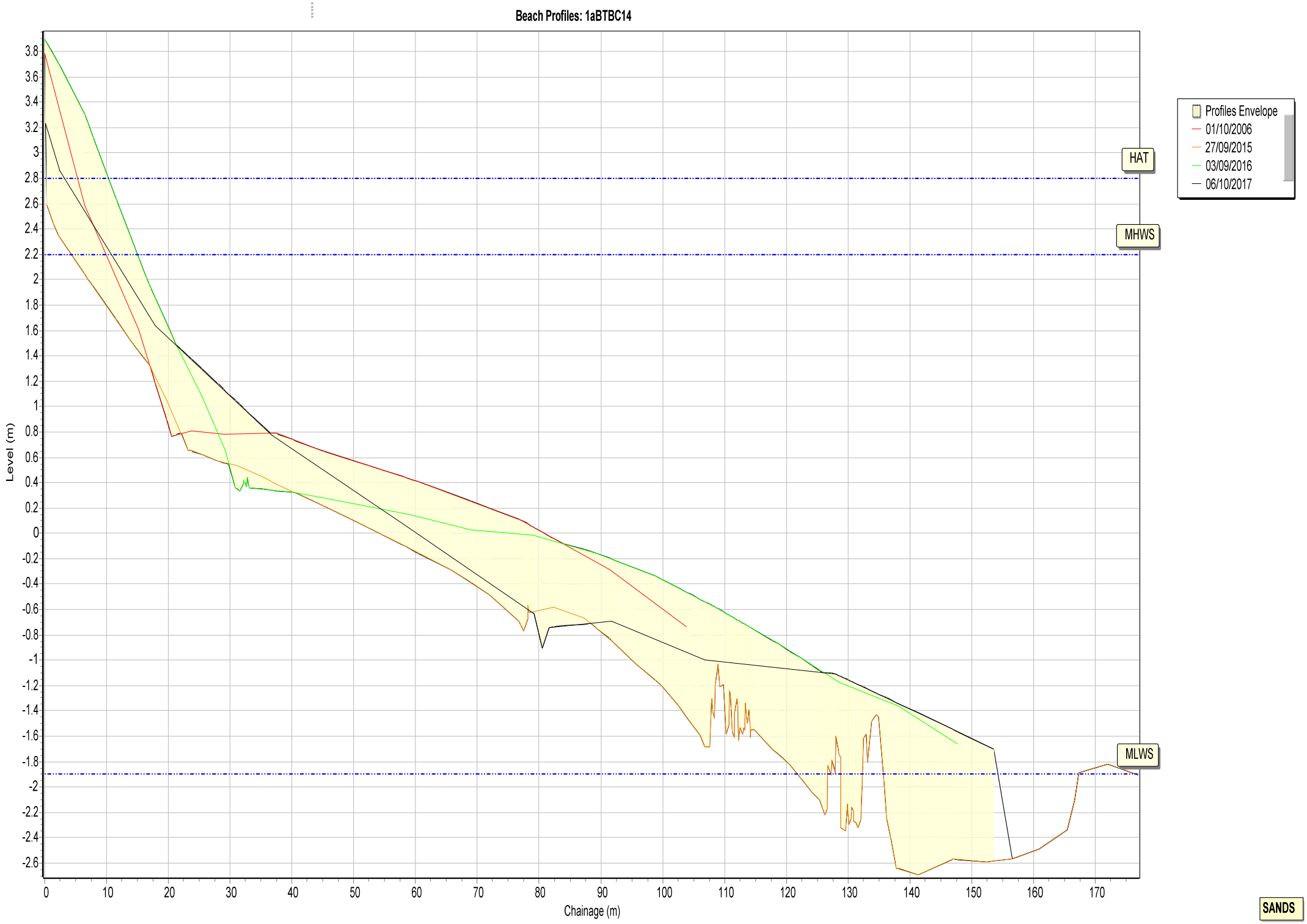
MLWS
Level (m)
Chainage (m)
SANDS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Level (m)
Chainage (m)
HAT
MHWS
MLWS
Profiles Envelope
01/10/2006
27/09/2015
03/09/2016
06/10/2017
SANDS

Beach Profile

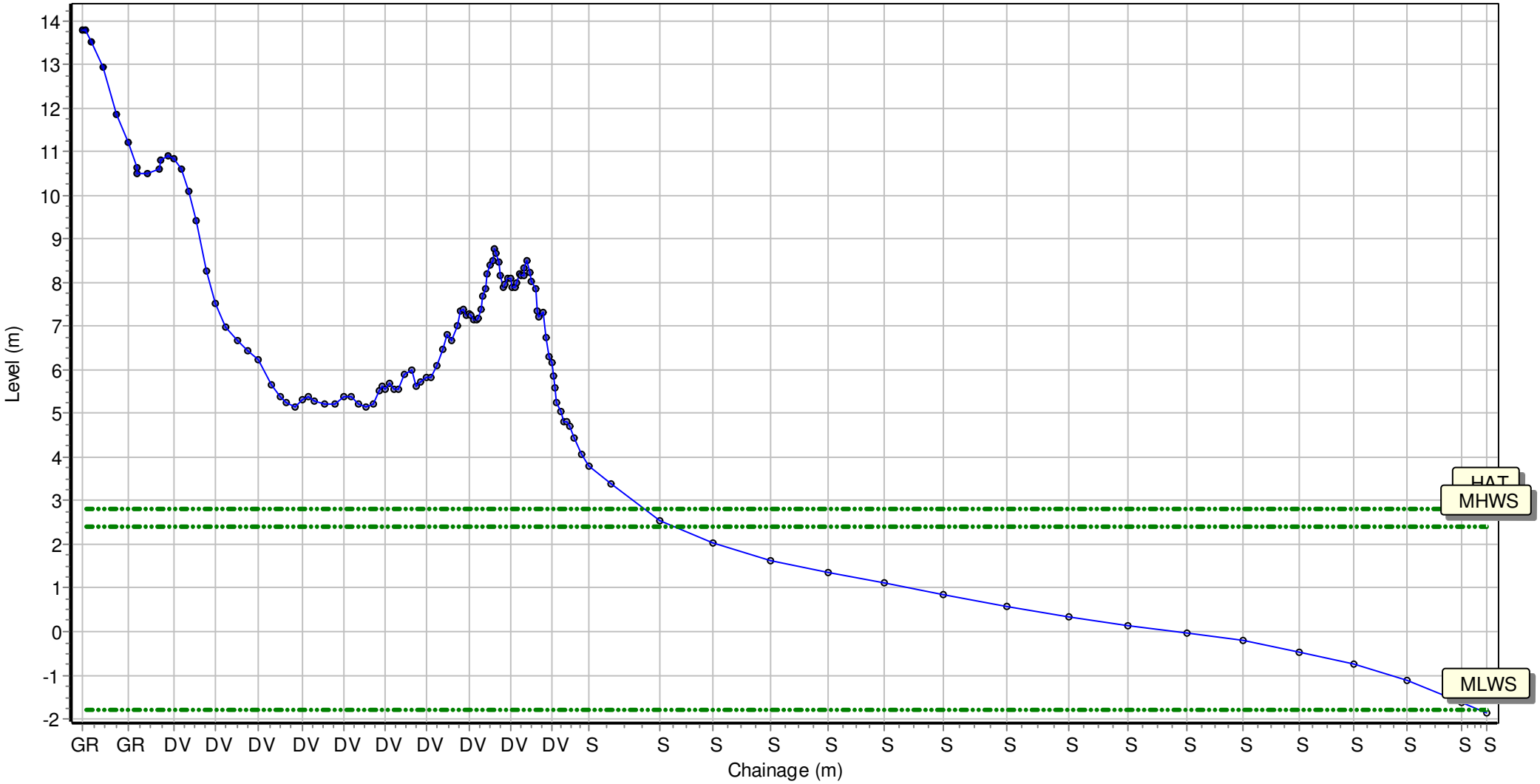
Location: **1aBTBC15**

Date: 05/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 402663.736 **Northing:** 648593.739 **Profile Bearing:** 40 ° from North



Beach Profile

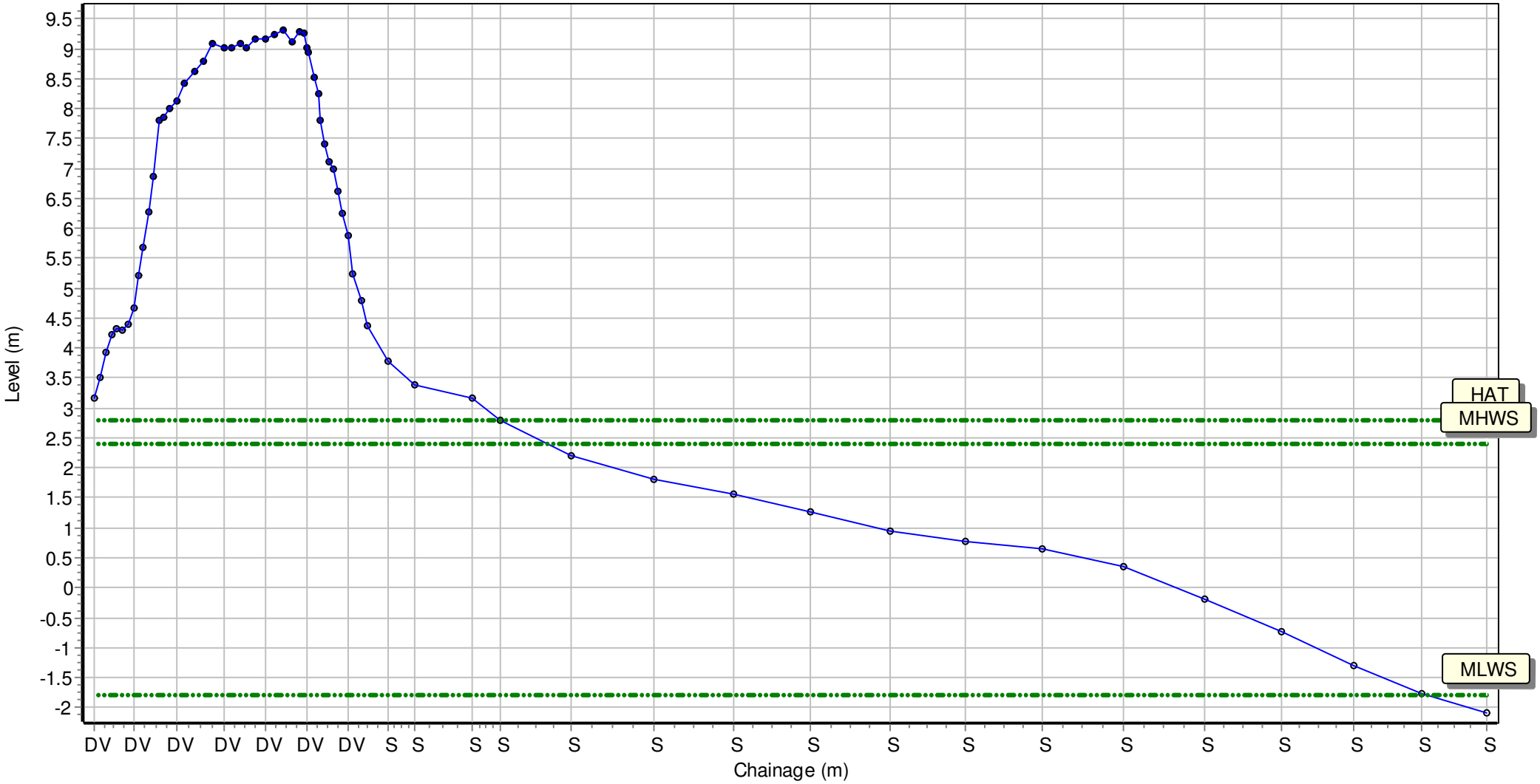
Location: **1aBTBC16**

Date: 05/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 403565.671 **Northing:** 647735.833 **Profile Bearing:** 53 ° from North



Beach Profile

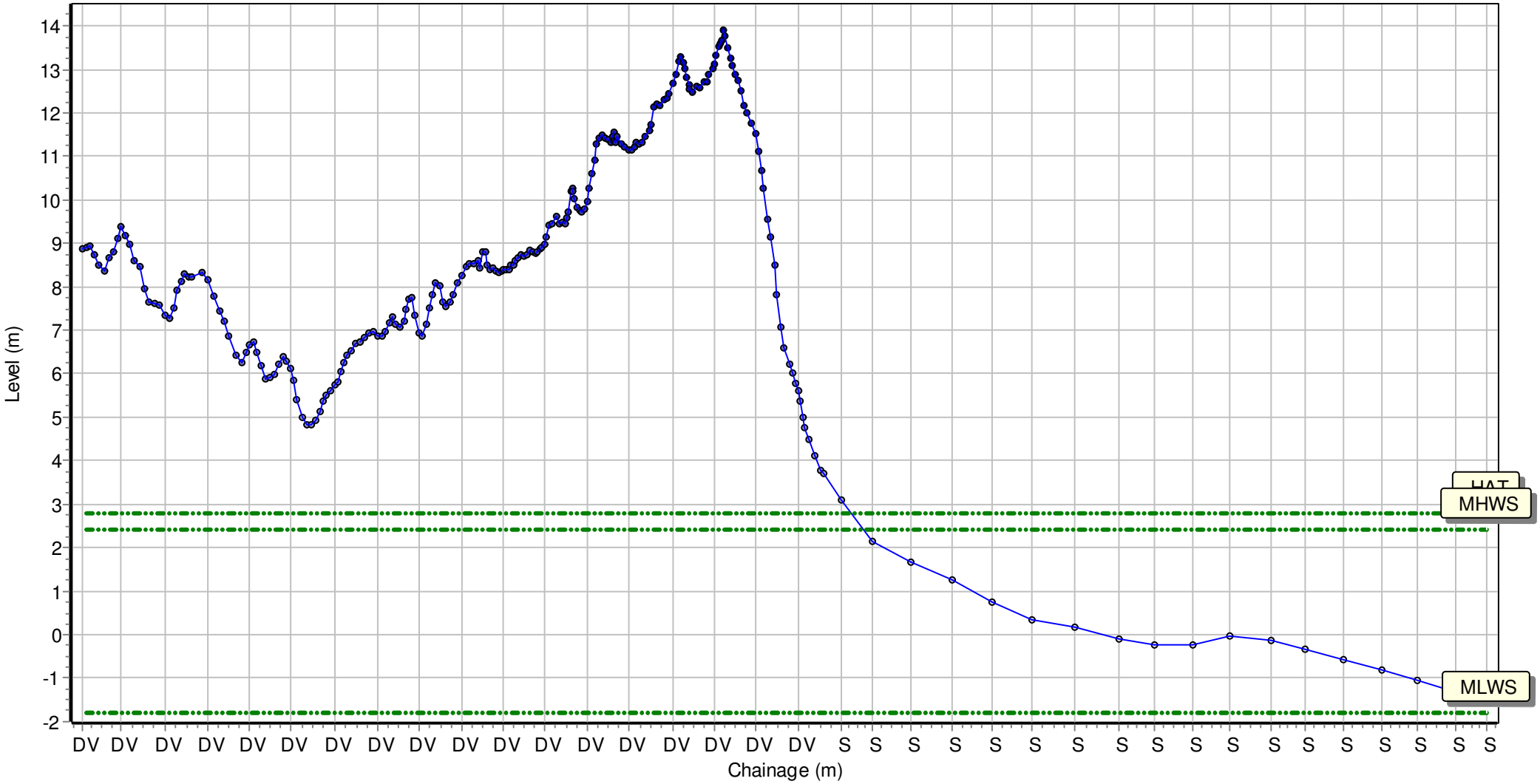
Location: **1aBTBC17**

Date: 05/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 404433.939 **Northing:** 646713.965 **Profile Bearing:** 51 ° from North



Beach Profile

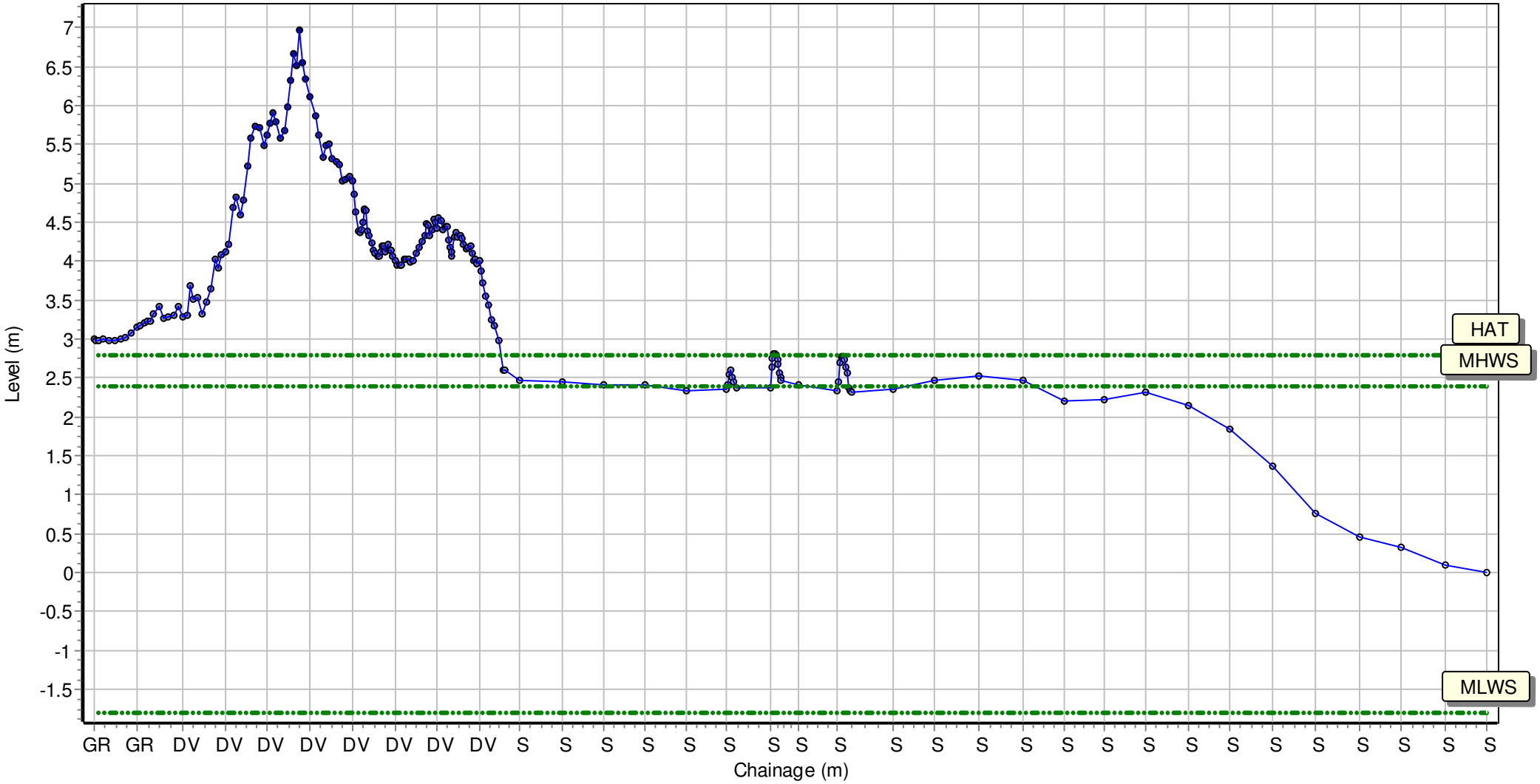
Location: **1aBTBC18**

Date: 05/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 405985.759 **Northing:** 645466.297 **Profile Bearing:** 38 ° from North



Beach Profile

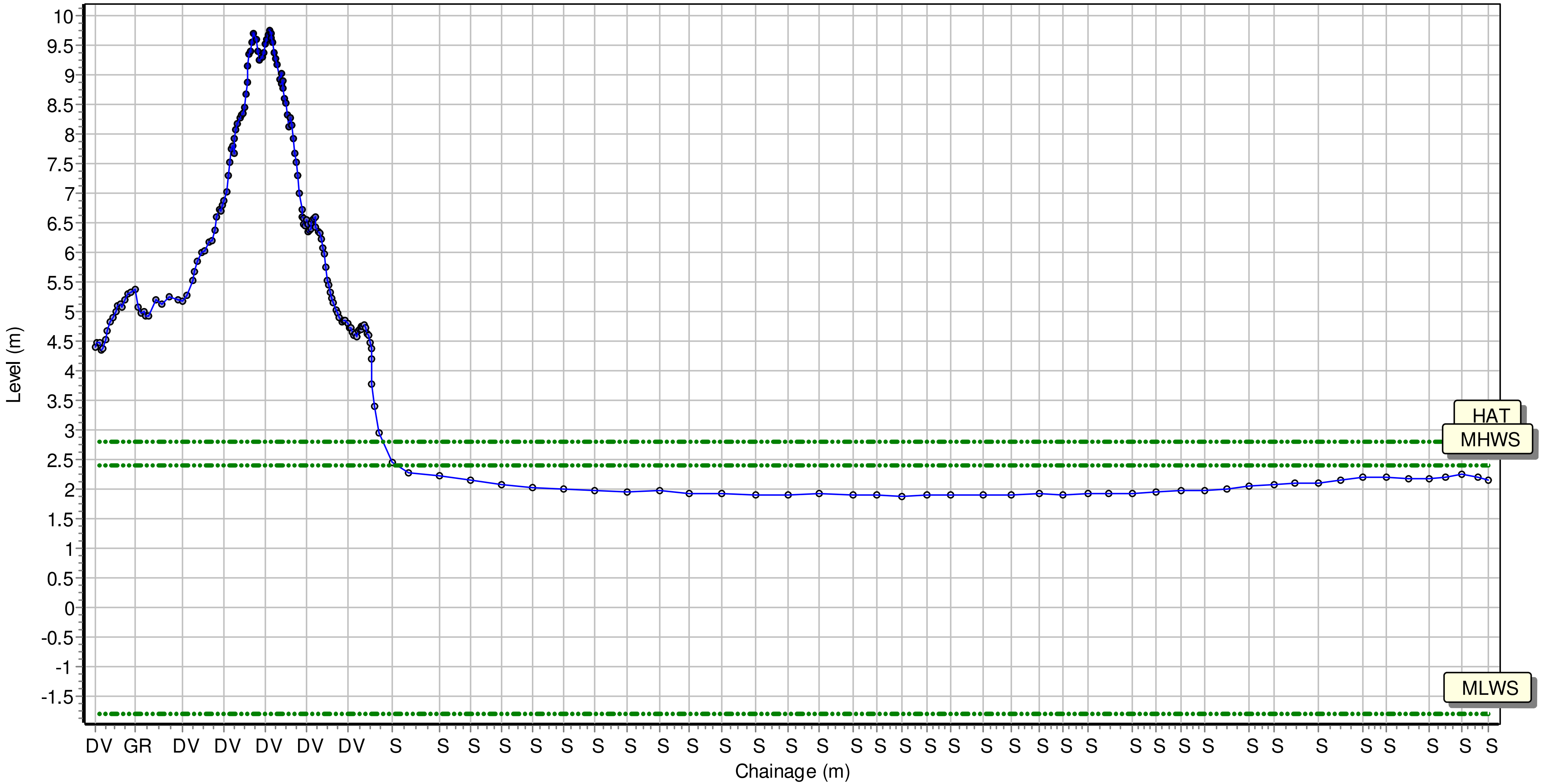
Location: 1aBTBC19

Date: 06/12/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 407091.566 **Northing:** 644616.133 **Profile Bearing:** 34 ° from North



http://www.sandsuser.com

SANDS

Beach Profile

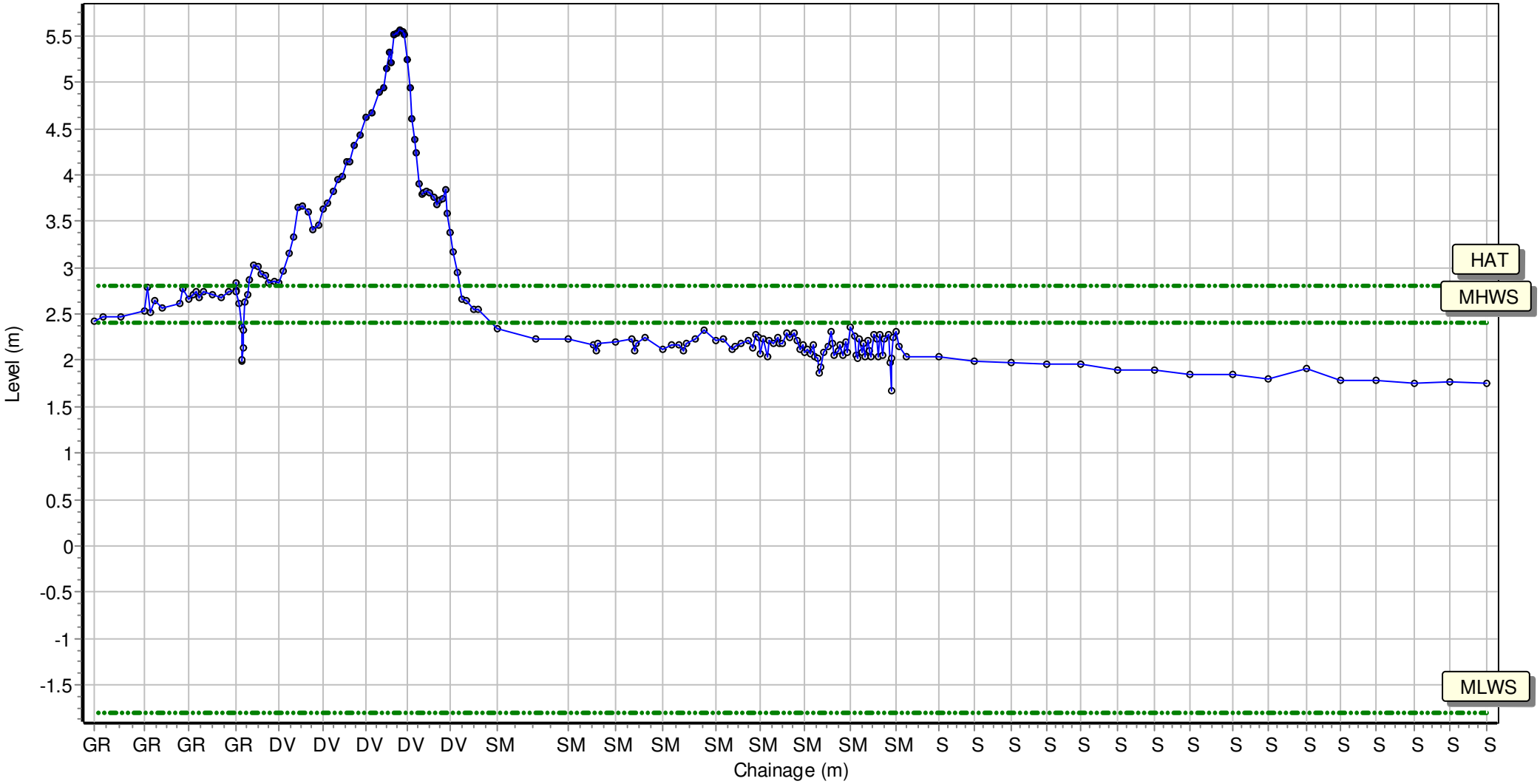
Location: **1aBTBC20**

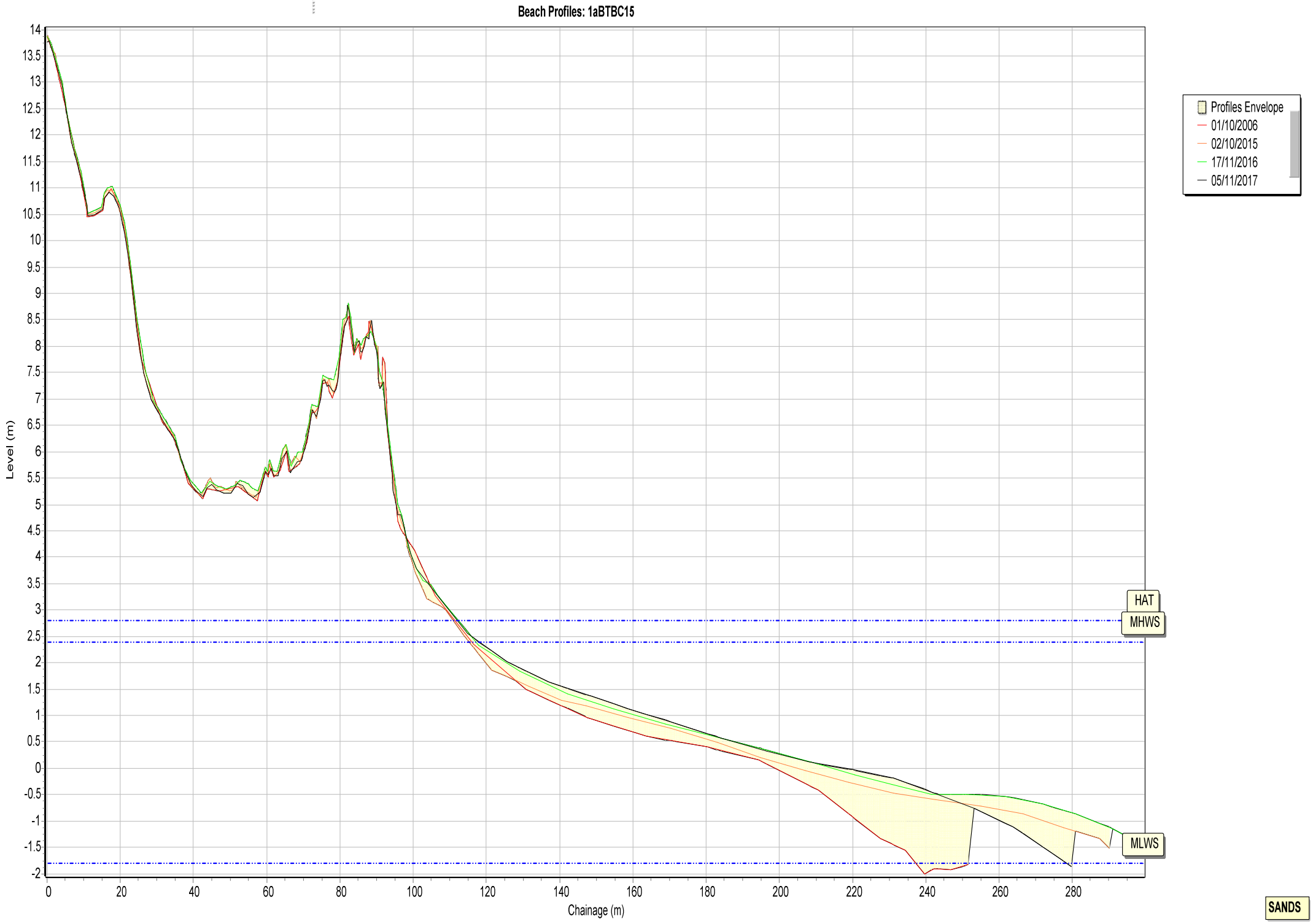
Date: 06/12/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 407390.255 **Northing:** 643841.768 **Profile Bearing:** 45 ° from North




Beach Profiles: 1aBTBC15
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02/10/2015
17/11/2016
05/11/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
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13.5
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12.5
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11.5
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10.5
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8.5
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7.5
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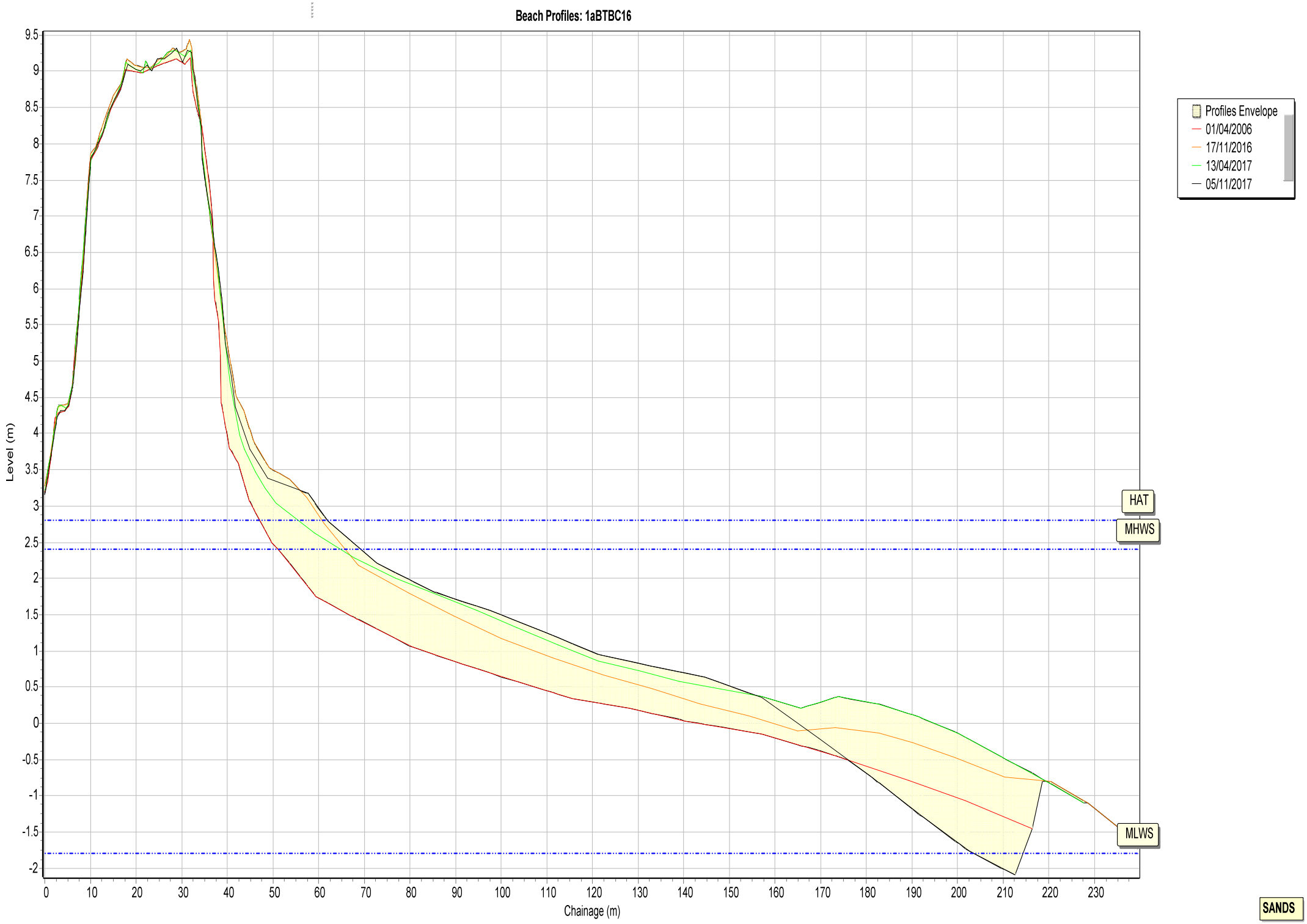
Beach Profiles: 1aBTBC16
Profiles Envelope
01/04/2006
17/11/2016
13/04/2017
05/11/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
9.5
9
8.5
8
7.5
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6.5
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5.5
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4.5
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3.5
3
2.5
2
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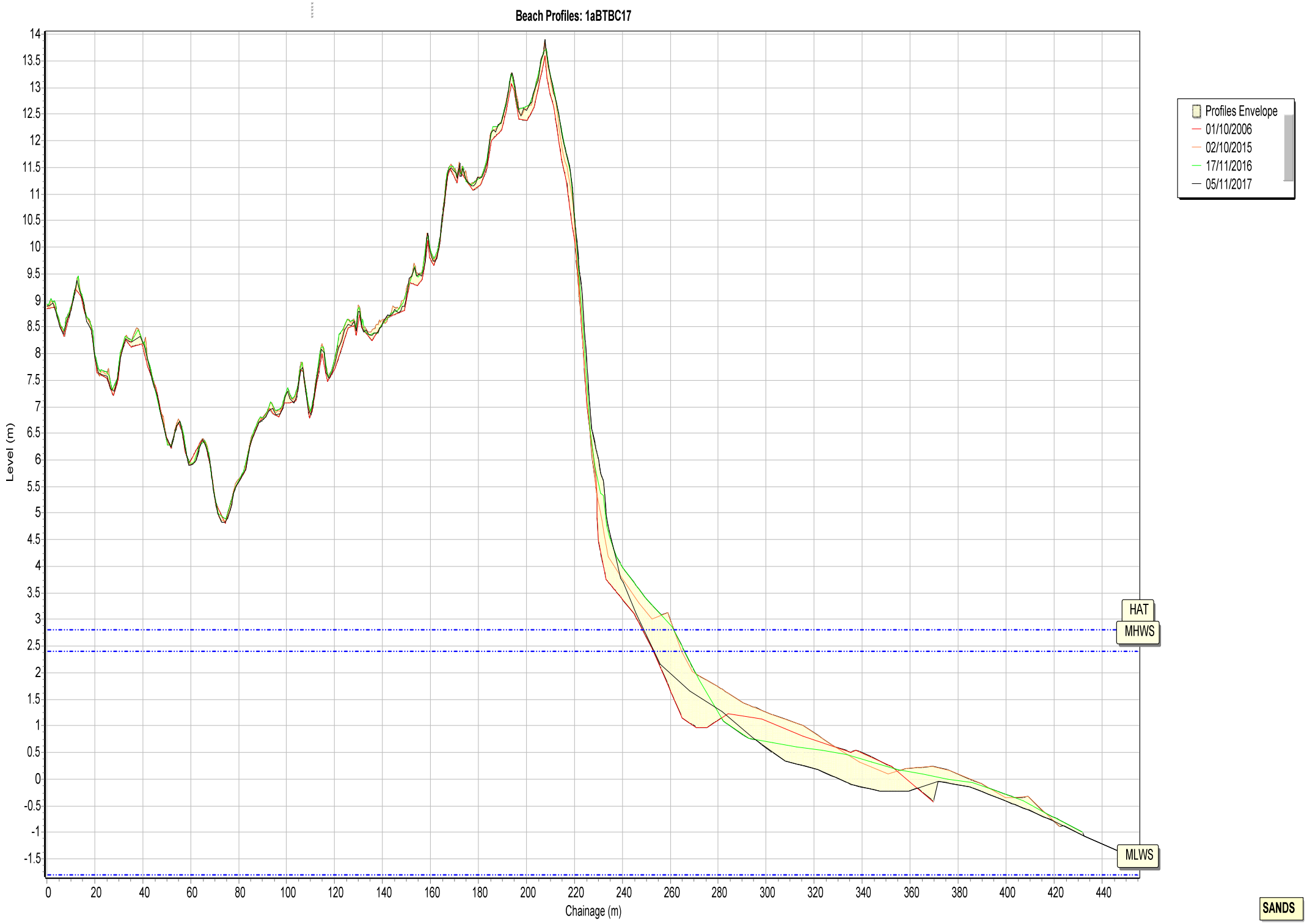
230


Beach Profiles: 1aBTBC17
Profiles Envelope
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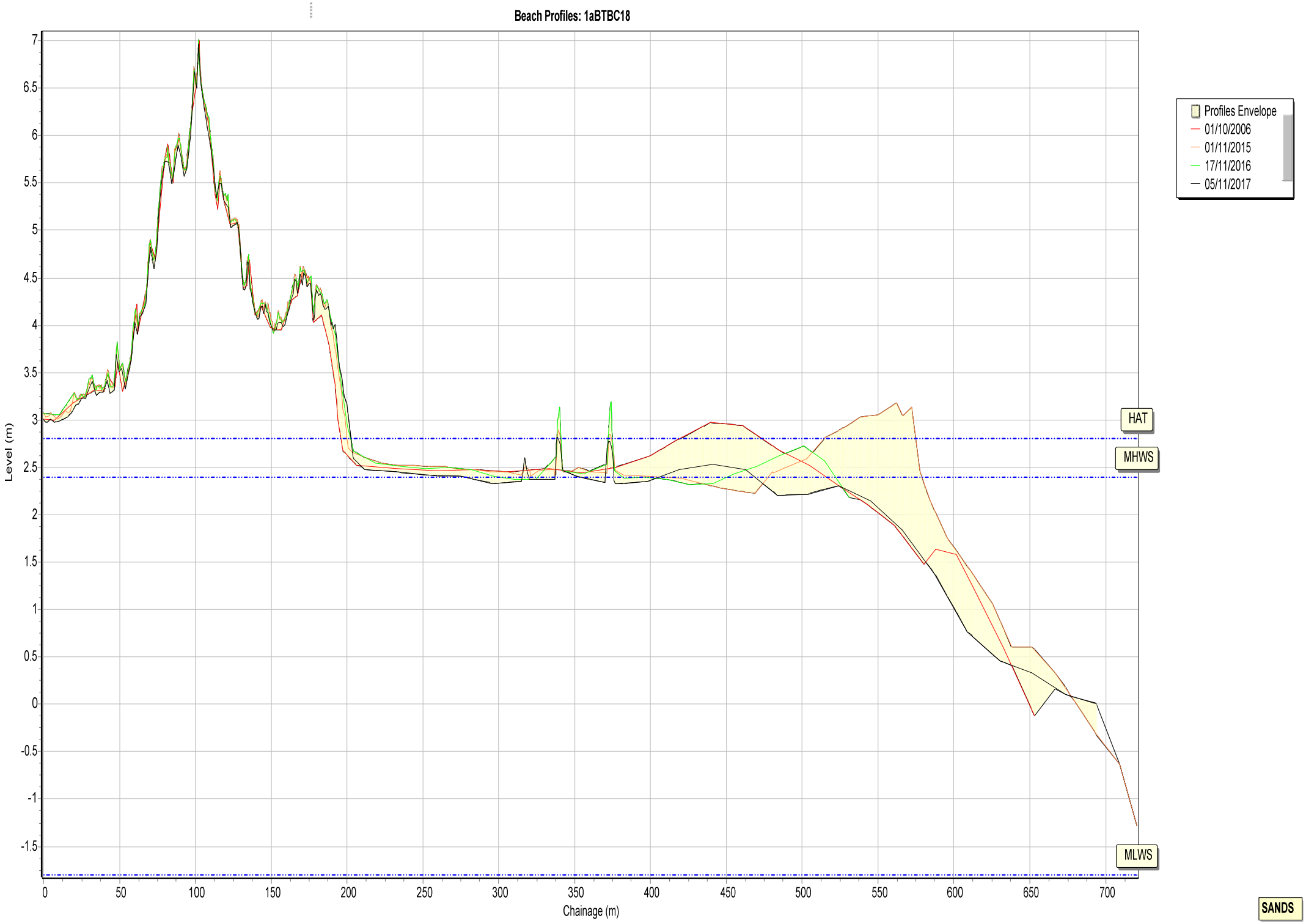
02/10/2015
17/11/2016
05/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aBTBC18
Profiles Envelope
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01/11/2015
17/11/2016
05/11/2017
HAT
MHWS
MLWS
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Level (m)
Chainage (m)
7
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5.5
5
4.5
4
3.5
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2.5
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0.5
0
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-1
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150
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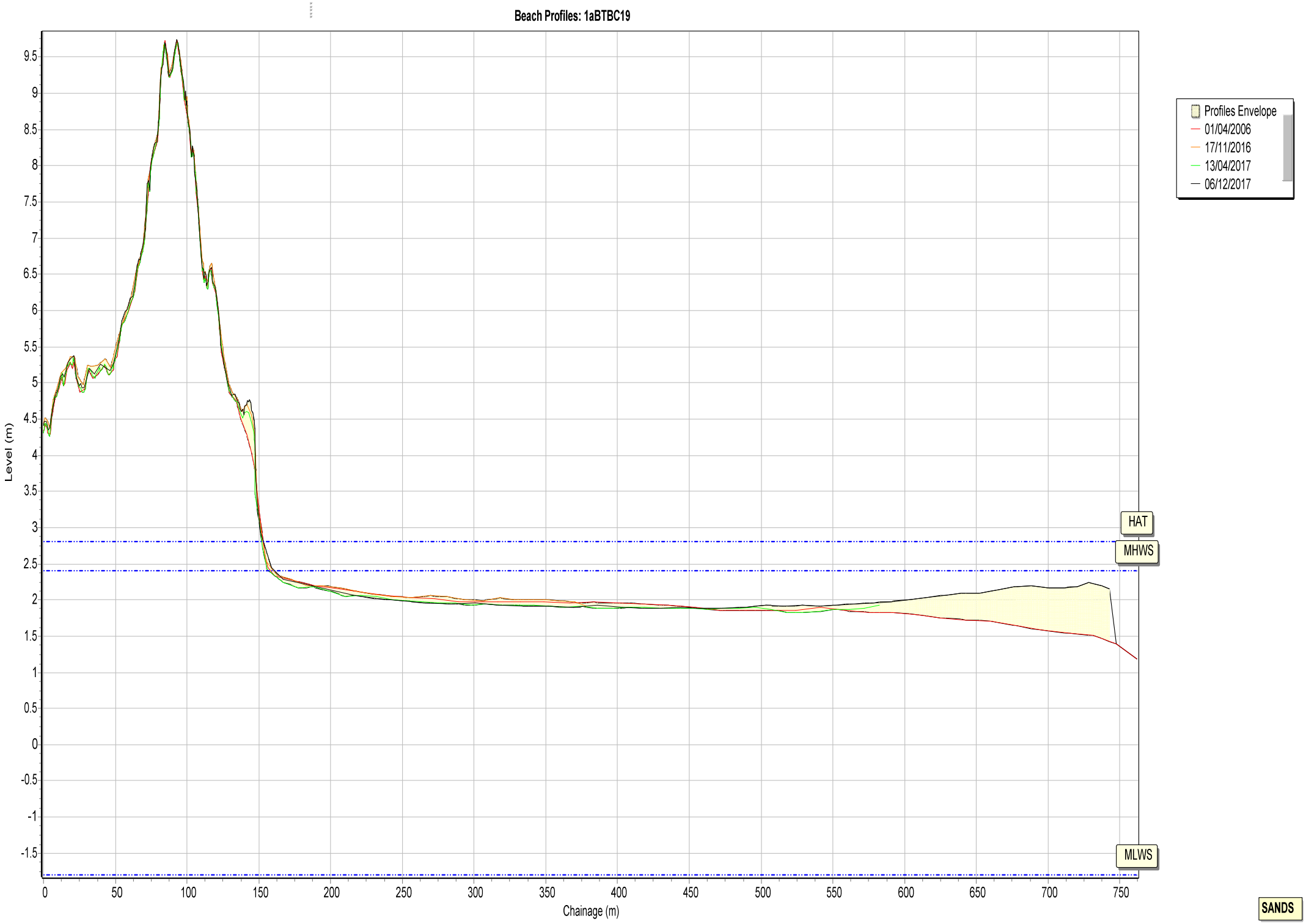
350
400
450
500
550
600
650
700


Beach Profiles: 1aBTBC19
Profiles Envelope
01/04/2006
17/11/2016
13/04/2017
06/12/2017
HAT
MHWS
MLWS
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8
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4.5
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3.5
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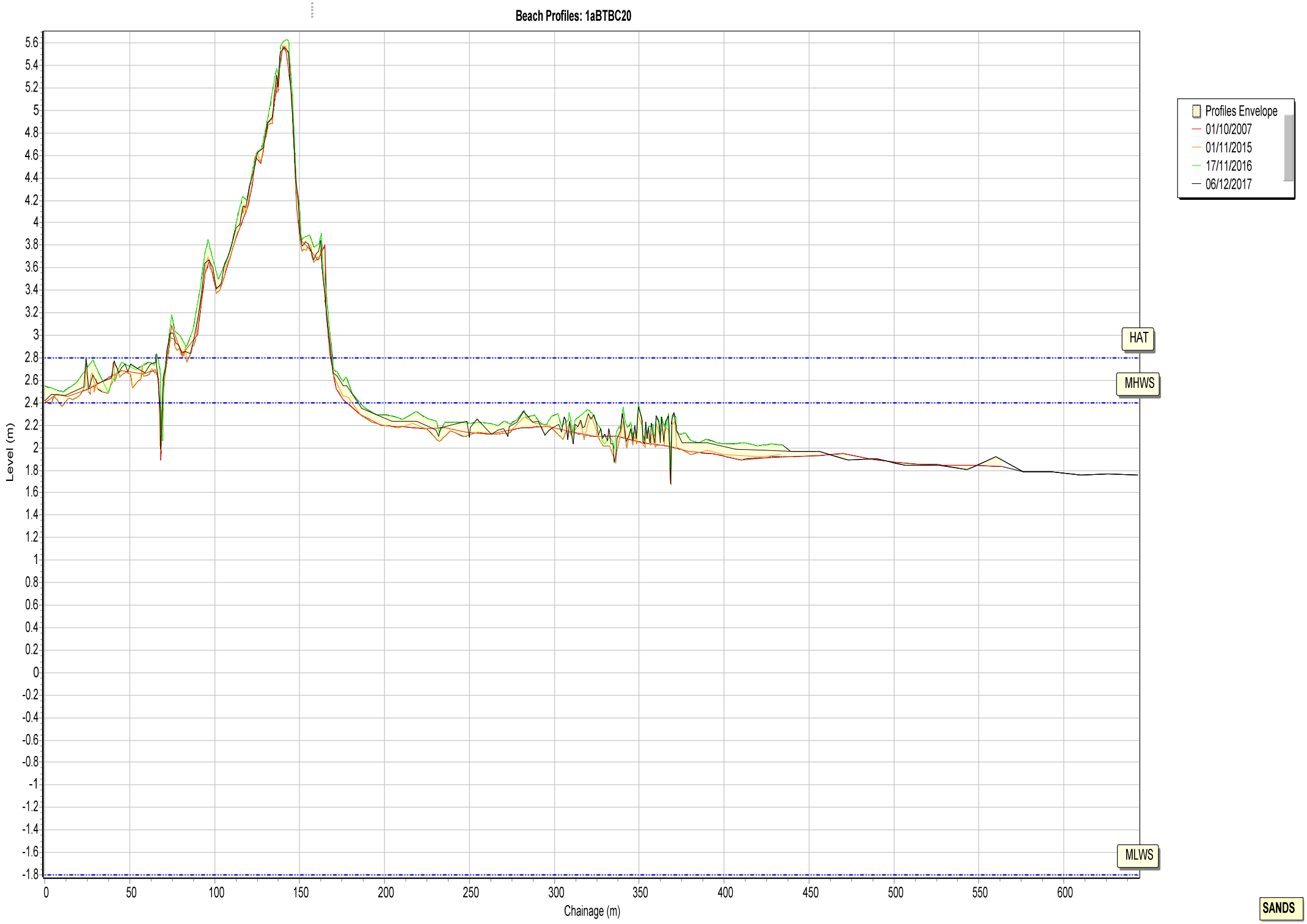
750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Profiles Envelope
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01/11/2015
17/11/2016
06/12/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
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4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
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0
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400
450
500
550
600

Beach Profile

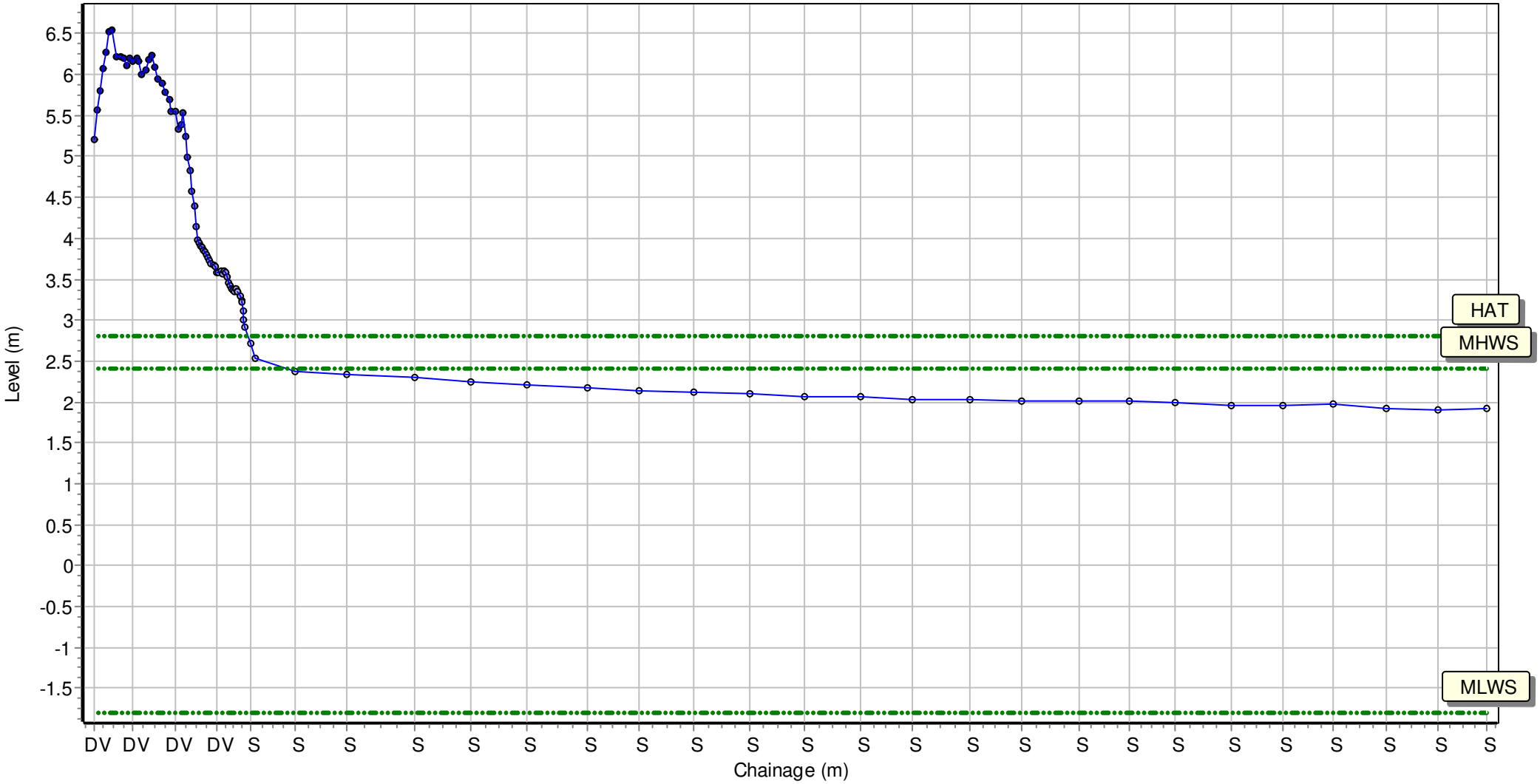
Location: **1aBTBC21**

Date: 09/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 409501.341 **Northing:** 643847.61 **Profile Bearing:** 33 ° from North



Beach Profile

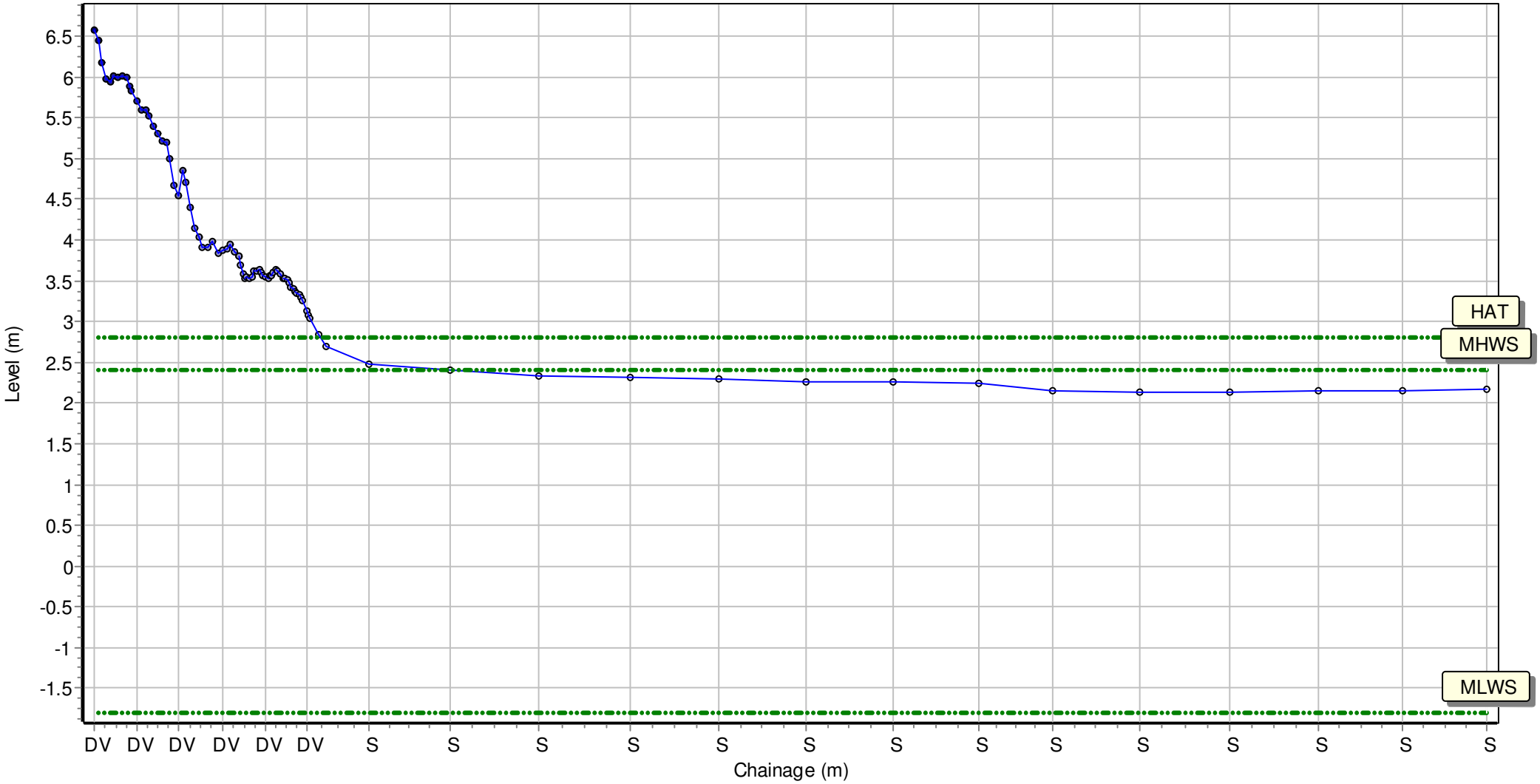
Location: **1aBTBC22**

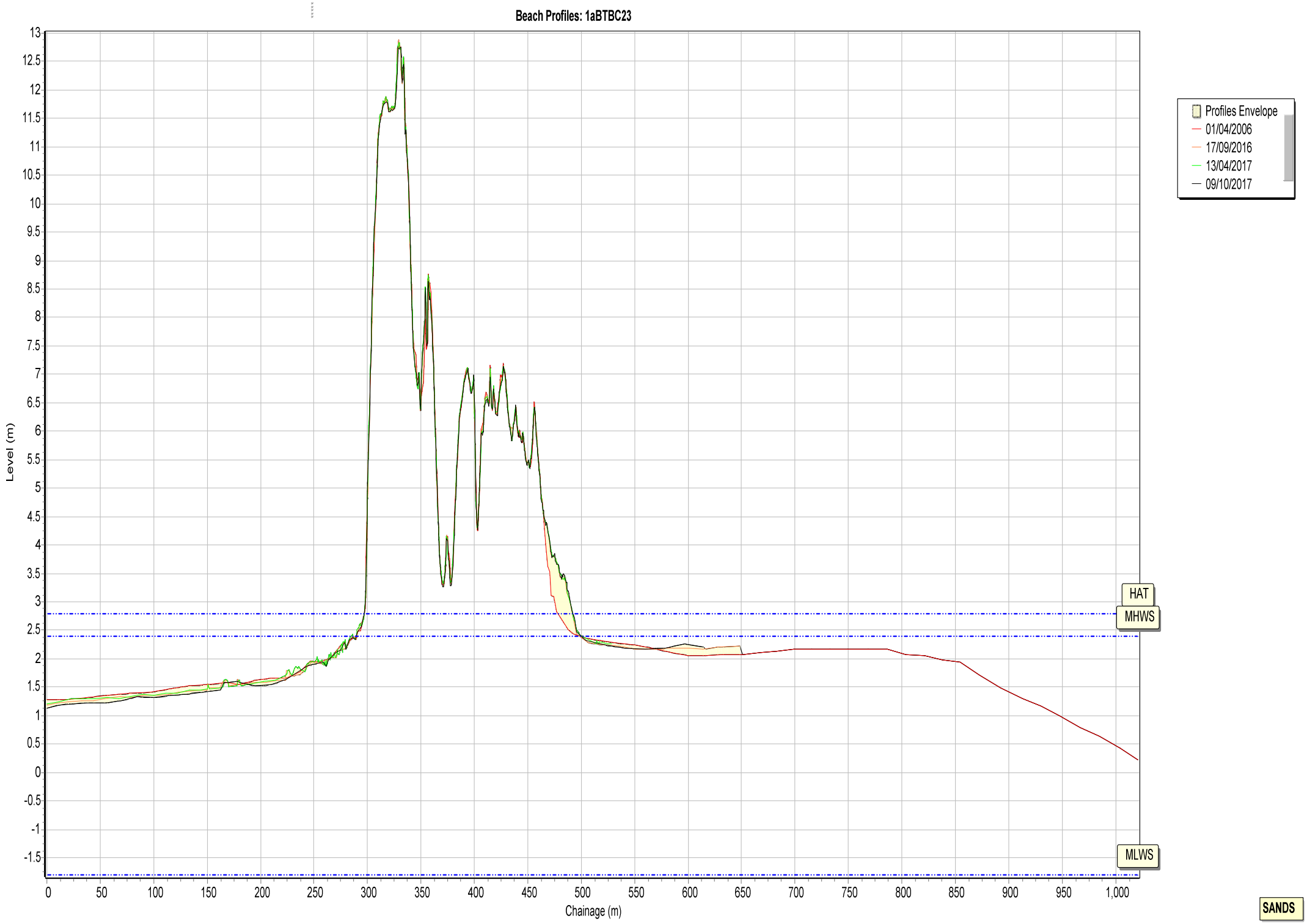
Date: 09/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 410213.981 **Northing:** 643697.867 **Profile Bearing:** 27 ° from North

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Profiles Envelope
01/04/2006
17/09/2016
13/04/2017
09/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
13
12.5
12
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750
800
850
900
950
1,000

Beach Profile

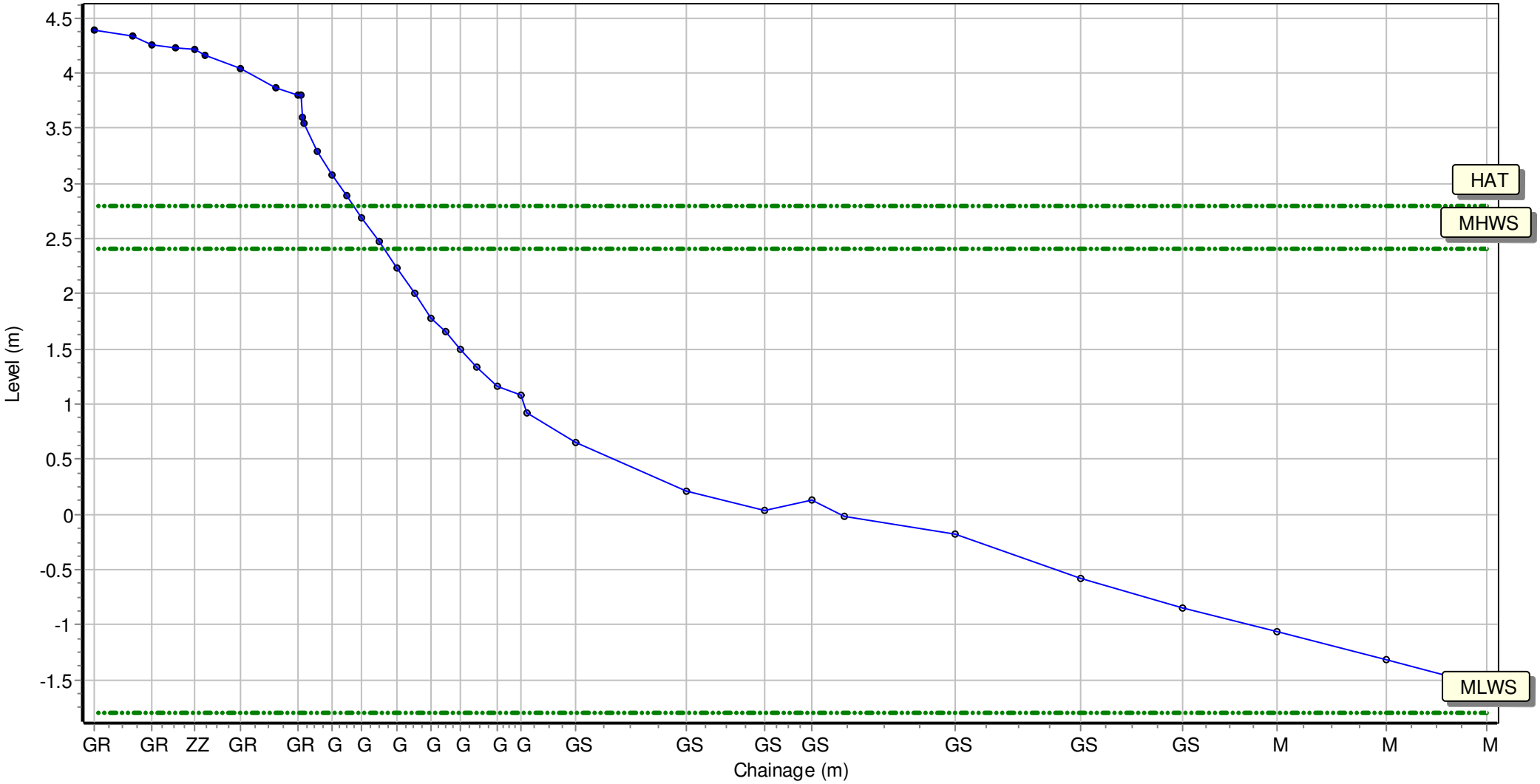
Location: **1aBTBC24**

Date: 09/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 413330.108 **Northing:** 641794.909 **Profile Bearing:** 227 ° from North



Beach Profile

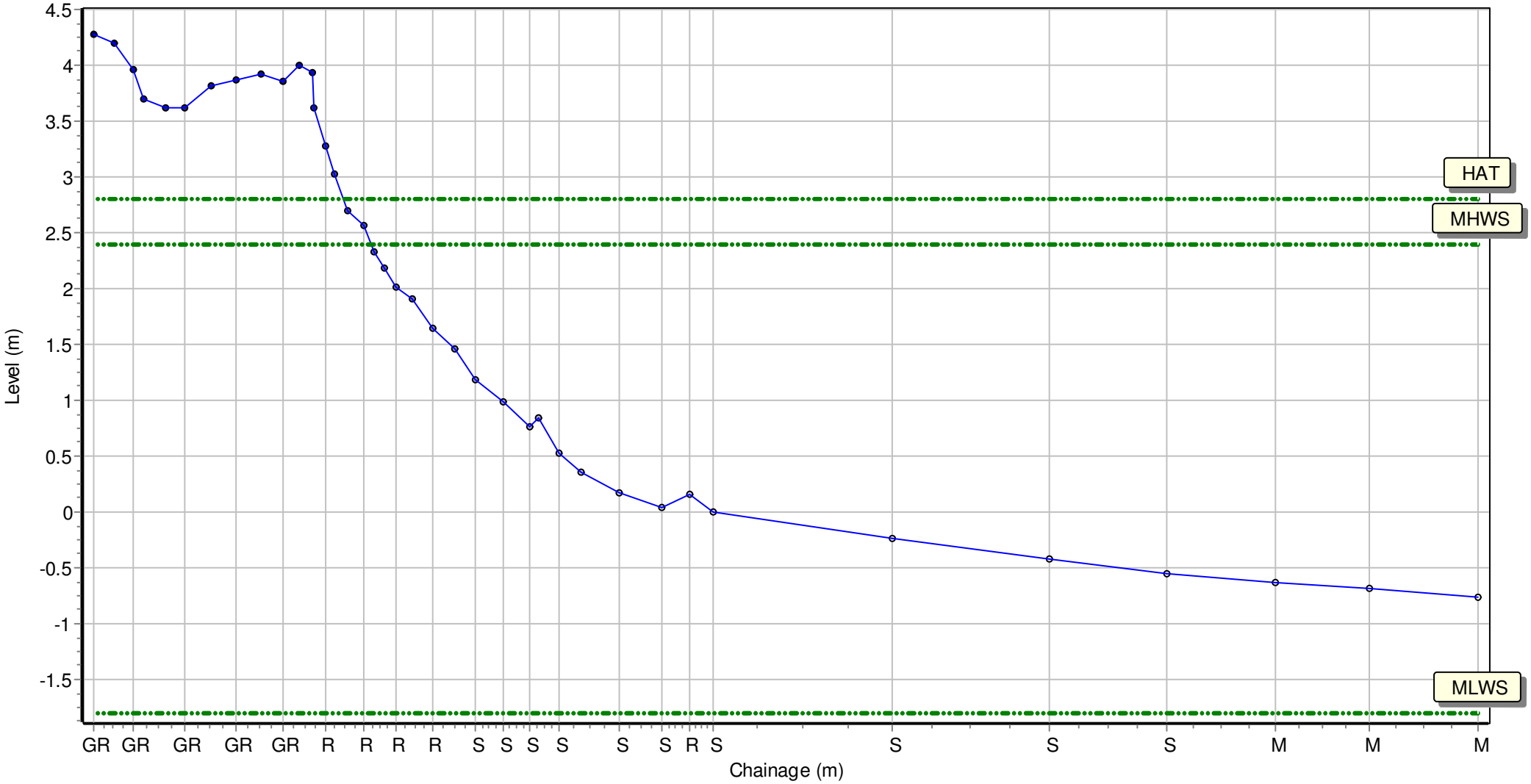
Location: **1aBTBC25**

Date: 09/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 413102.684 **Northing:** 641936.754 **Profile Bearing:** 173 ° from North



Beach Profile

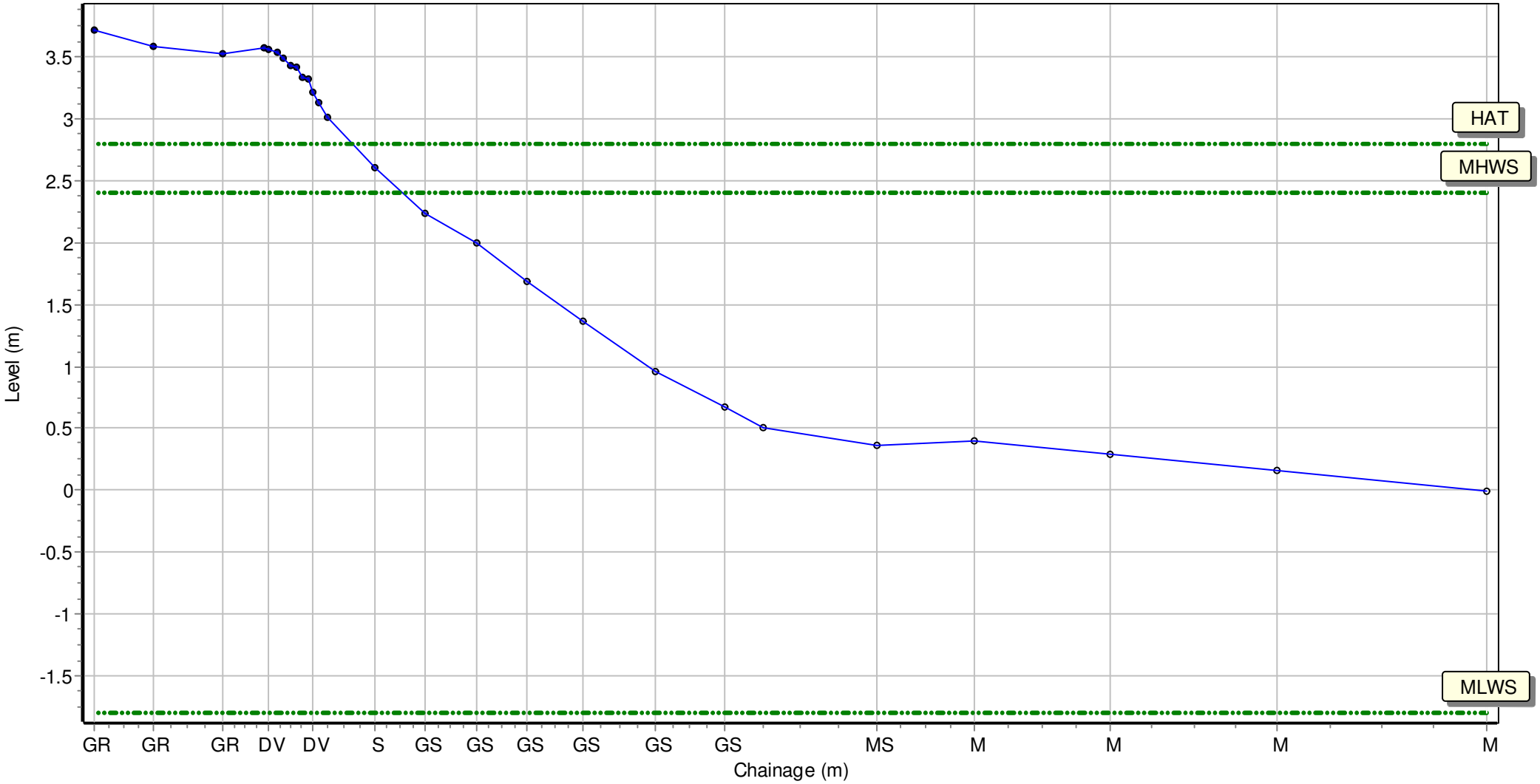
Location: **1aBTBC26**

Date: 09/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 412895.322 **Northing:** 641784.343 **Profile Bearing:** 122 ° from North



Beach Profile

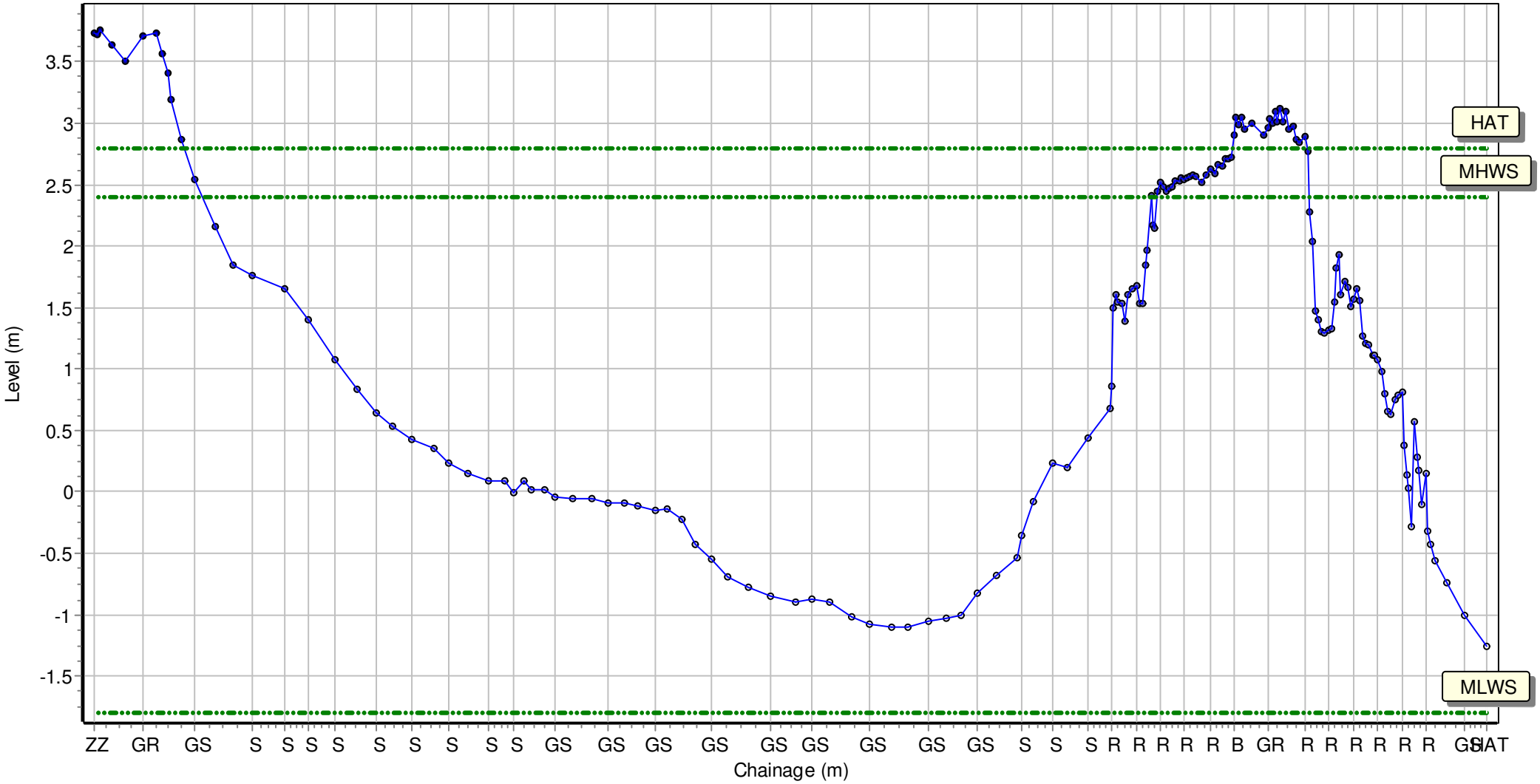
Location: **1aBTBC27**

Date: 09/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 412475.398 **Northing:** 641733.834 **Profile Bearing:** 227 ° from North



Beach Profile

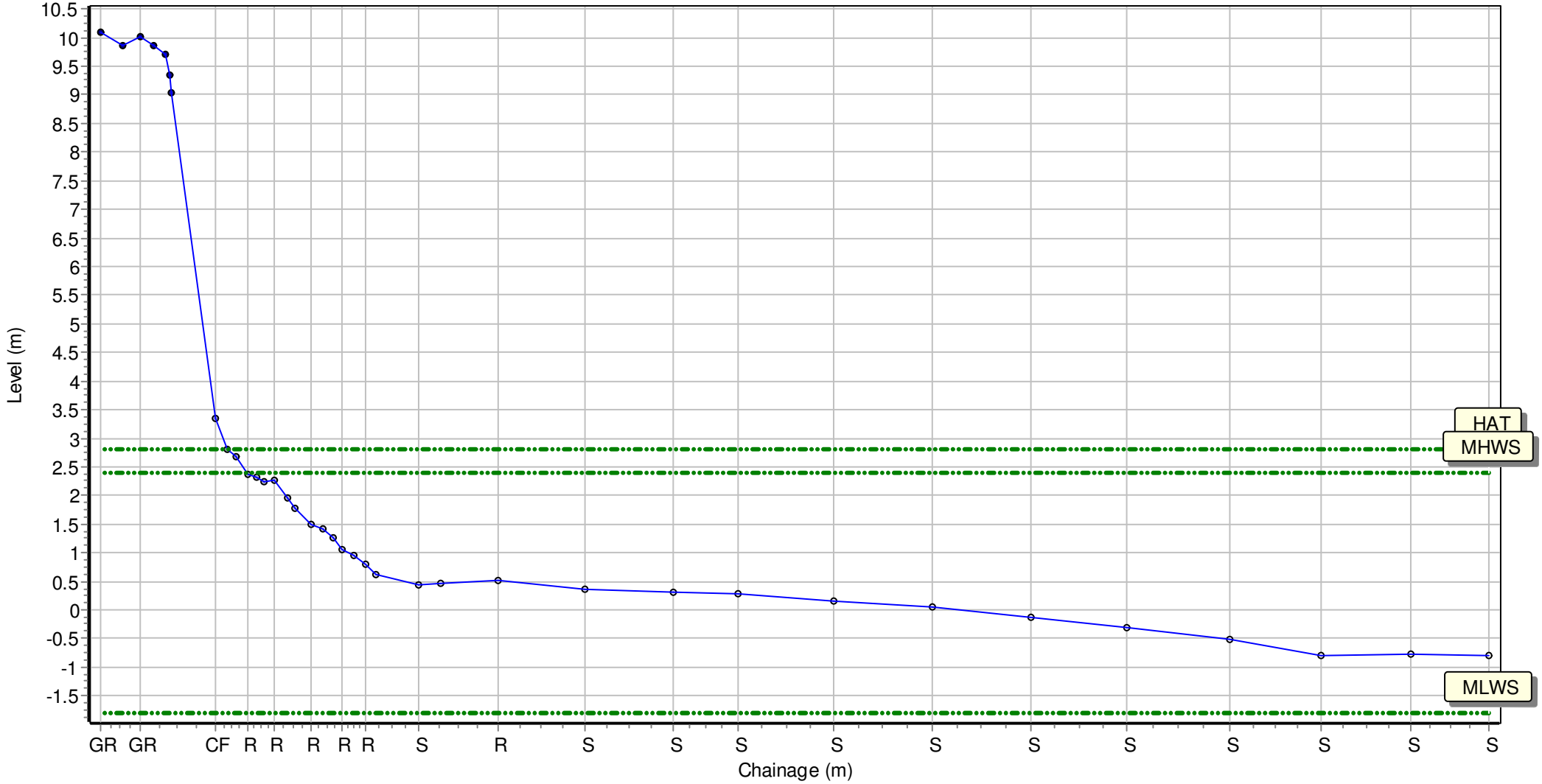
Location: **1aBTBC28**

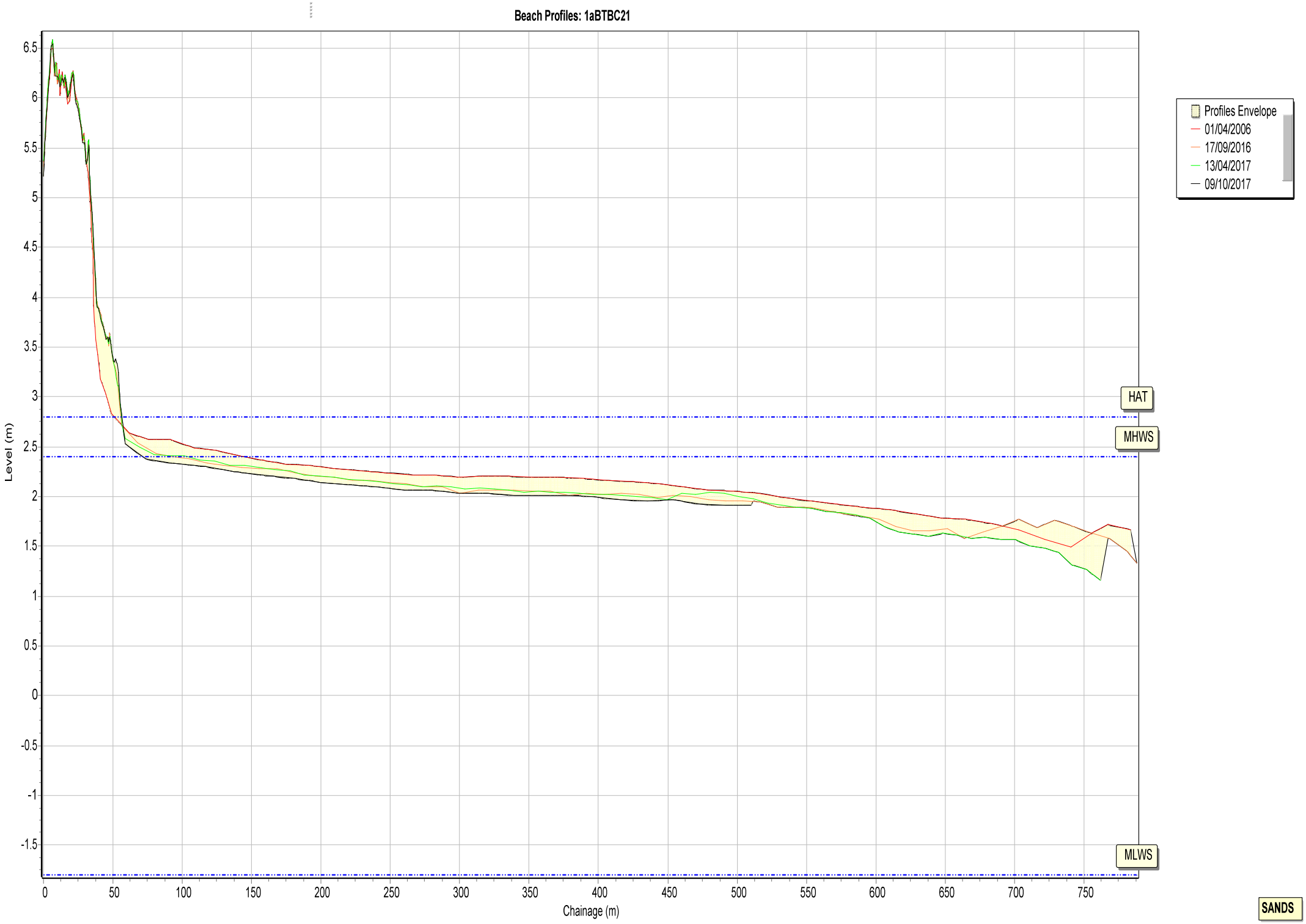
Date: 09/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 412324.036 **Northing:** 641984.353 **Profile Bearing:** 245 ° from North




Beach Profiles: 1aBTBC21
Profiles Envelope
01/04/2006
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13/04/2017
09/10/2017
HAT
MHWS
MLWS
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Chainage (m)
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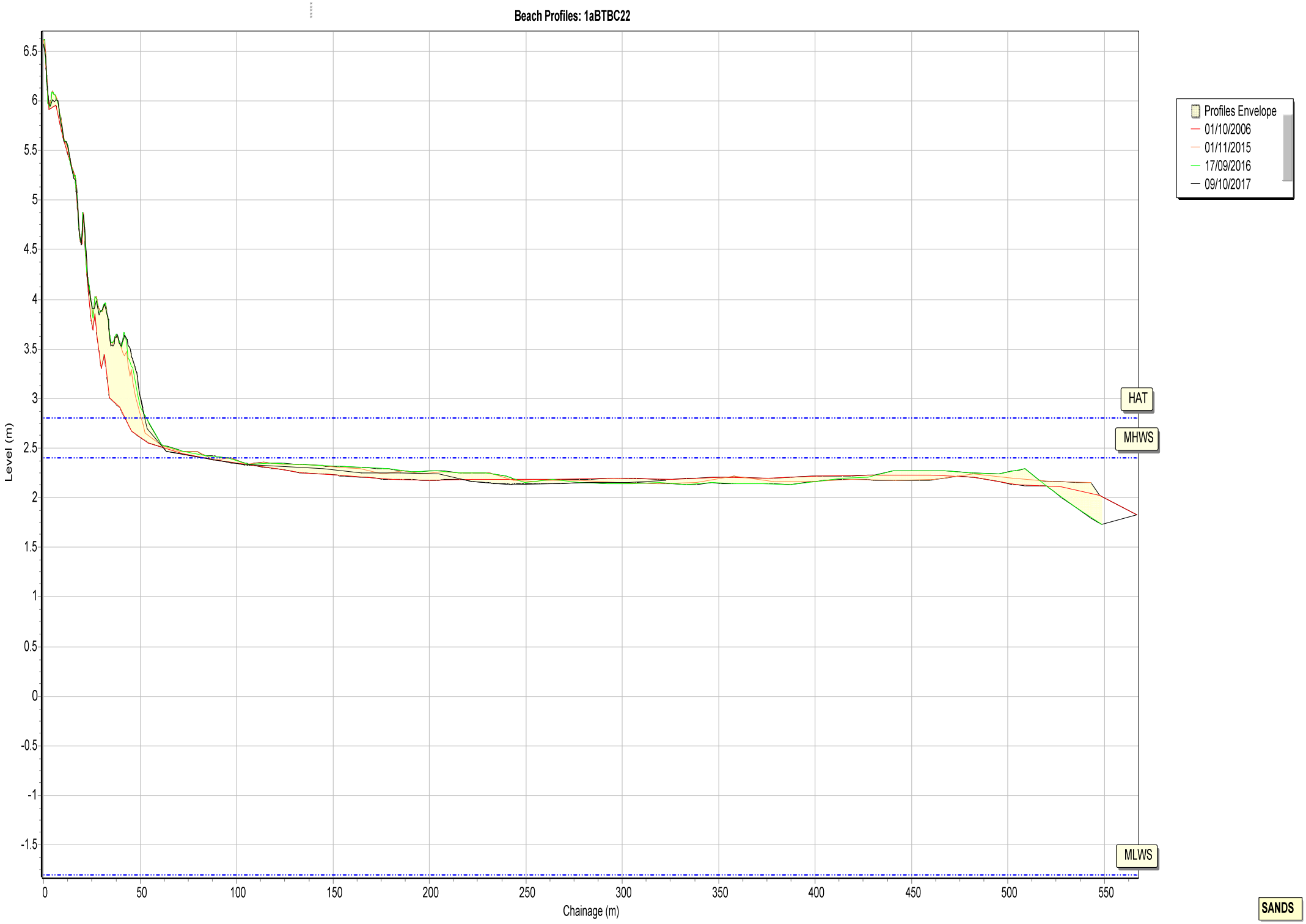
Beach Profiles: 1aBTBC22
Profiles Envelope
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01/11/2015
17/09/2016
09/10/2017
HAT
MHWS
MLWS
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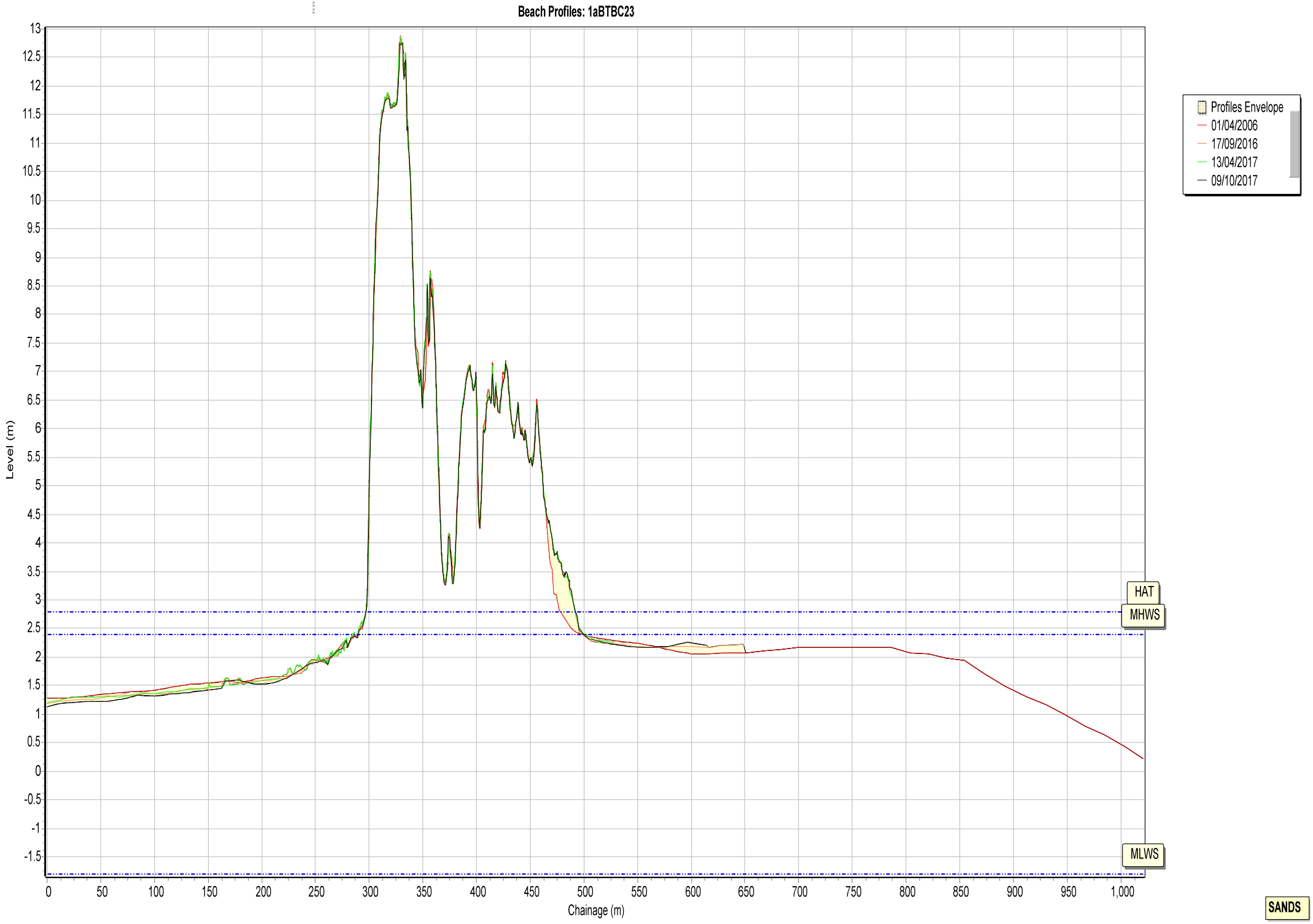
Beach Profiles: 1aBTBC23
Profiles Envelope
01/04/2006
17/09/2016
13/04/2017
09/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
13
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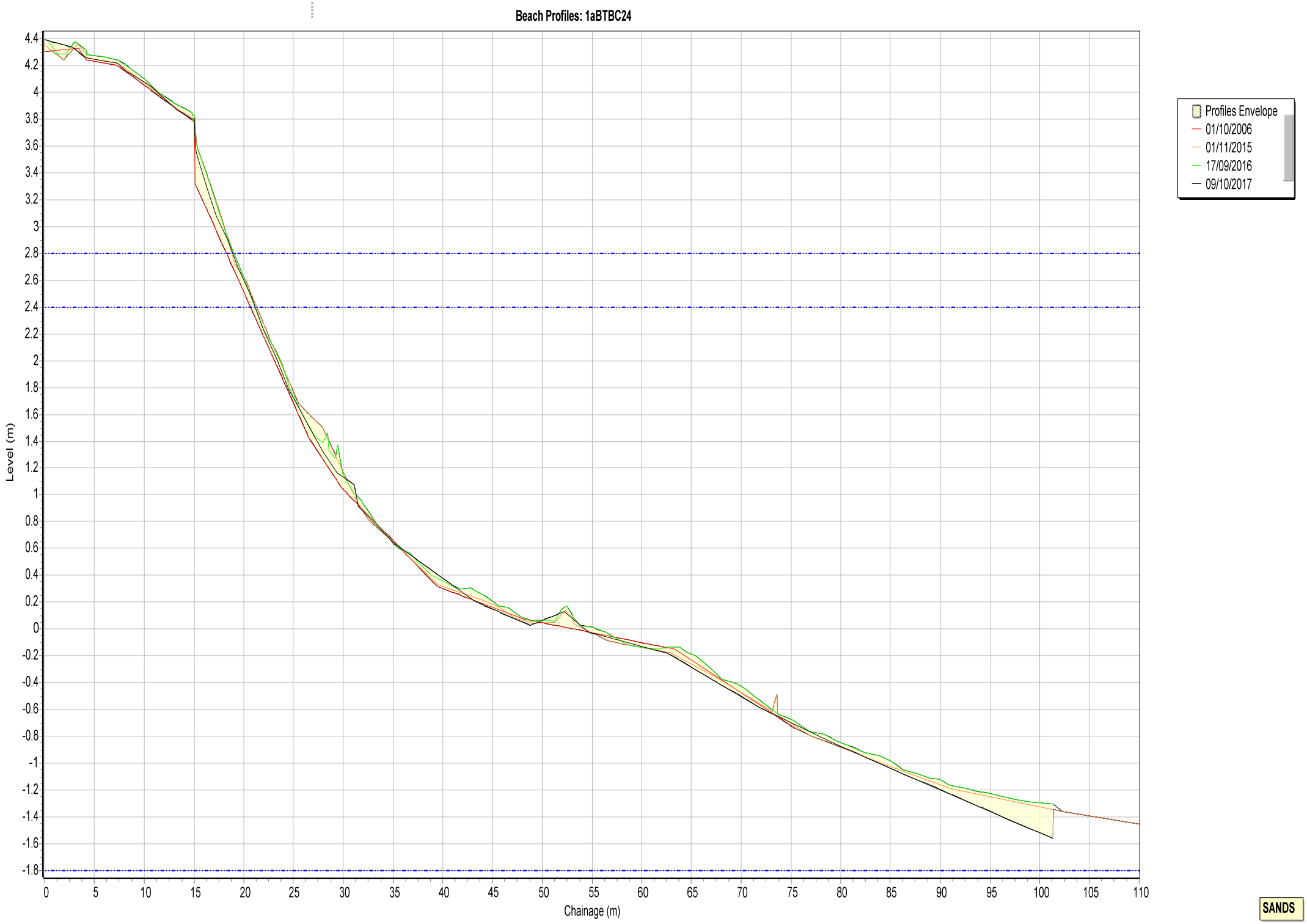
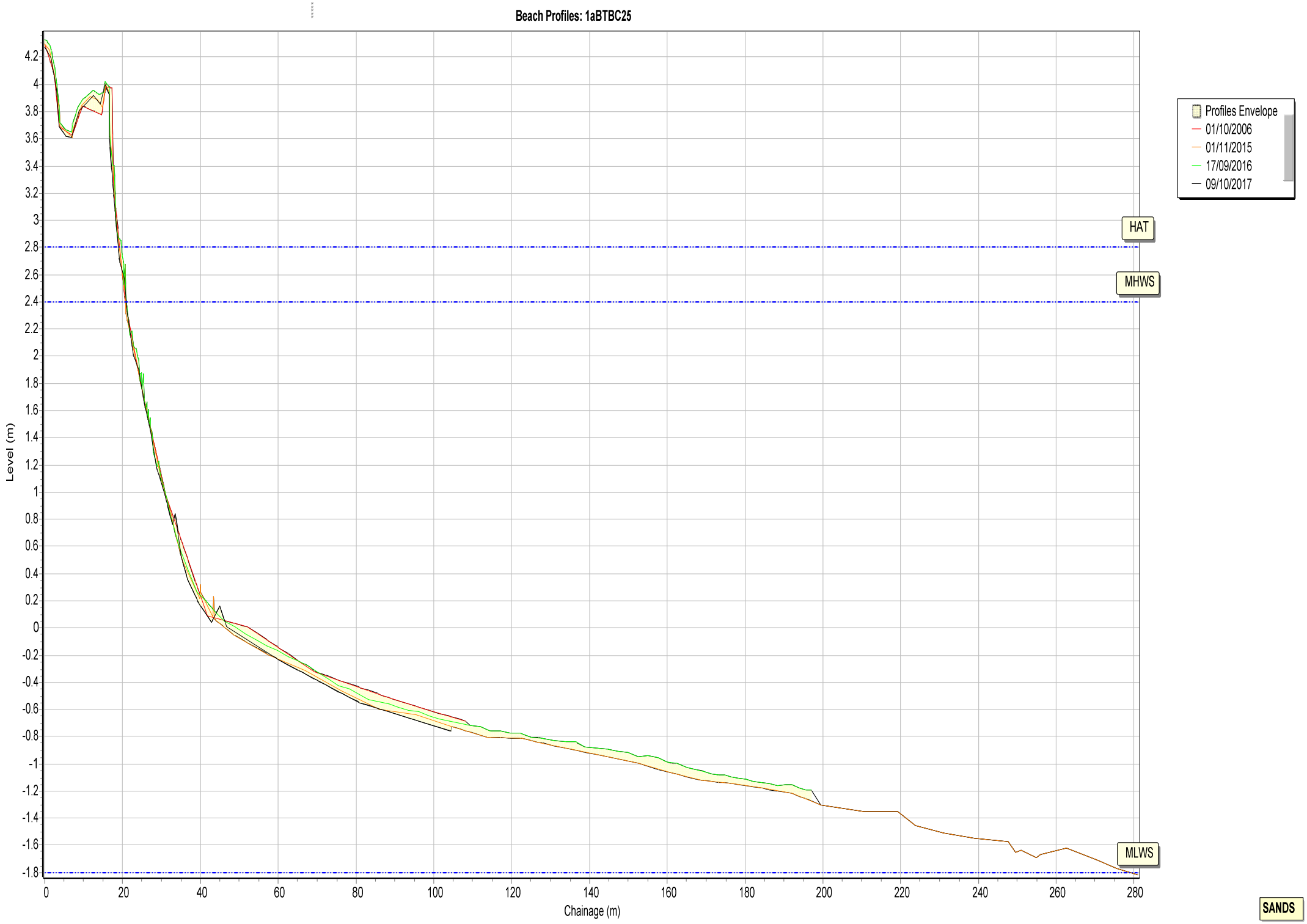
900
950
1,000


Beach Profiles: 1aBTBC24
Profiles Envelope
01/10/2006
01/11/2015
17/09/2016
09/10/2017
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aBTBC25
Profiles Envelope
01/10/2006
01/11/2015
17/09/2016
09/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
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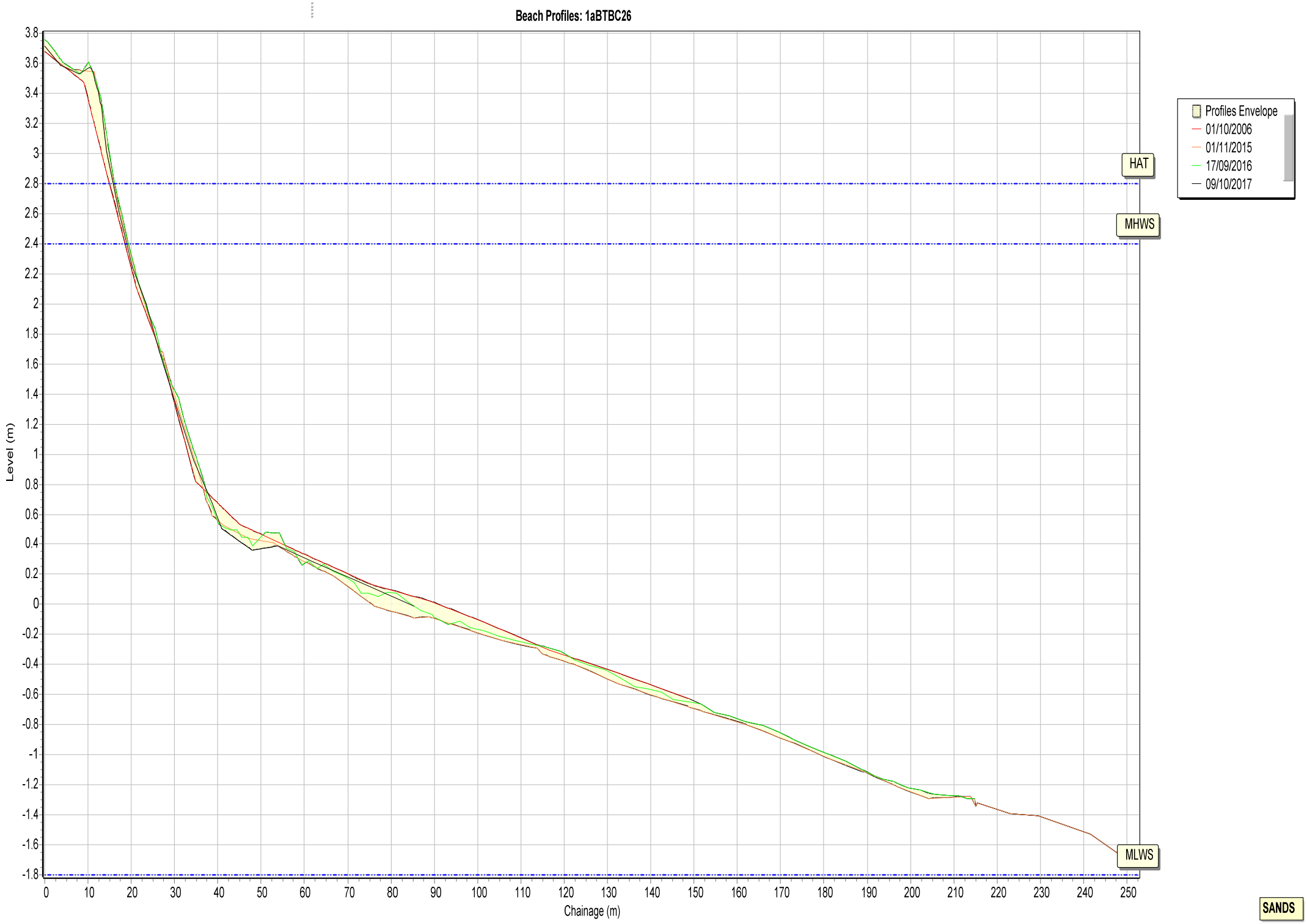
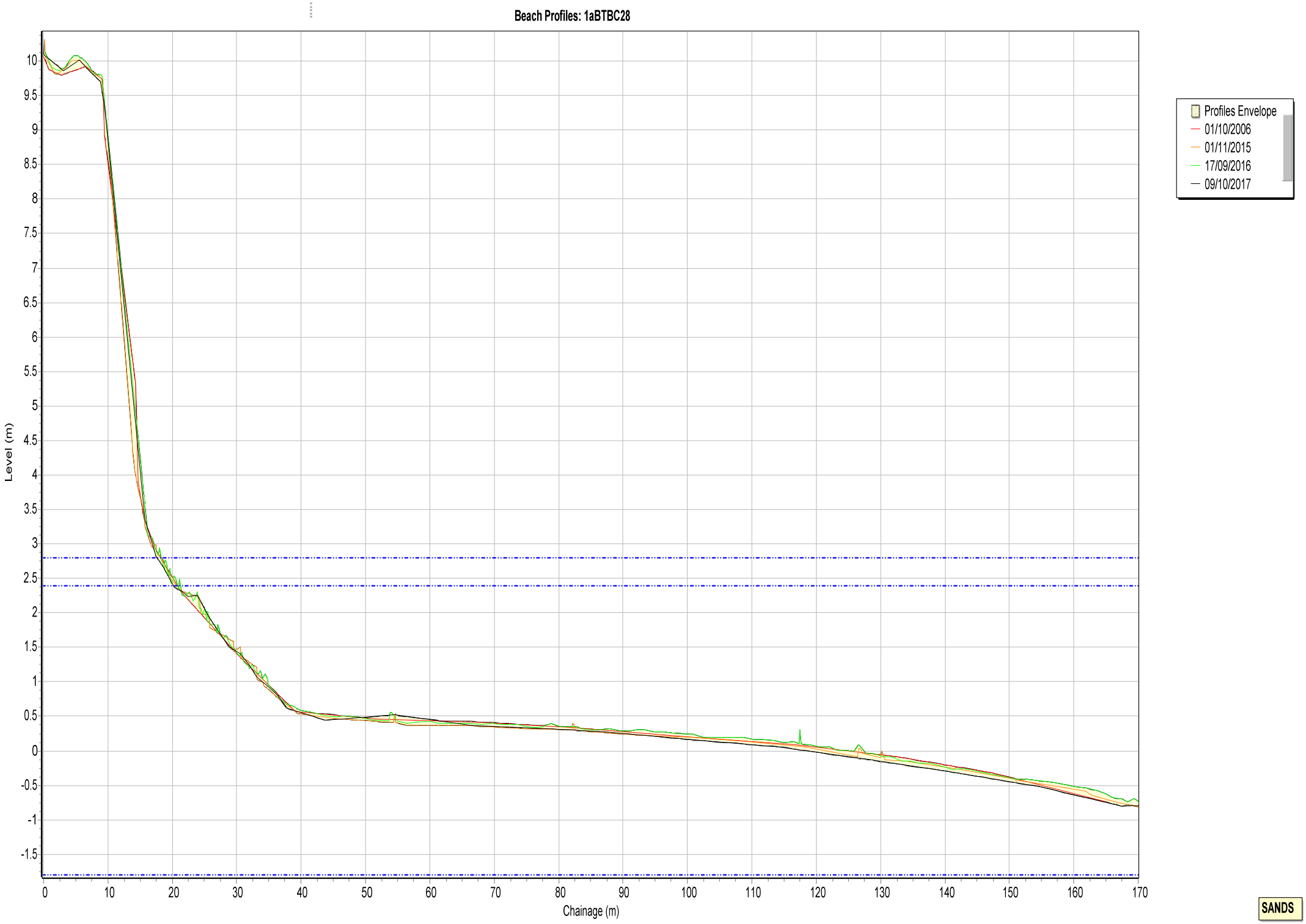
280


Beach Profiles: 1aBTBC26
Level (m)
Chainage (m)
HAT
MHWS
MLWS
Profiles Envelope
01/10/2006
01/11/2015
17/09/2016
09/10/2017
SANDS


Beach Profiles: 1aBTBC27
Profiles Envelope
01/10/2006
01/11/2015
17/09/2016
09/10/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aBTBC28
Profiles Envelope
01/10/2006
01/11/2015
17/09/2016
09/10/2017
Level (m)
Chainage (m)
SANDS

Beach Profile

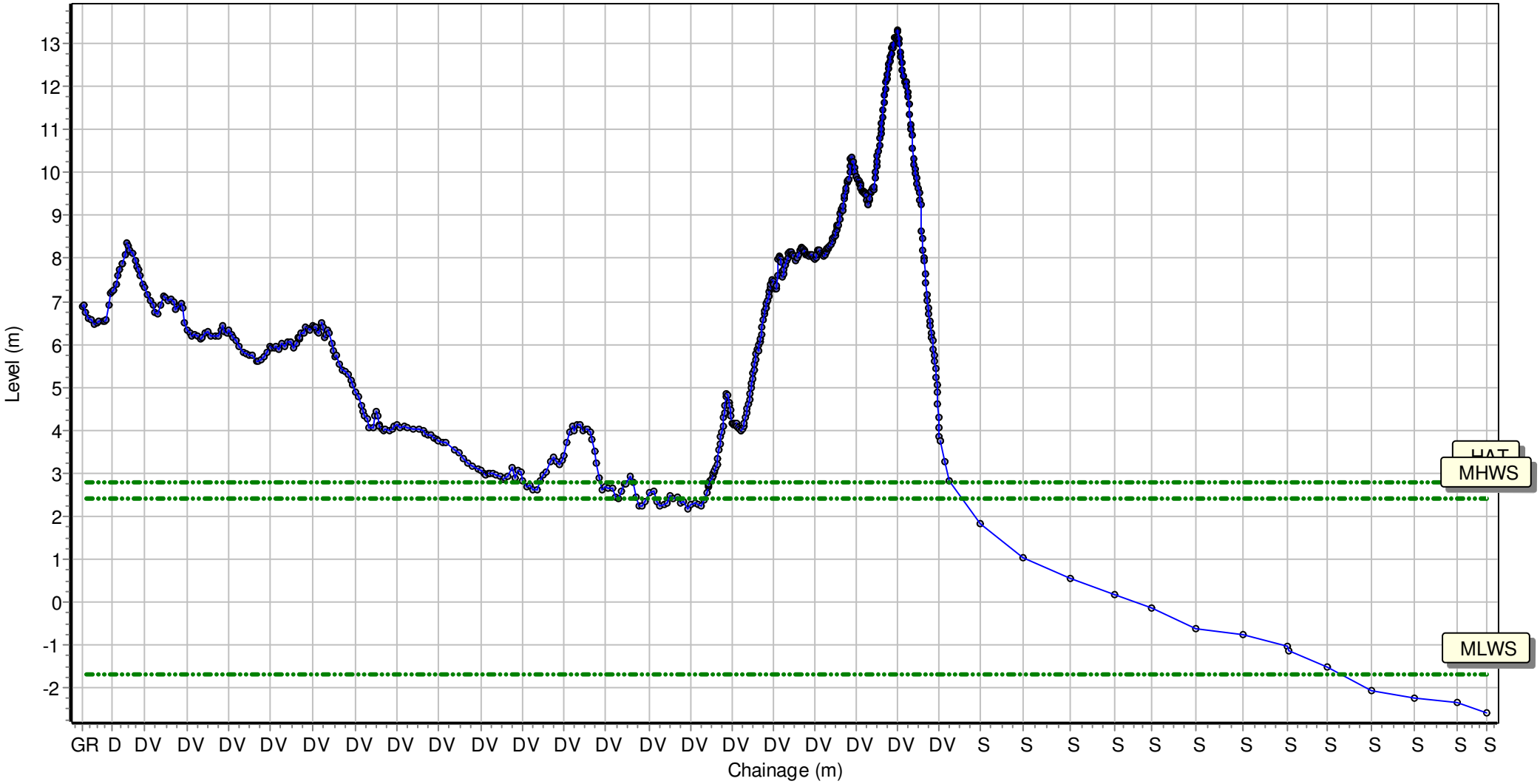
Location: **1aBTBC29**

Date: 10/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 418972.296 **Northing:** 634628.46 **Profile Bearing:** 31 ° from North



Beach Profile

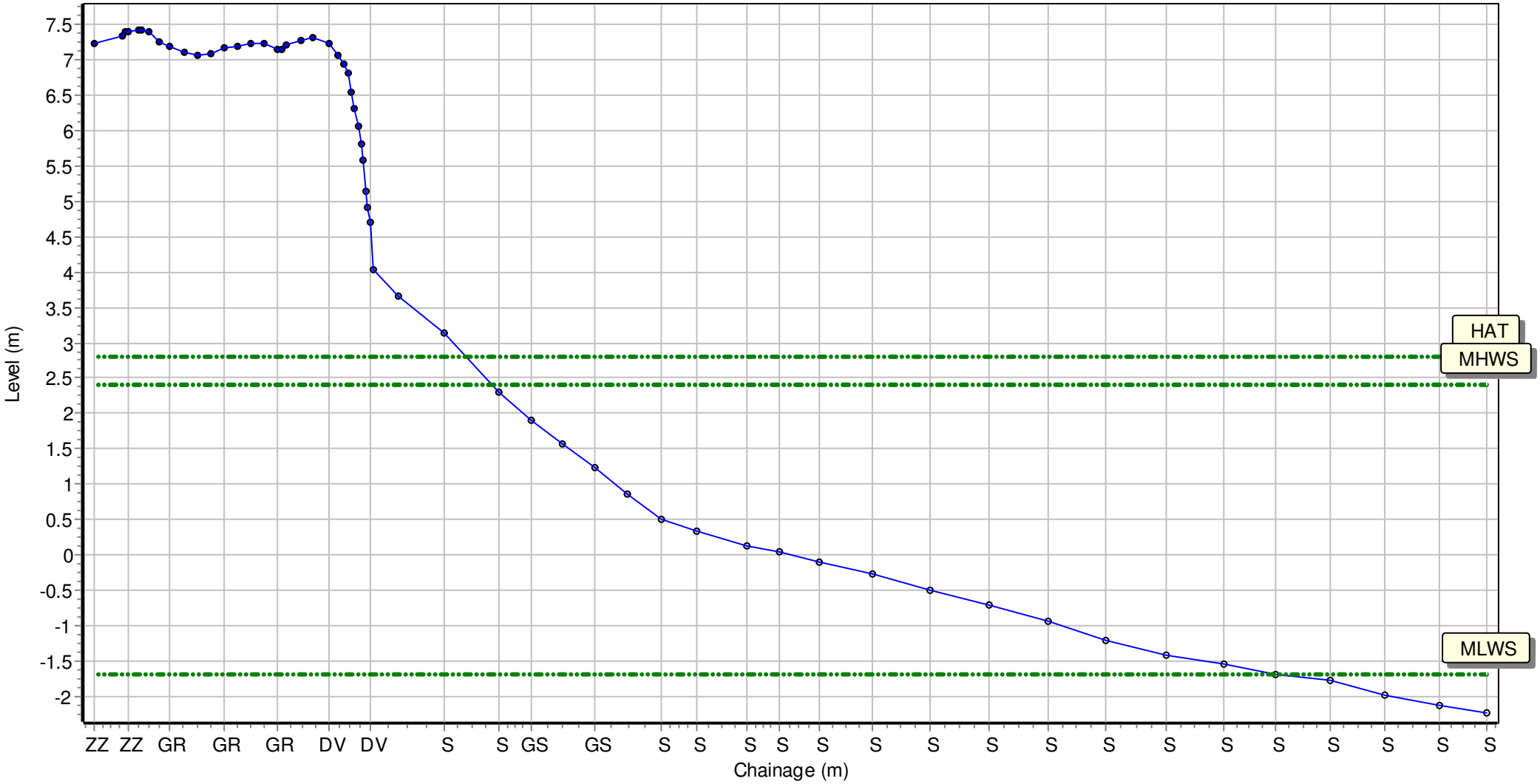
Location: **1aBTBC30**

Date: 08/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 423056.791 **Northing:** 629887.437 **Profile Bearing:** 71 ° from North



Beach Profile

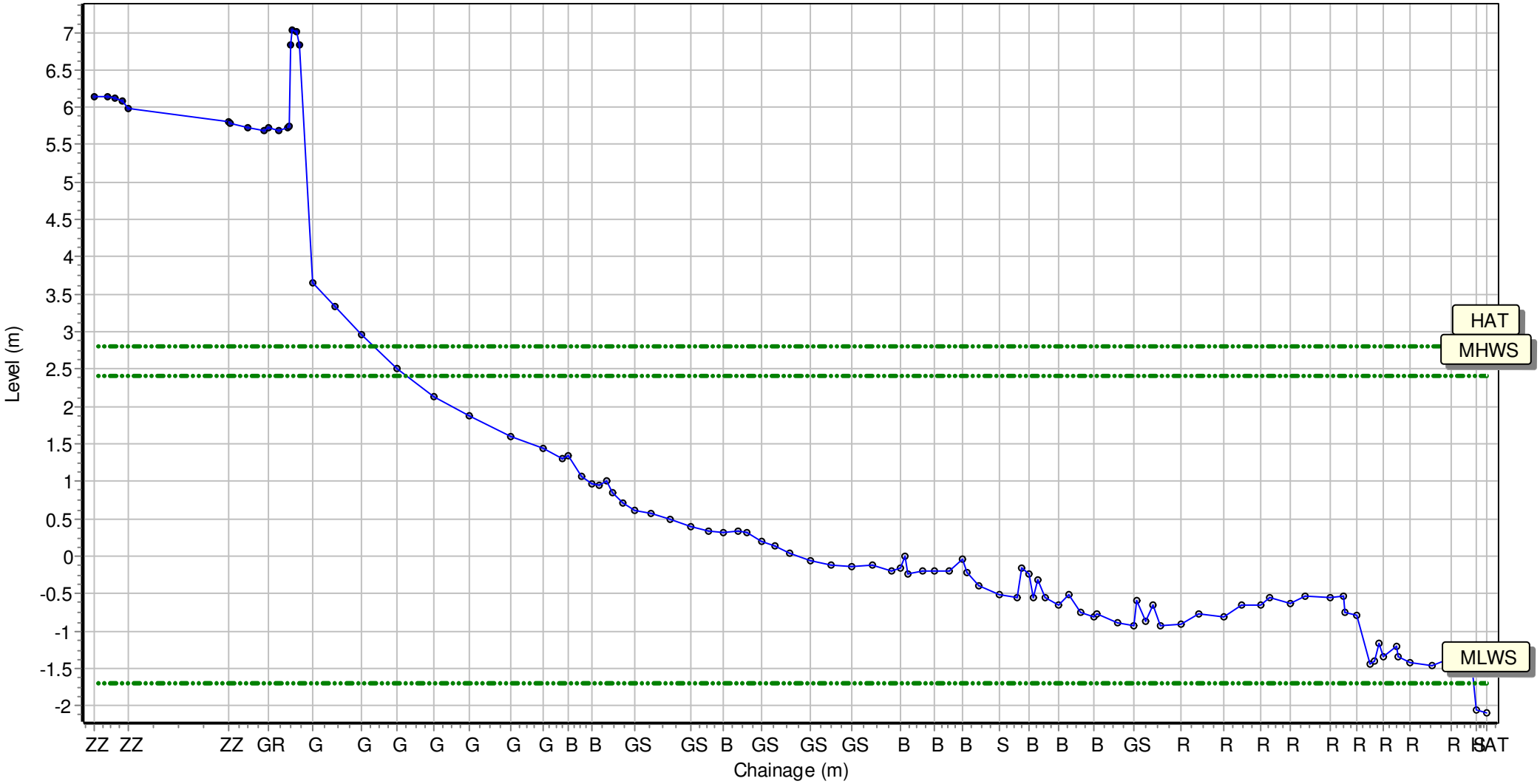
Location: **1aBTBC31**

Date: 08/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 423579.204 **Northing:** 628973.295 **Profile Bearing:** 56 ° from North



Beach Profile

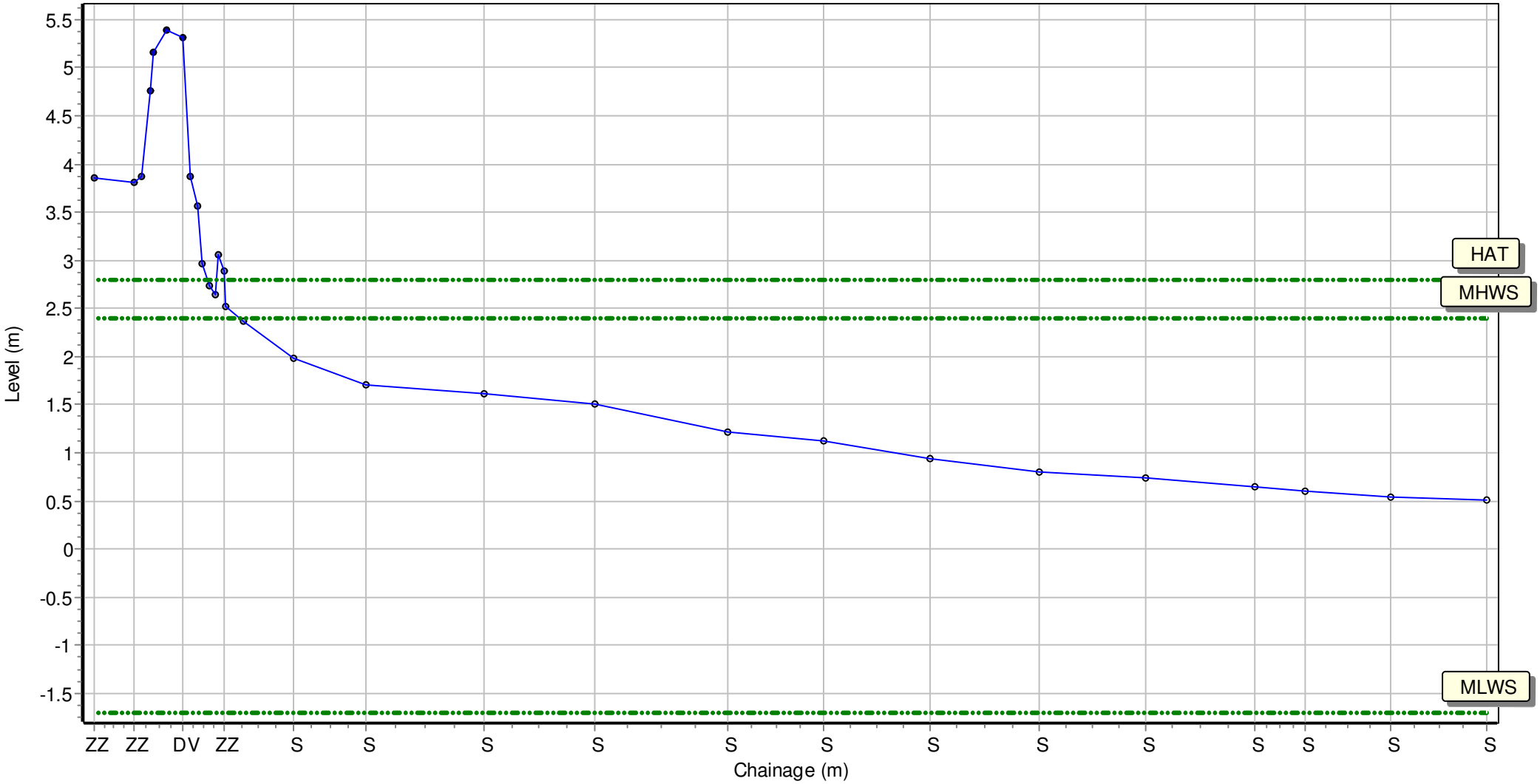
Location: **1aBTBC32**

Date: 08/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 423738.386 **Northing:** 628624.99 **Profile Bearing:** 279 ° from North



Beach Profile

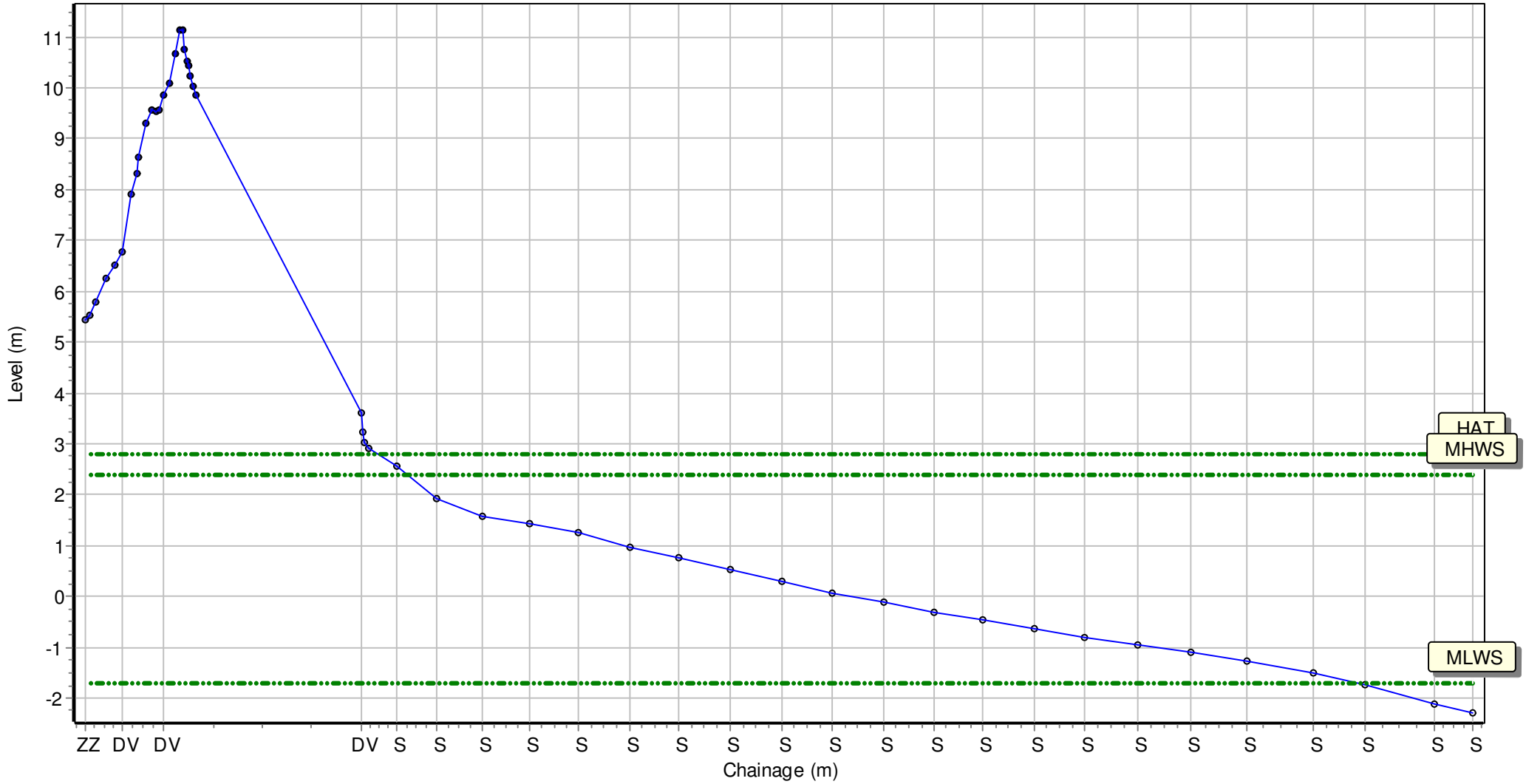
Location: **1aBTBC33**

Date: 08/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 423672.571 **Northing:** 628761.646 **Profile Bearing:** 204 ° from North



Beach Profile

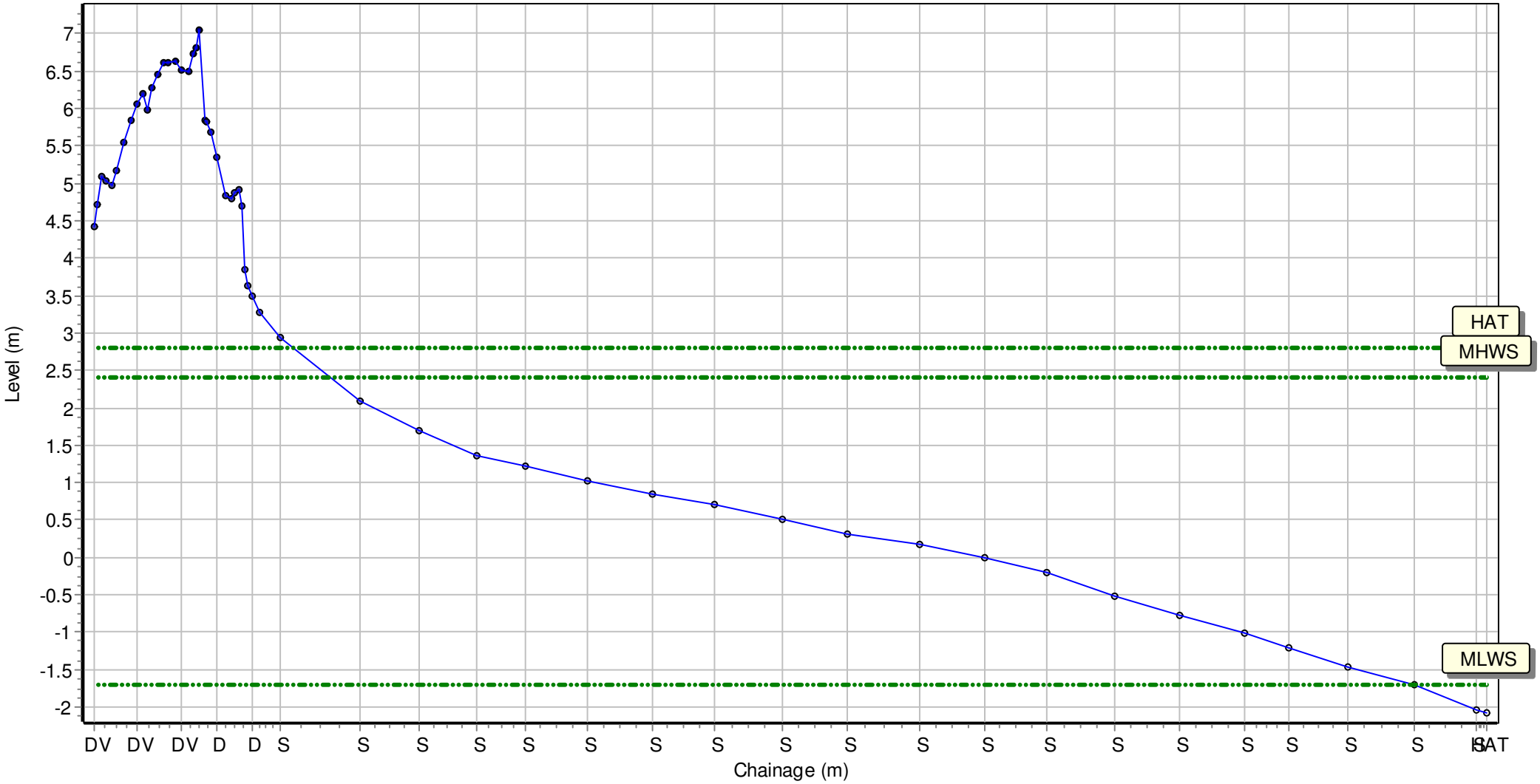
Location: **1aBTBC34**

Date: 08/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 423434.960 **Northing:** 628693.15 **Profile Bearing:** 160 ° from North



Beach Profile

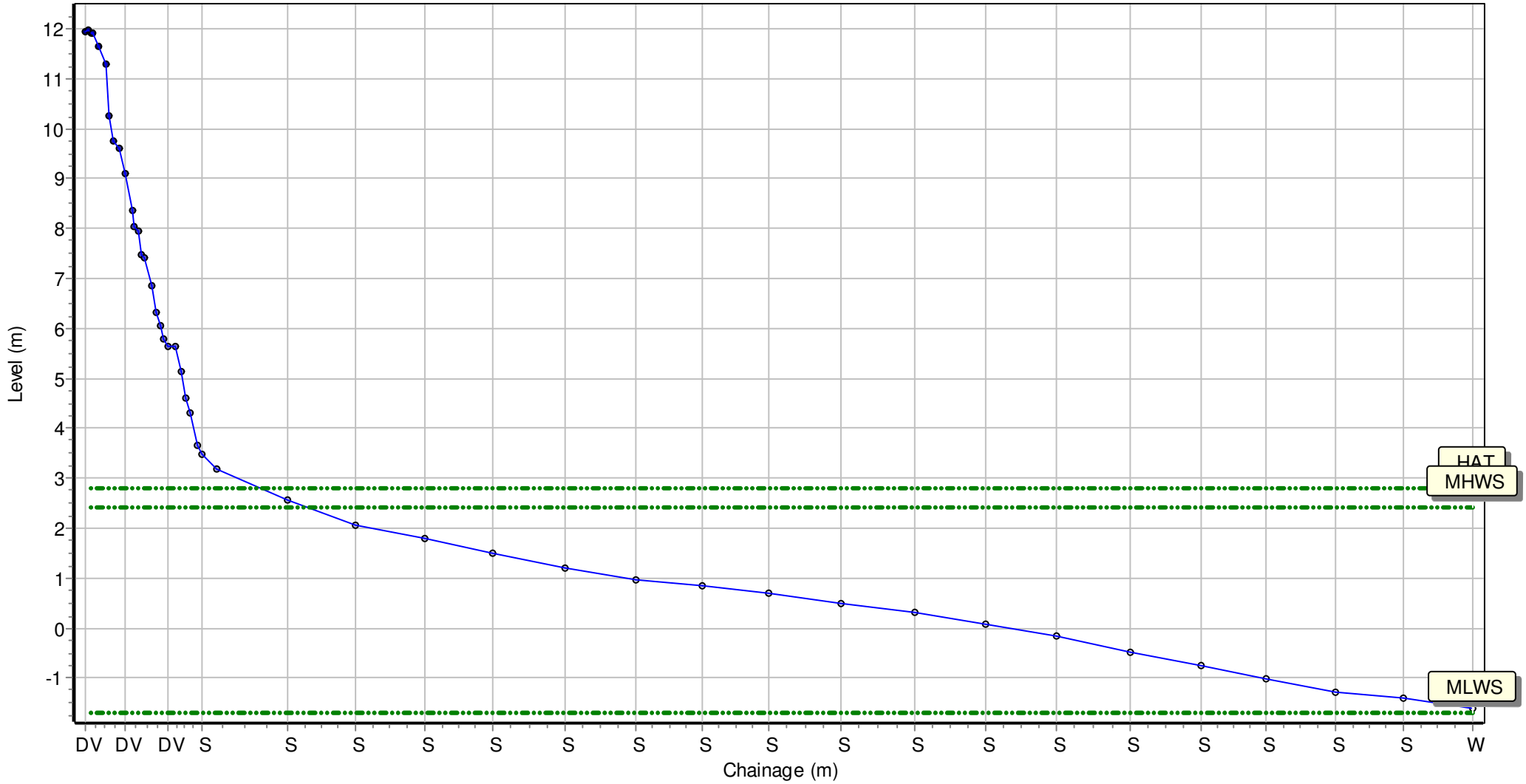
Location: **1aBTBC35**

Date: 08/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 423171.083 **Northing:** 628414.273 **Profile Bearing:** 105 ° from North



Beach Profile

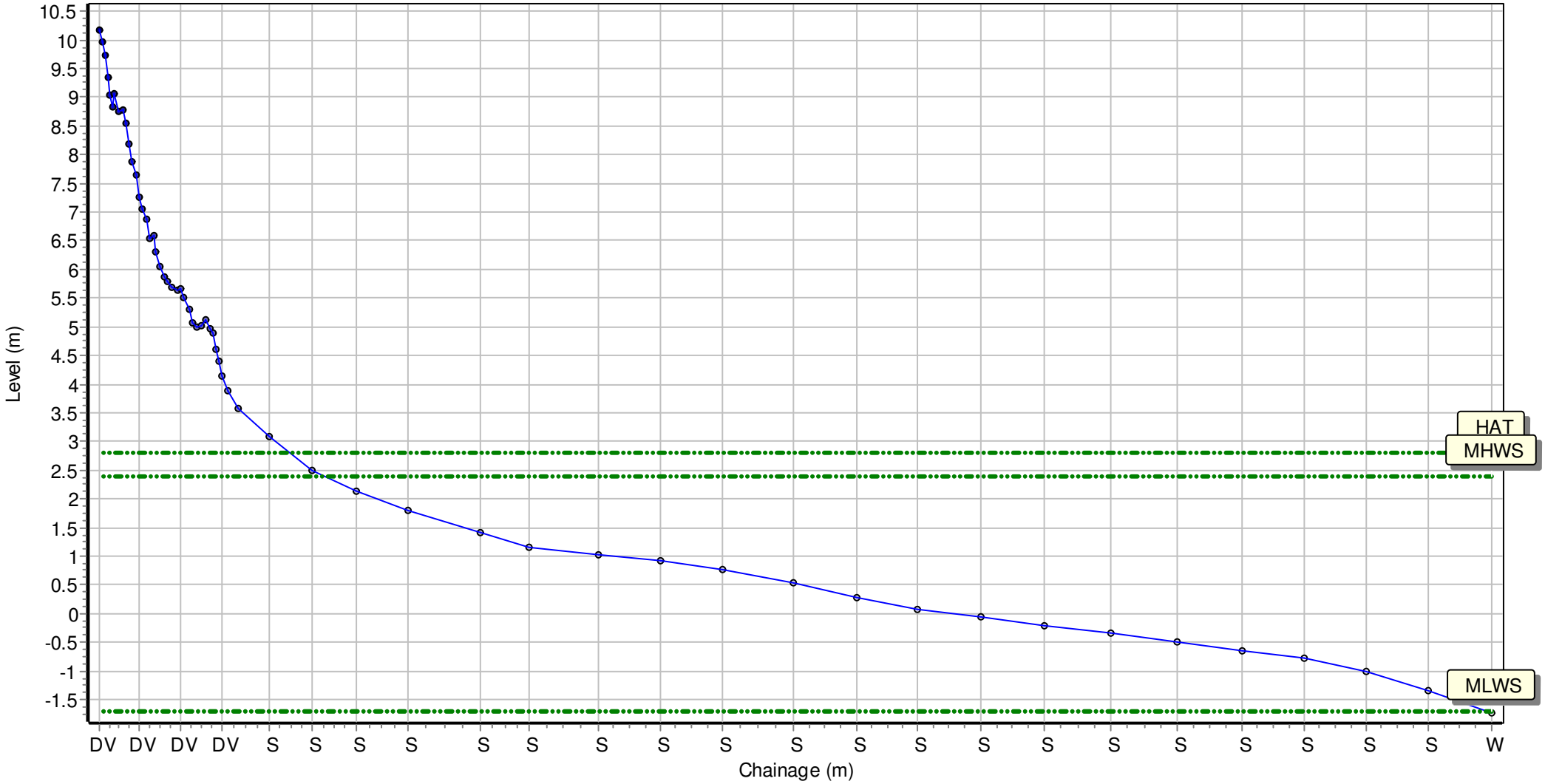
Location: **1aBTBC36**

Date: 08/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 423094.516 **Northing:** 628204.644 **Profile Bearing:** 106 ° from North



Beach Profile

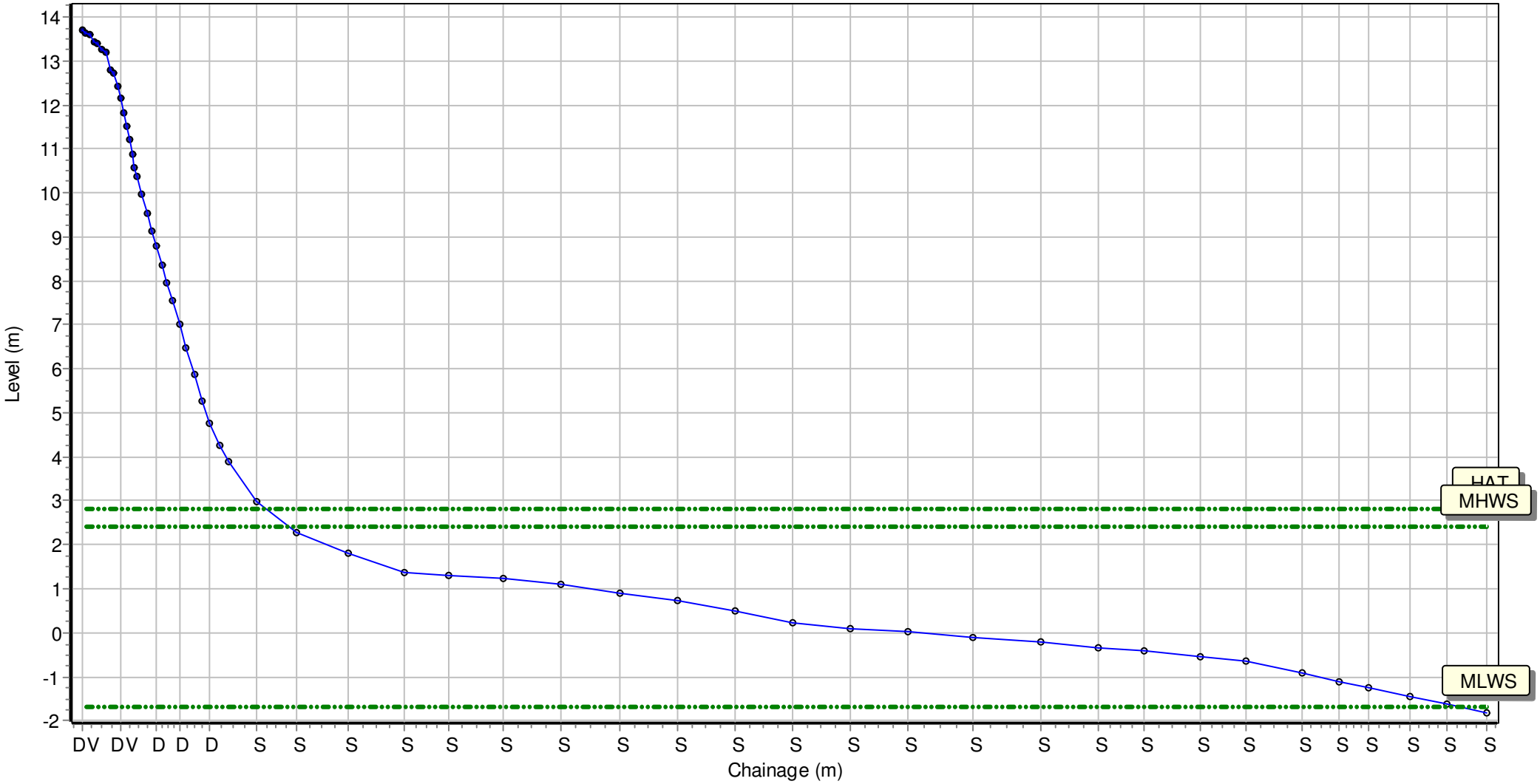
Location: **1aBTBC37**

Date: 08/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 423060.156 **Northing:** 628006.169 **Profile Bearing:** 96 ° from North



Beach Profile

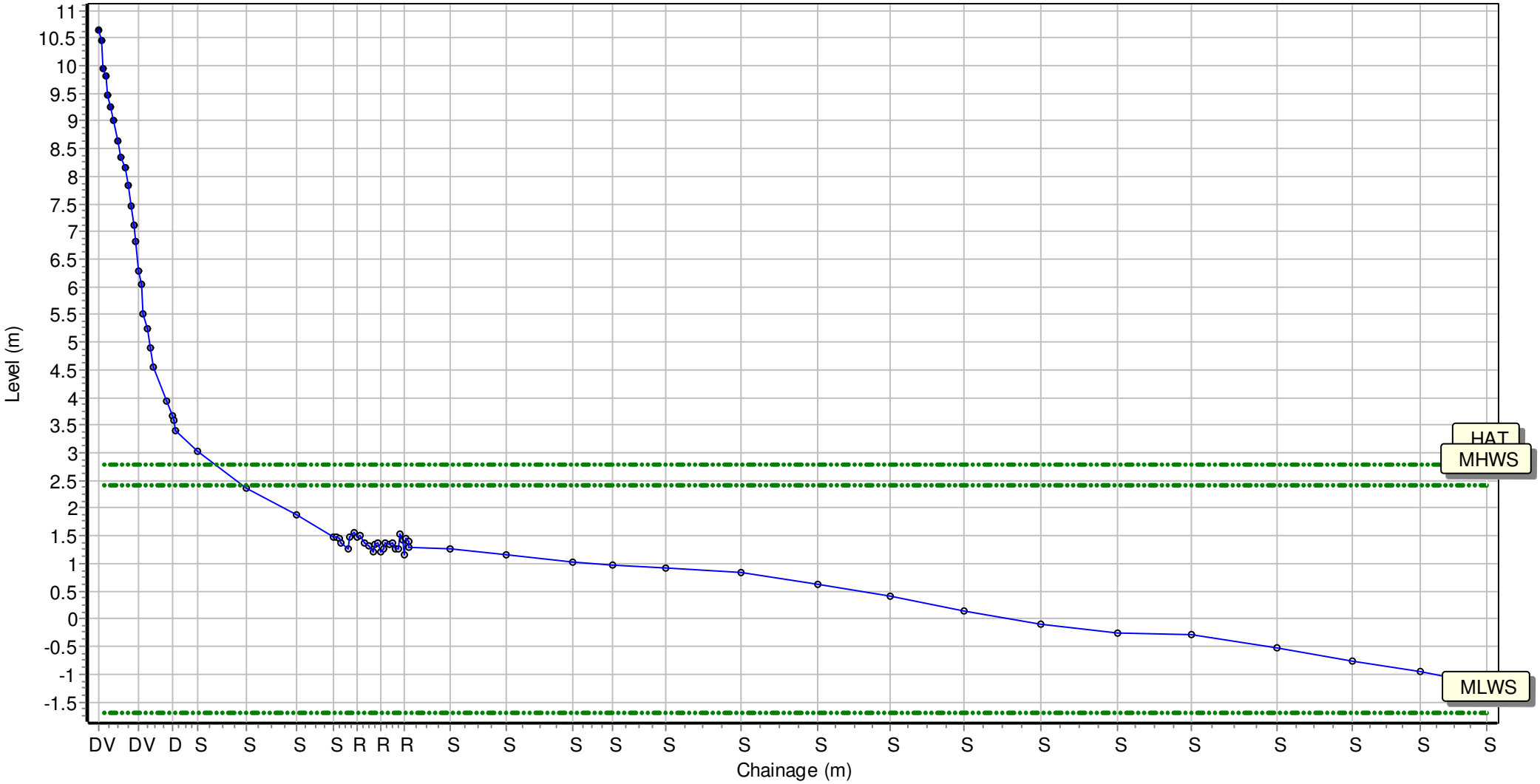
Location: **1aBTBC38**

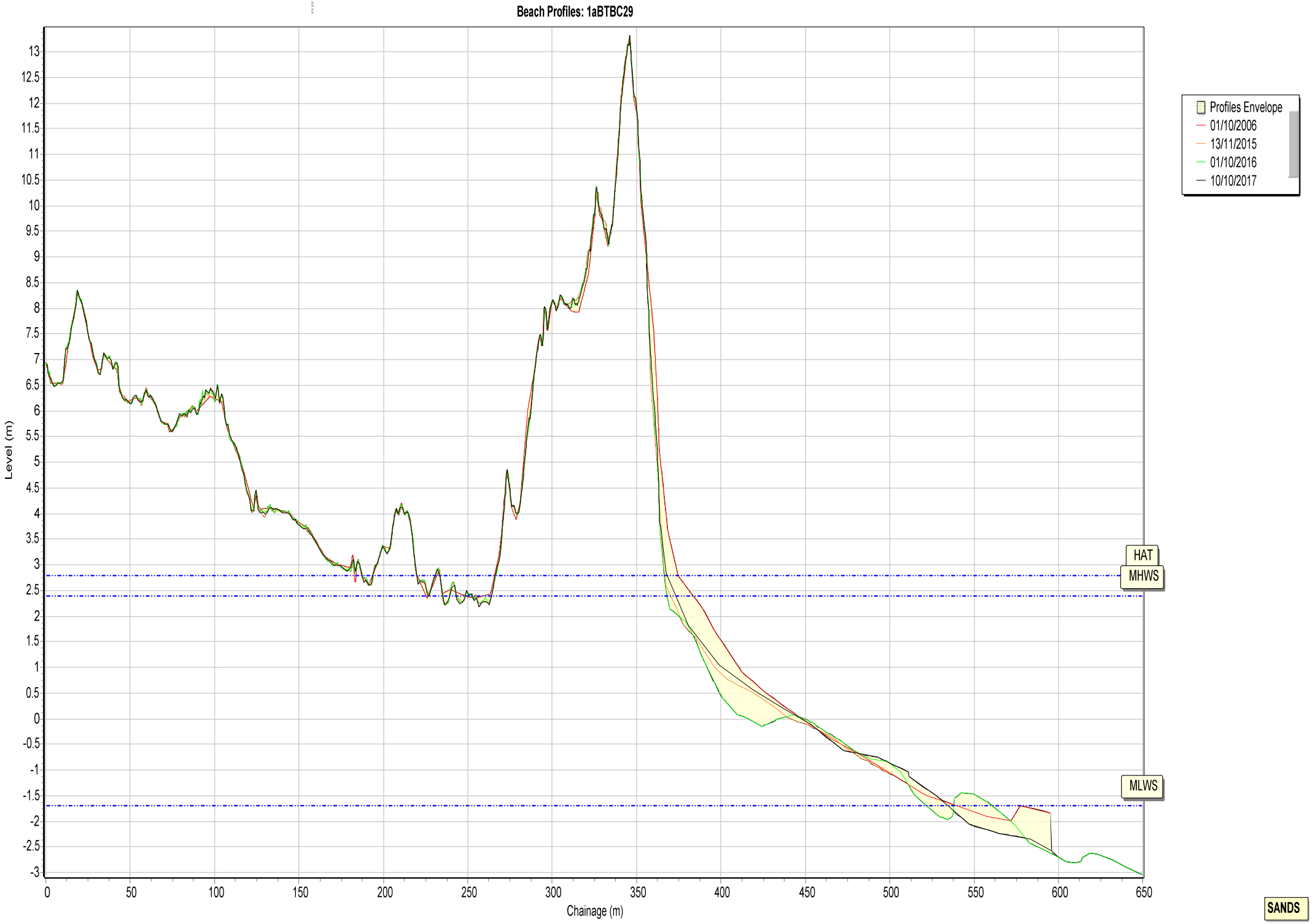
Date: 08/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

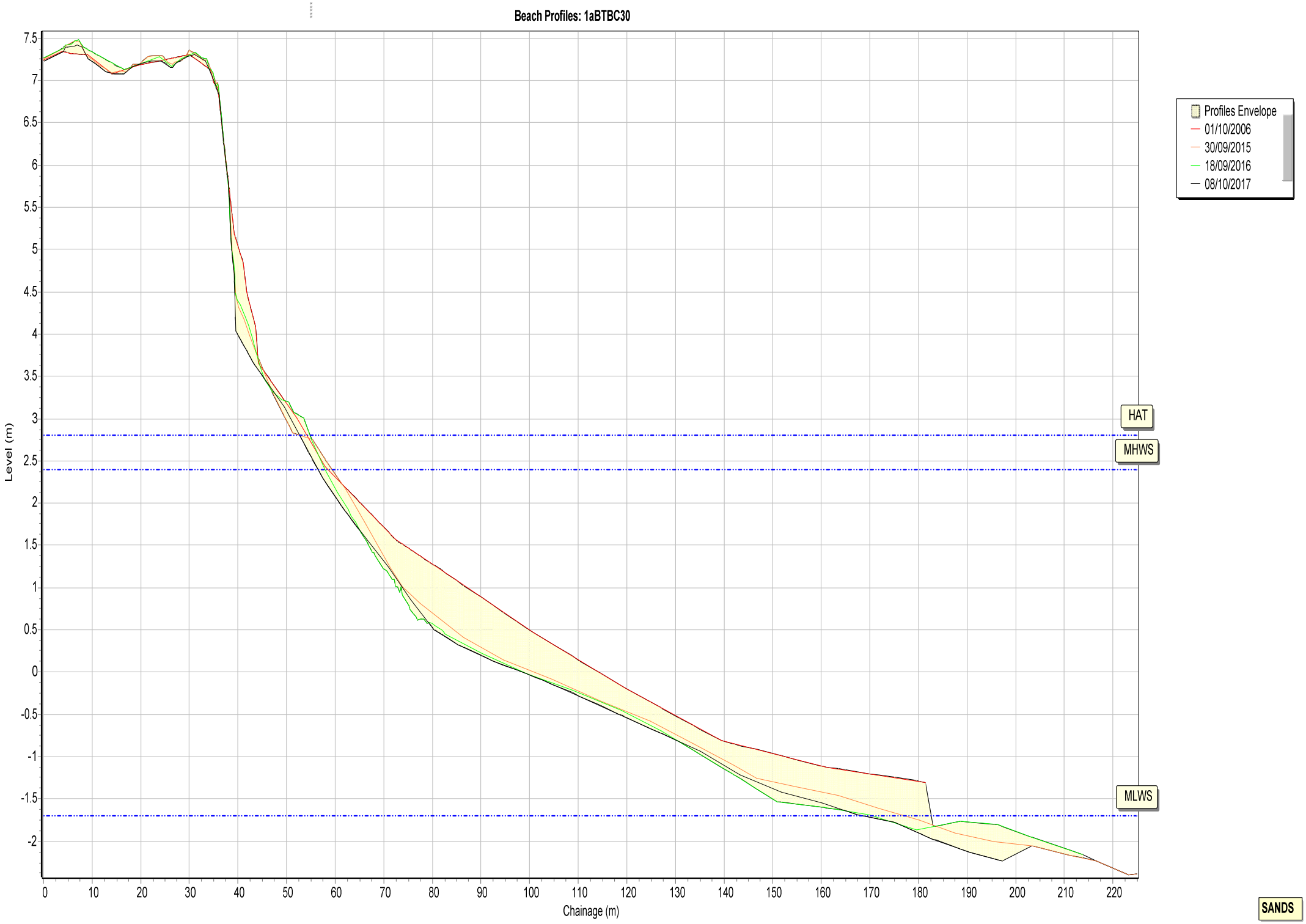
Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 423022.073 **Northing:** 627769.195 **Profile Bearing:** 92 ° from North




Beach Profiles: 1aBTBC29
Profiles Envelope
01/10/2006
13/11/2015
01/10/2016
10/10/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
13
12.5
12
11.5
11
10.5
10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
0
50
100
150
200
250
300
350
400
450
500
550
600
650
SANDS


Beach Profiles: 1aBTBC30
Profiles Envelope
01/10/2006
30/09/2015
18/09/2016
08/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
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100
110
120
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200
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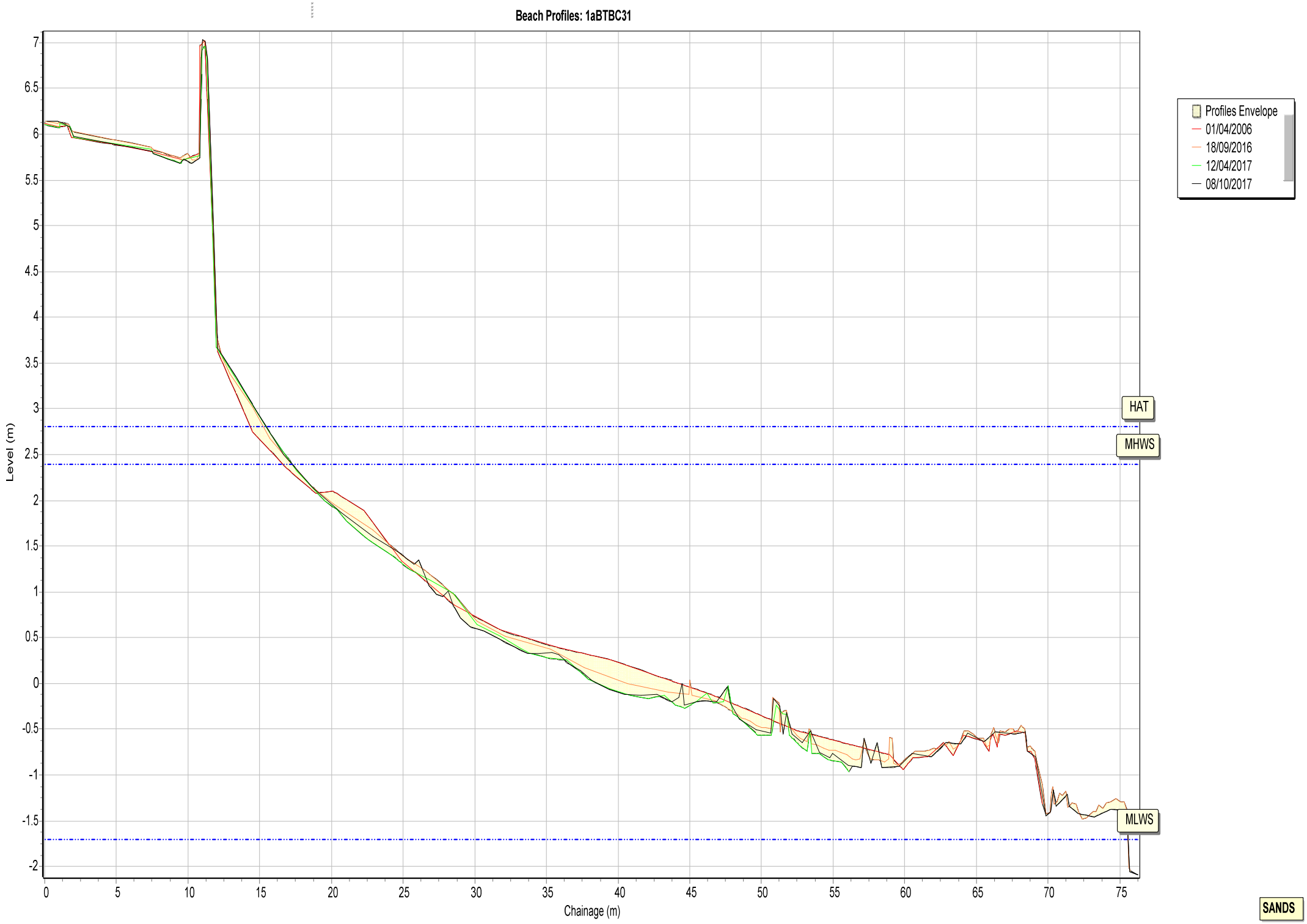
220


Beach Profiles: 1aBTBC31
Profiles Envelope
01/04/2006
18/09/2016
12/04/2017
08/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
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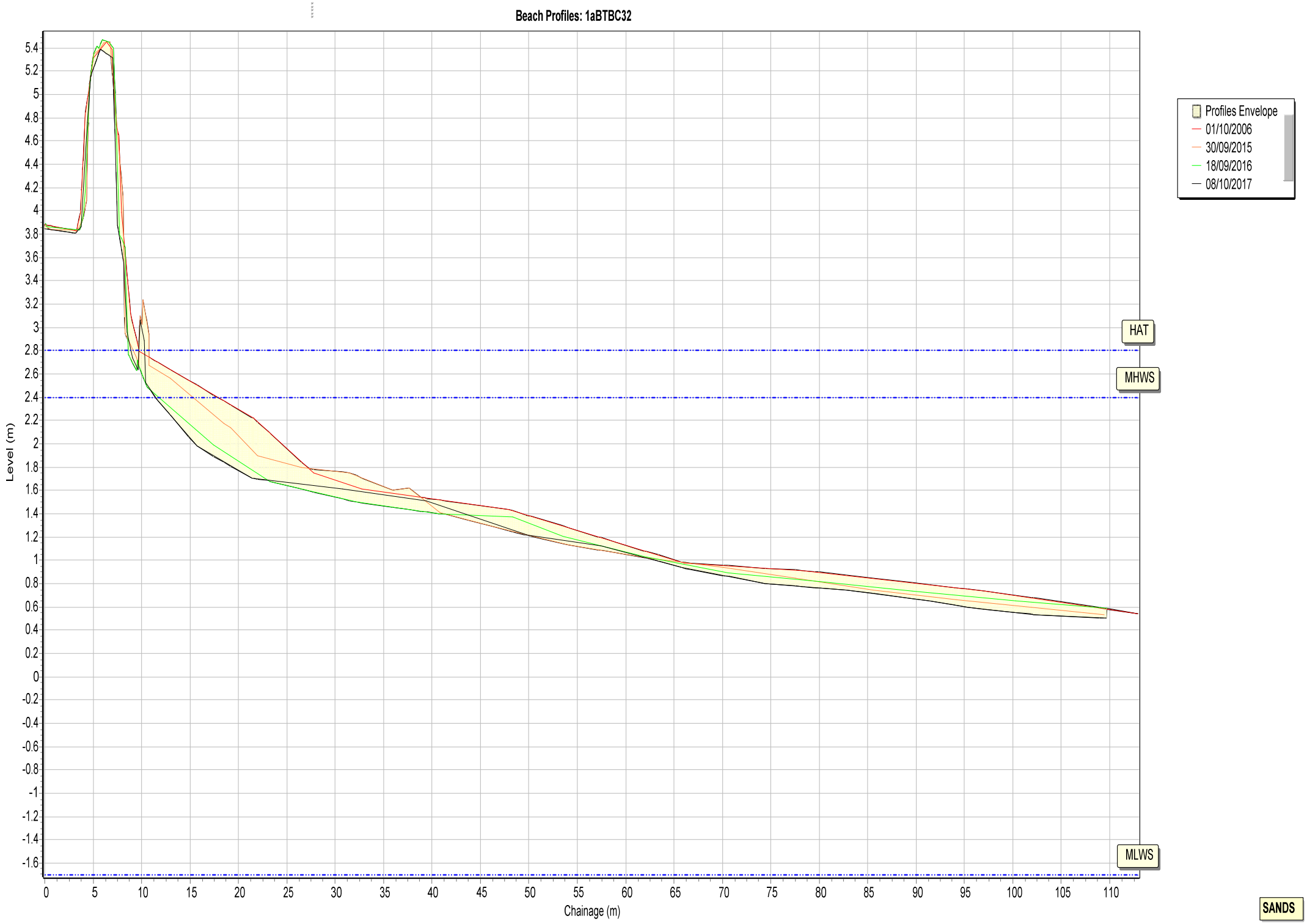
20
25
30
35
40
45
50
55
60
65
70
75


Beach Profiles: 1aBTBC32
Profiles Envelope
01/10/2006
30/09/2015
18/09/2016
08/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
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5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
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2.4
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1.6
1.4
1.2
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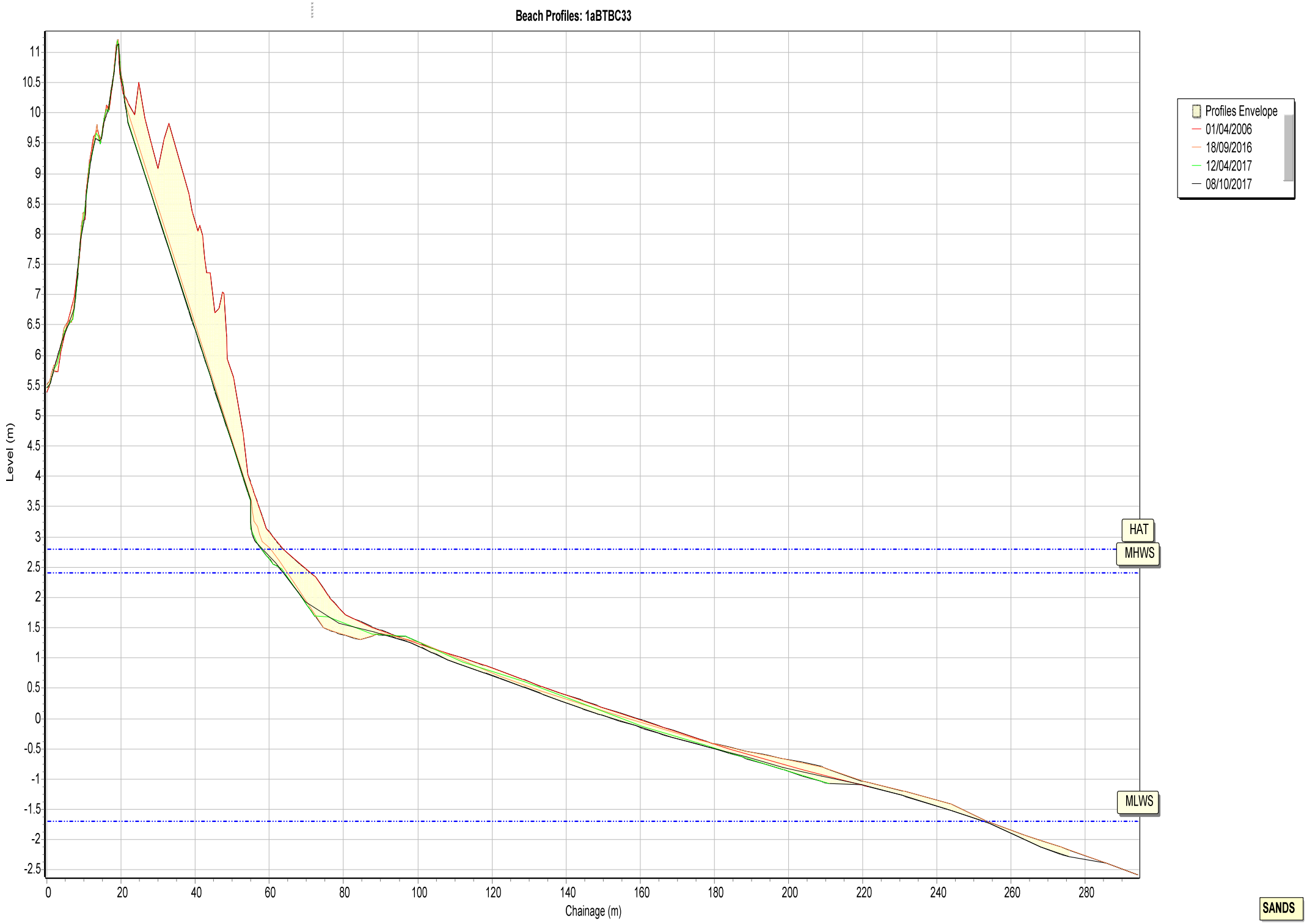
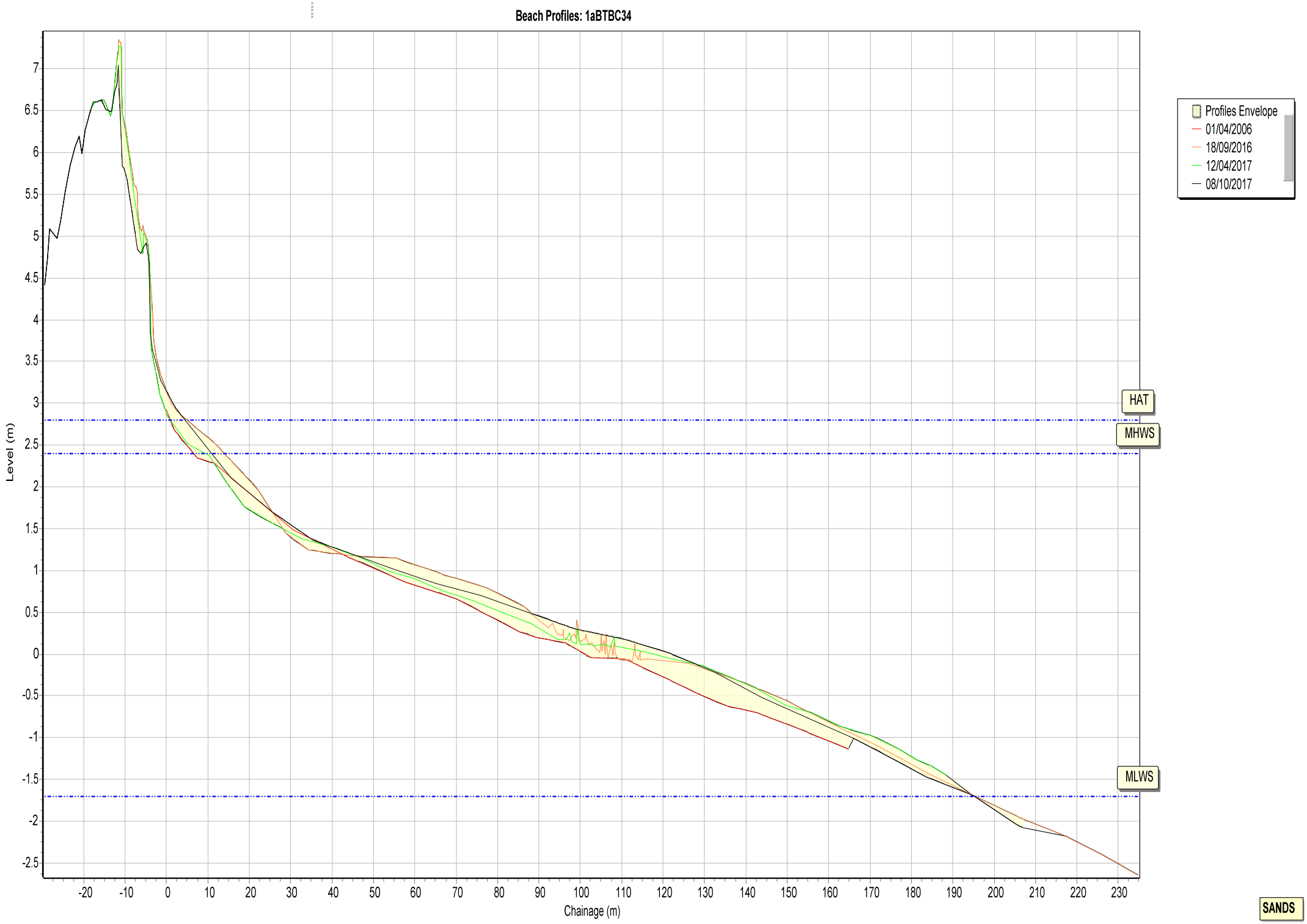
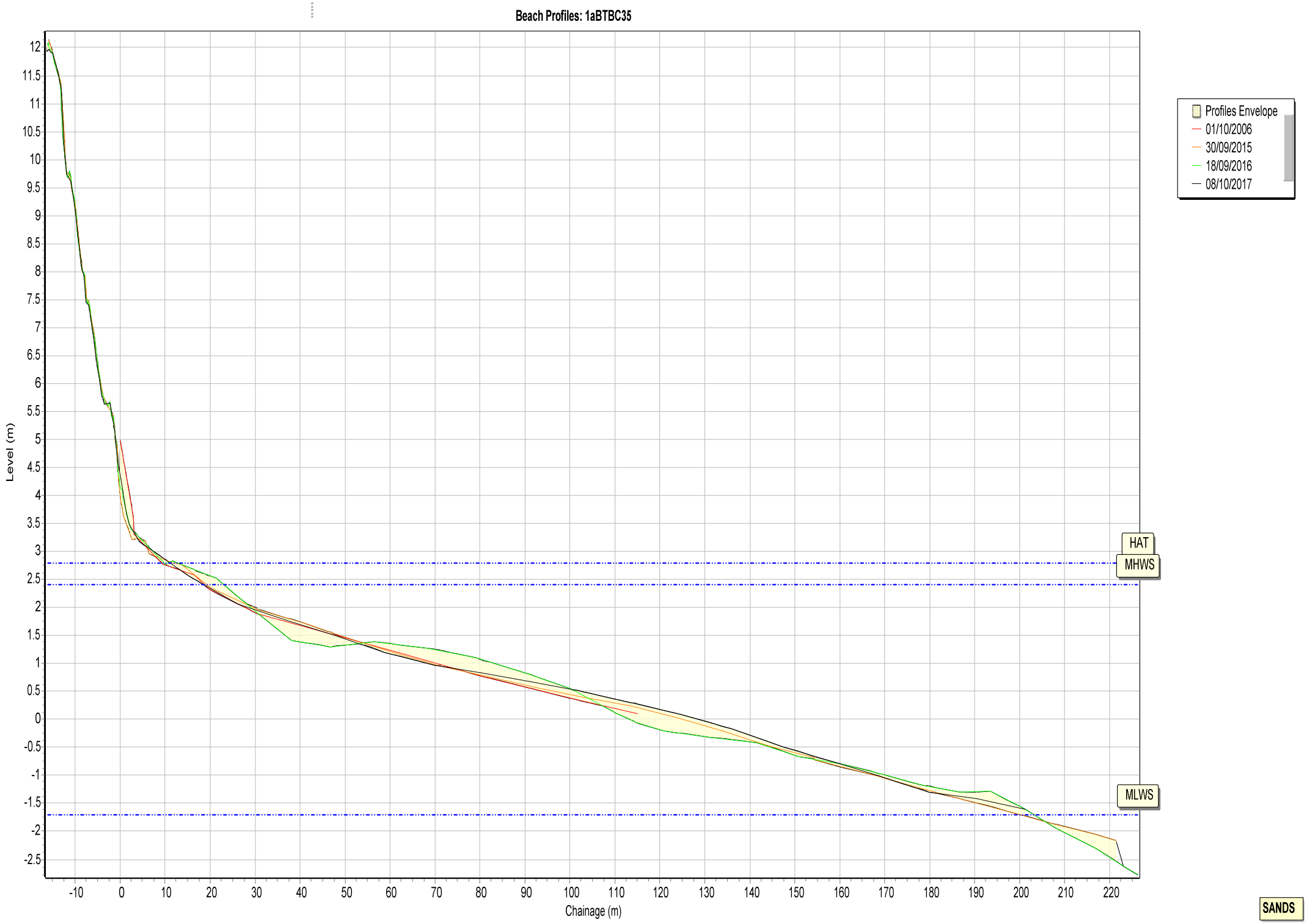
105
110


Beach Profiles: 1aBTBC33
Profiles Envelope
01/04/2006
18/09/2016
12/04/2017
08/10/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aBTBC34
Profiles Envelope
01/04/2006
18/09/2016
12/04/2017
08/10/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aBTBC35
Profiles Envelope
01/10/2006
30/09/2015
18/09/2016
08/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
12
11.5
11
10.5
10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
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2.5
2
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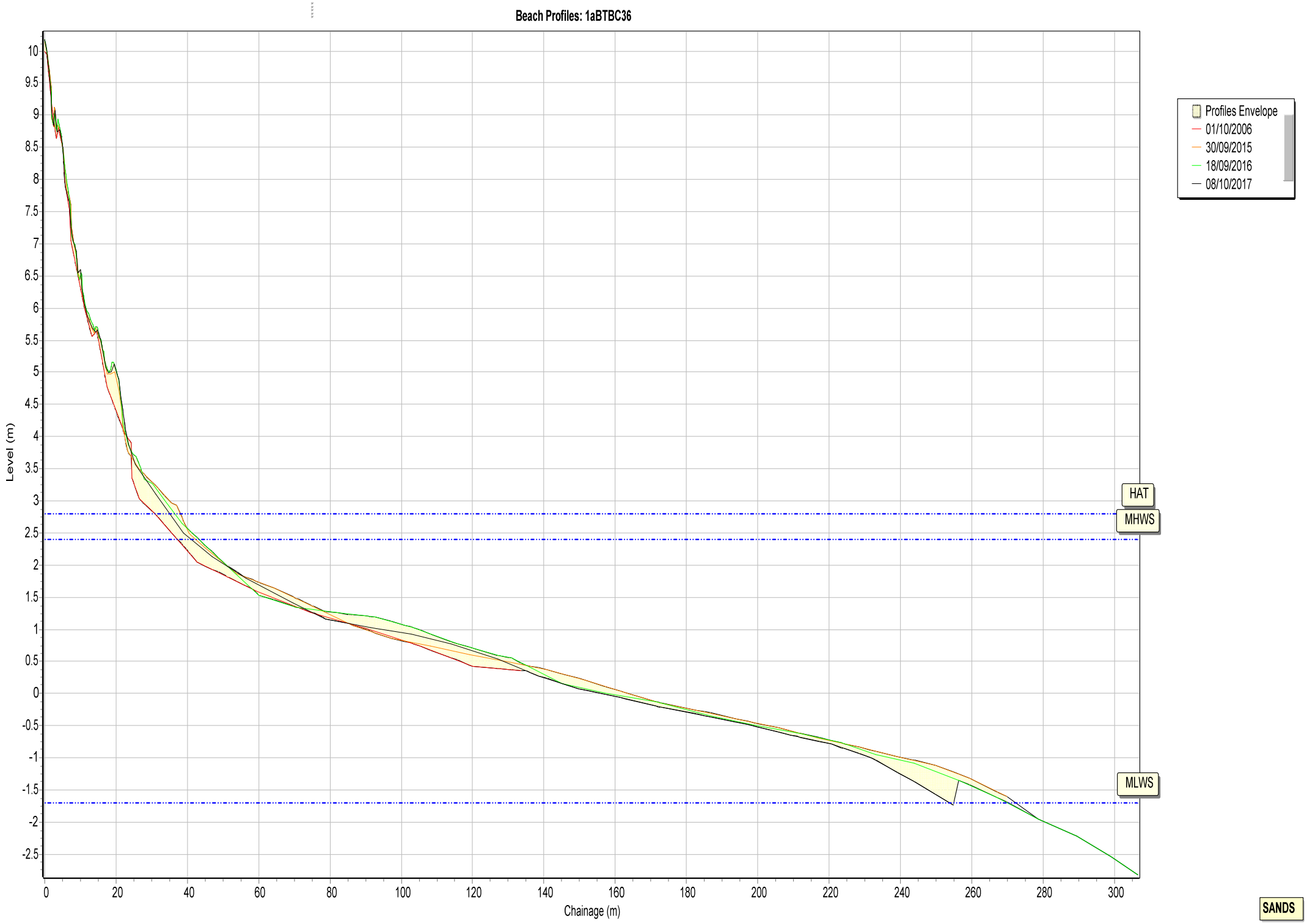
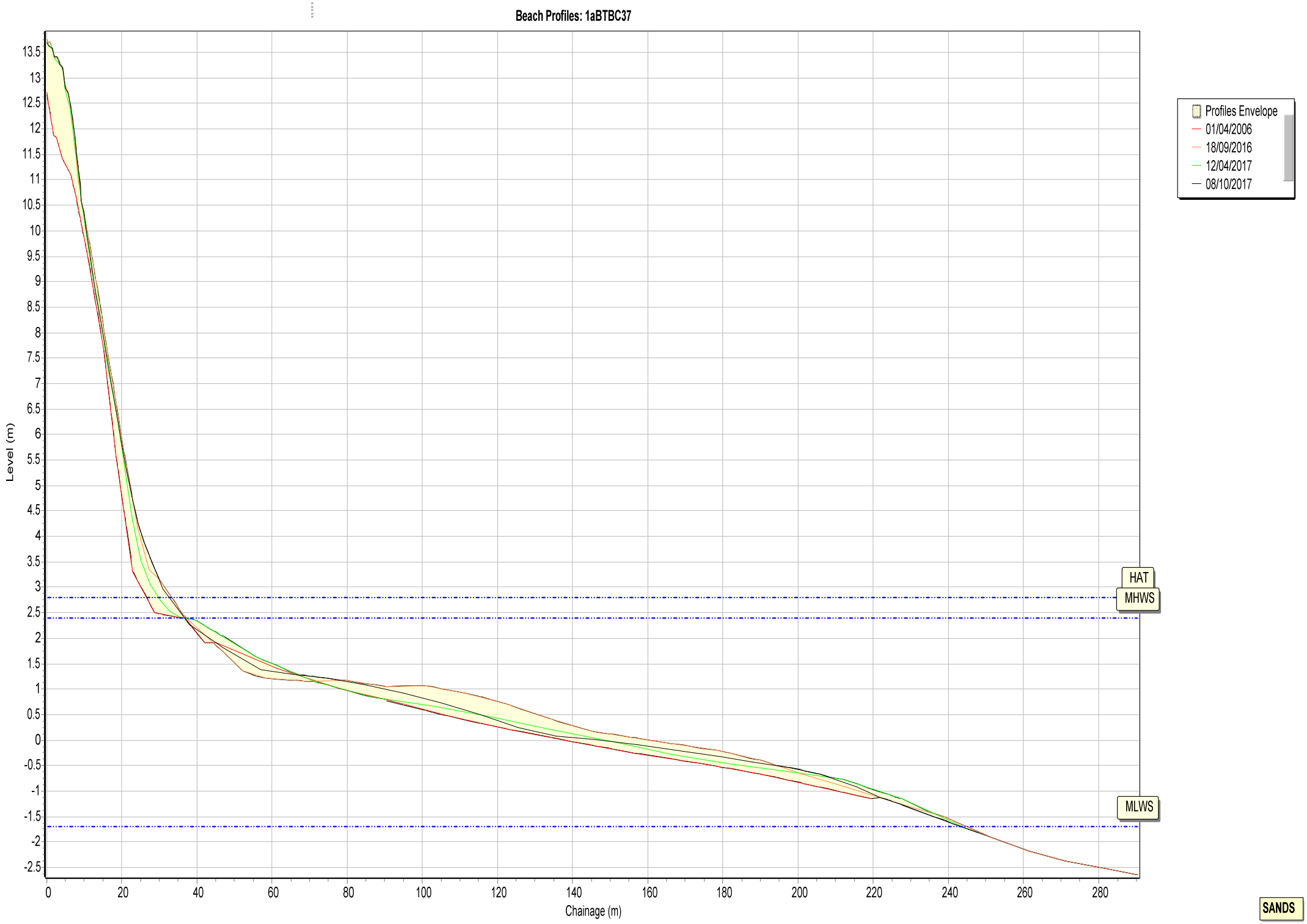

Beach Profiles: 1aBTBC36
Profiles Envelope
01/10/2006
30/09/2015
18/09/2016
08/10/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aBTBC37
Profiles Envelope
01/04/2006
18/09/2016
12/04/2017
08/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
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12.5
12
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7
6.5
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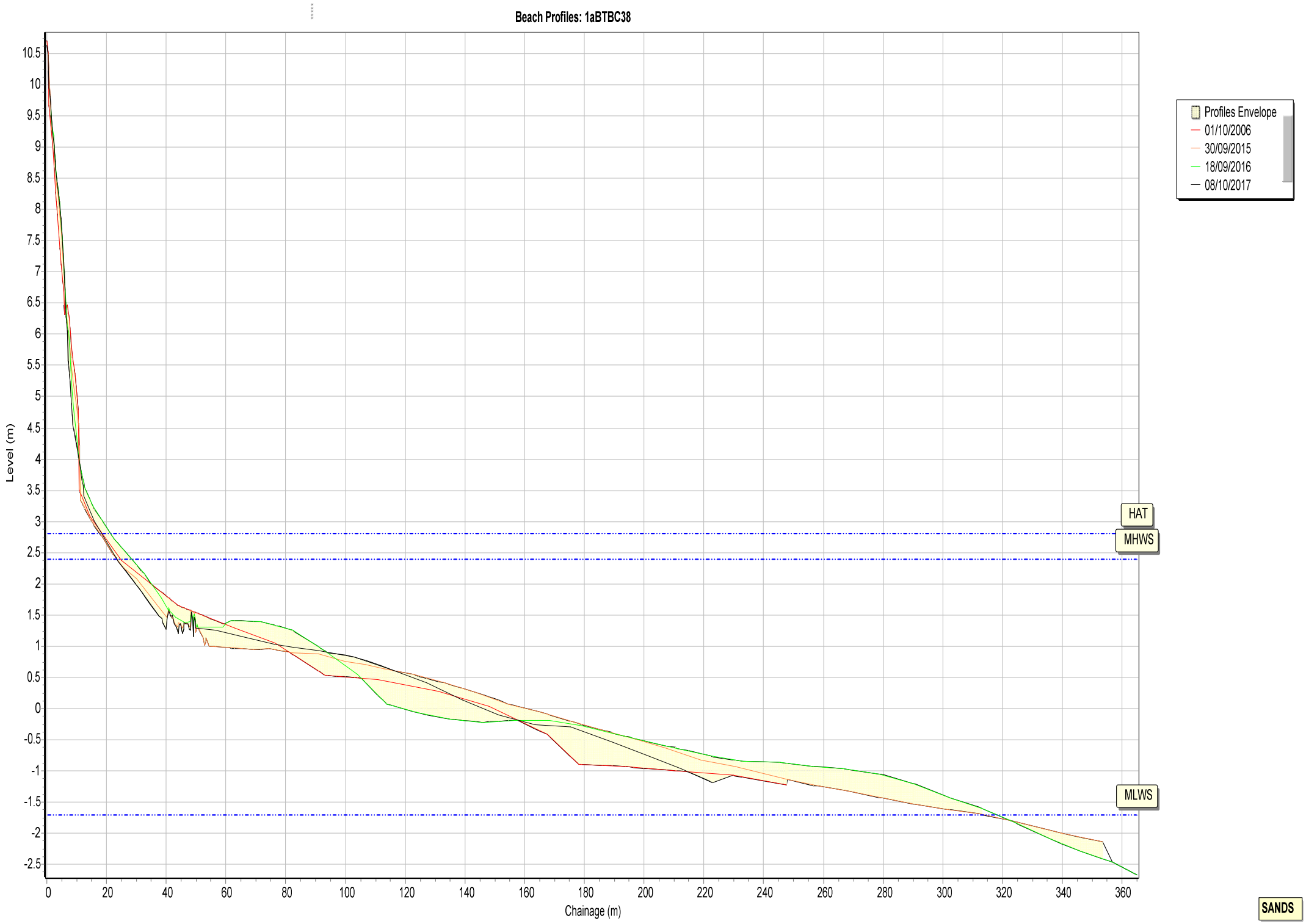
Beach Profiles: 1aBTBC38
Profiles Envelope
01/10/2006
30/09/2015
18/09/2016
08/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
10.5
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9.5
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7
6.5
6
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40
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100
120
140
160
180
200
220
240
260
280
300
320
340
360

Beach Profile

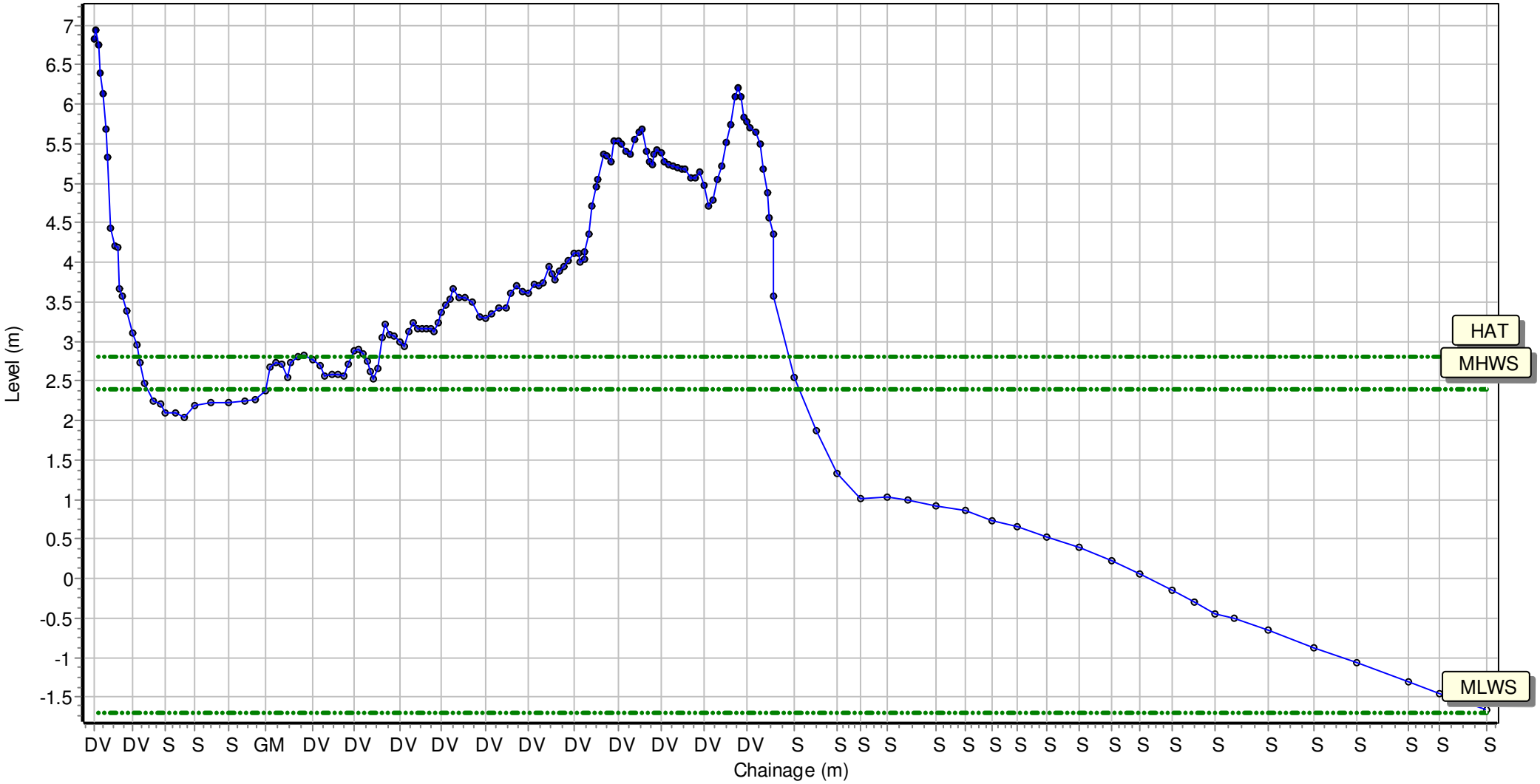
Location: **1aADC01**

Date: 08/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 422824.294 **Northing:** 627077.805 **Profile Bearing:** 77 ° from North



Beach Profile

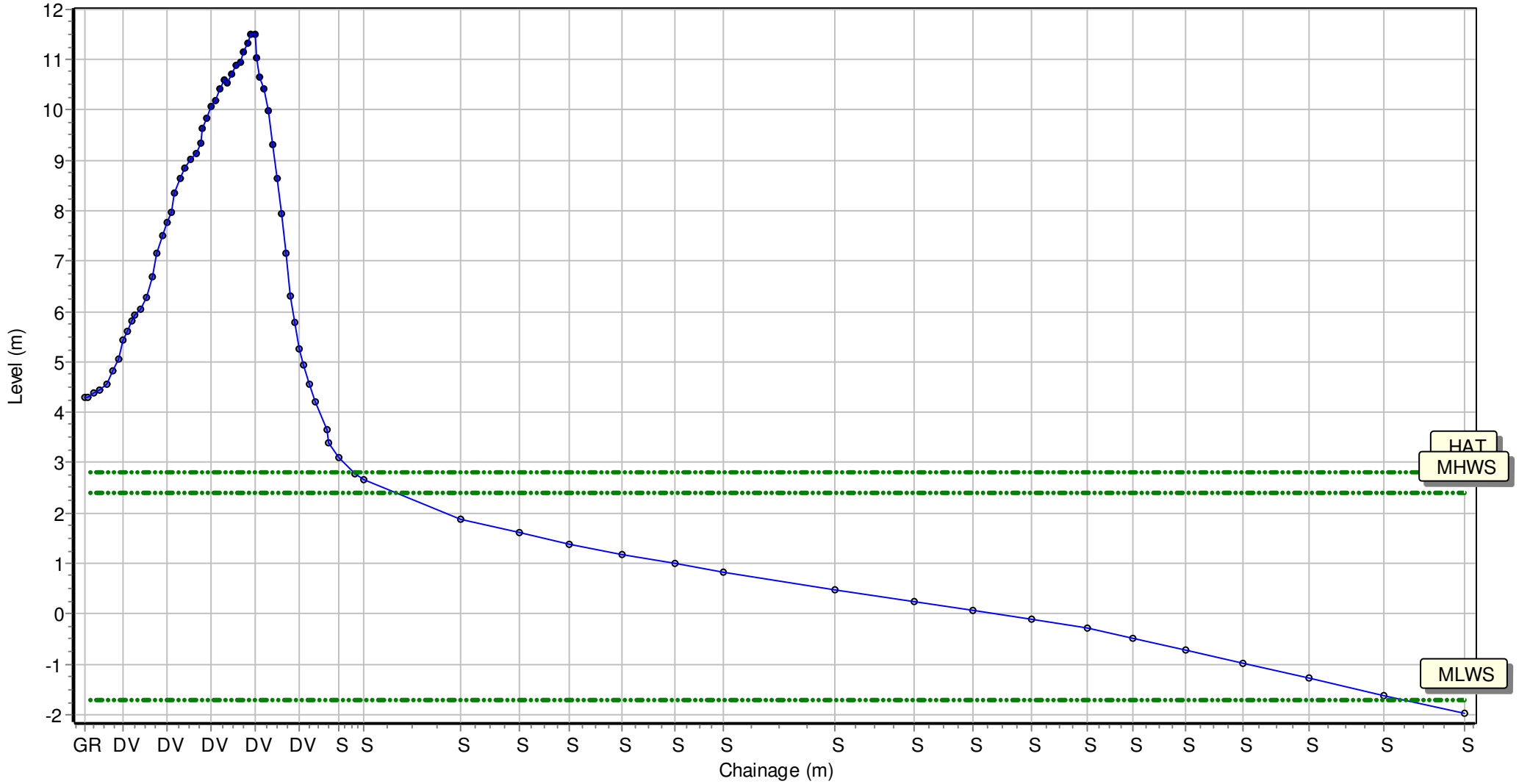
Location: **1aADC02**

Date: 08/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 423387.925 **Northing:** 626385.049 **Profile Bearing:** 56 ° from North



Beach Profile

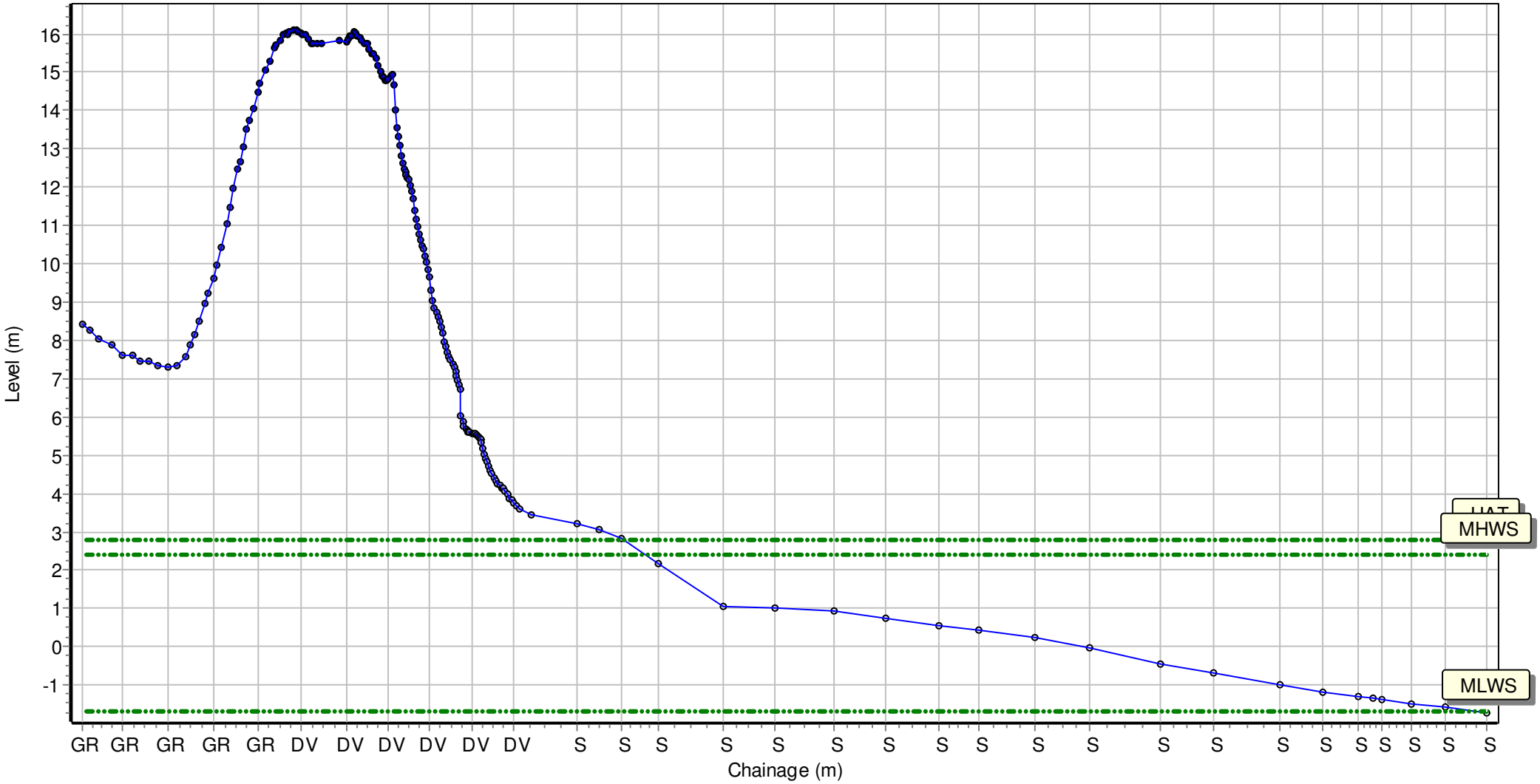
Location: **1aADC03**

Date: 10/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 424282.669 **Northing:** 623628.714 **Profile Bearing:** 112 ° from North



Beach Profile

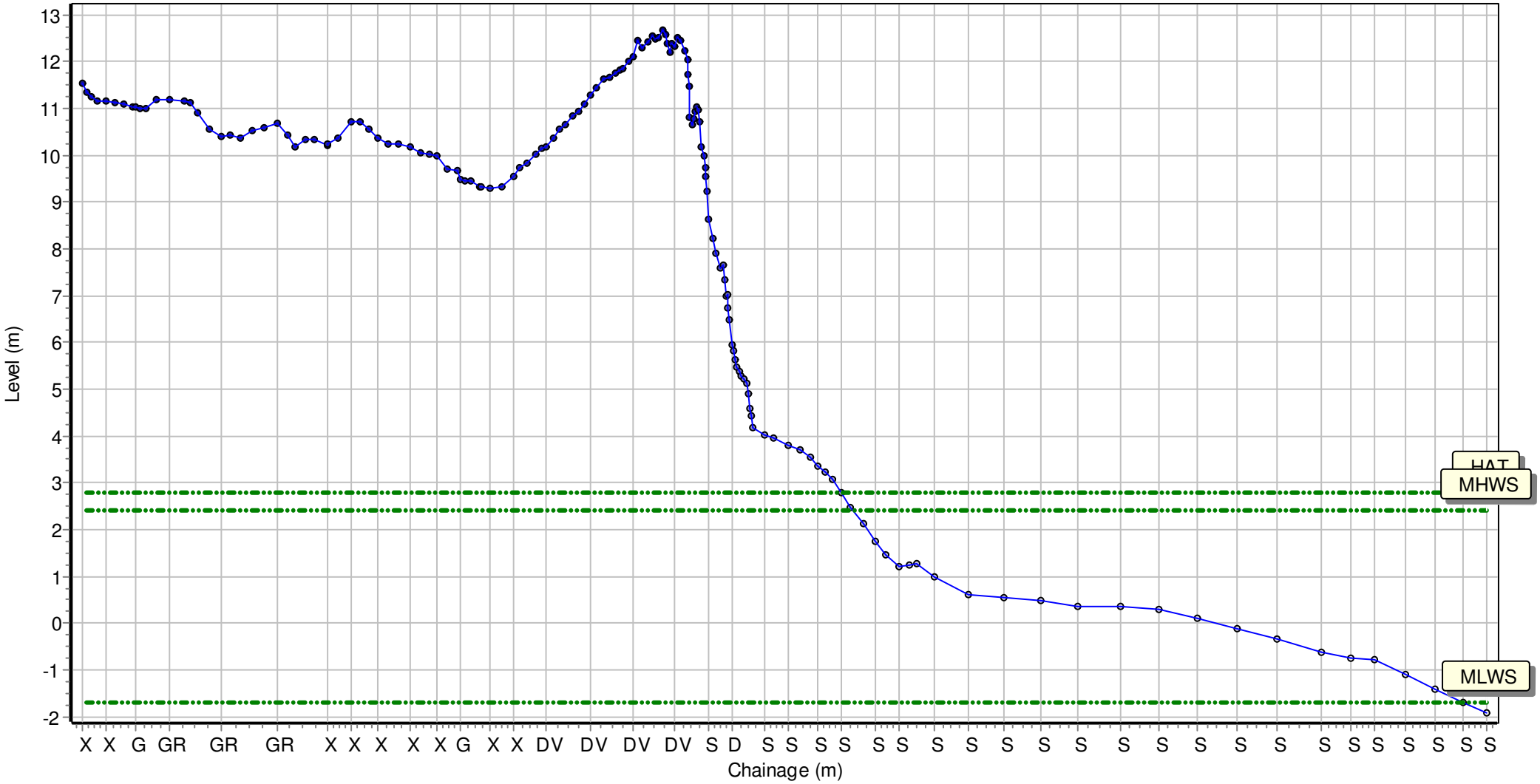
Location: **1aADC04**

Date: 10/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 424479.626 **Northing:** 622434.173 **Profile Bearing:** 50 ° from North



Beach Profile

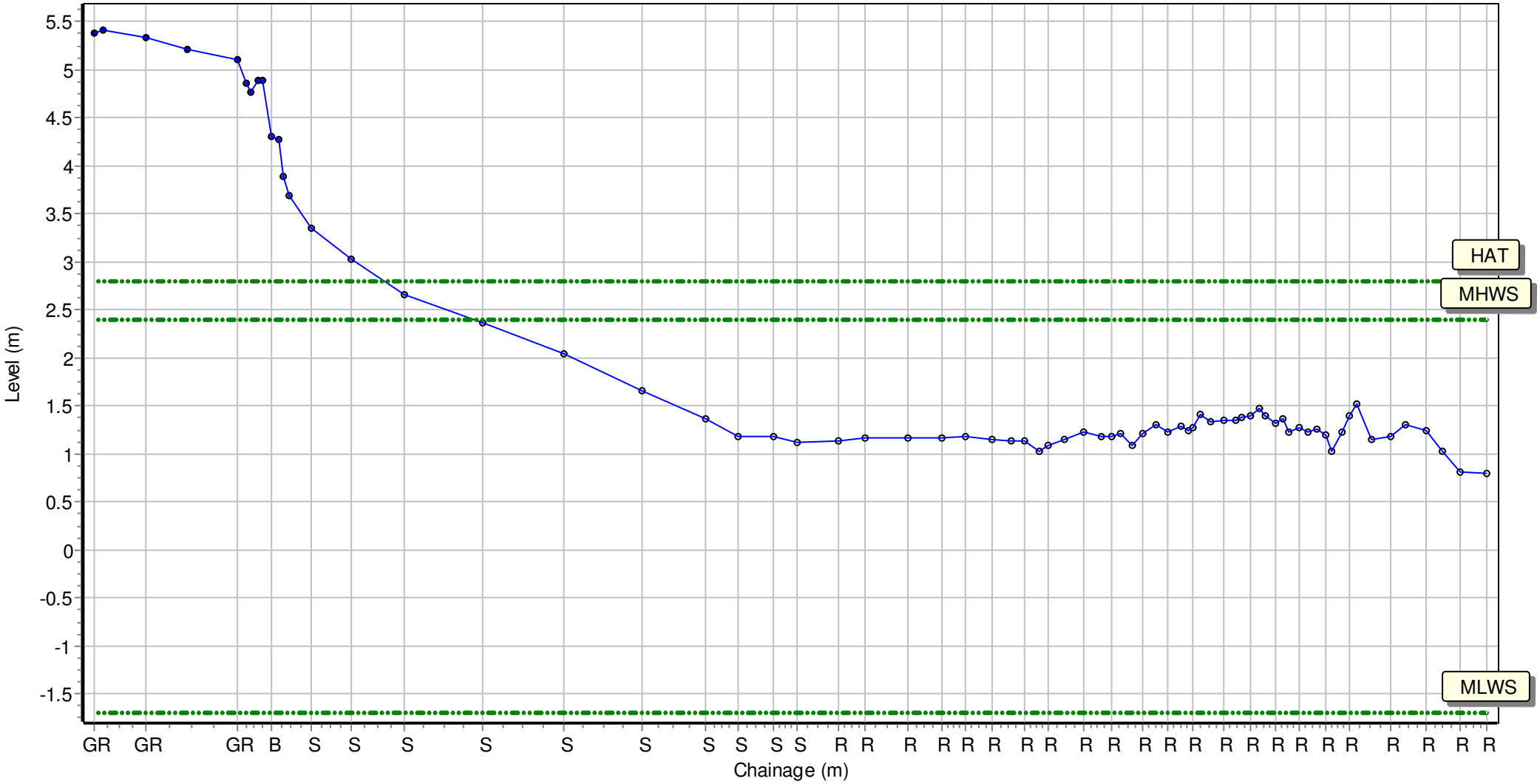
Location: **1aADC04A**

Date: 11/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 426649.592 **Northing:** 614336.9 **Profile Bearing:** 93 ° from North



Beach Profile

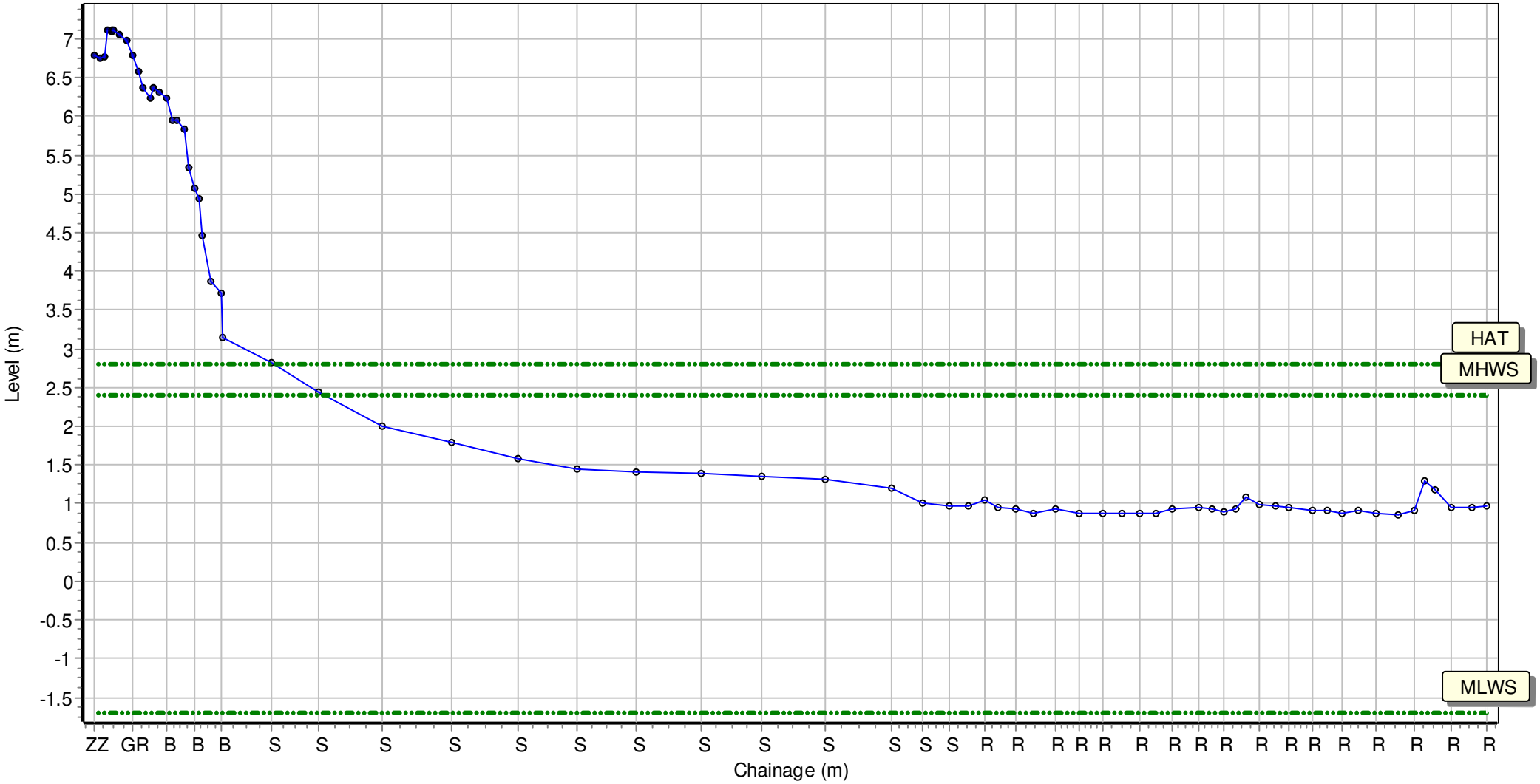
Location: **1aADC04B**

Date: 11/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 426641.642 **Northing:** 614193.793 **Profile Bearing:** 91 ° from North



Beach Profile

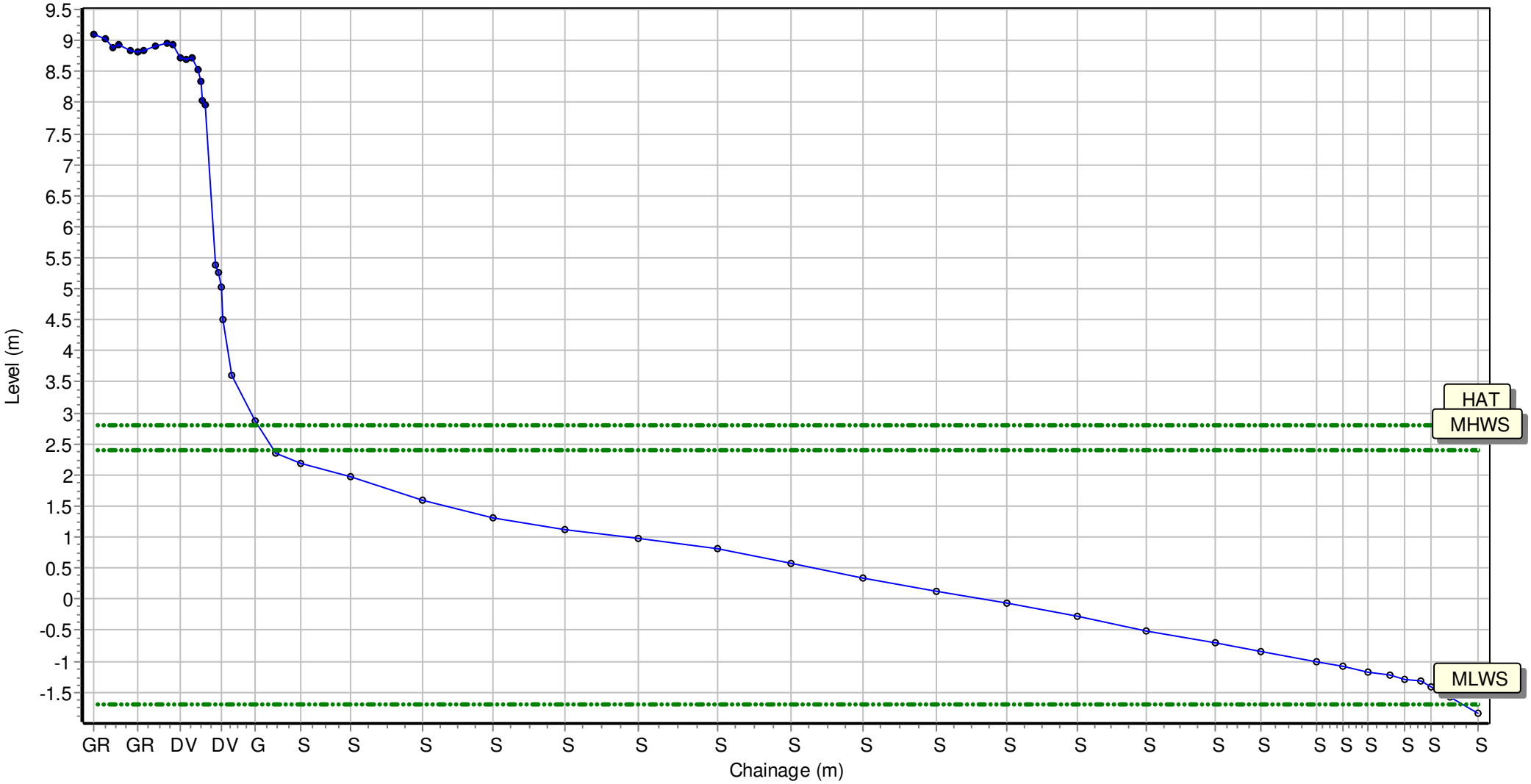
Location: **1aADC05**

Date: 11/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 426185.186 **Northing:** 612543.216 **Profile Bearing:** 142 ° from North



Beach Profile

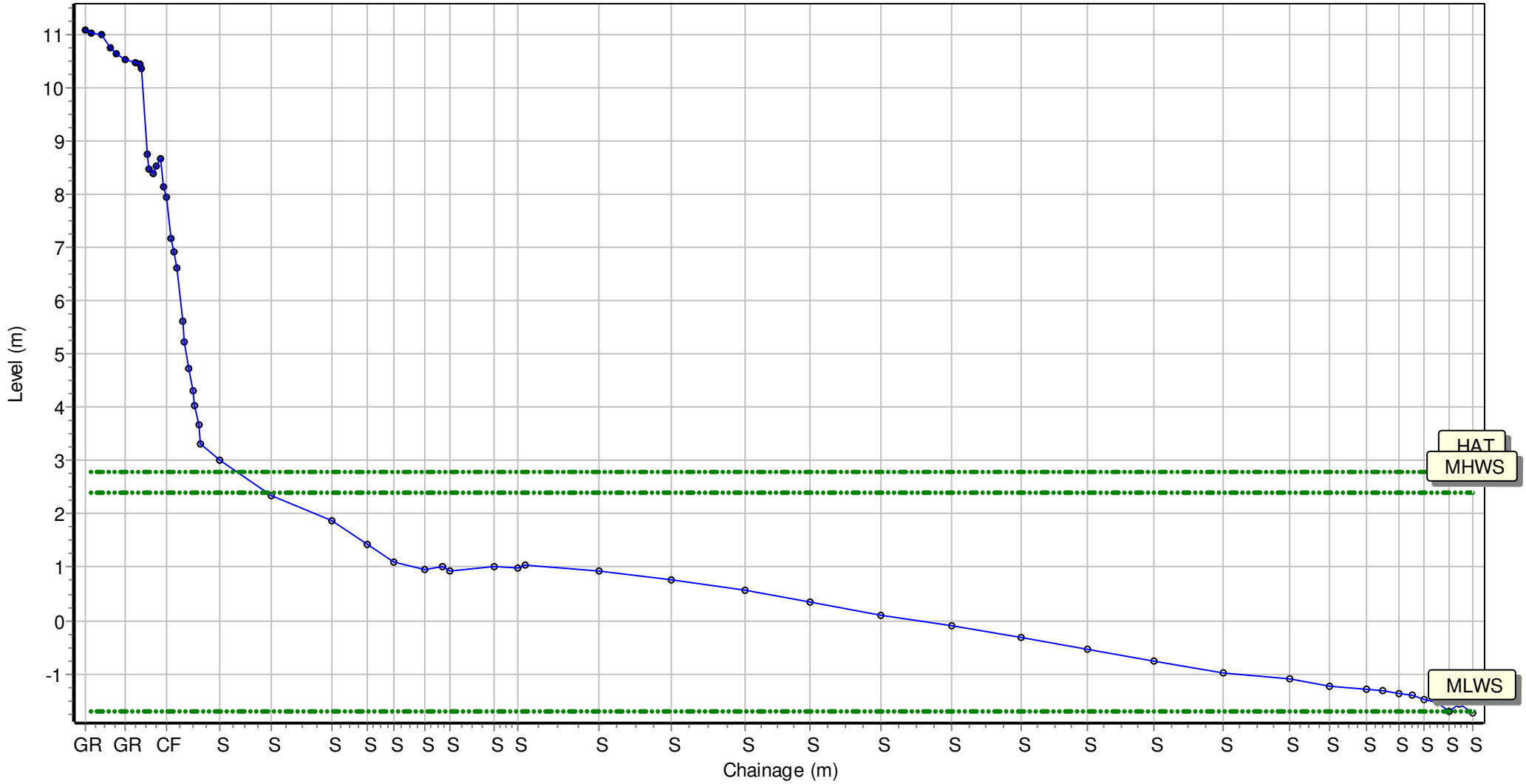
Location: **1aADC06**

Date: 11/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 425950.4 **Northing:** 612302.499 **Profile Bearing:** 122 ° from North



Beach Profile

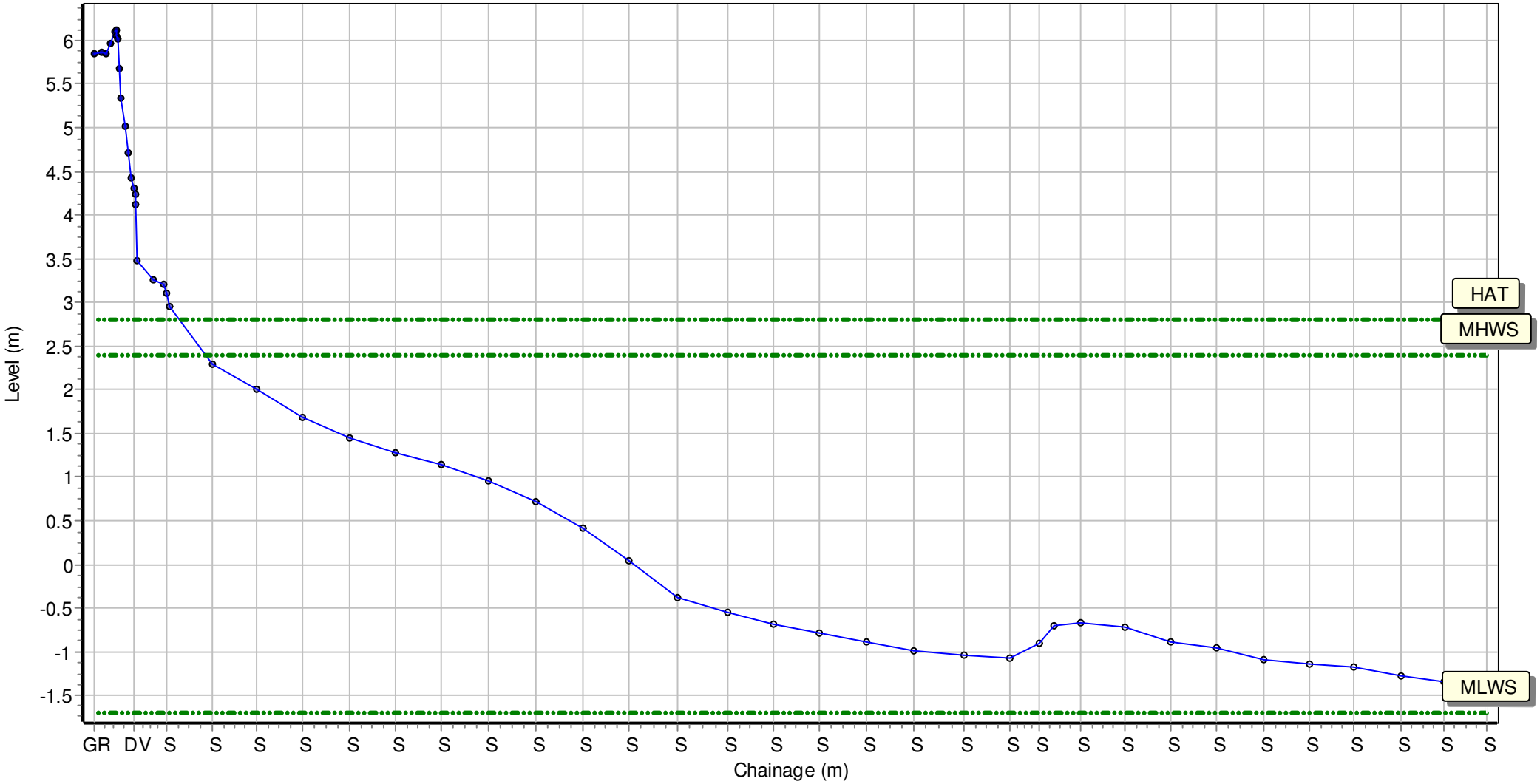
Location: **1aADC07**

Date: 11/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 425324.445 **Northing:** 611018.794 **Profile Bearing:** 134 ° from North



Beach Profile

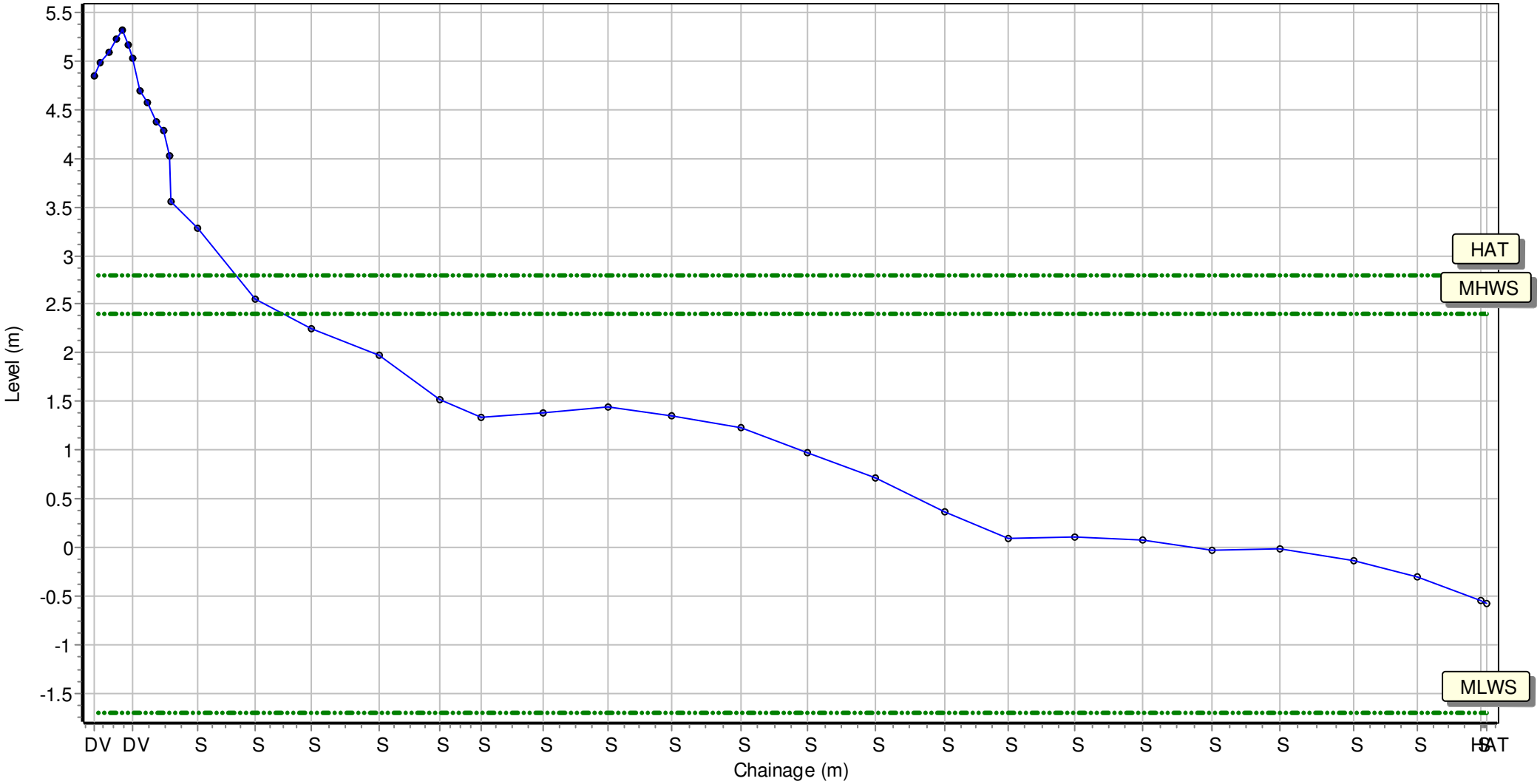
Location: **1aADC08**

Date: 11/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 425031.727 **Northing:** 610632.355 **Profile Bearing:** 112 ° from North



Beach Profile

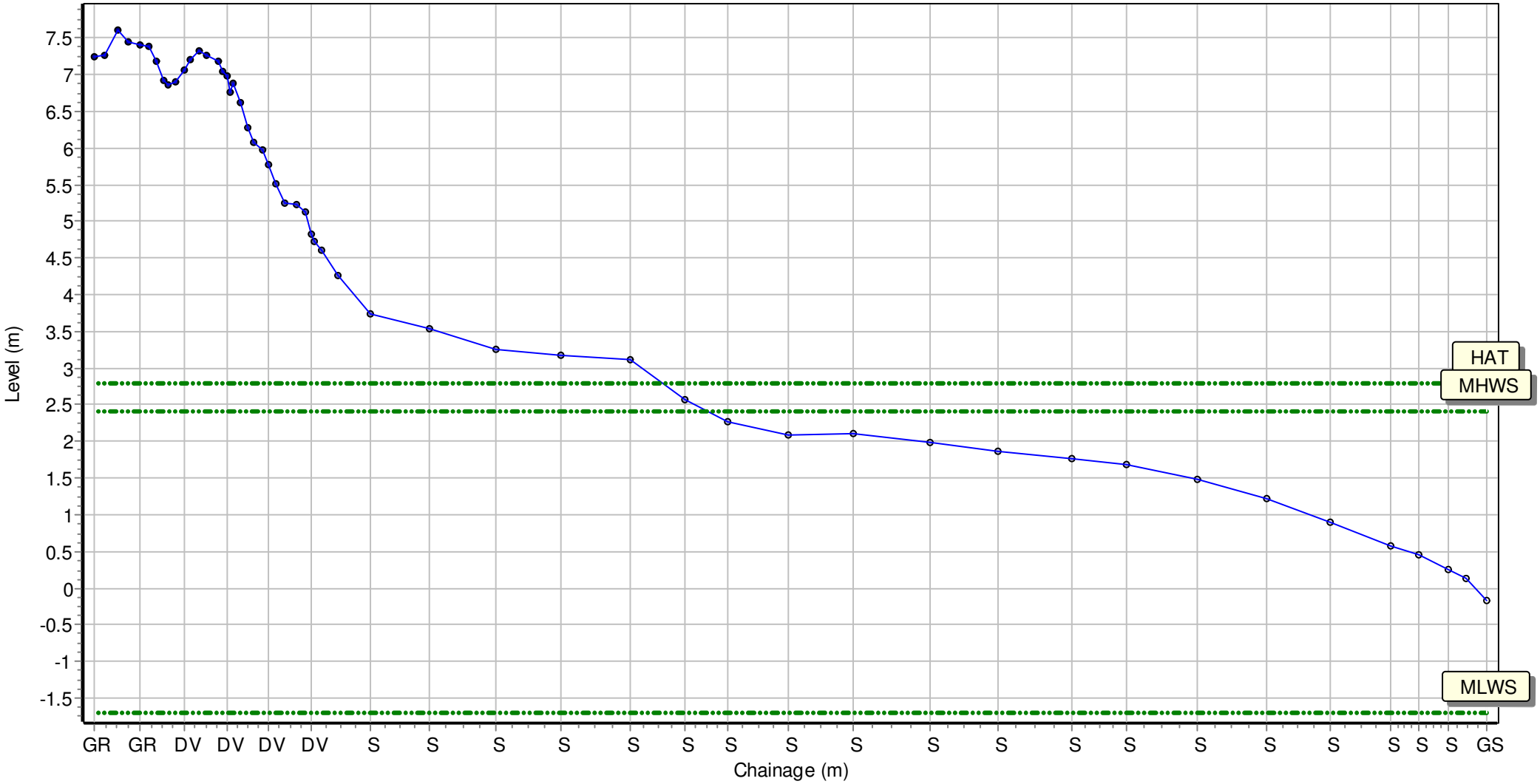
Location: **1aADC09**

Date: 11/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 424802.33 **Northing:** 610353.259 **Profile Bearing:** 120 ° from North



Beach Profile

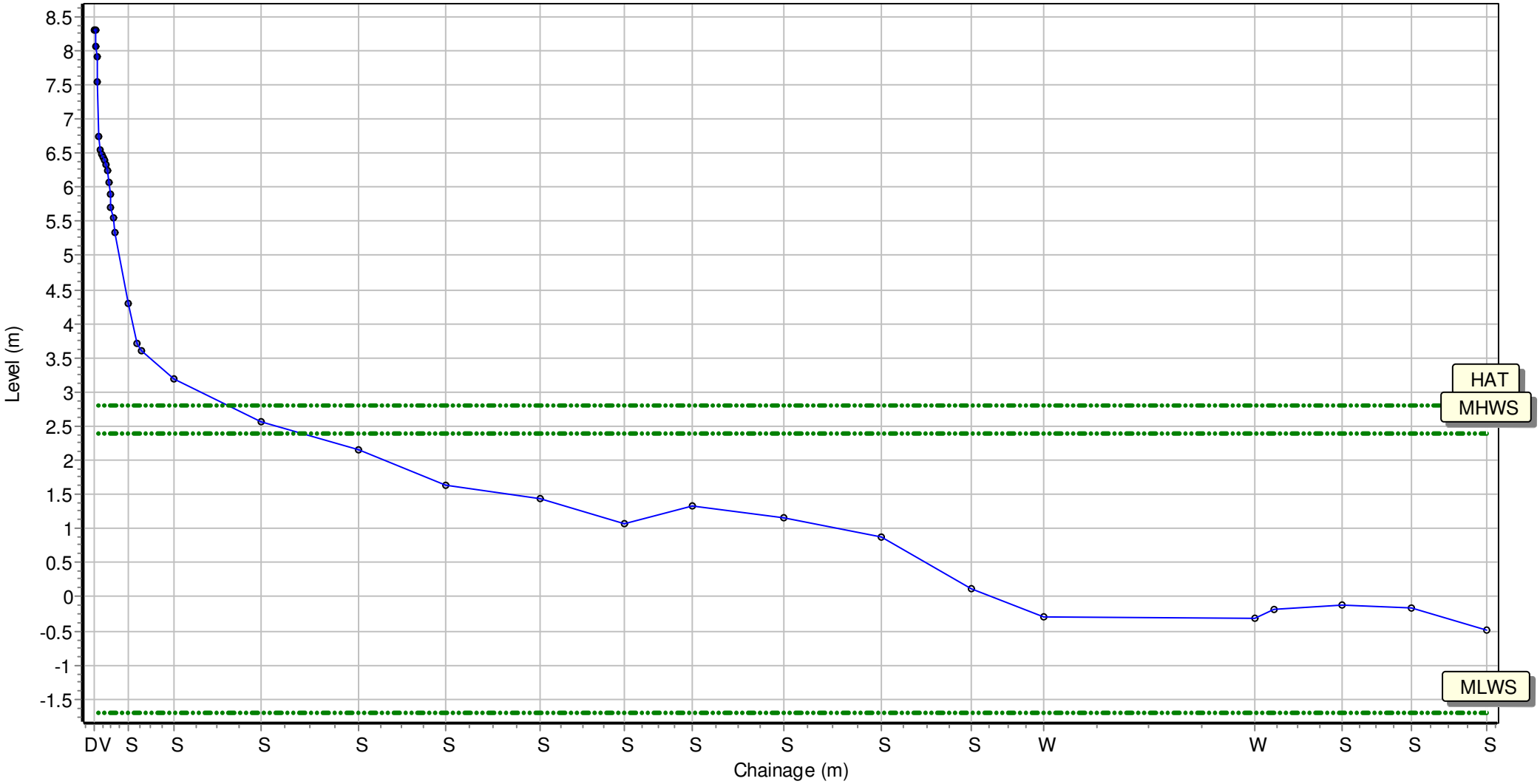
Location: **1aADC10**

Date: 21/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 424845.495 **Northing:** 610035.618 **Profile Bearing:** 70 ° from North



Beach Profile

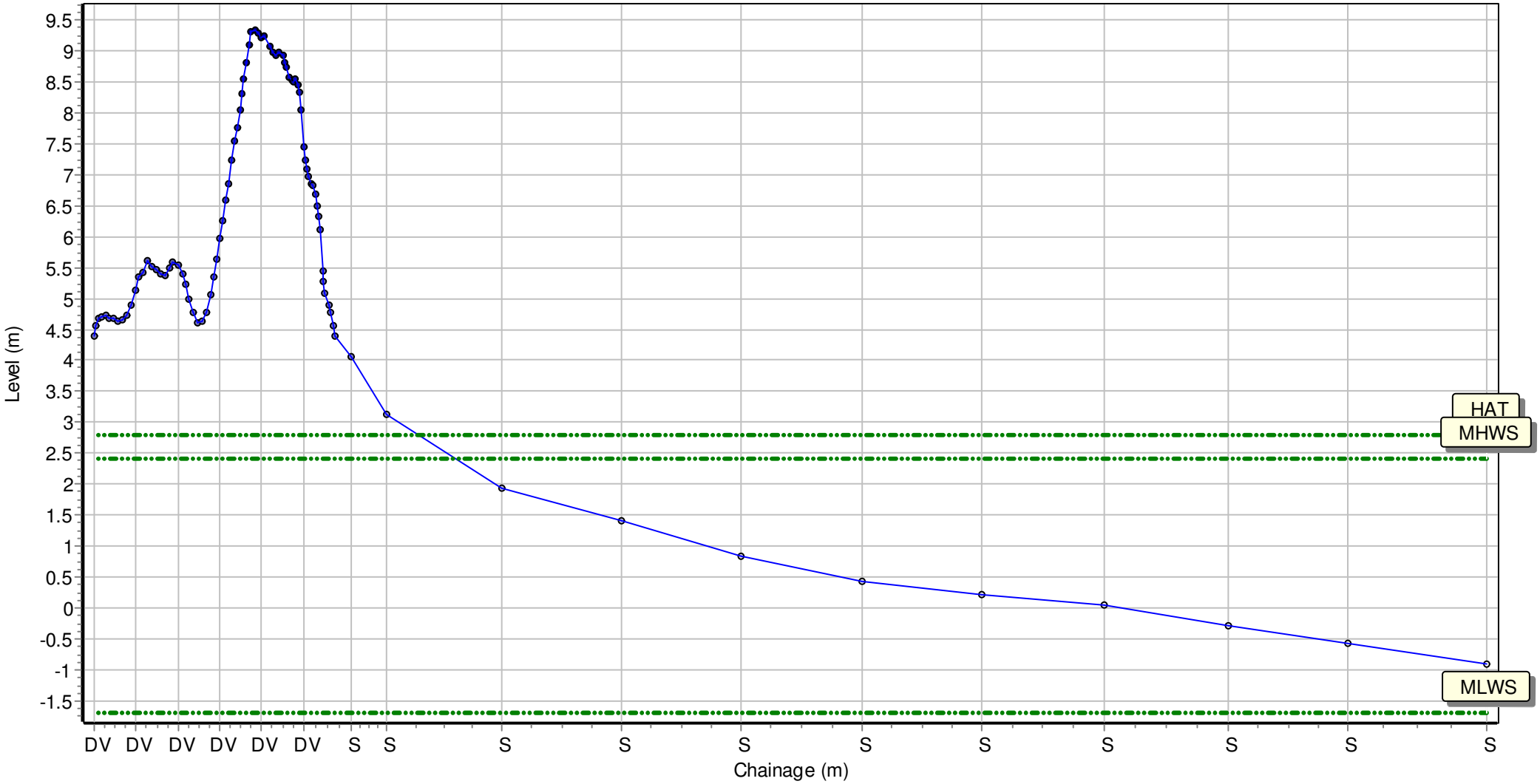
Location: **1aADC11**

Date: 21/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 424966.878 **Northing:** 609097.685 **Profile Bearing:** 71 ° from North



Beach Profile

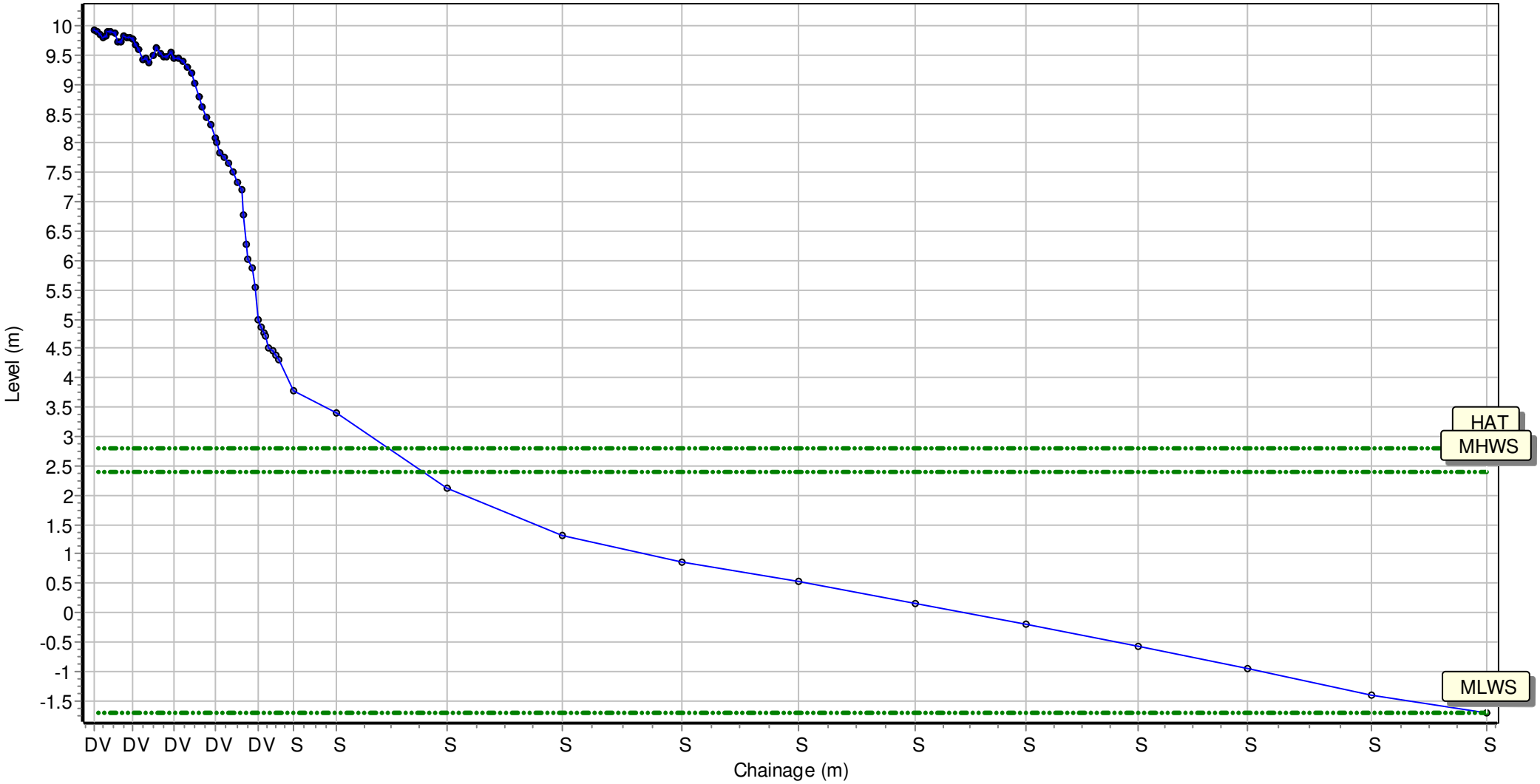
Location: **1aADC12**

Date: 21/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 425376.479 **Northing:** 607303.998 **Profile Bearing:** 67 ° from North



Beach Profile

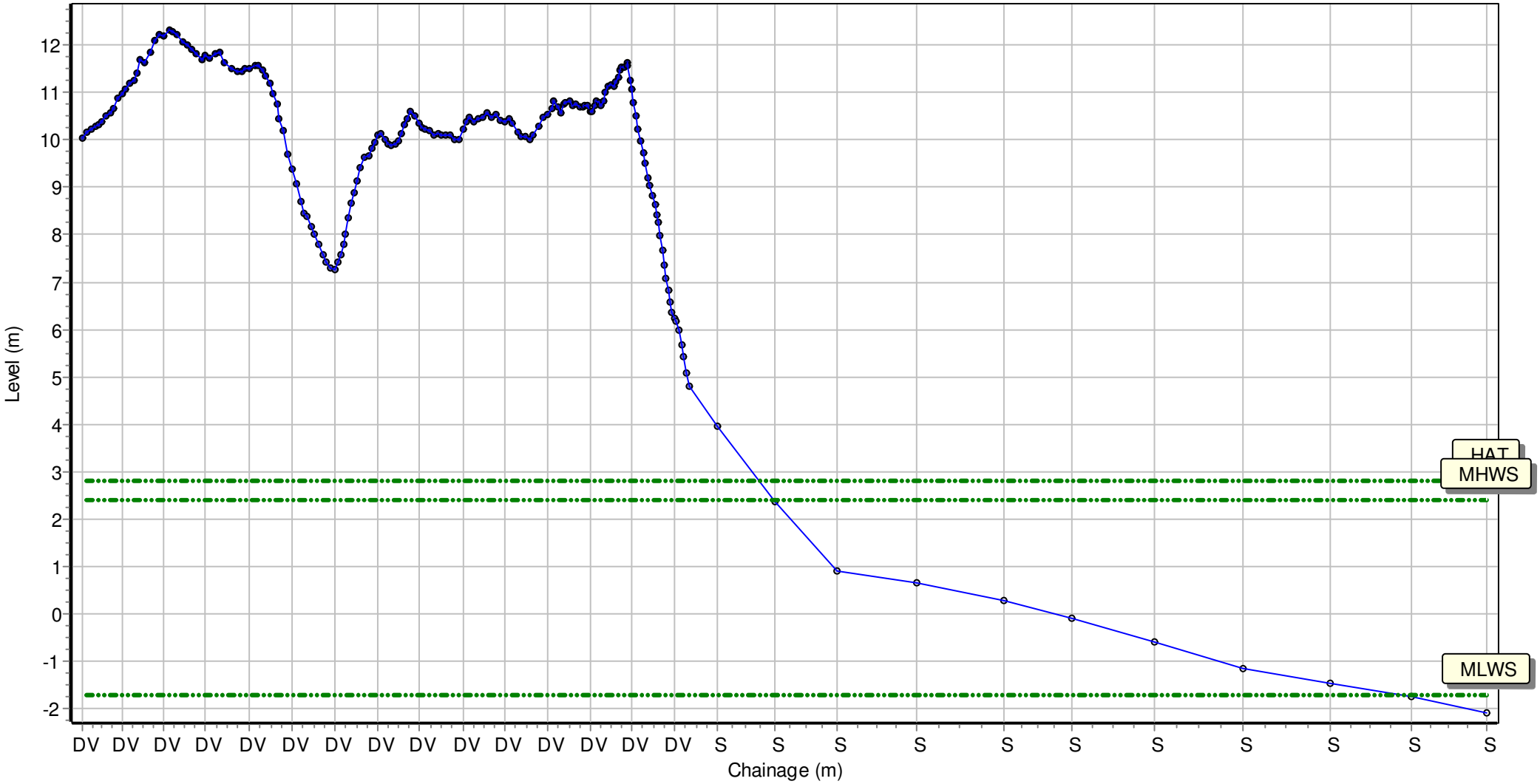
Location: **1aADC13**

Date: 21/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 425859.769 **Northing:** 606033.935 **Profile Bearing:** 63 ° from North



Beach Profile

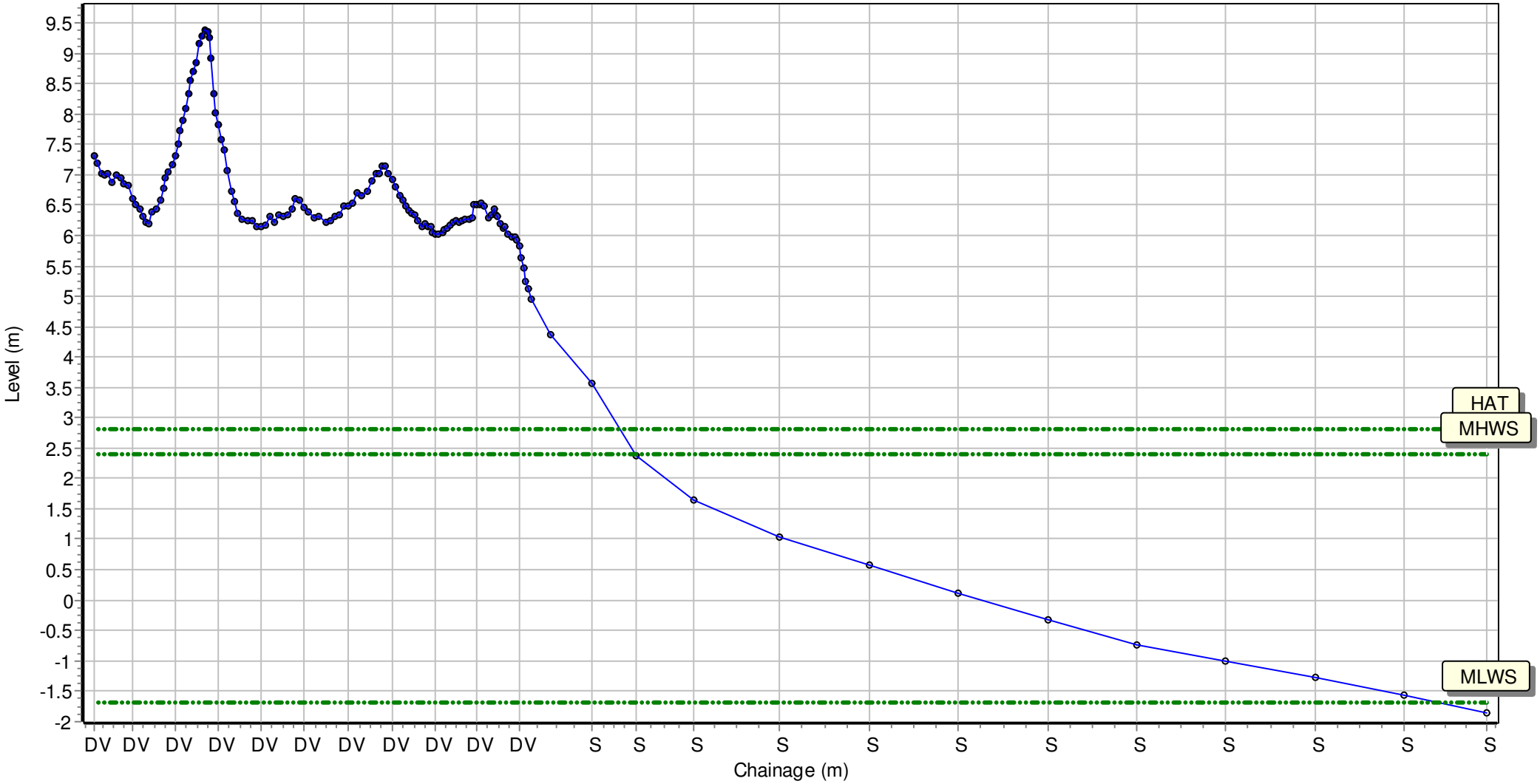
Location: **1aADC14**

Date: 21/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 426469.136 **Northing:** 605263.954 **Profile Bearing:** 59 ° from North



Beach Profile

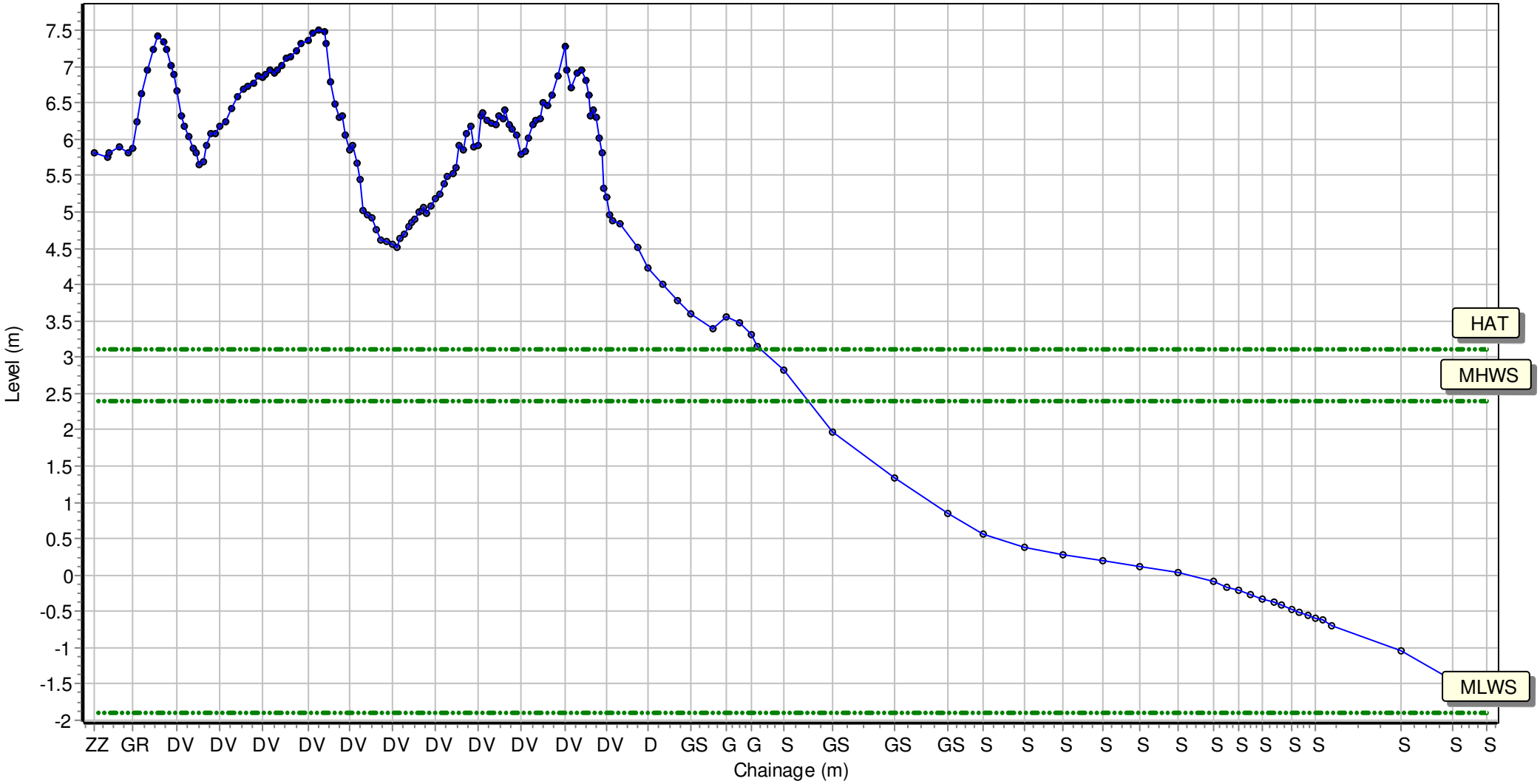
Location: **1aADC15**

Date: 12/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 427956.742 **Northing:** 603743.758 **Profile Bearing:** 46 ° from North



Beach Profile

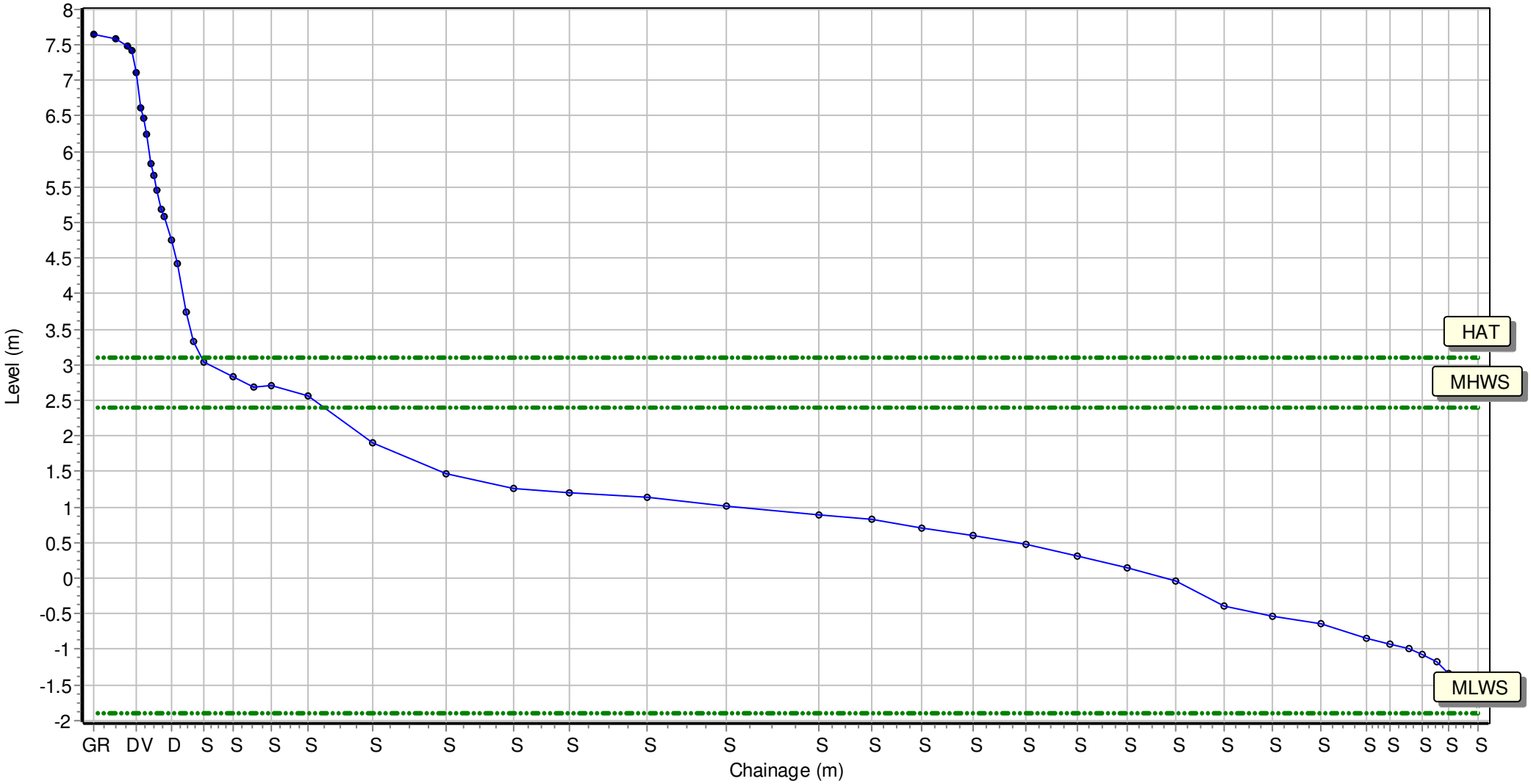
Location: **1aADC15A**

Date: 12/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 428642.365 **Northing:** 603069.145 **Profile Bearing:** 90 ° from North



Beach Profile

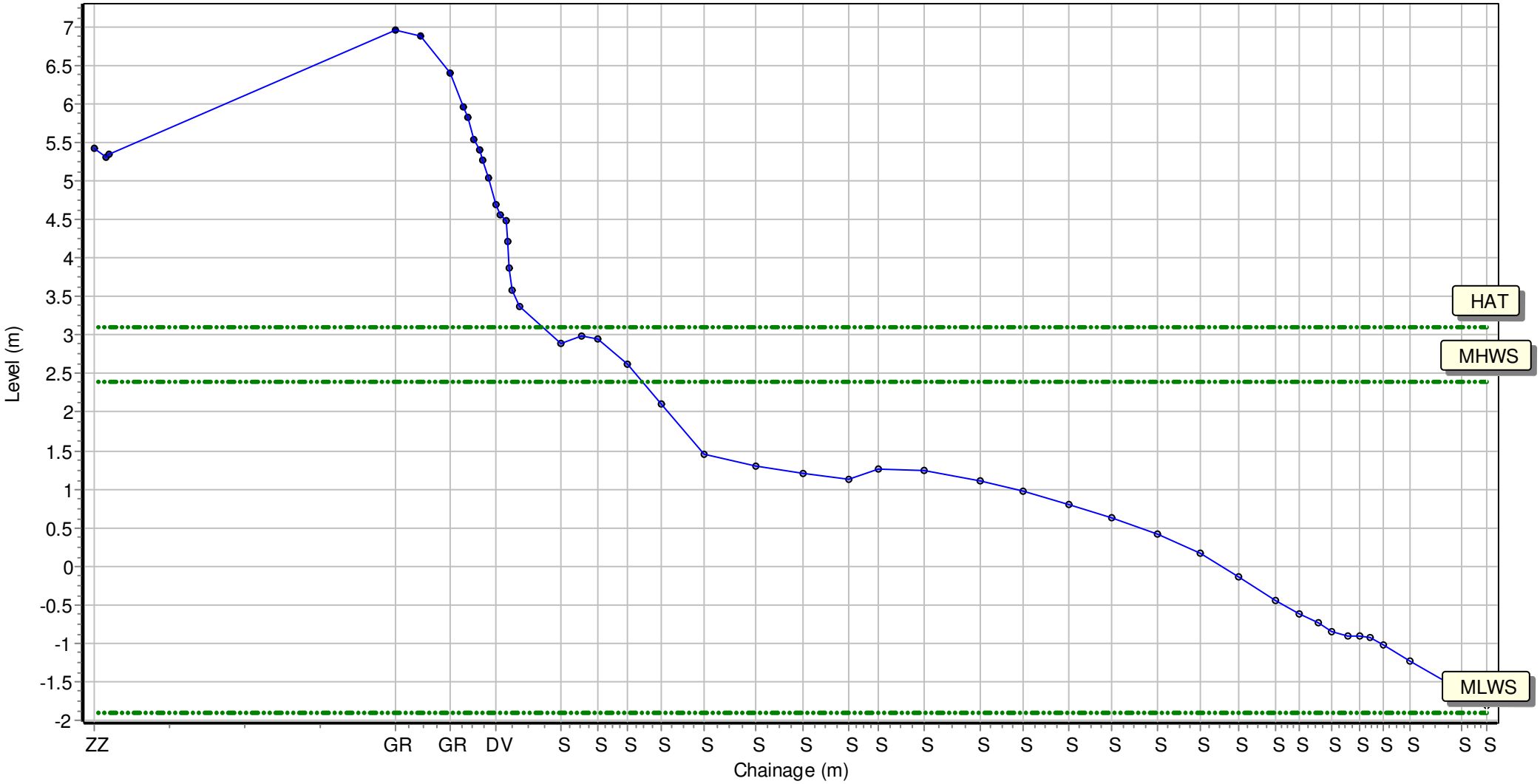
Location: **1aADC16**

Date: 12/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 428575.092 **Northing:** 602921.577 **Profile Bearing:** 93 ° from North



Beach Profile

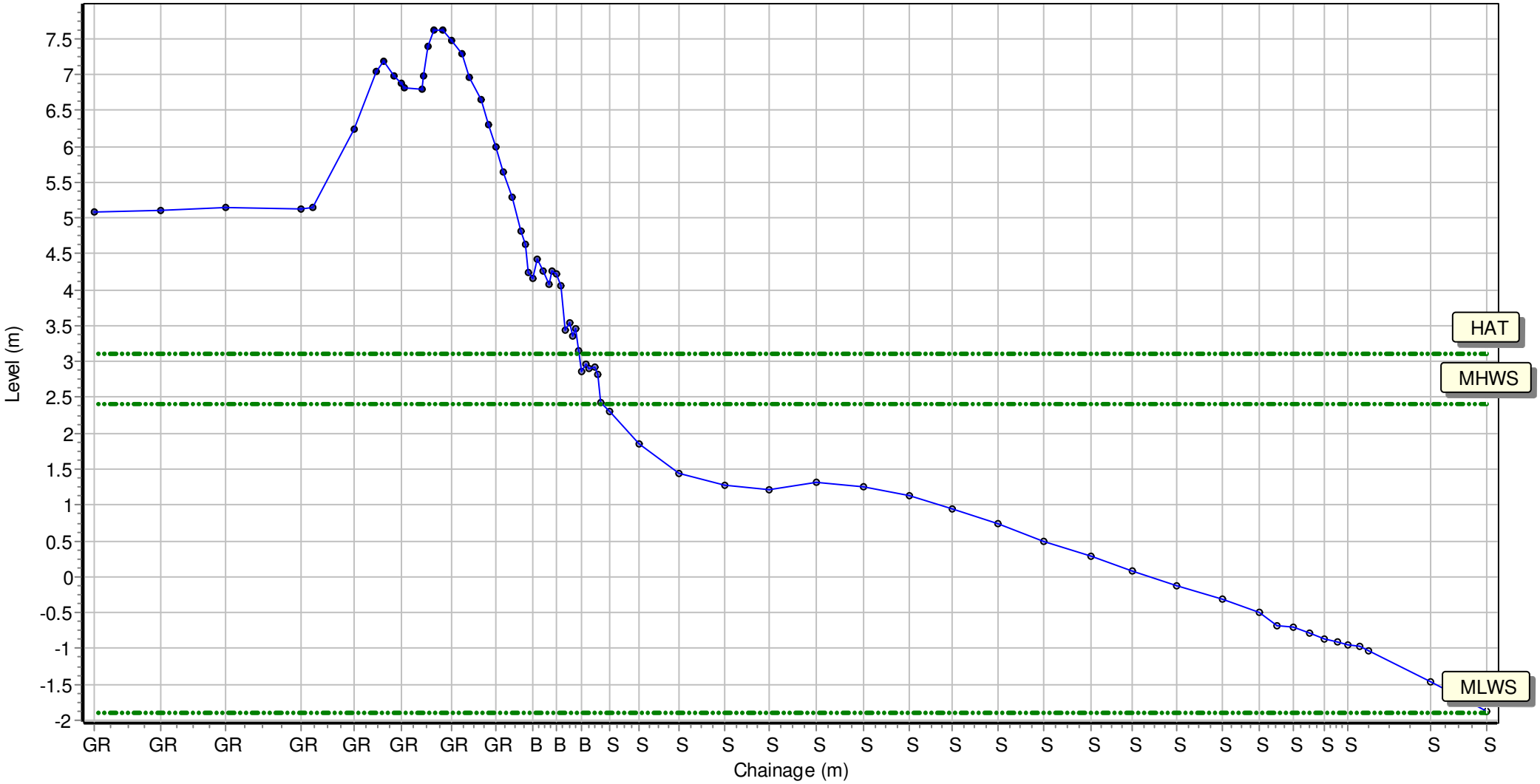
Location: **1aADC16A**

Date: 12/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 428543.525 **Northing:** 602704.175 **Profile Bearing:** 92 ° from North



Beach Profile

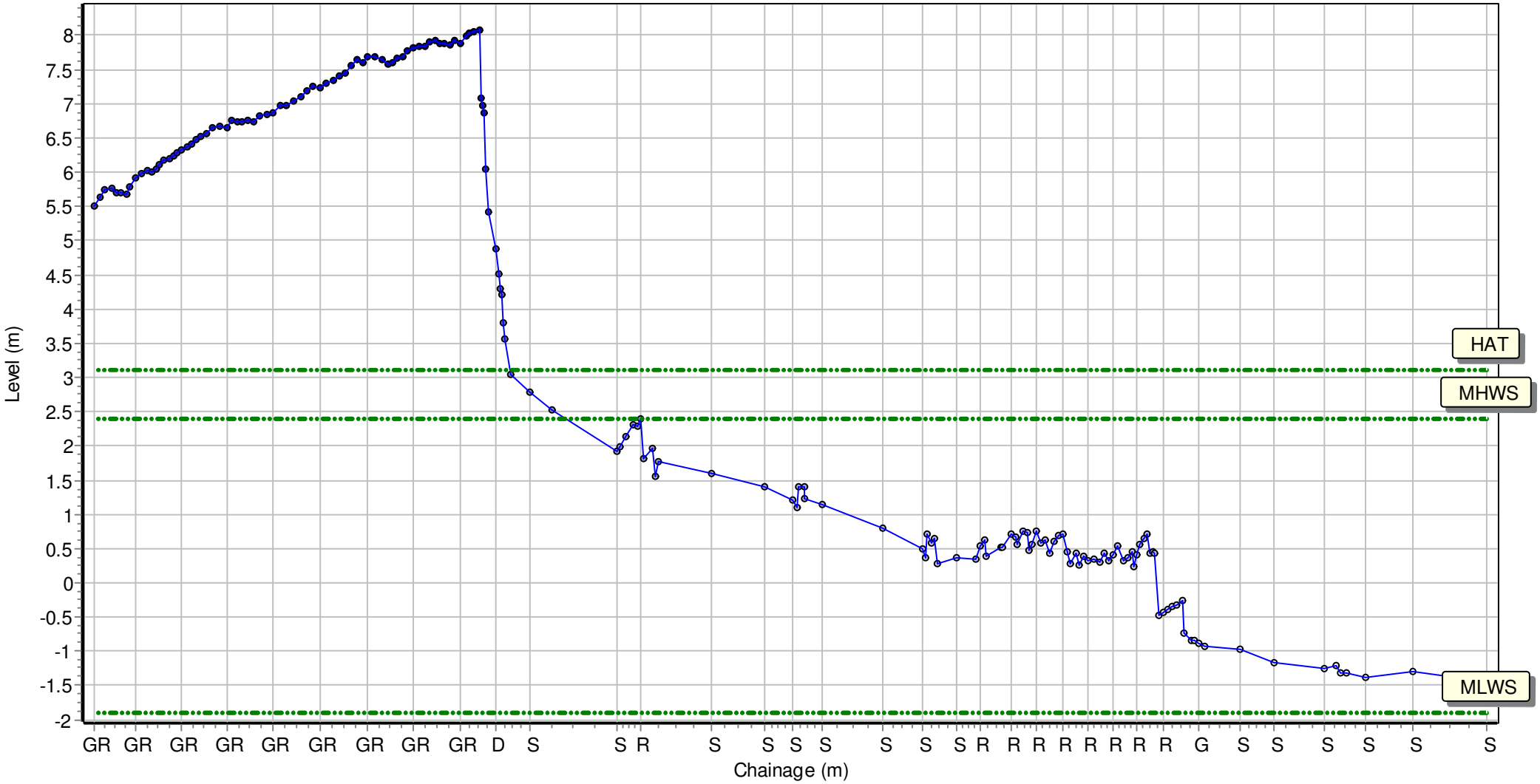
Location: **1aADC16B**

Date: 12/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 428440.457 **Northing:** 601948.341 **Profile Bearing:** 144 ° from North



Beach Profile

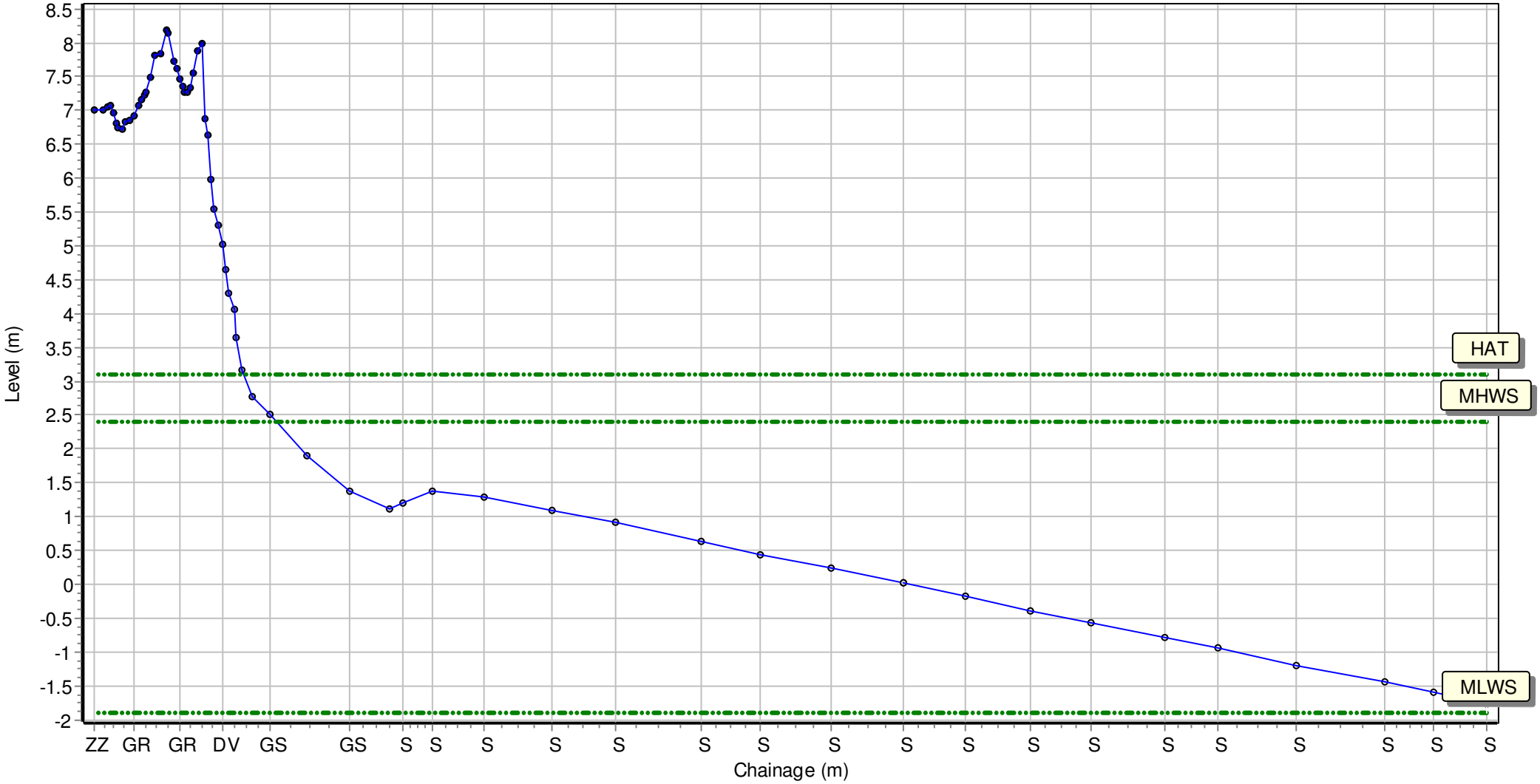
Location: **1aADC17**

Date: 12/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 428116.847 **Northing:** 601565.465 **Profile Bearing:** 114 ° from North



Beach Profile

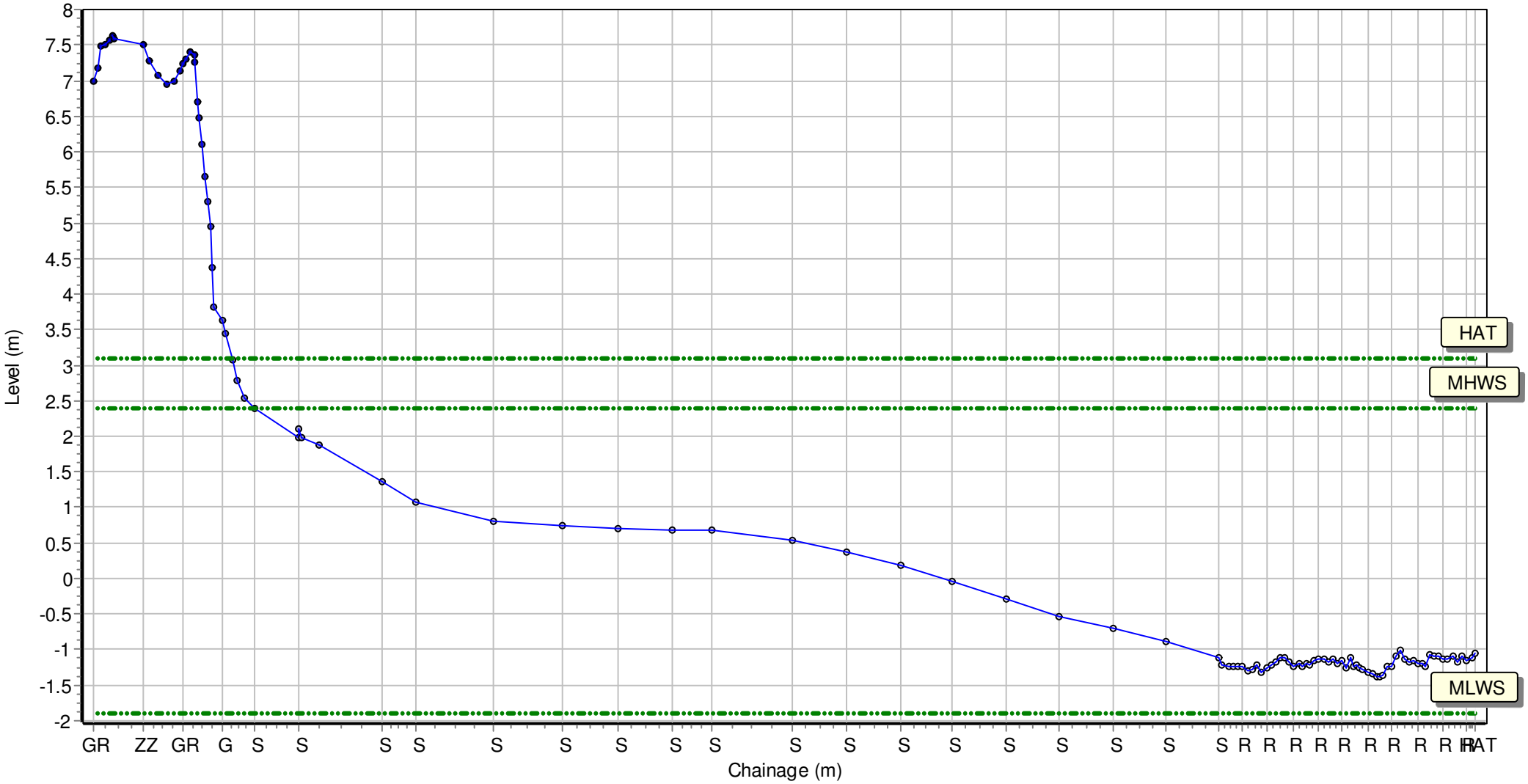
Location: **1aADC17A**

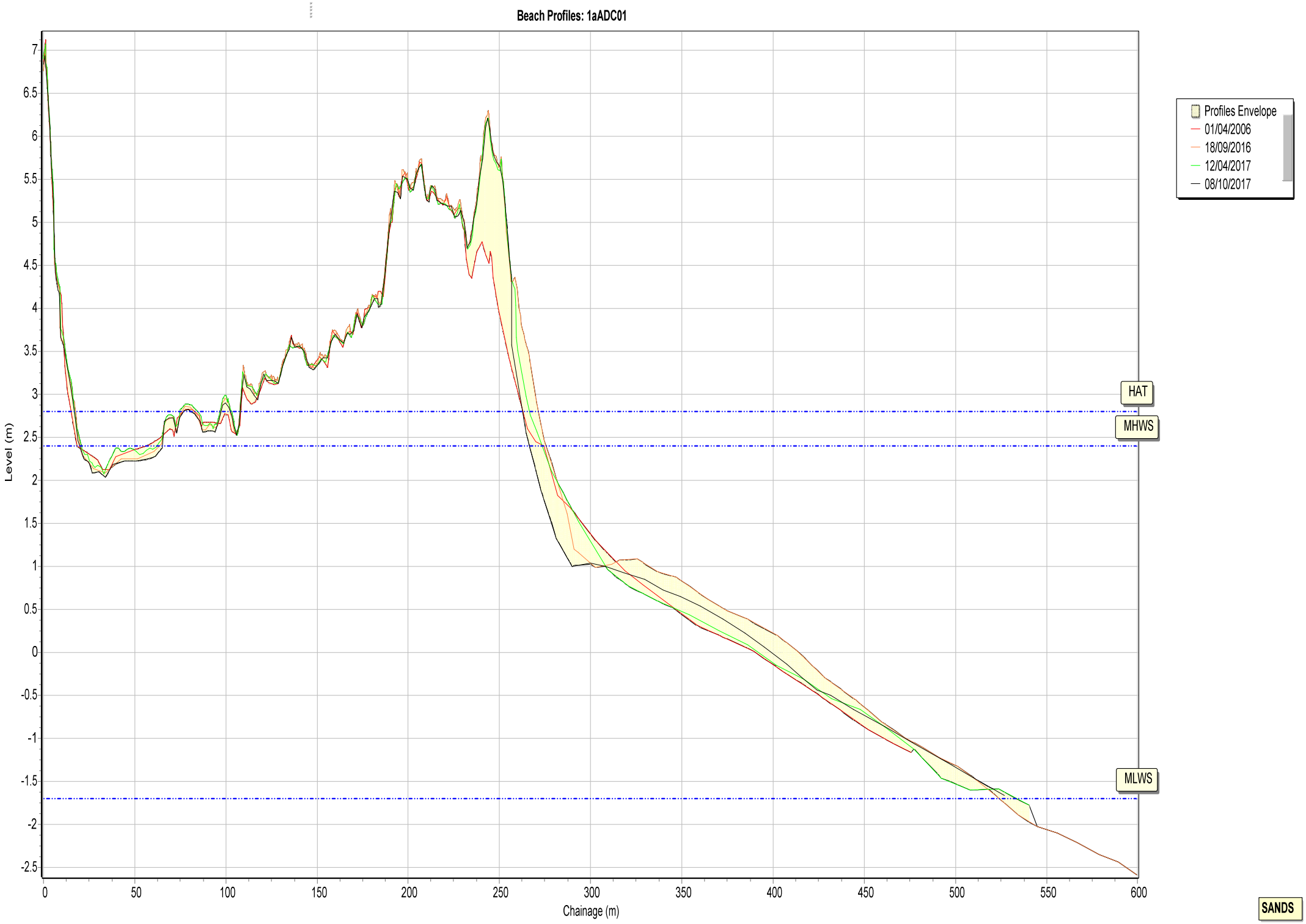
Date: 12/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 427947.662 **Northing:** 601040.259 **Profile Bearing:** 109 ° from North




Beach Profiles: 1aADC01
Profiles Envelope
01/04/2006
18/09/2016
12/04/2017
08/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
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250
300
350
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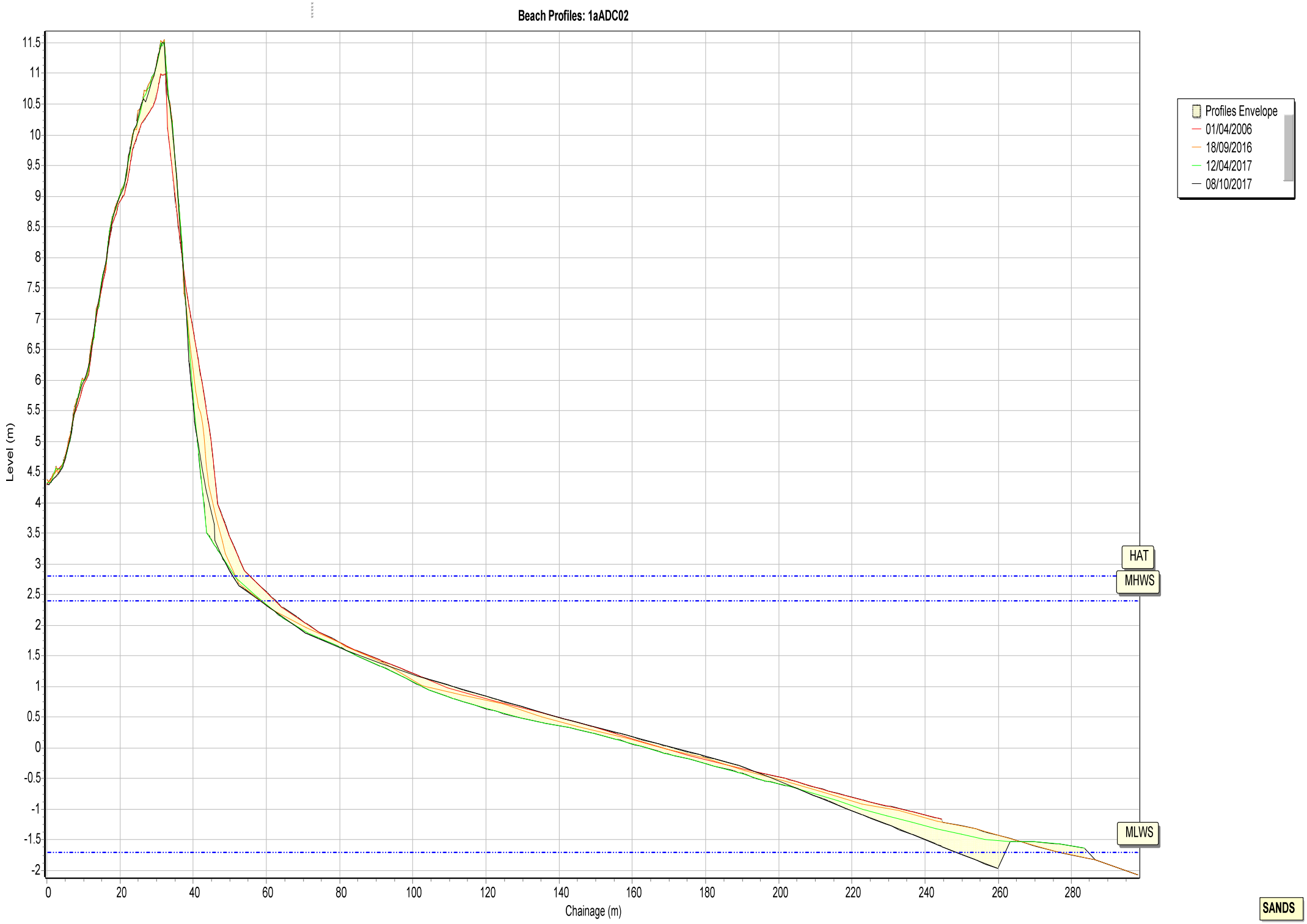
450
500
550
600


Beach Profiles: 1aADC02
Profiles Envelope
01/04/2006
18/09/2016
12/04/2017
08/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
11.5
11
10.5
10
9.5
9
8.5
8
7.5
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6.5
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5.5
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4.5
4
3.5
3
2.5
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1.5
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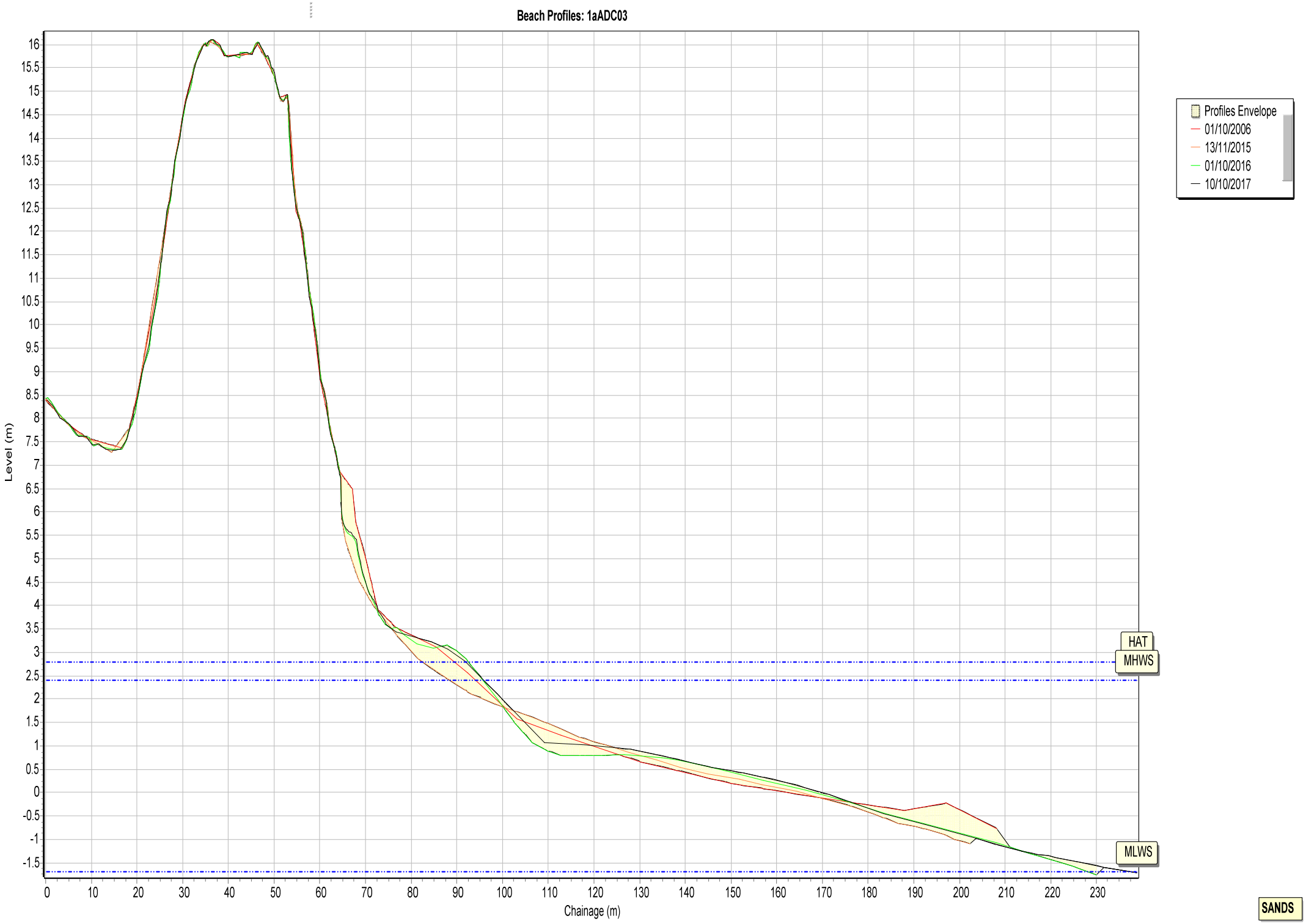
220
240
260
280


Beach Profiles: 1aADC03
Profiles Envelope
01/10/2006
13/11/2015
01/10/2016
10/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
16
15.5
15
14.5
14
13.5
13
12.5
12
11.5
11
10.5
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9.5
9
8.5
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7.5
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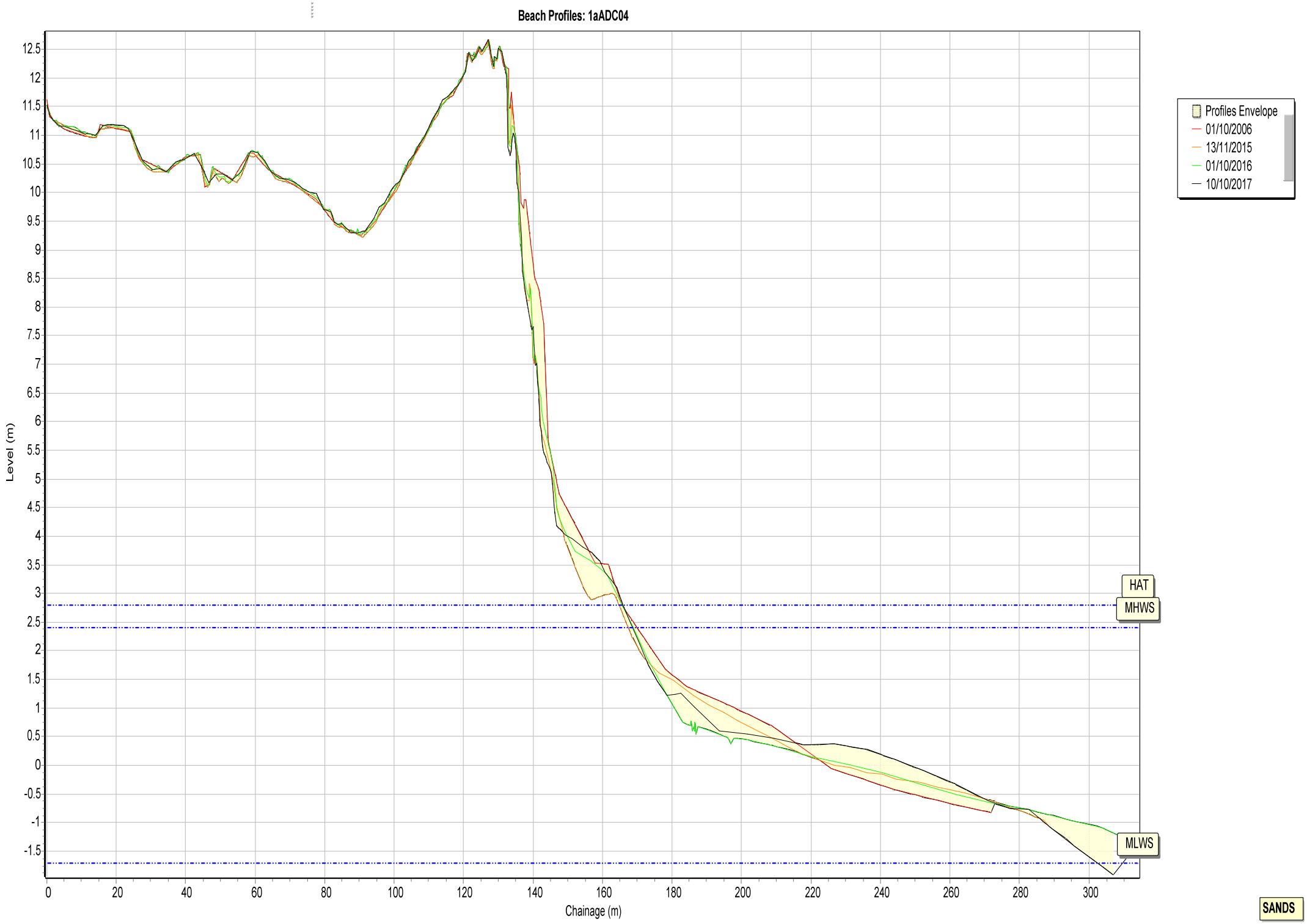
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Profiles Envelope
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13/11/2015
01/10/2016
10/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
12.5
12
11.5
11
10.5
10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
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220
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260
280
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Beach Profiles: 1aADC04A
Profiles Envelope
01/10/2007
16/09/2016
13/03/2017
11/09/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
5.4
5.2
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3.2
3
2.8
2.6
2.4
2.2
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1.8
1.6
1.4
1.2
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-0.4
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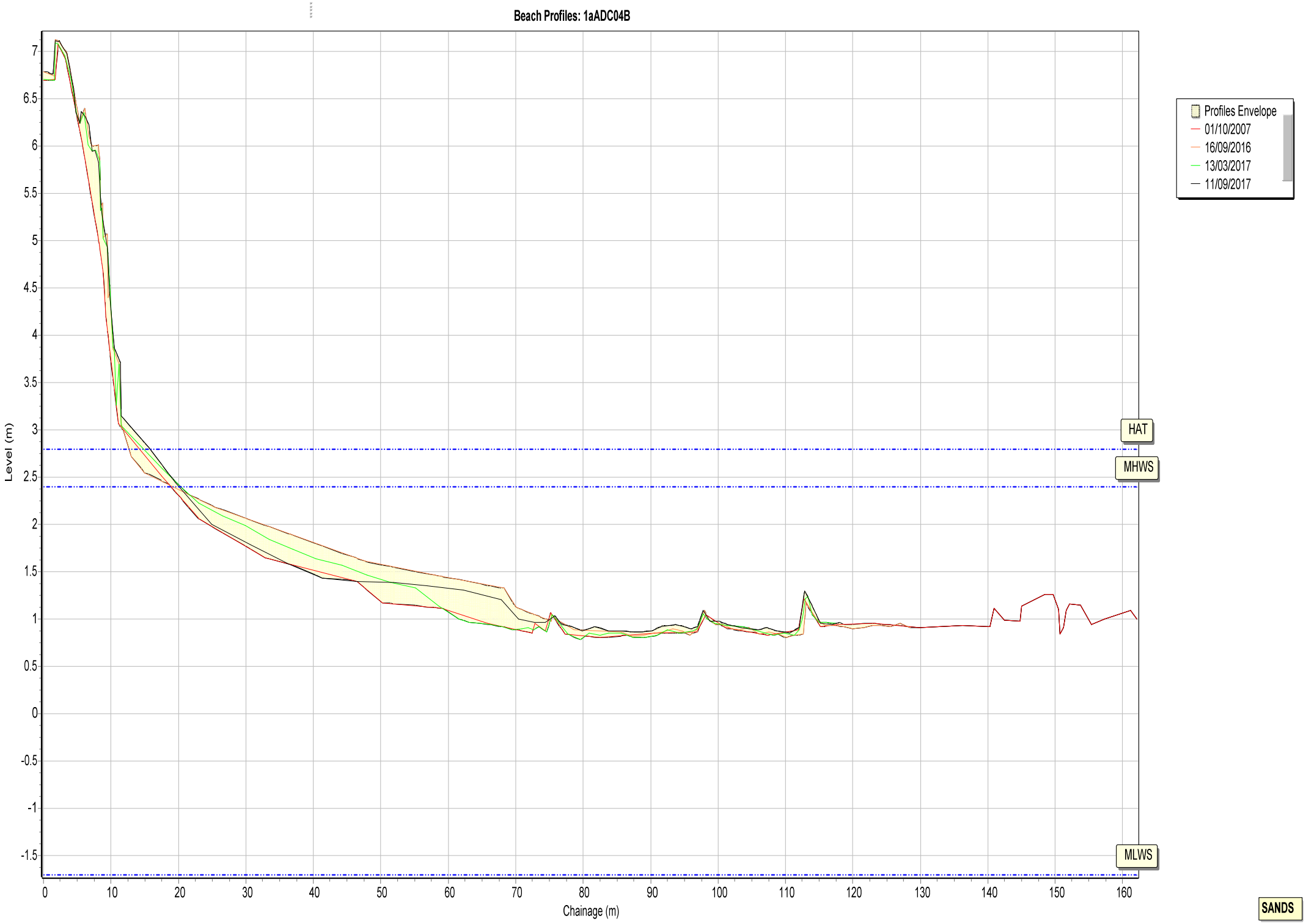
125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Profiles Envelope
01/10/2007
16/09/2016
13/03/2017
11/09/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
7
6.5
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4.5
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3.5
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1.5
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-0.5
-1
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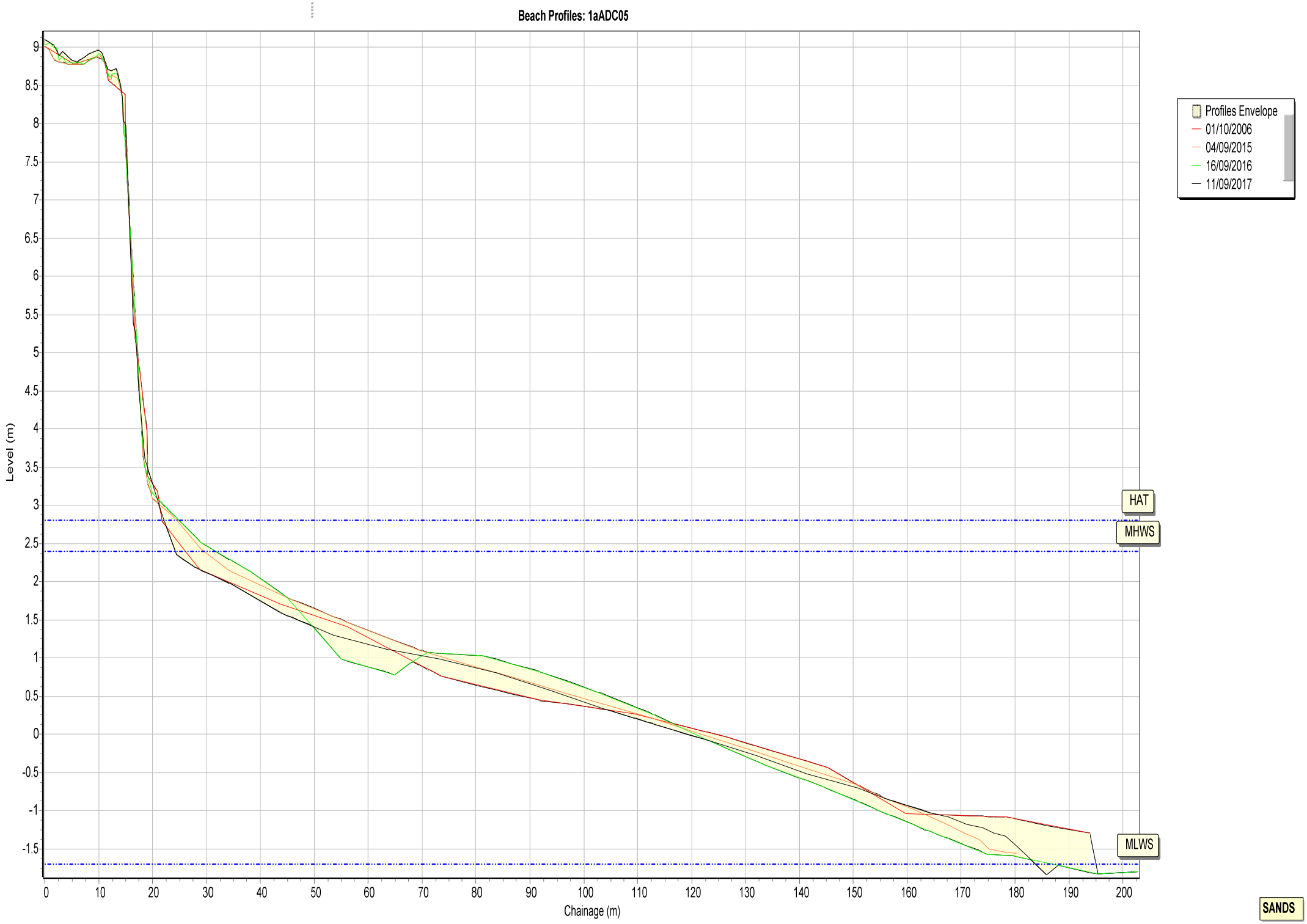
160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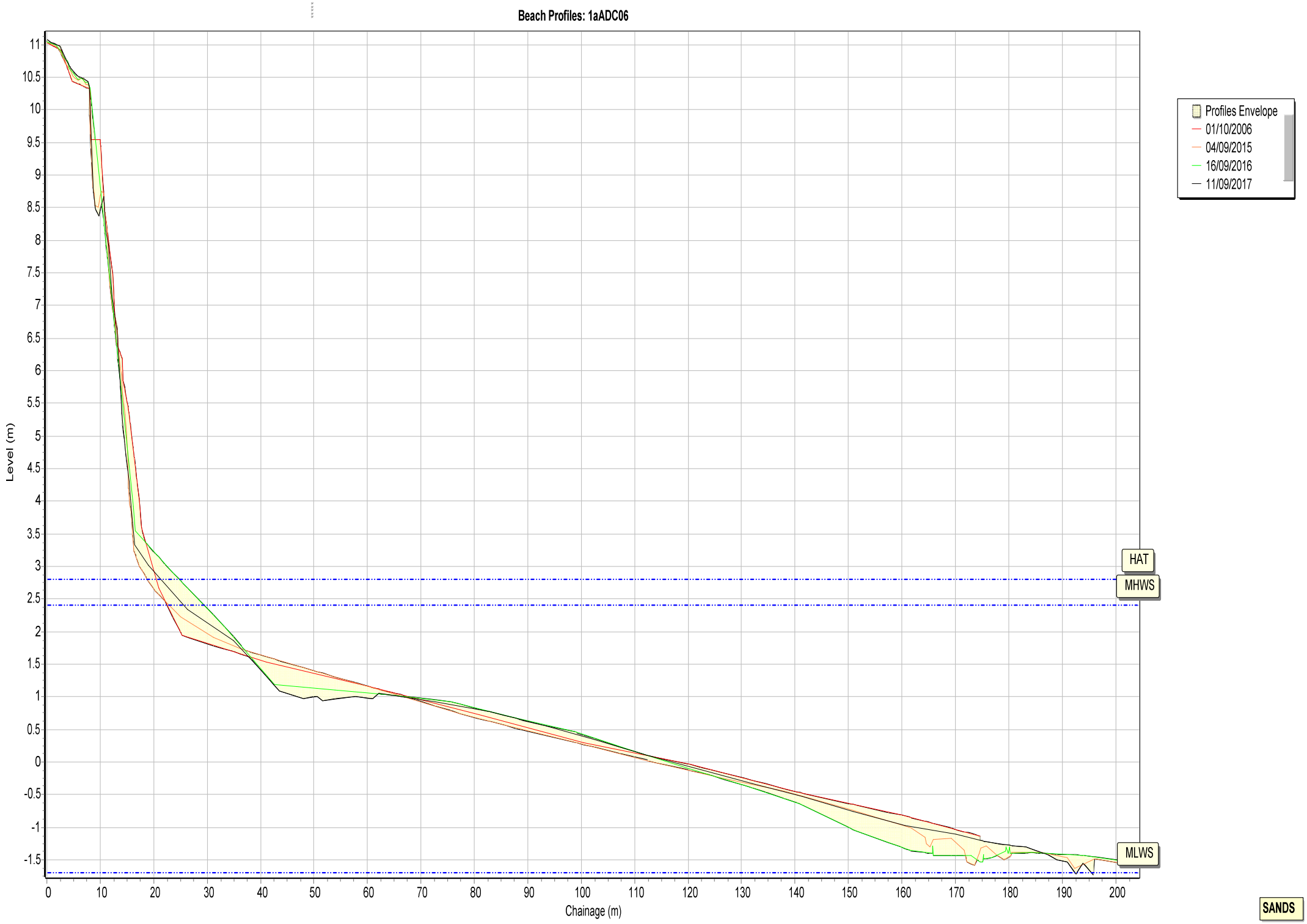
01/10/2006
04/09/2015
16/09/2016
11/09/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS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04/09/2015
16/09/2016
11/09/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
11
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10
9.5
9
8.5
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7.5
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6.5
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5.5
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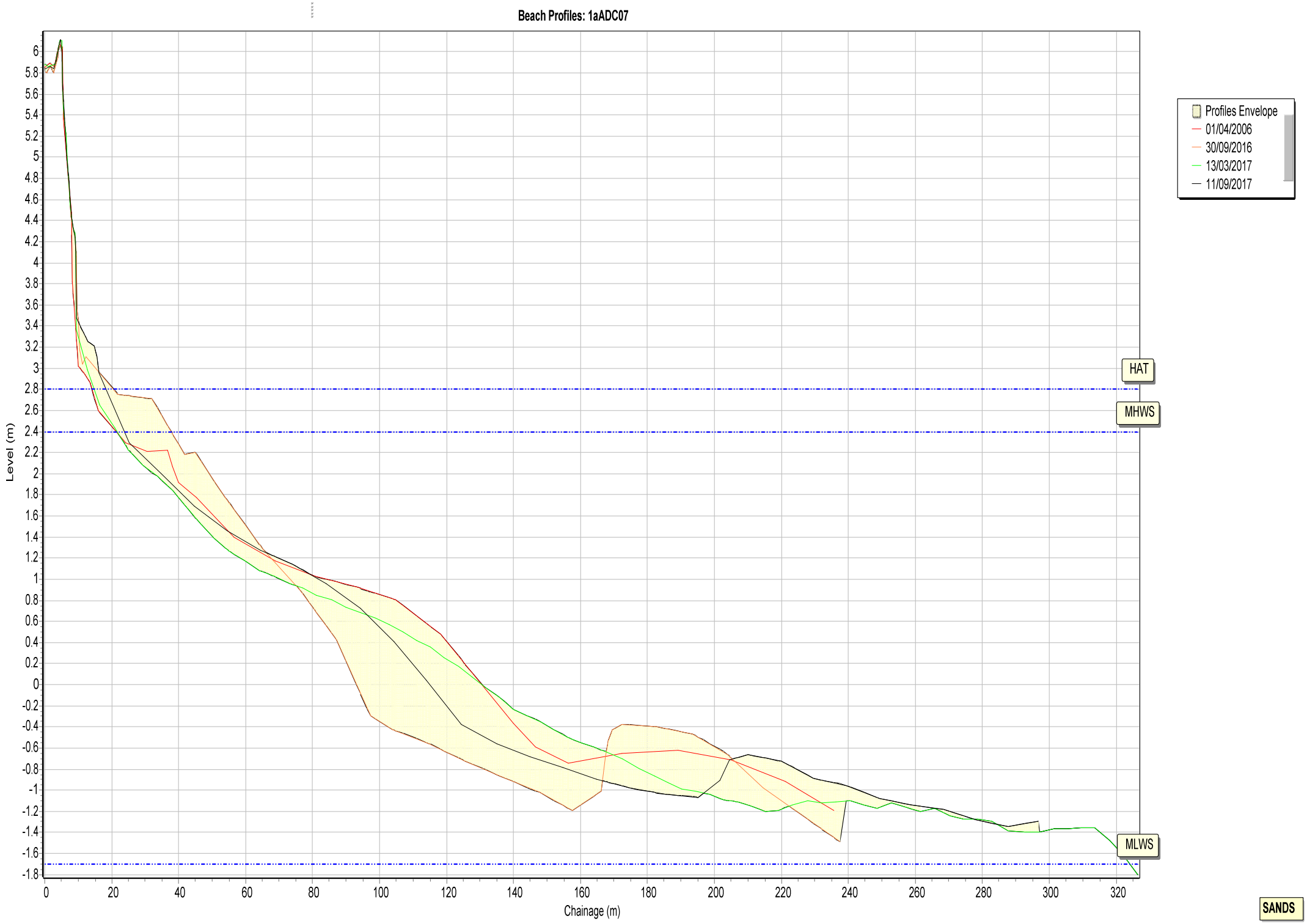
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01/04/2006
30/09/2016
13/03/2017
11/09/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
6
5.8
5.6
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5.2
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4.8
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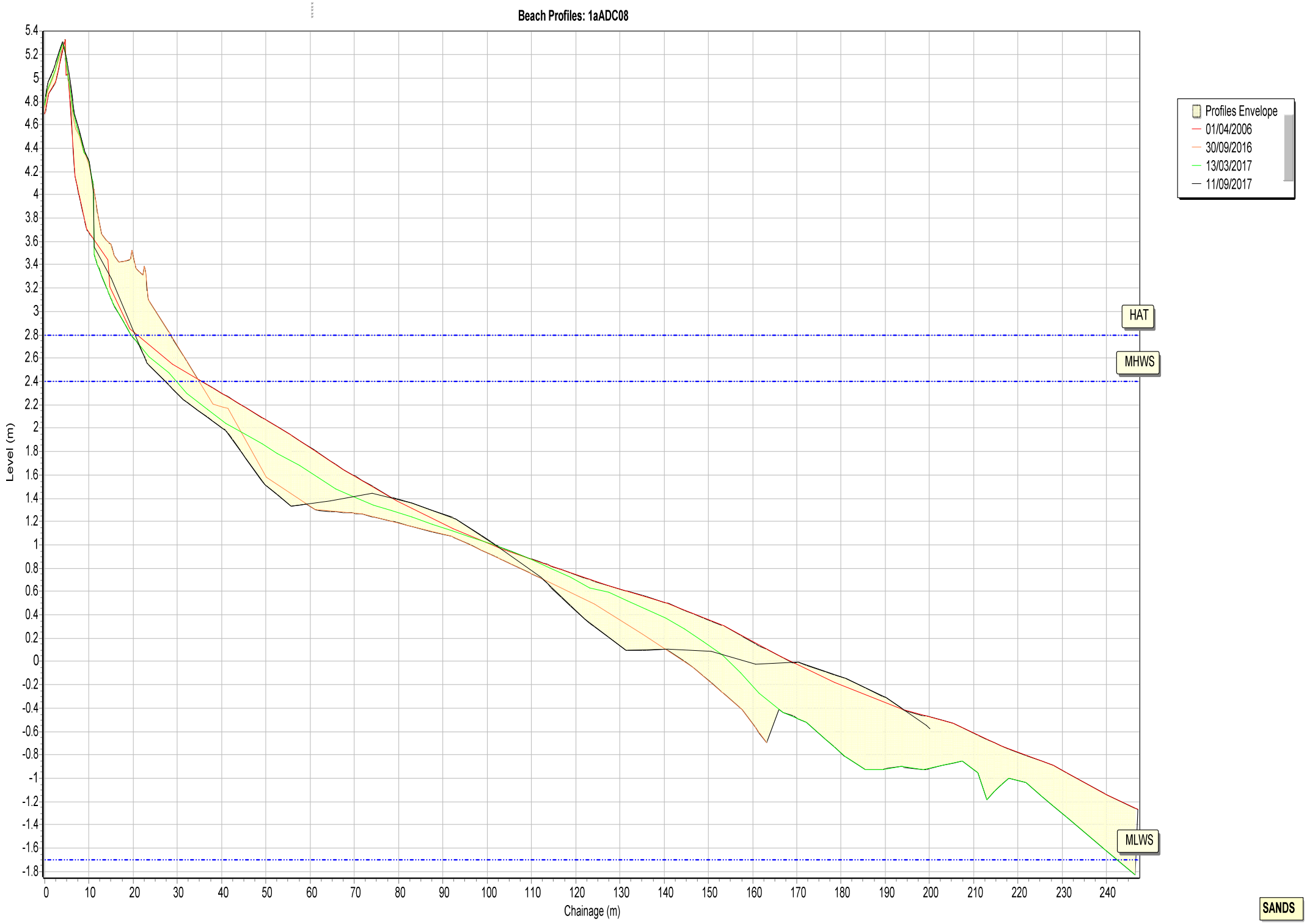
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Profiles Envelope
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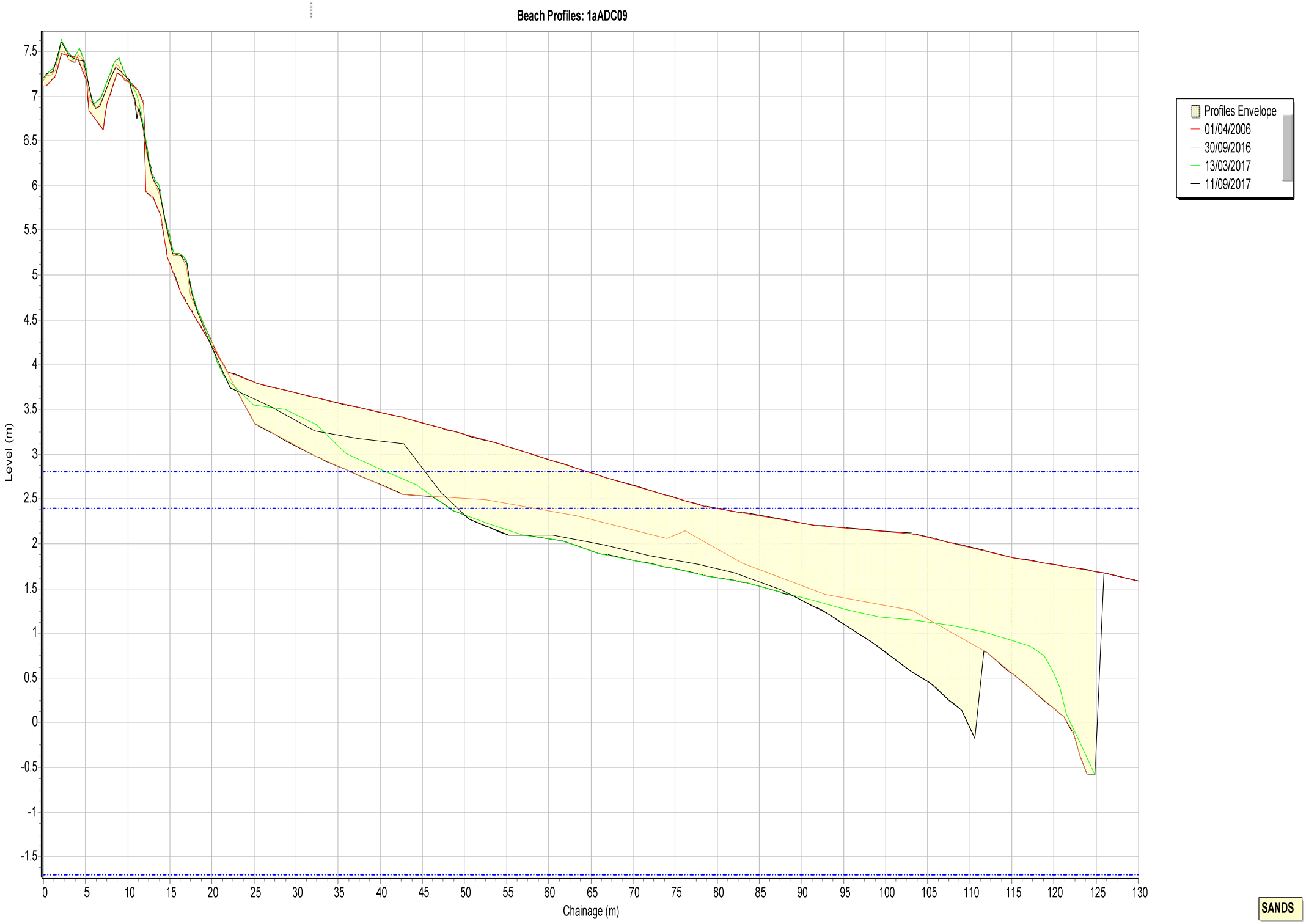
30/09/2016
13/03/2017
11/09/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS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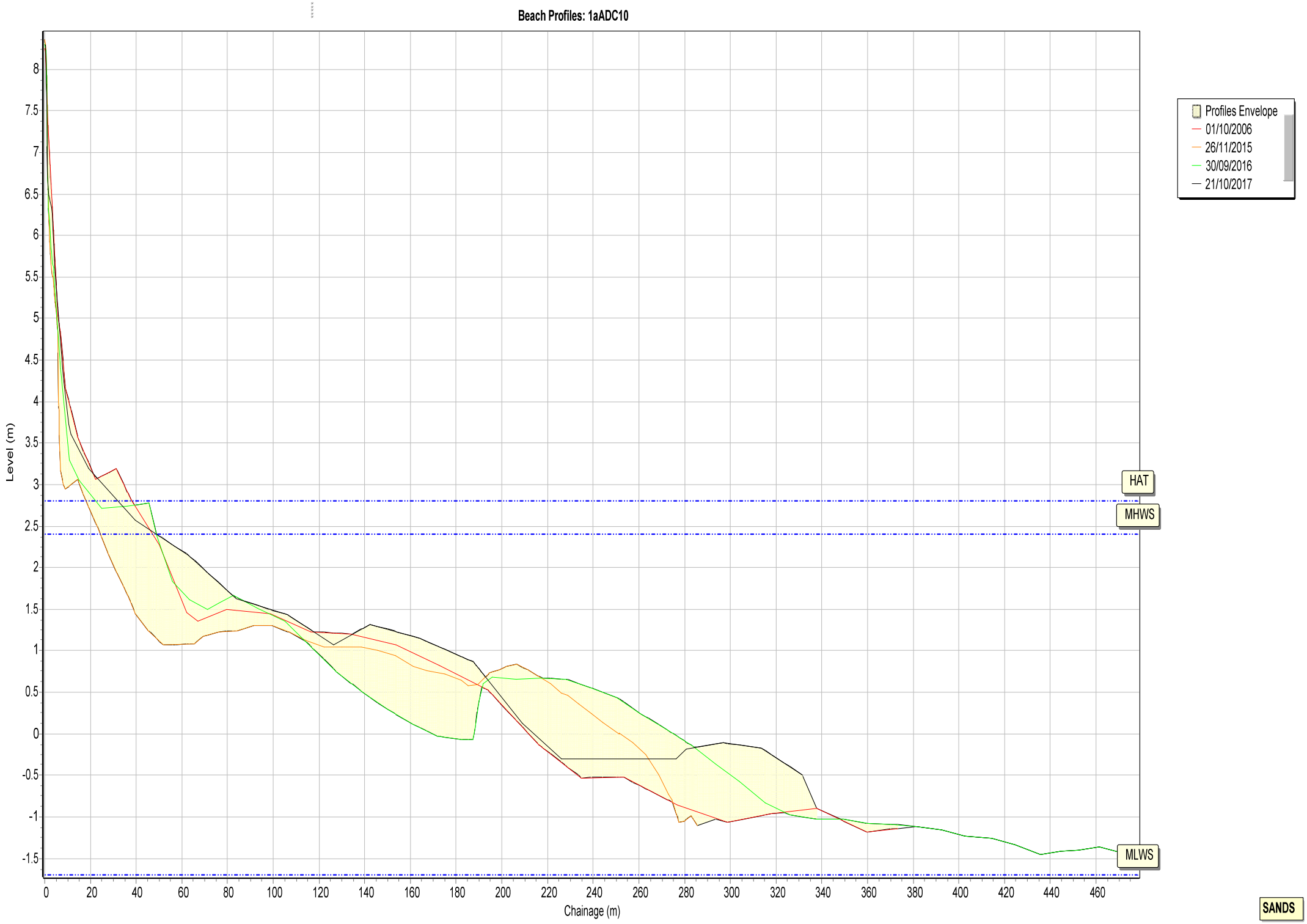
Profiles Envelope
01/04/2006
30/09/2016
13/03/2017
11/09/2017
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aADC10
Profiles Envelope
01/10/2006
26/11/2015
30/09/2016
21/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
8
7.5
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6.5
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5.5
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4.5
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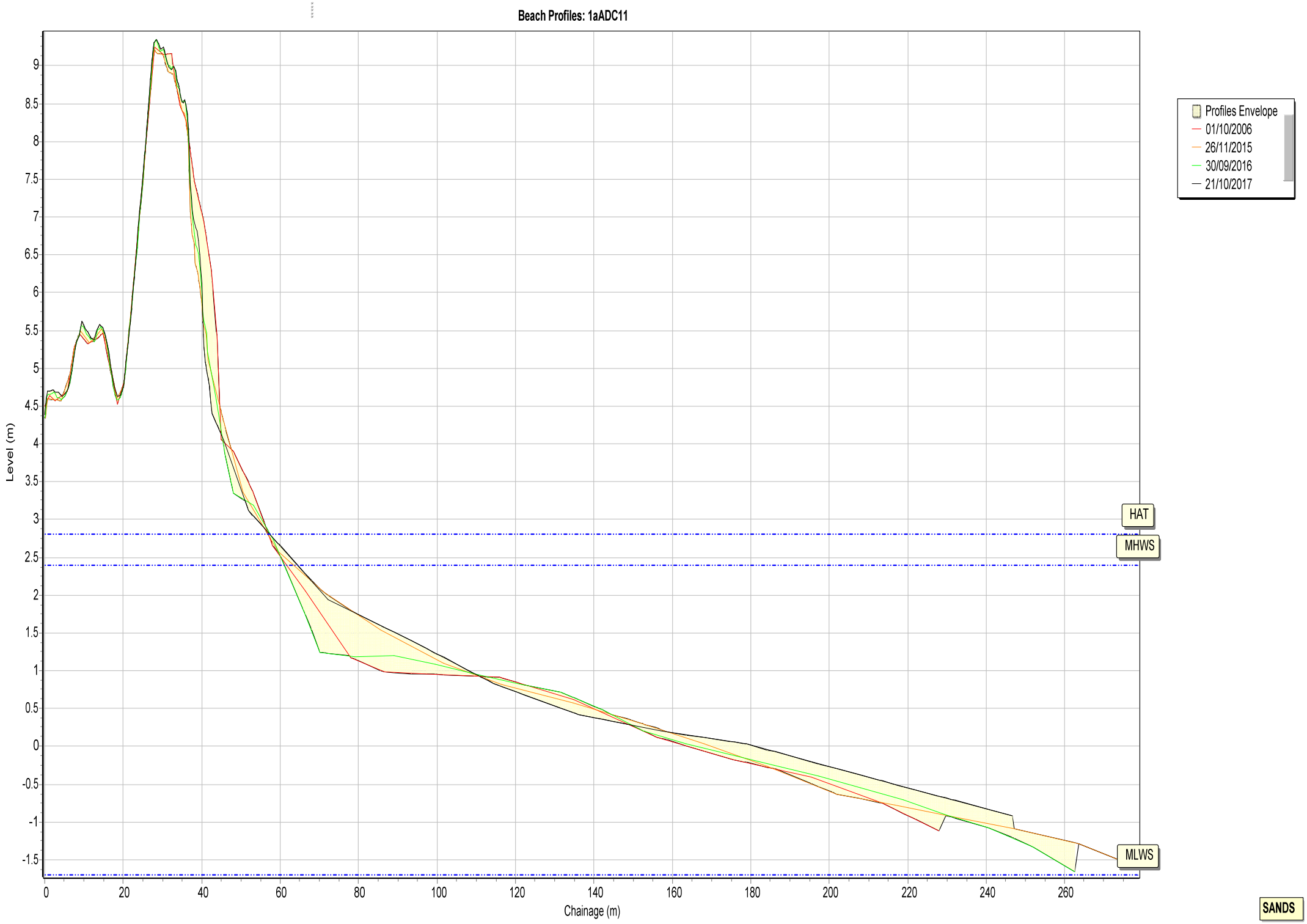
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01/10/2006
26/11/2015
30/09/2016
21/10/2017
HAT
MHWS
MLWS
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Level (m)
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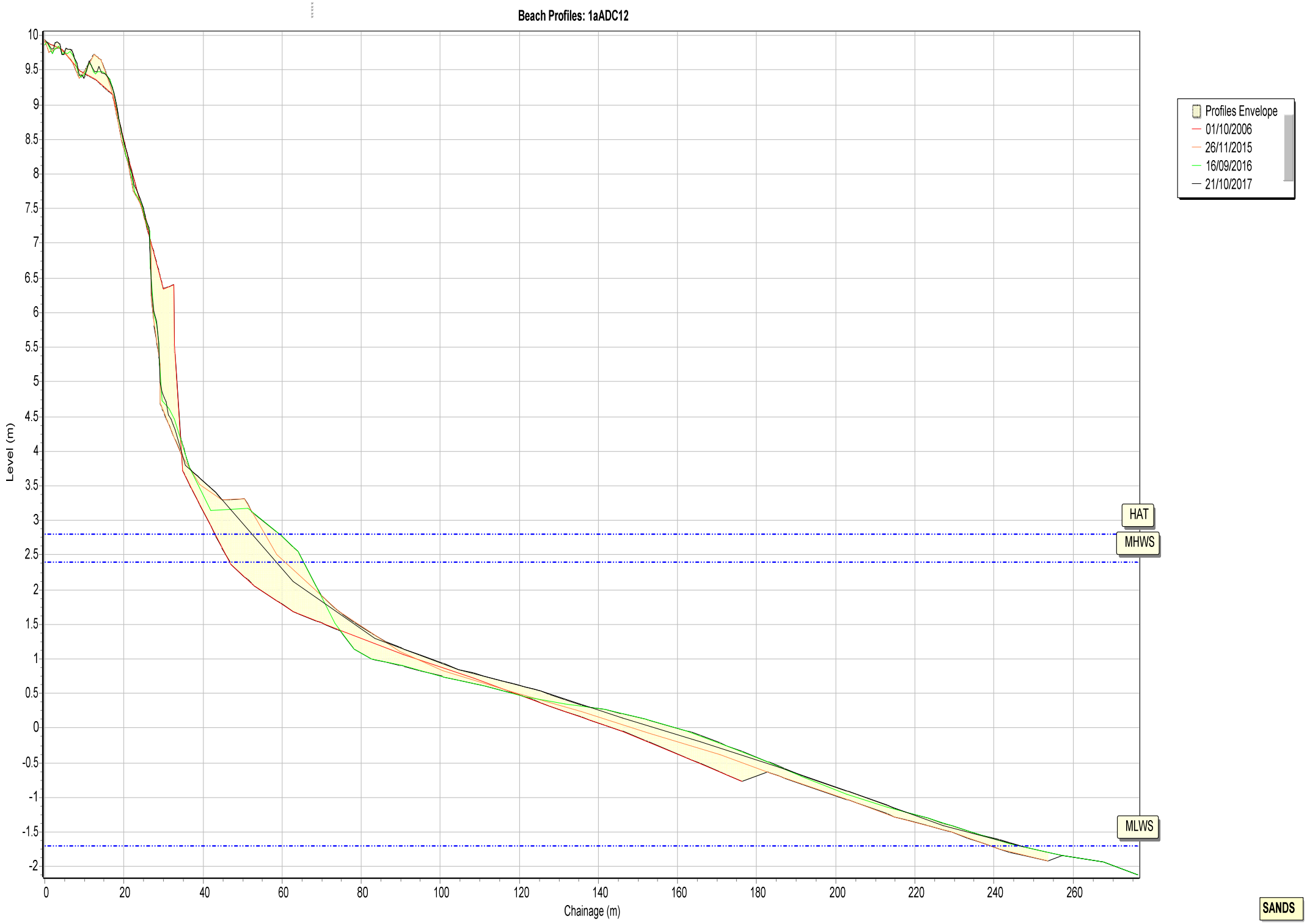
Beach Profiles: 1aADC12
Profiles Envelope
01/10/2006
26/11/2015
16/09/2016
21/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
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40
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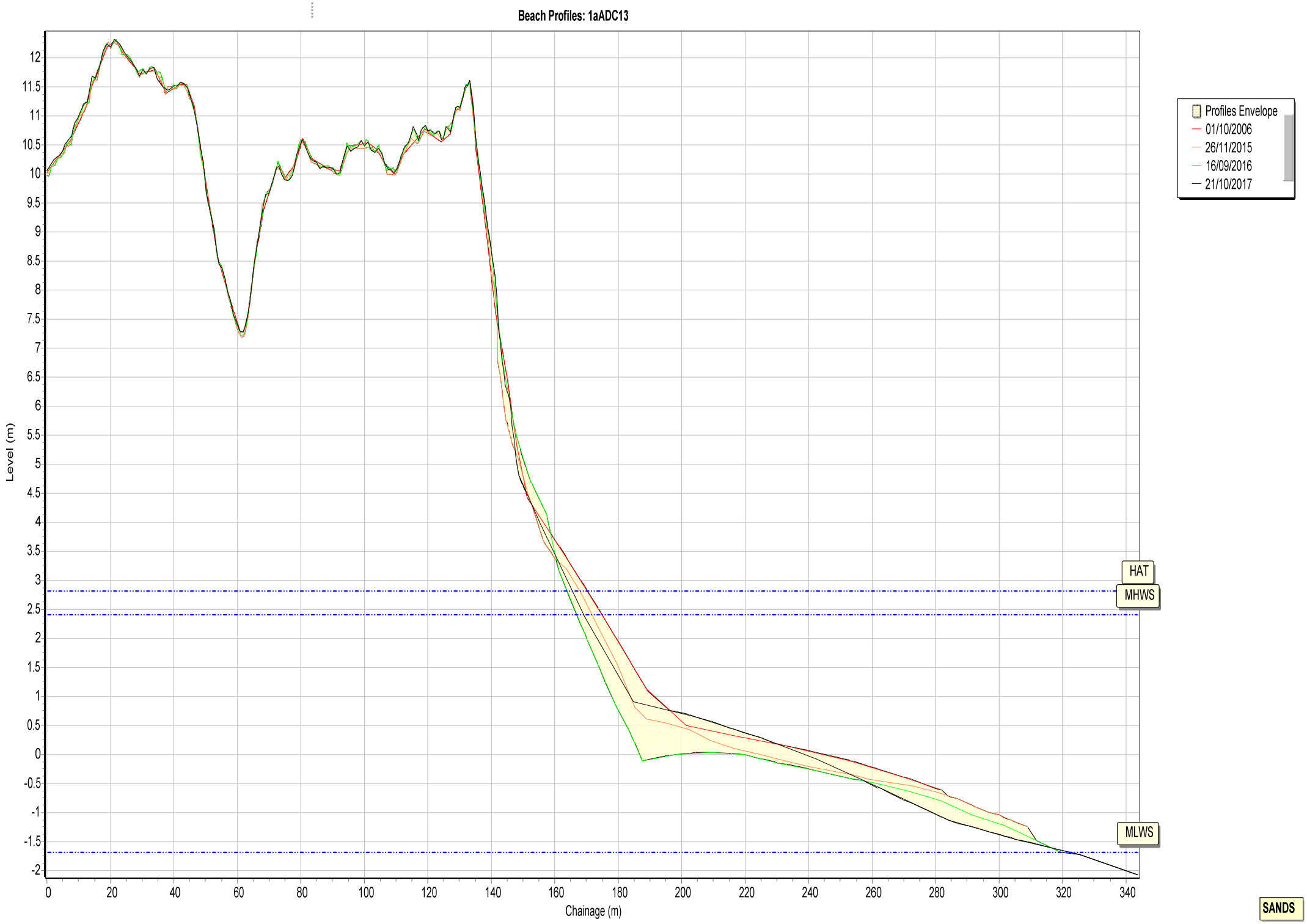
80
100
120
140
160
180
200
220
240
260


Beach Profiles: 1aADC13
Profiles Envelope
01/10/2006
26/11/2015
16/09/2016
21/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
12
11.5
11
10.5
10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
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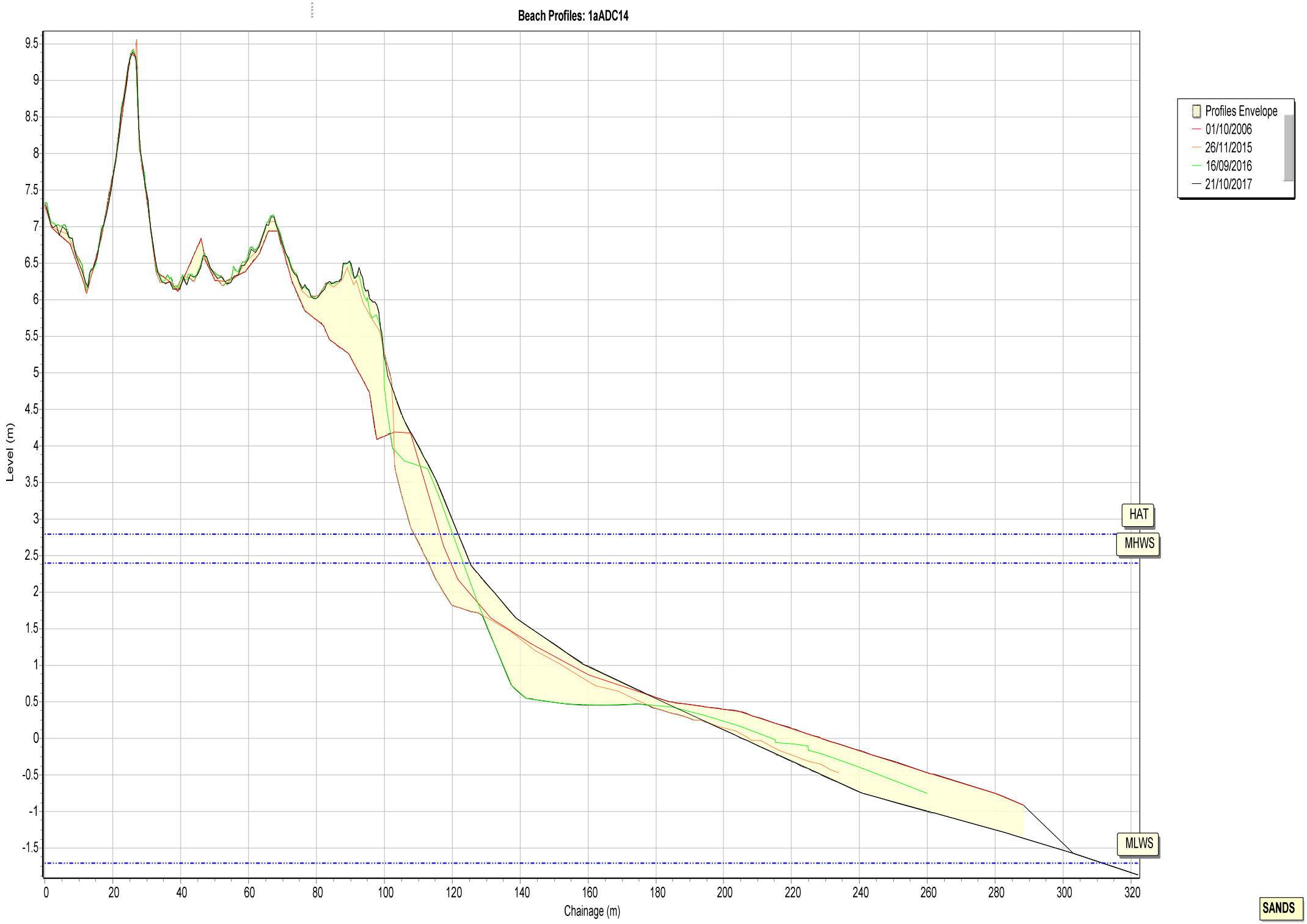
120
140
160
180
200
220
240
260
280
300
320
340


Beach Profiles: 1aADC14
Profiles Envelope
01/10/2006
26/11/2015
16/09/2016
21/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
9.5
9
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
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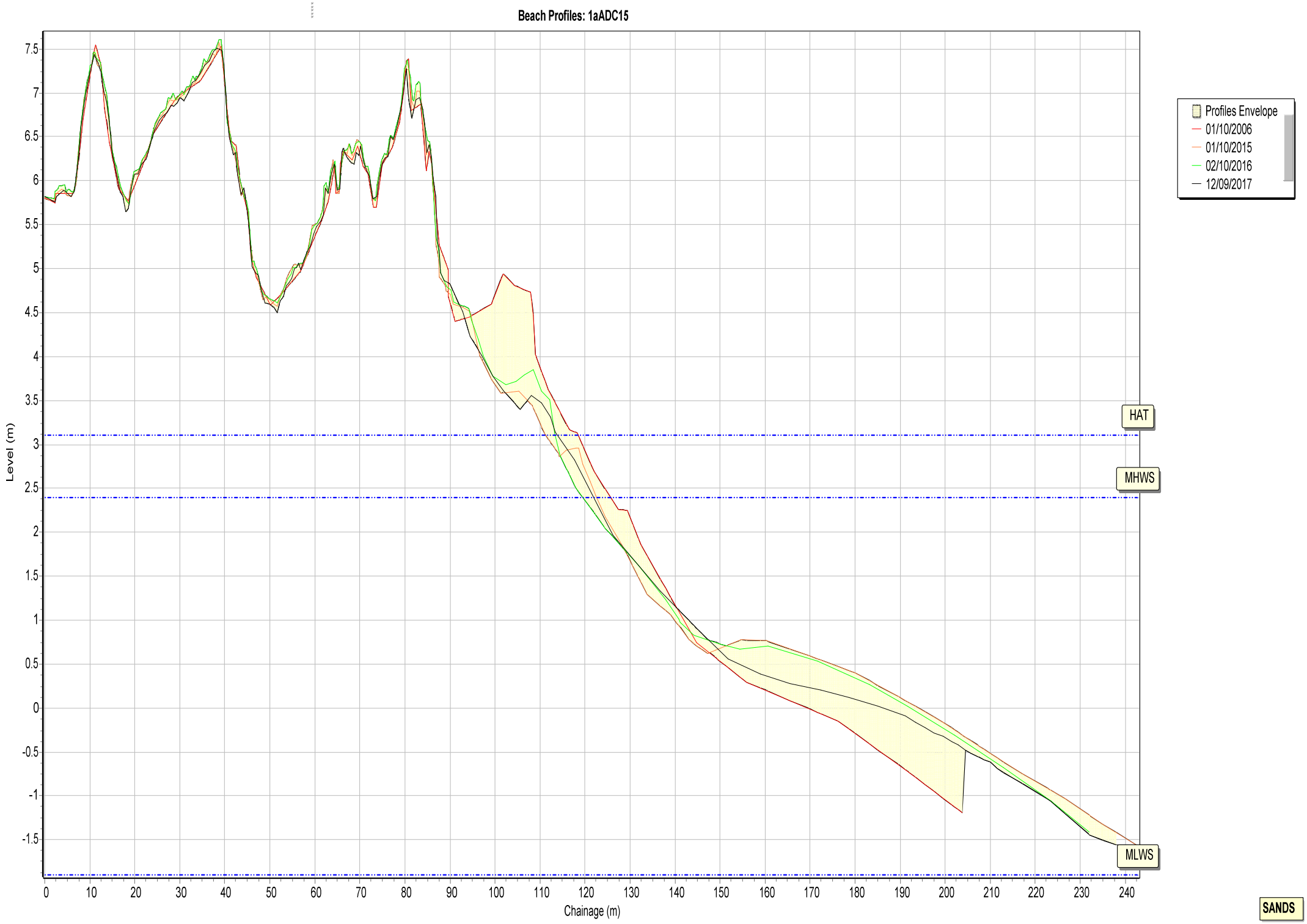
200
220
240
260
280
300
320


Beach Profiles: 1aADC15
Profiles Envelope
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01/10/2015
02/10/2016
12/09/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
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-0.5
-1
-1.5
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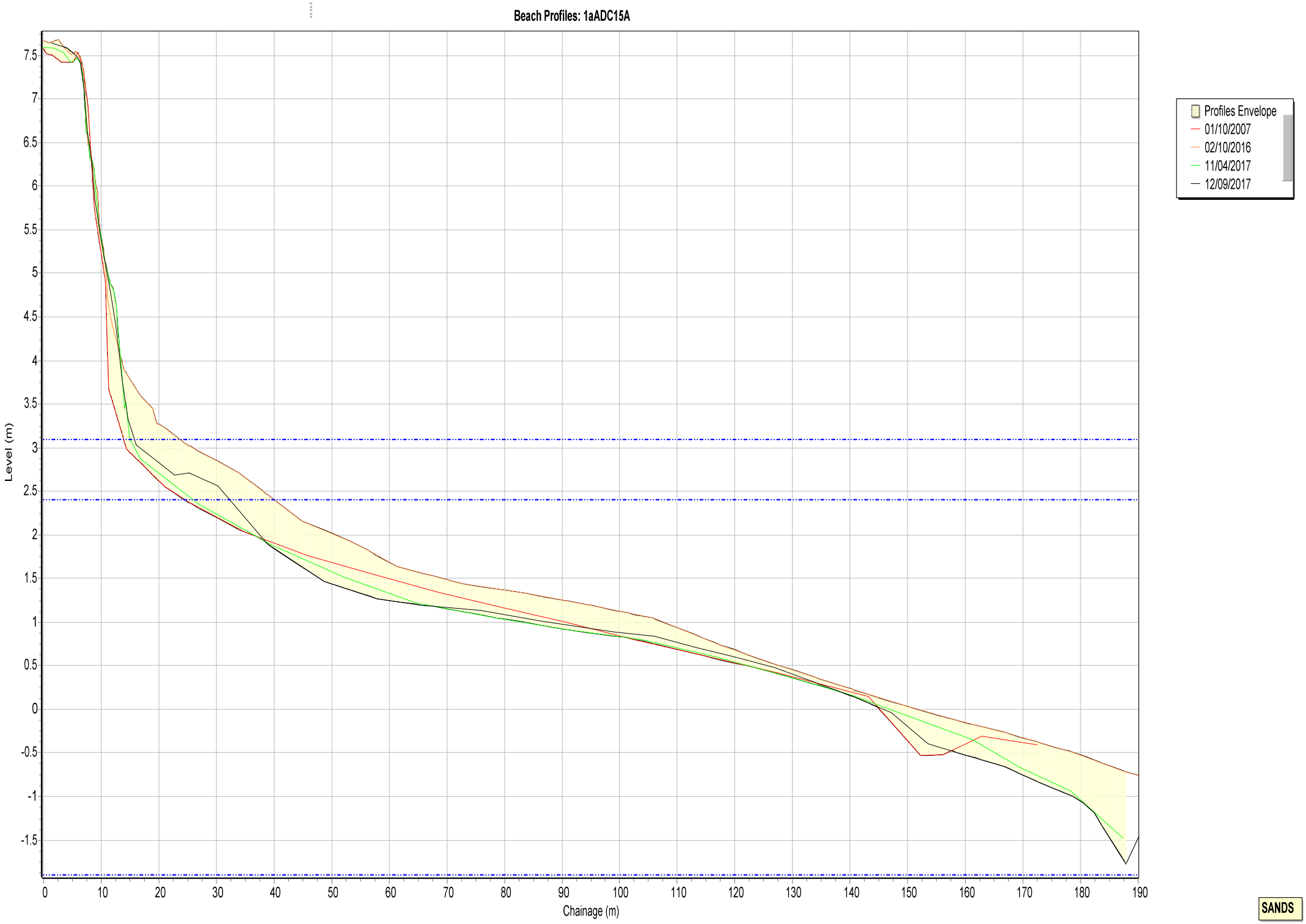
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Profiles Envelope
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02/10/2016
11/04/2017
12/09/2017
Level (m)
Chainage (m)
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7
6.5
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5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
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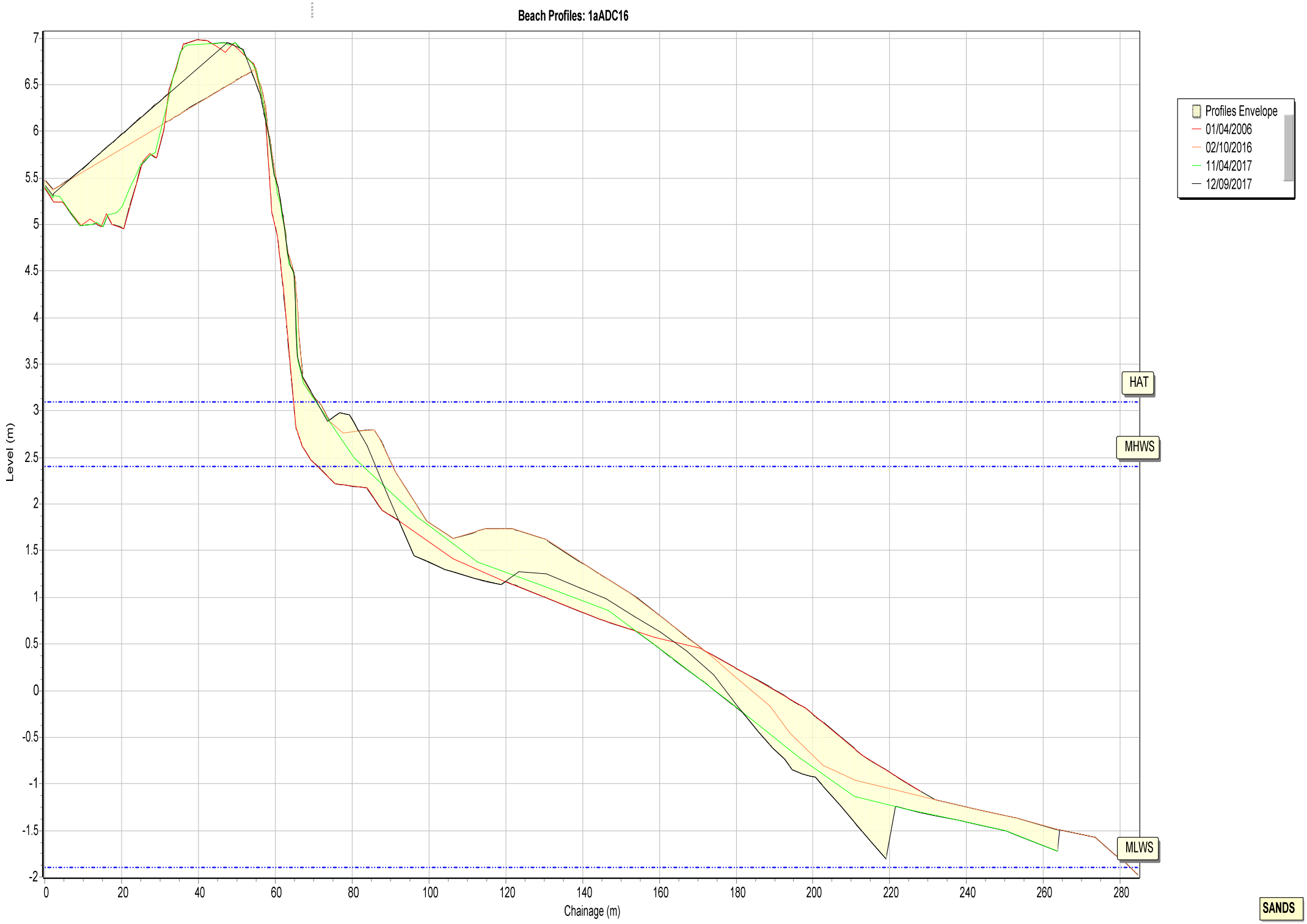
SANDS


Beach Profiles: 1aADC16
Profiles Envelope
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02/10/2016
11/04/2017
12/09/2017
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MHWS
MLWS
SANDS
Level (m)
Chainage (m)
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
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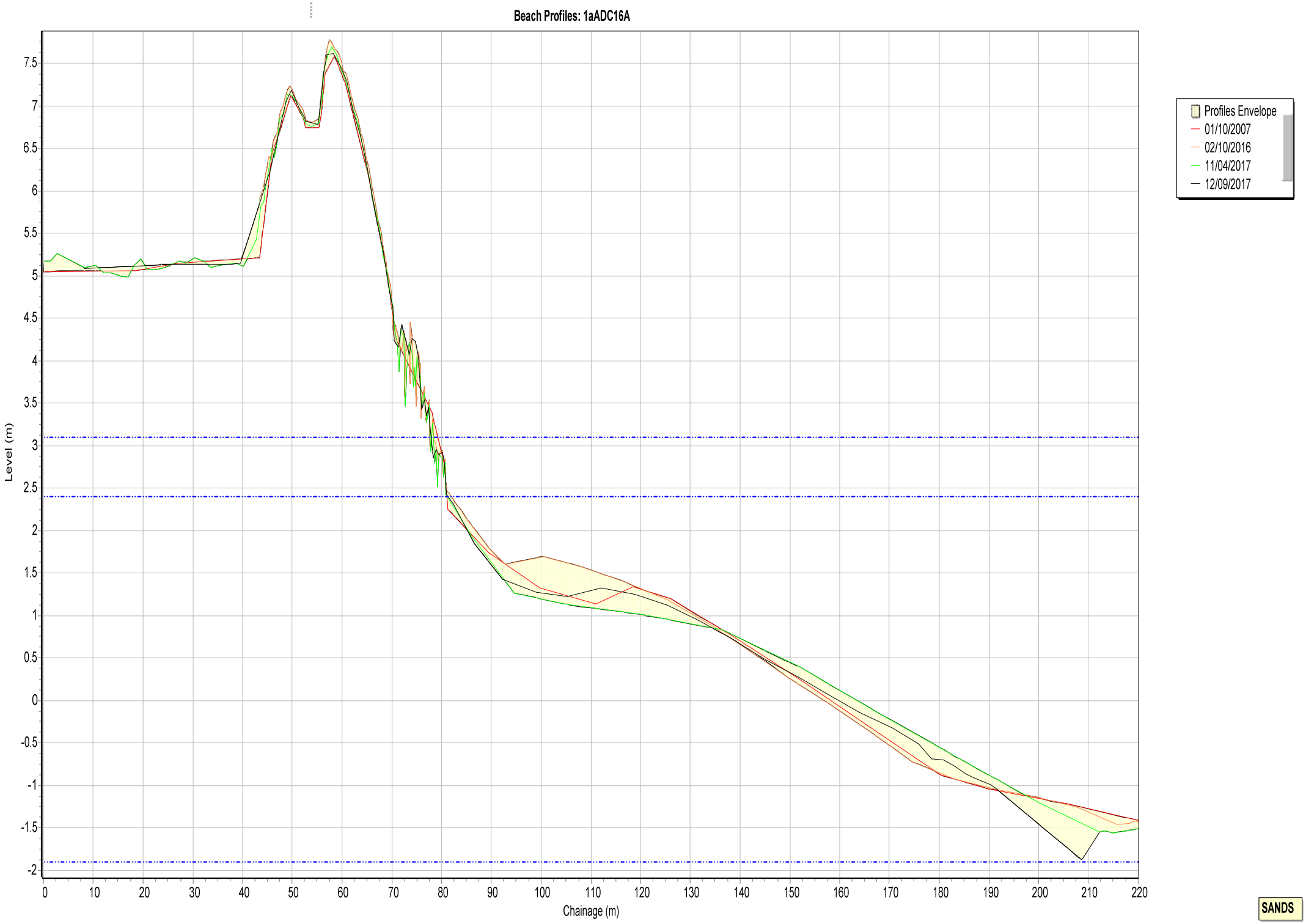
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Profiles Envelope
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02/10/2016
11/04/2017
12/09/2017
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aADC16B
Profiles Envelope
01/10/2007
02/10/2016
11/04/2017
12/09/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
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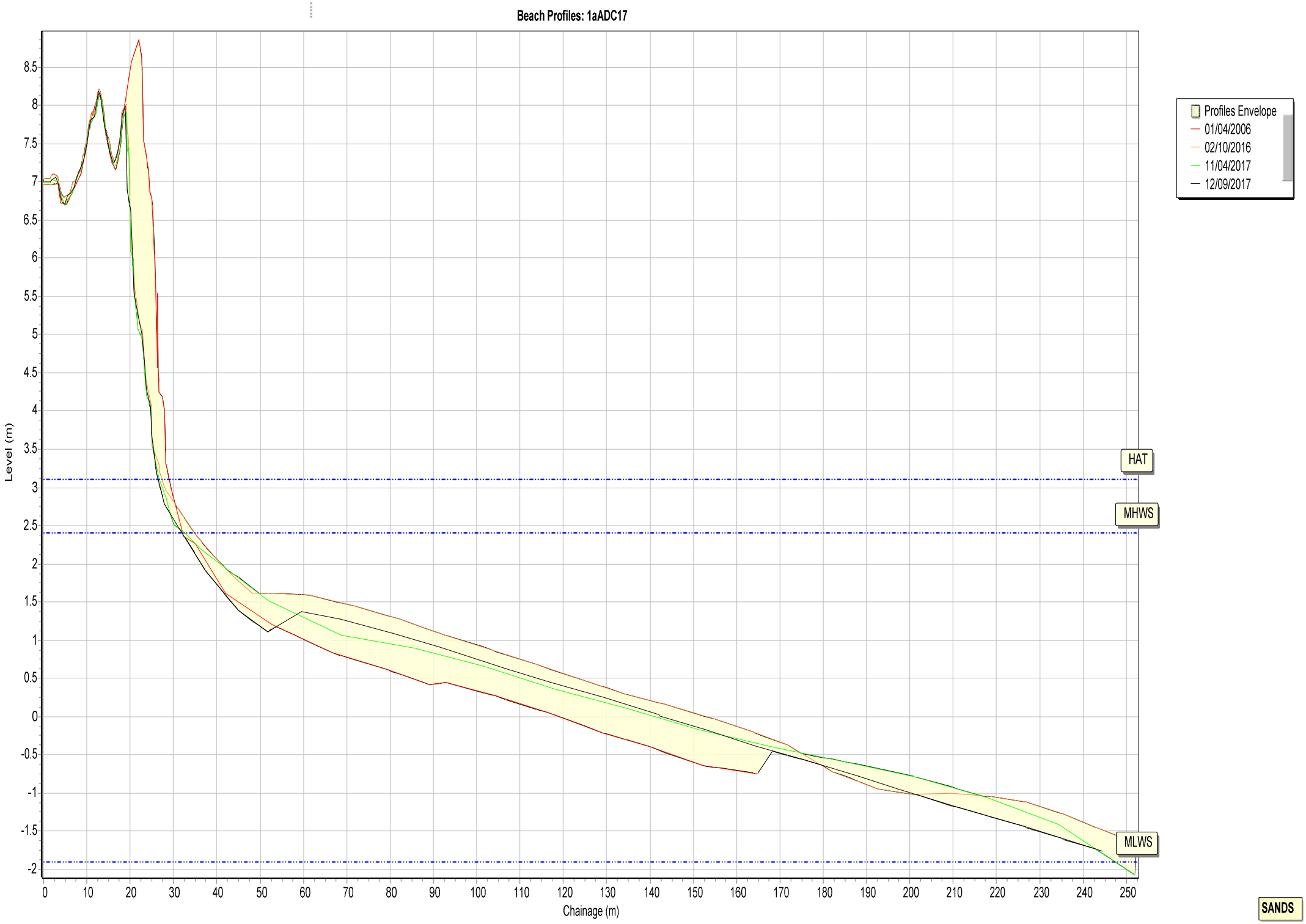
Beach Profiles: 1aADC17
Profiles Envelope
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02/10/2016
11/04/2017
12/09/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
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8
7.5
7
6.5
6
5.5
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4.5
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3.5
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2.5
2
1.5
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0.5
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-2
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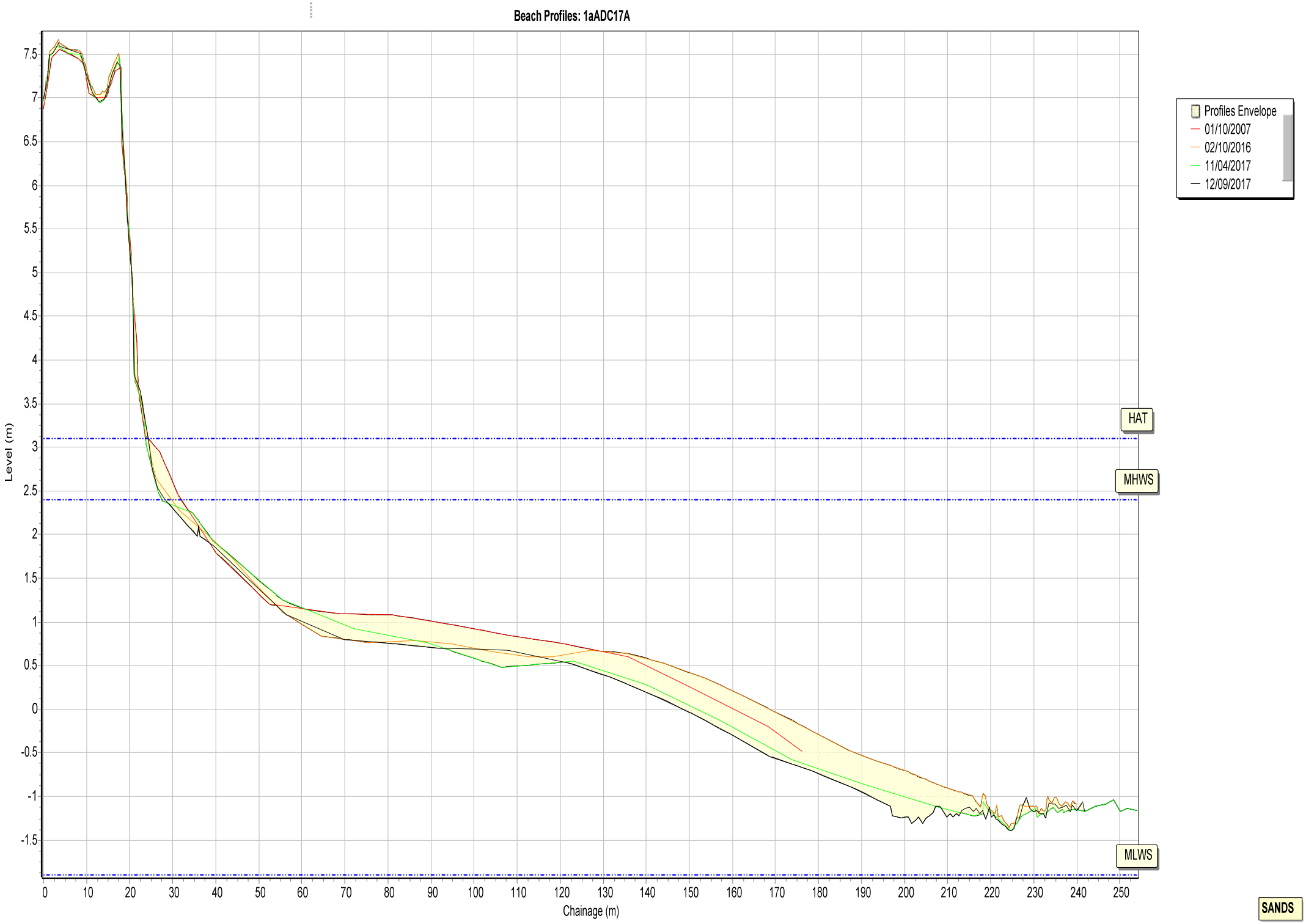
Beach Profiles: 1aADC17A
Profiles Envelope
01/10/2007
02/10/2016
11/04/2017
12/09/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
7.5
7
6.5
6
5.5
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4.5
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3.5
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2.5
2
1.5
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0.5
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-0.5
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-1.5
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240
250

Beach Profile

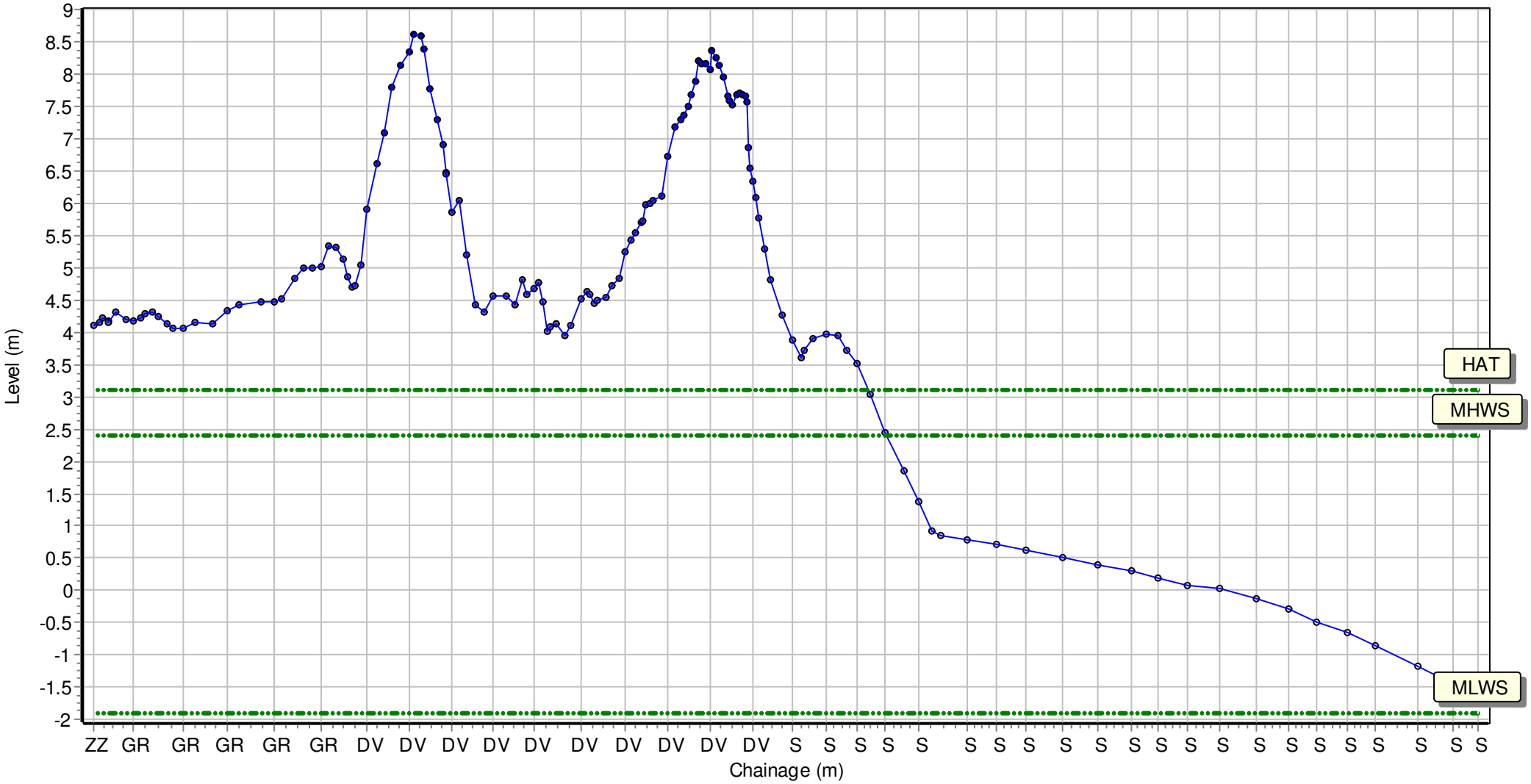
Location: **1aCMBC01**

Date: 22/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 427552.578 **Northing:** 596402.769 **Profile Bearing:** 59 ° from North



Beach Profile

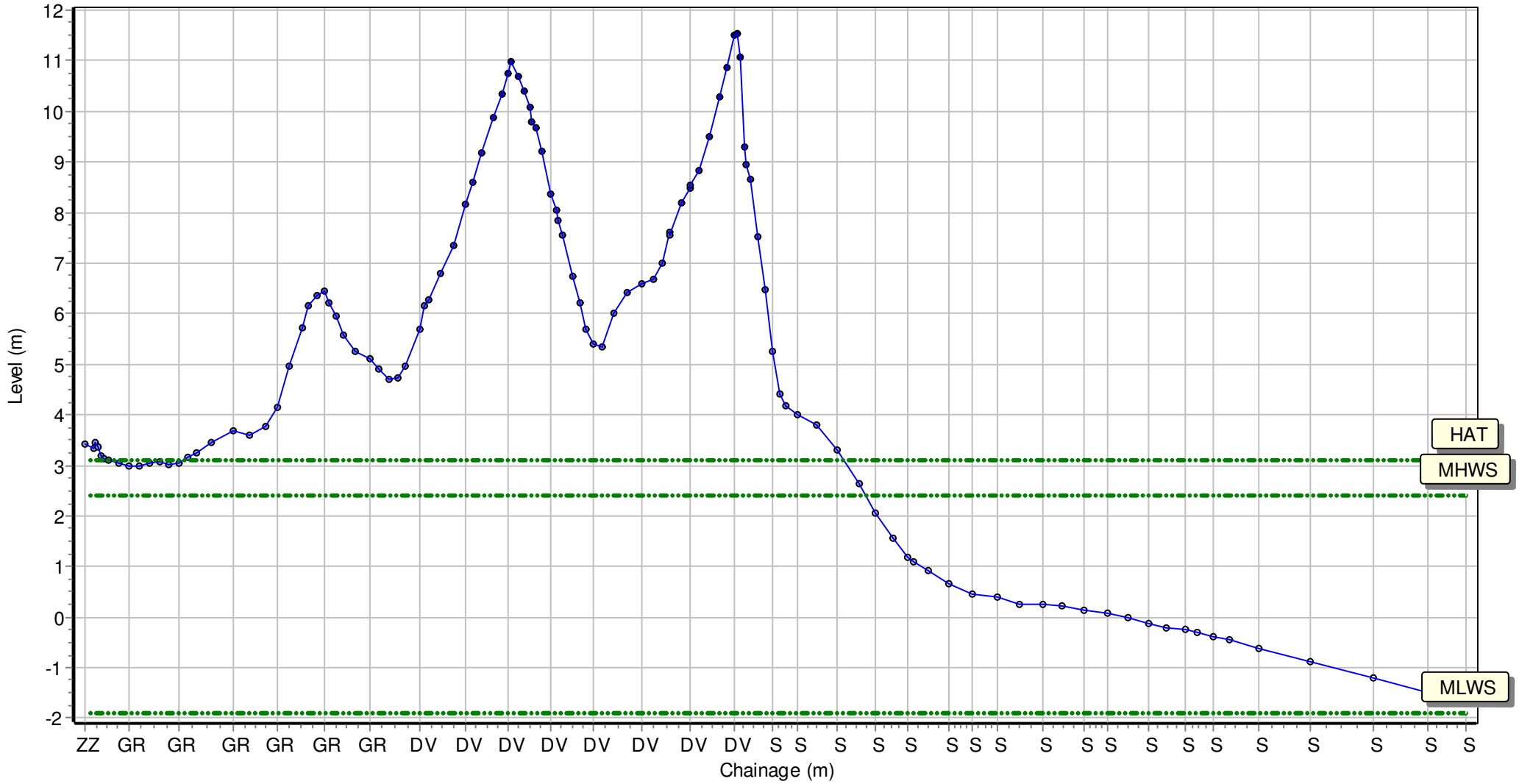
Location: **1aCMBC02**

Date: 22/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 428355.916 **Northing:** 594532.141 **Profile Bearing:** 56 ° from North



Beach Profile

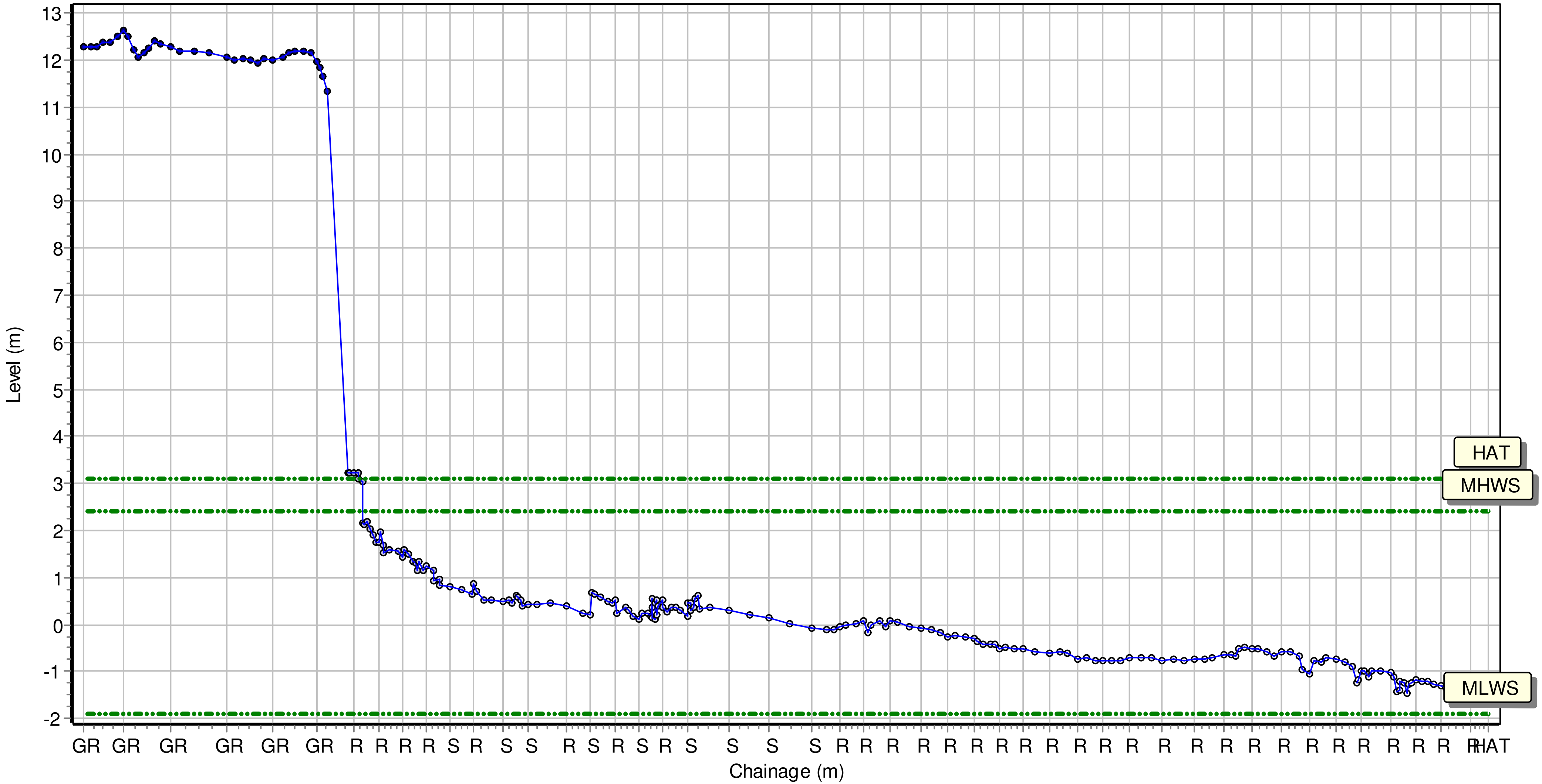
Location: 1aCMBC03

Date: 06/12/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430118.859 **Northing:** 592587.445 **Profile Bearing:** 115 ° from North



Beach Profile

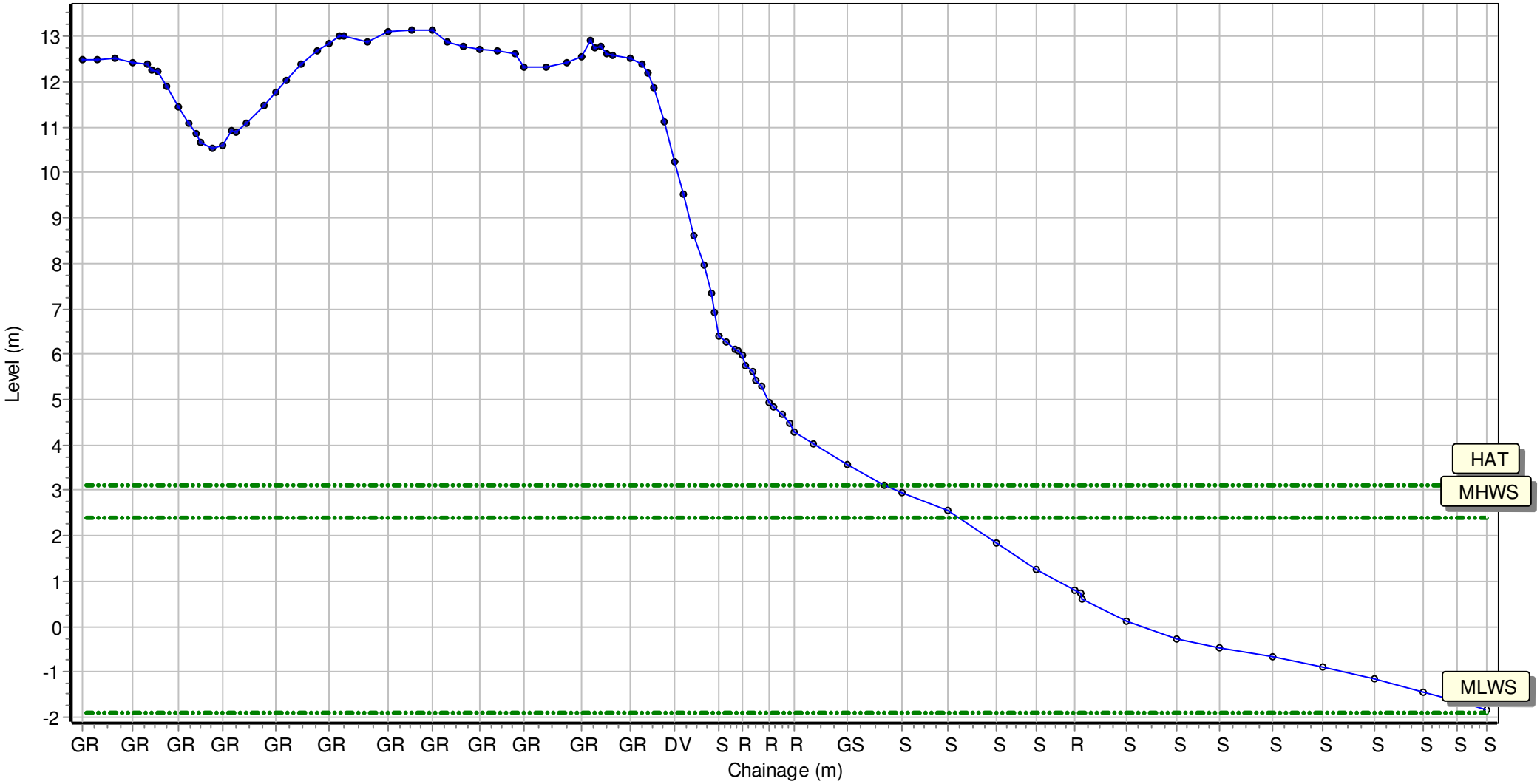
Location: **1aCMBC03A**

Date: 22/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430128.317 **Northing:** 591148.463 **Profile Bearing:** 70 ° from North



Beach Profile

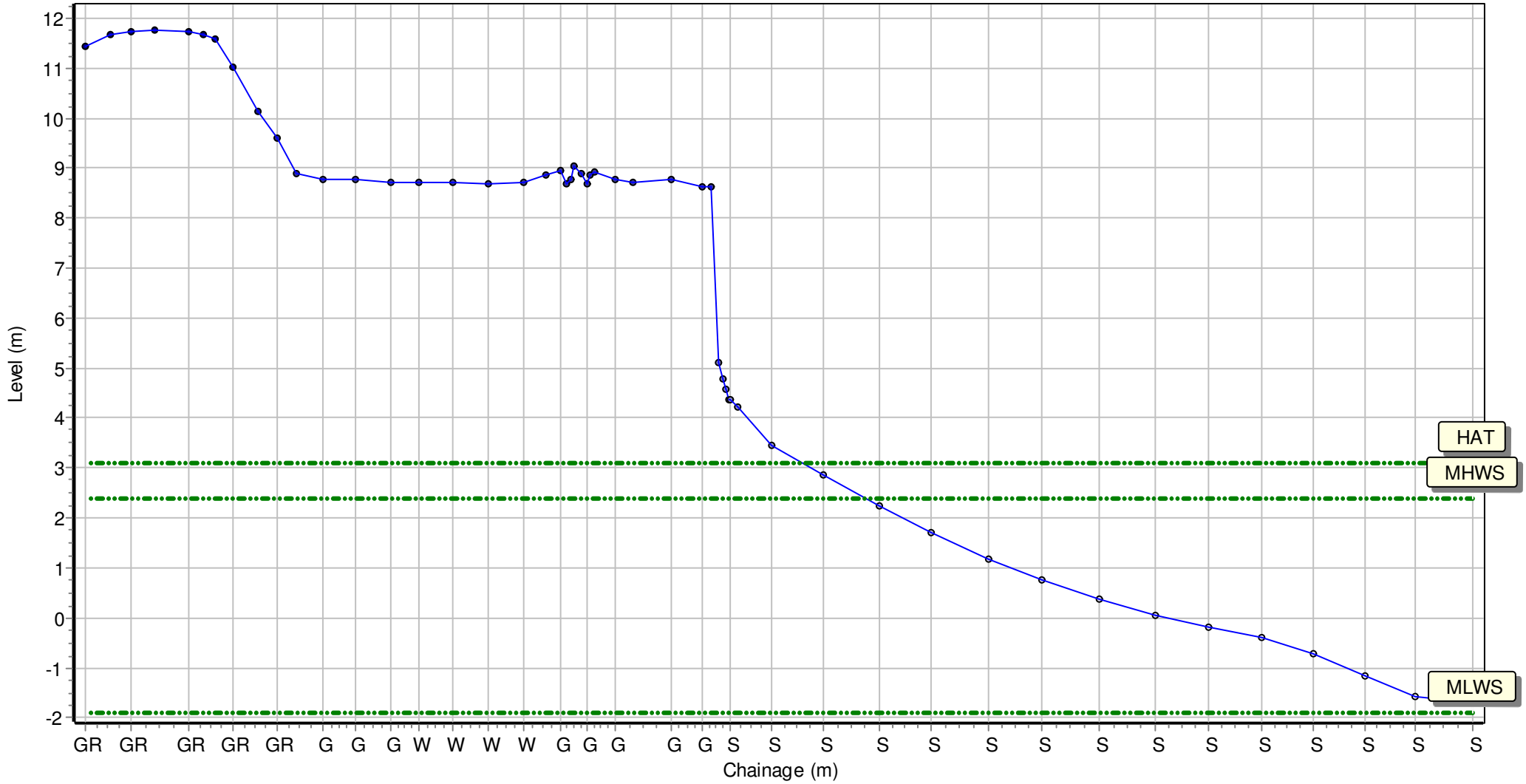
Location: **1aCMBC03B**

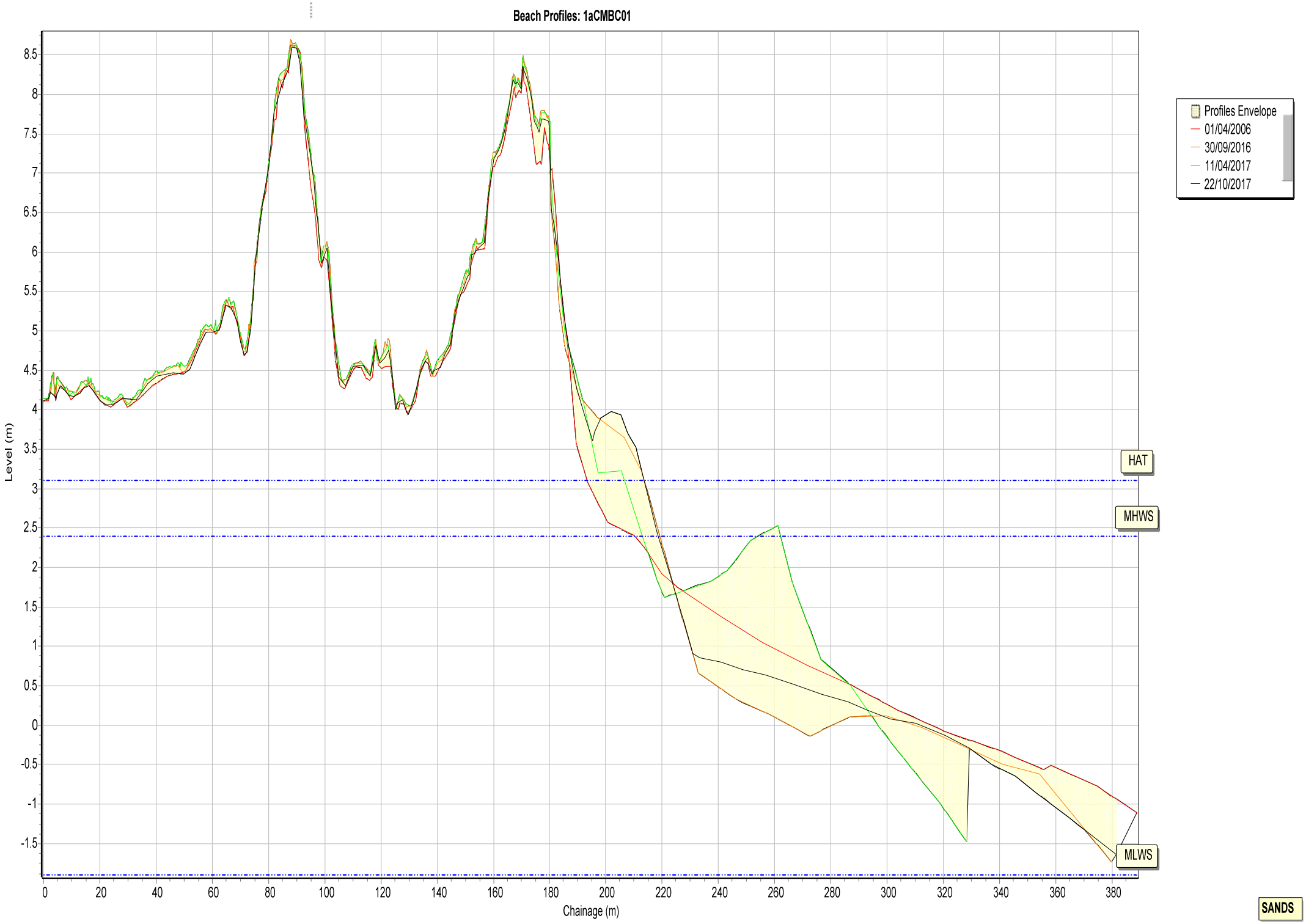
Date: 22/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430478.518 **Northing:** 590661.474 **Profile Bearing:** 58 ° from North




Beach Profiles: 1aCMBC01
Profiles Envelope
01/04/2006
30/09/2016
11/04/2017
22/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
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120
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160
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260
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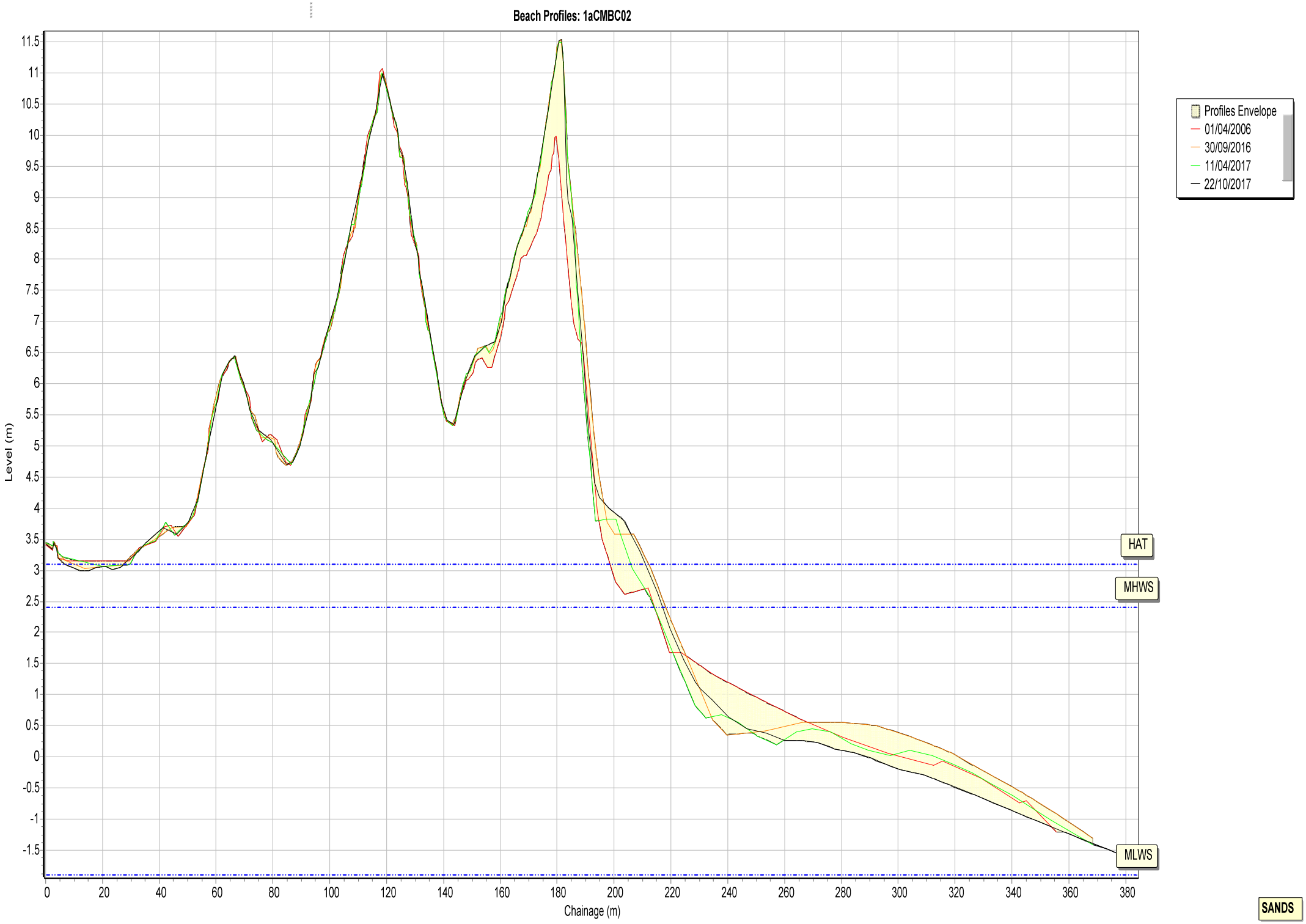
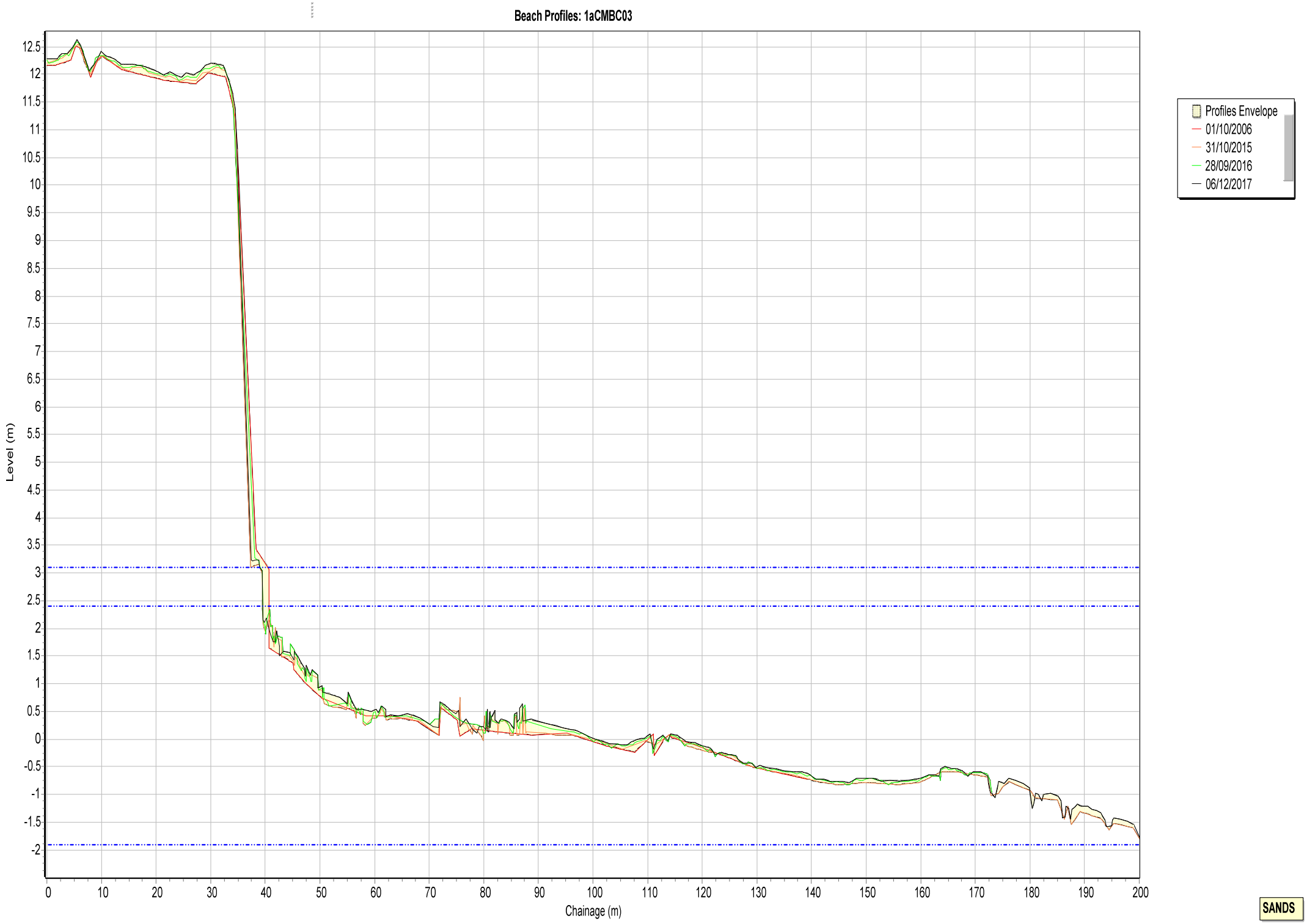
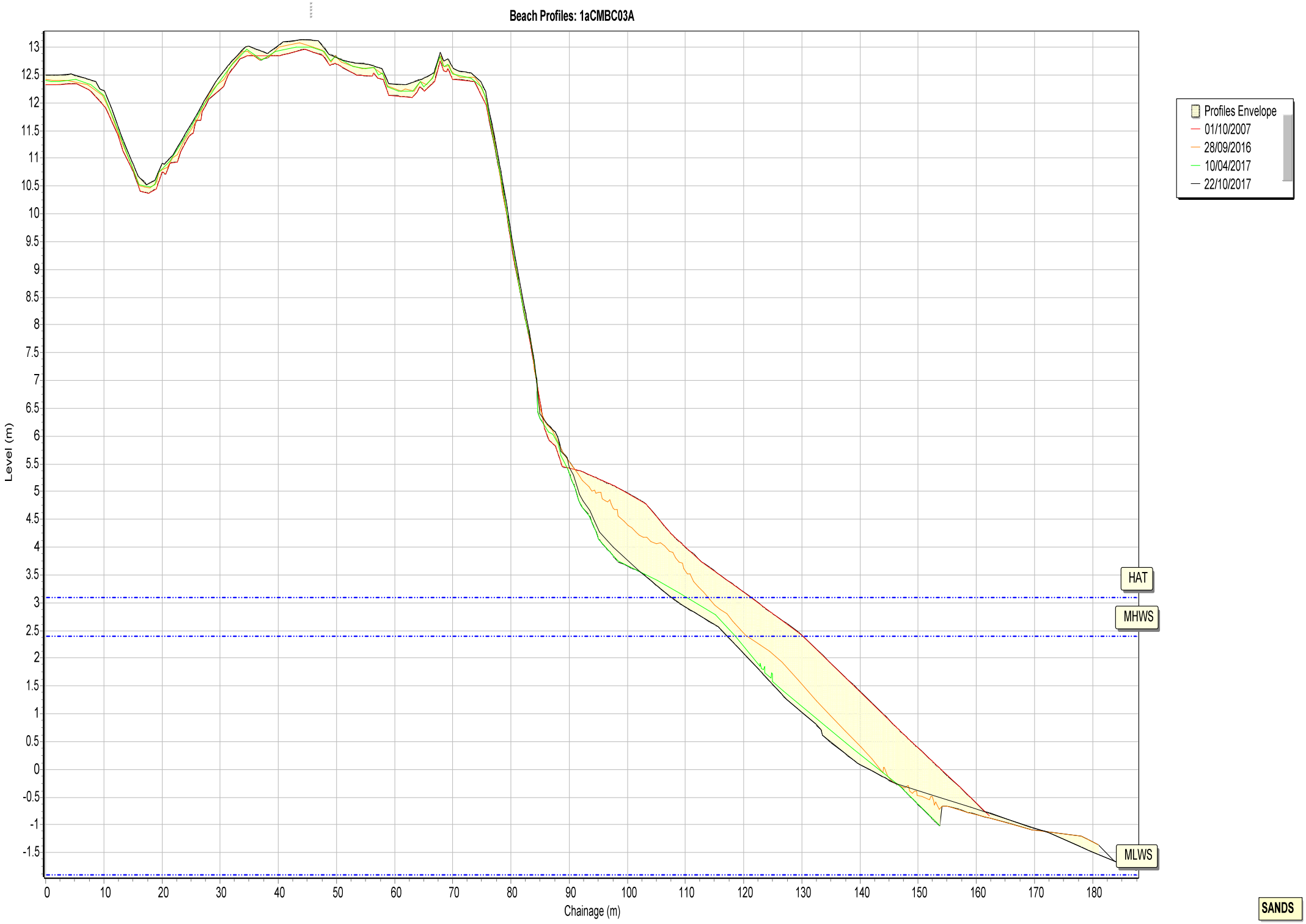
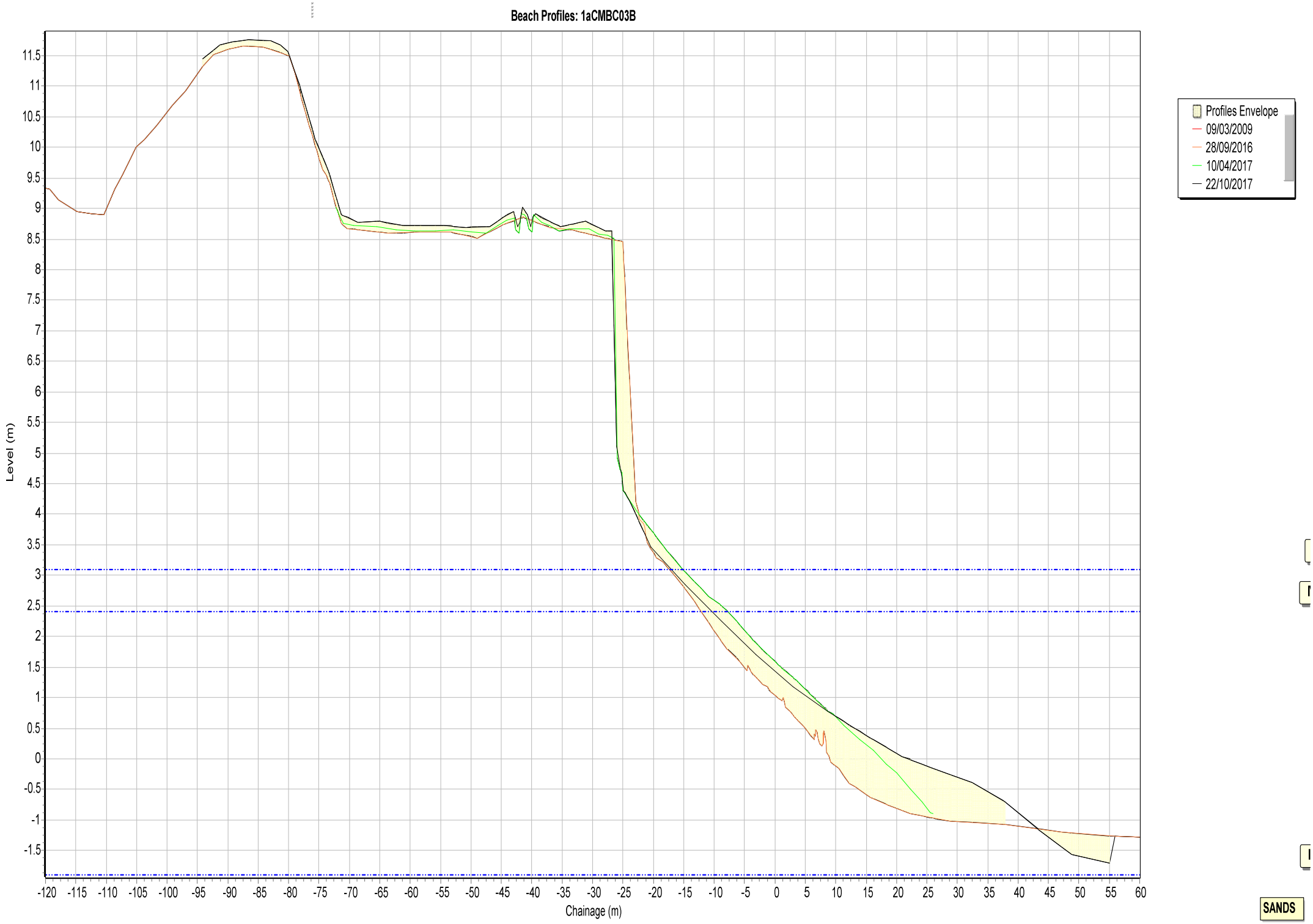
300
320
340
360
380


Beach Profiles: 1aCMBC02
Profiles Envelope
01/04/2006
30/09/2016
11/04/2017
22/10/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aCMBC03
Profiles Envelope
01/10/2006
31/10/2015
28/09/2016
06/12/2017
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aCMBC03A
Profiles Envelope
01/10/2007
28/09/2016
10/04/2017
22/10/2017
Level (m)
Chainage (m)
HAT
MHWS
MLWS
SANDS


Beach Profiles: 1aCMBC03B
Profiles Envelope
09/03/2009
28/09/2016
10/04/2017
22/10/2017
Level (m)
Chainage (m)
SANDS

Beach Profile

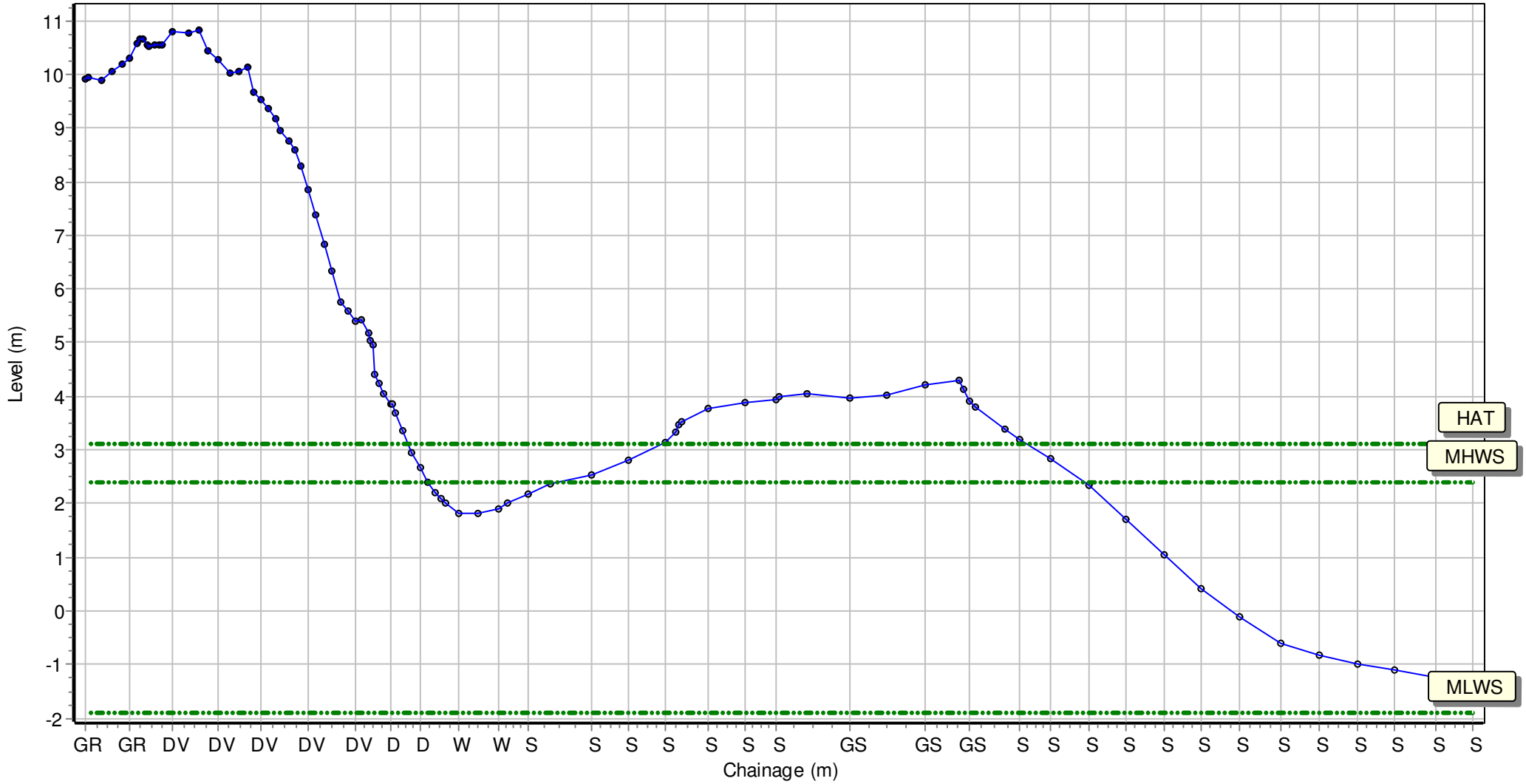
Location: **1aWDC02**

Date: 22/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430807.97 **Northing:** 589773.192 **Profile Bearing:** 59 ° from North



Beach Profile

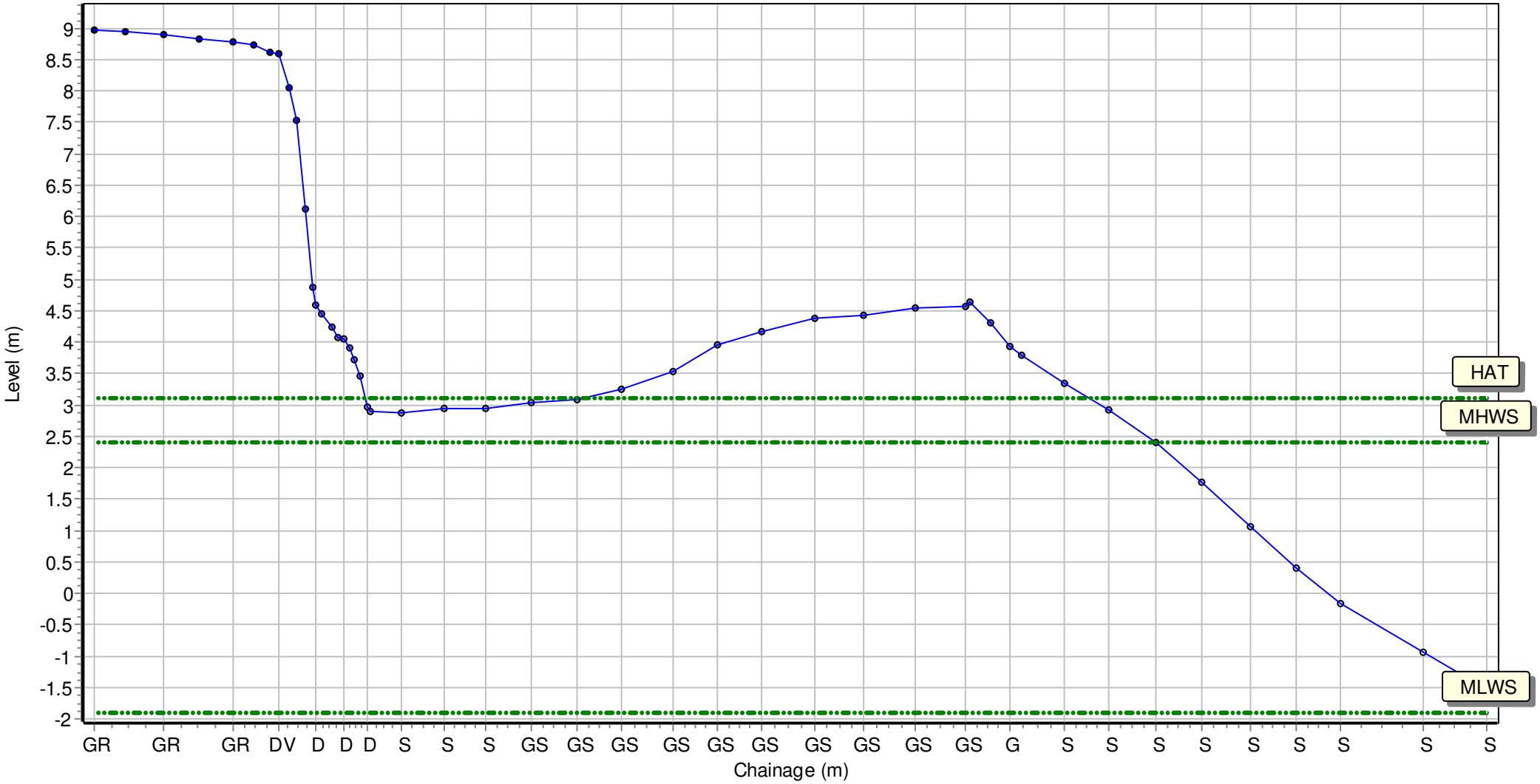
Location: **1aWDC03**

Date: 22/10/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430998.77 **Northing:** 589548.265 **Profile Bearing:** 58 ° from North



Beach Profile

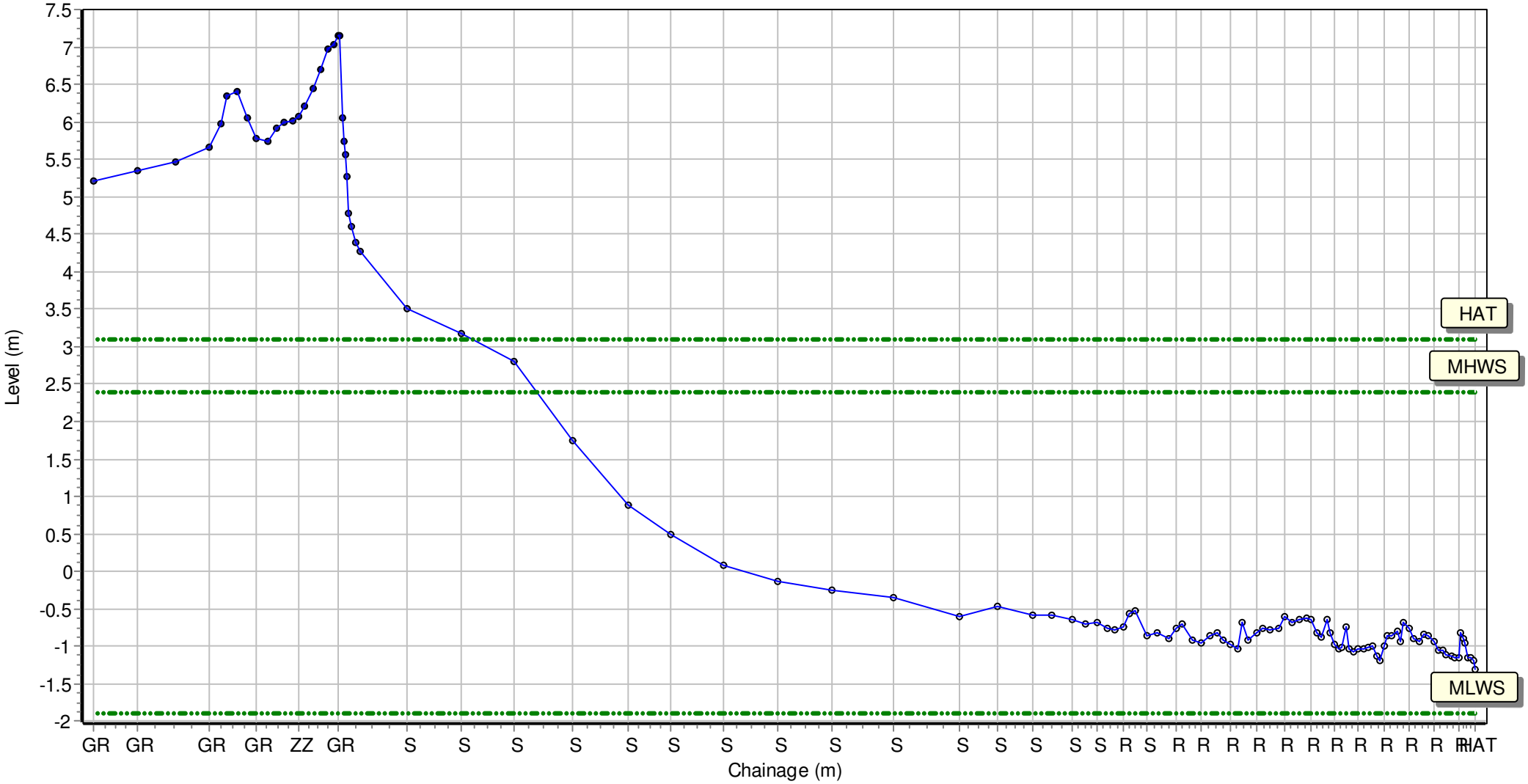
Location: **1aWDC04**

Date: 08/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431518.807 **Northing:** 588823.532 **Profile Bearing:** 92 ° from North



Beach Profile

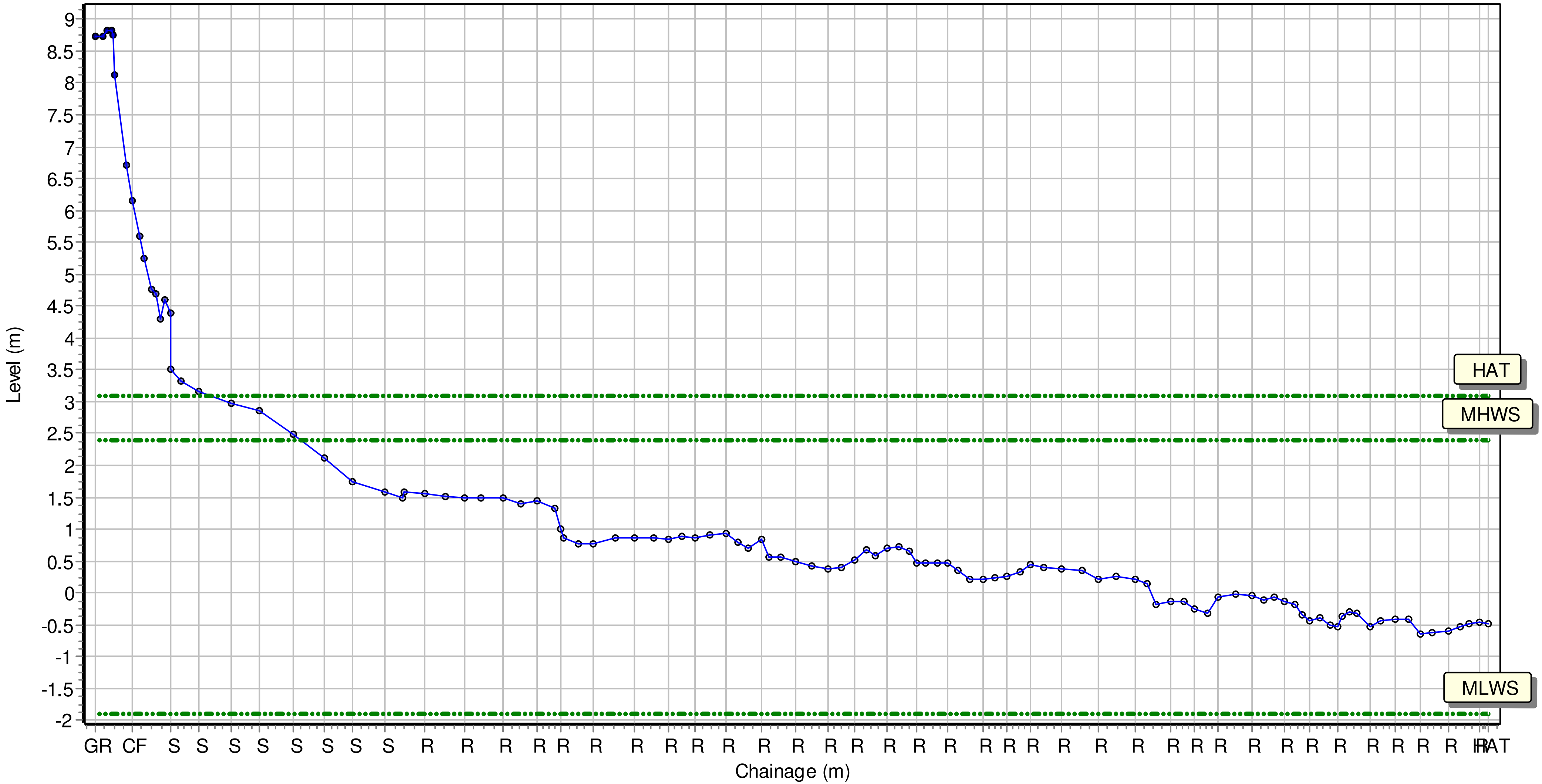
Location: **1aWDC05**

Date: 08/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431750.615 **Northing:** 588299.035 **Profile Bearing:** 56 ° from North



http://www.sandsuser.com

SANDS

Beach Profile

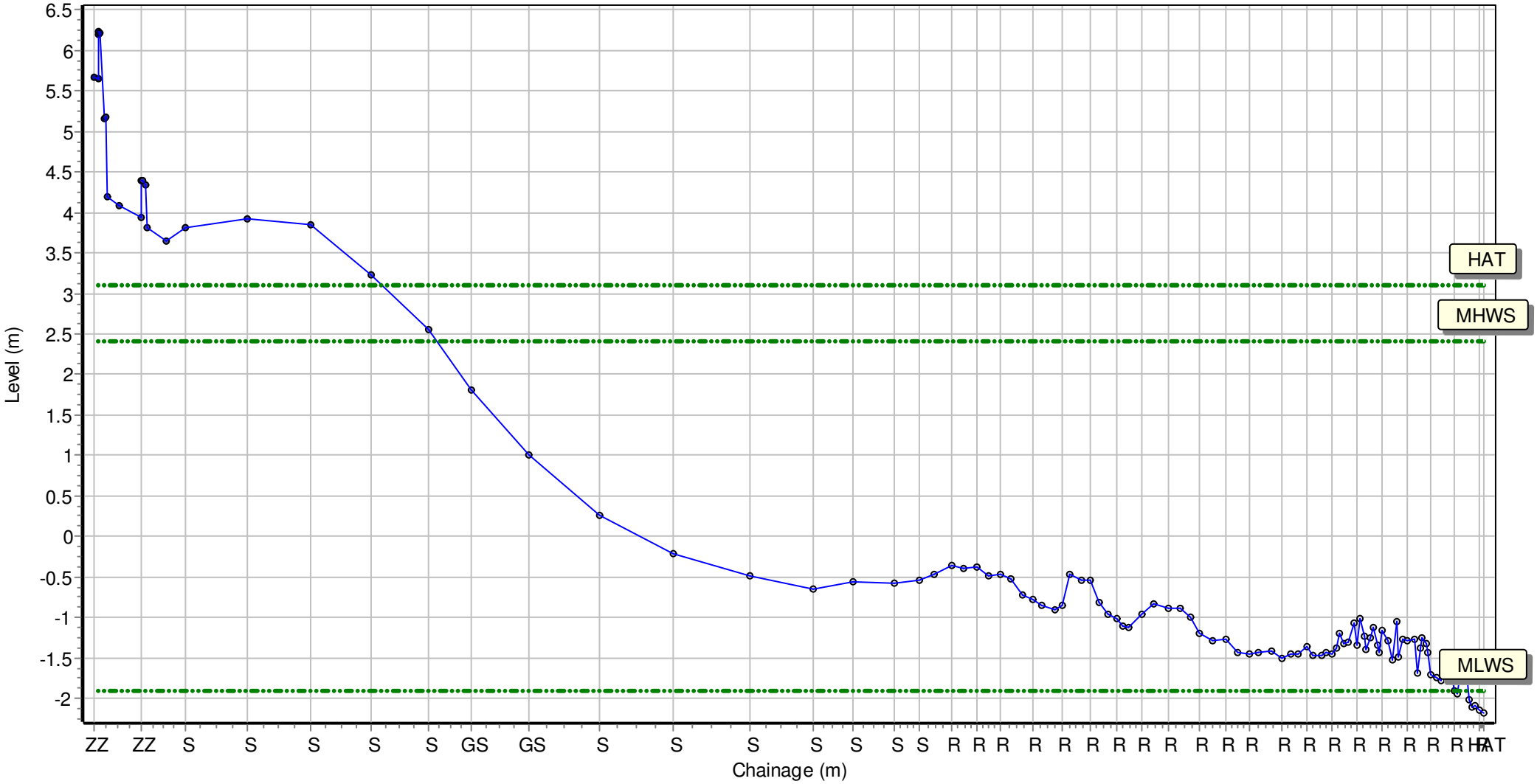
Location: **1aWDC05A**

Date: 08/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431490.829 **Northing:** 588054.668 **Profile Bearing:** 181 ° from North



Beach Profile

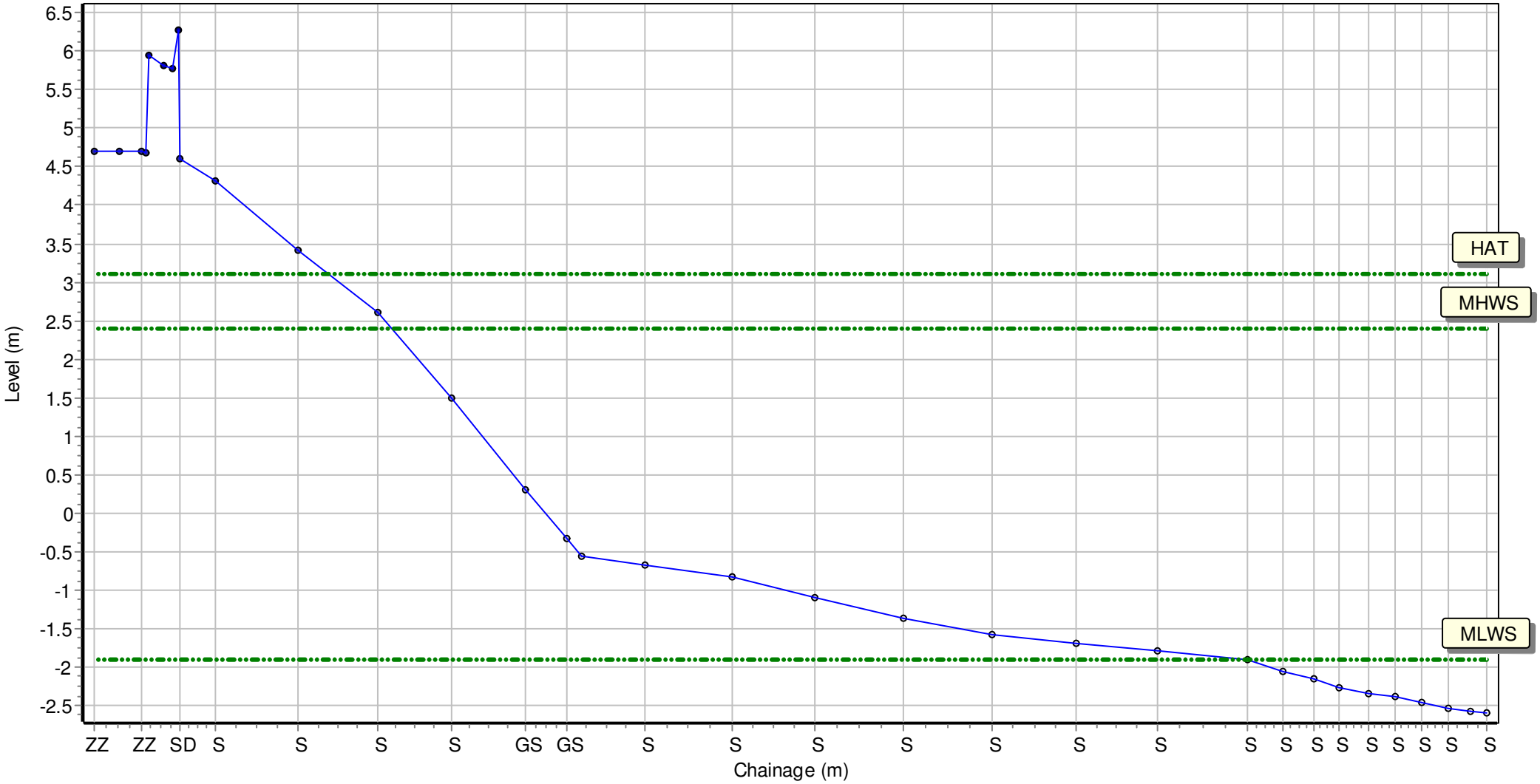
Location: **1aWDC06**

Date: 08/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431176.409 **Northing:** 587860.146 **Profile Bearing:** 125 ° from North



Beach Profile

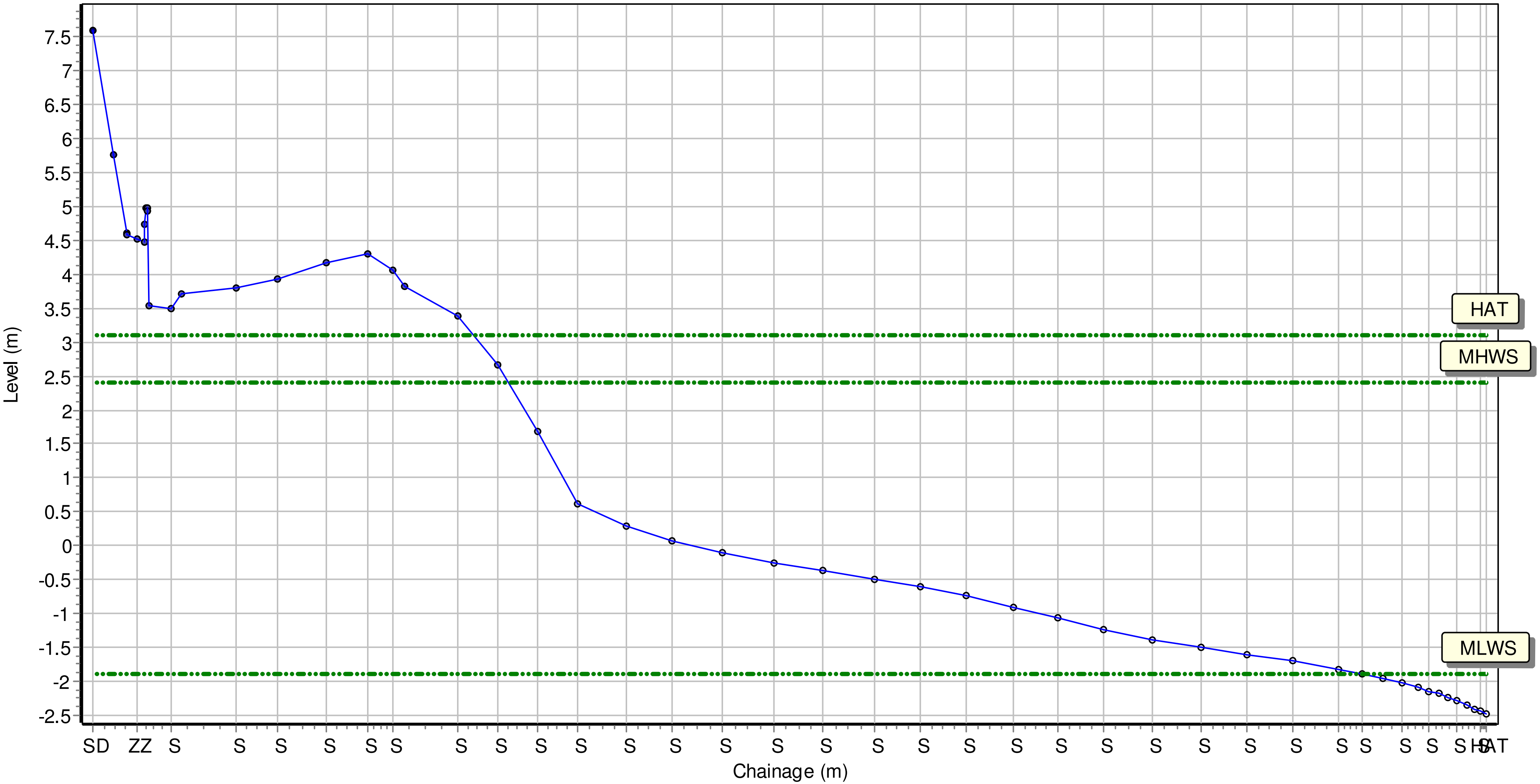
Location: **1aWDC06A**

Date: 08/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431040.809 **Northing:** 587666.014 **Profile Bearing:** 114 ° from North



http://www.sandsuser.com

SANDS

Beach Profile

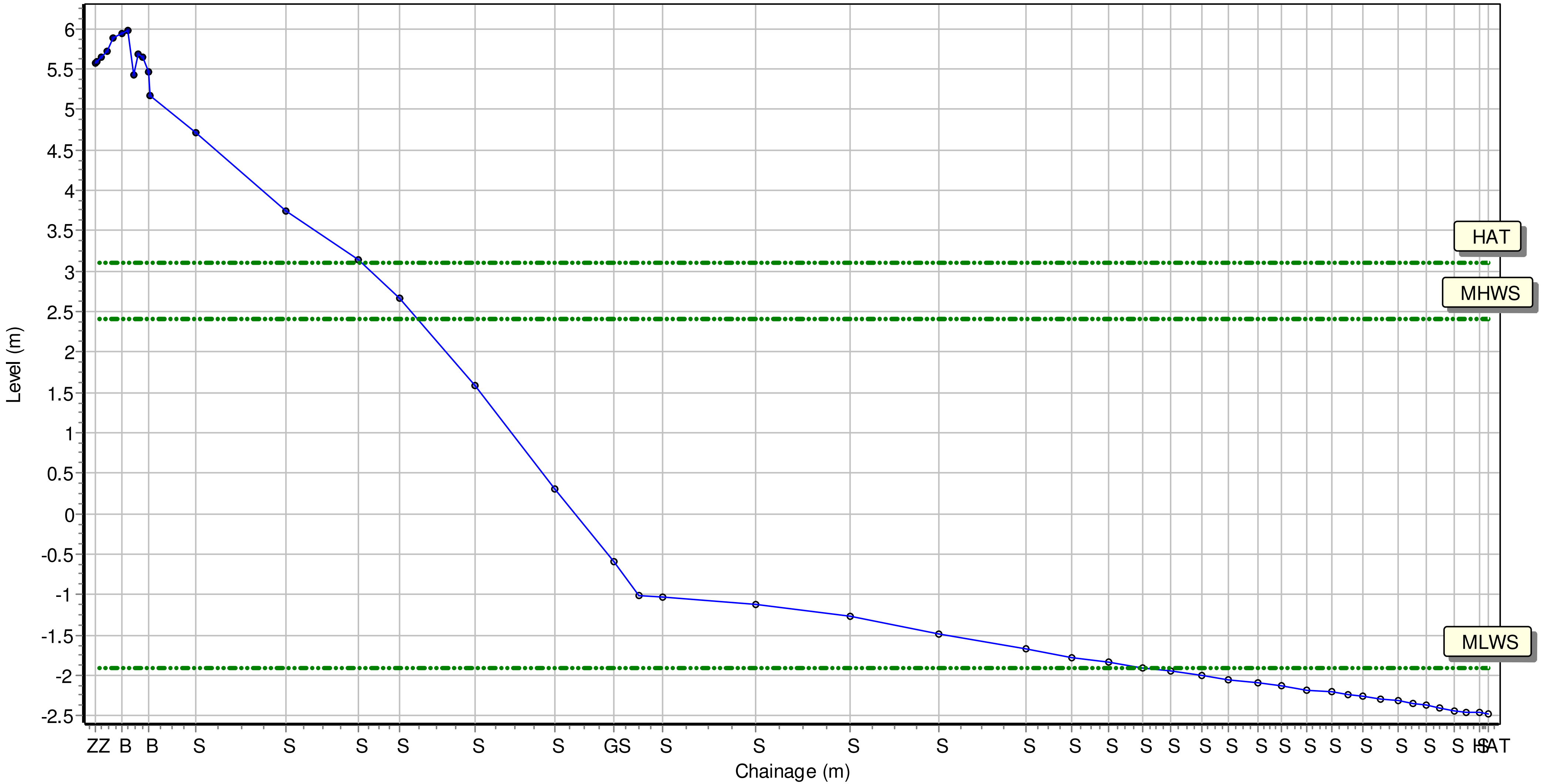
Location: 1aWDC07

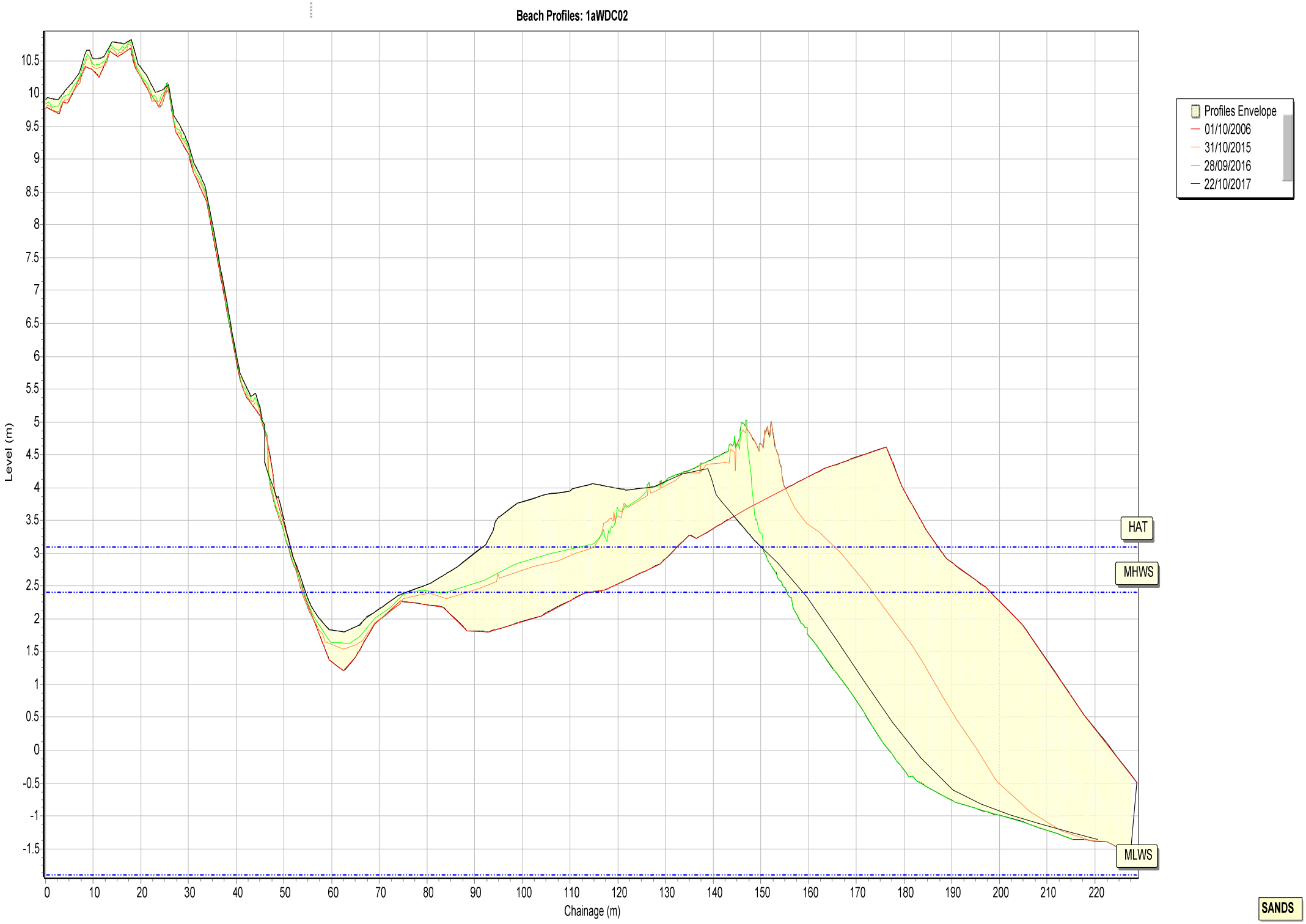
Date: 08/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430972.923 **Northing:** 587417.667 **Profile Bearing:** 103 ° from North




Beach Profiles: 1aWDC02
Profiles Envelope
01/10/2006
31/10/2015
28/09/2016
22/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
10.5
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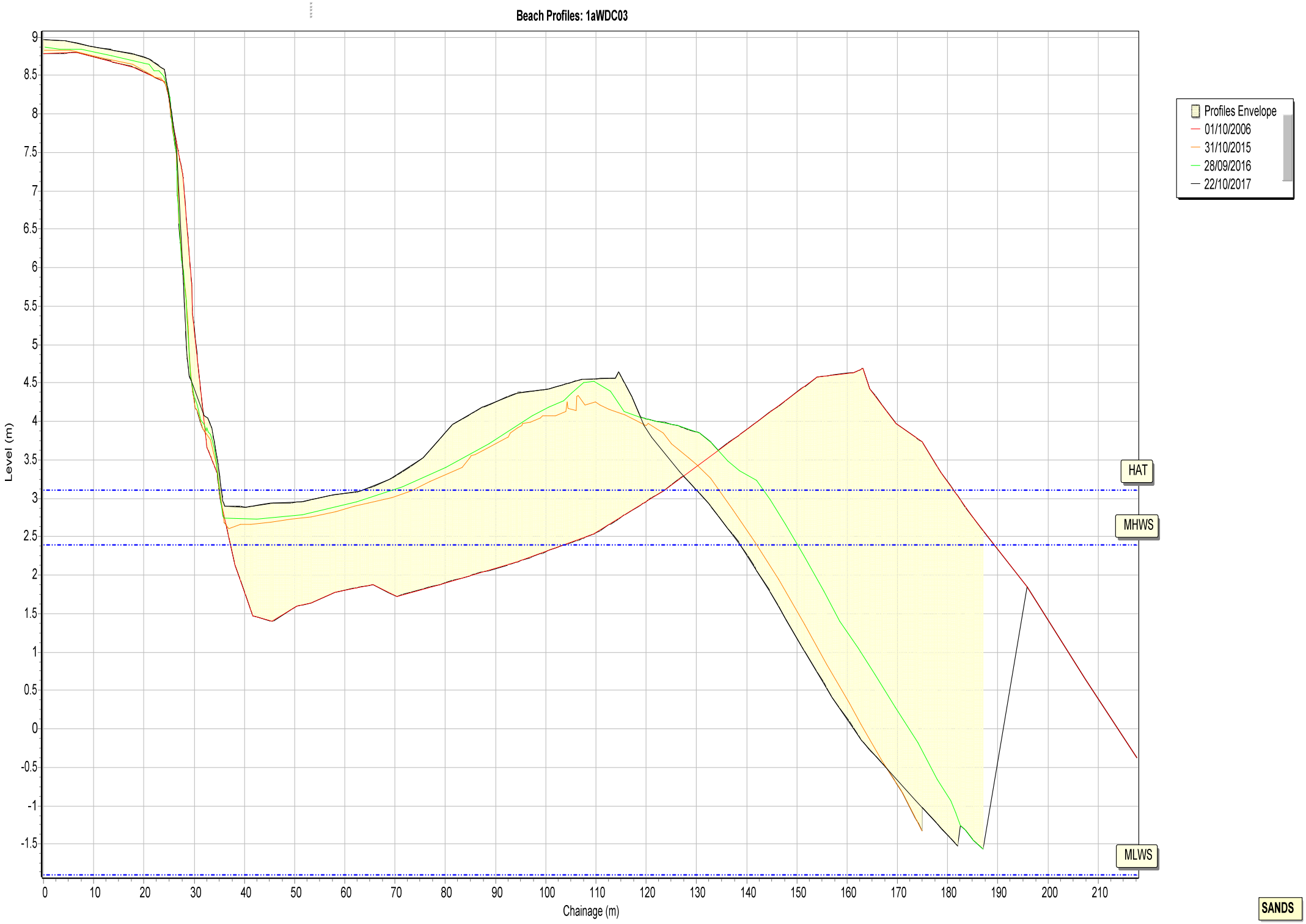
Beach Profiles: 1aWDC03
Profiles Envelope
01/10/2006
31/10/2015
28/09/2016
22/10/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
9
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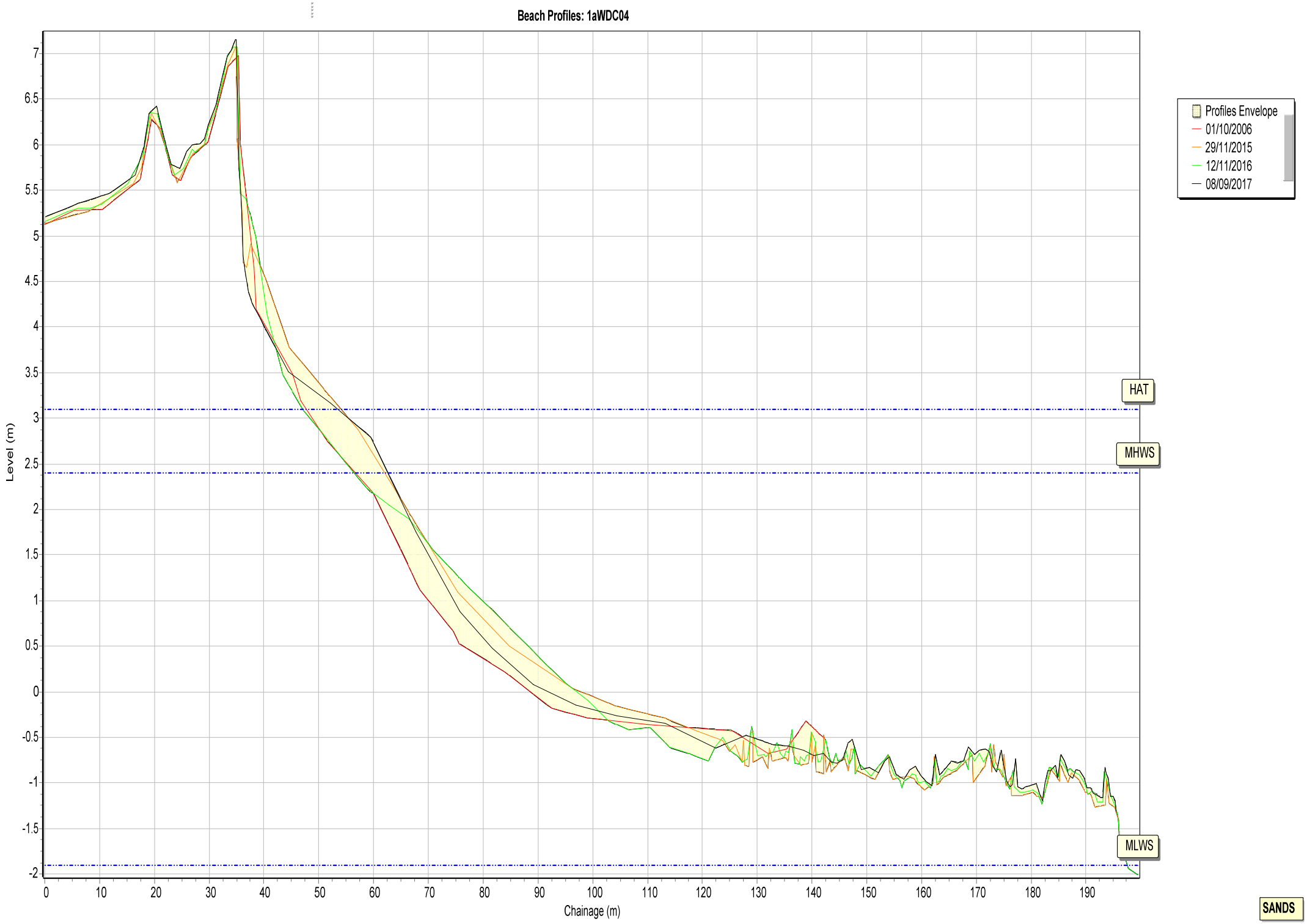
210


Beach Profiles: 1aWDC04
Profiles Envelope
01/10/2006
29/11/2015
12/11/2016
08/09/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
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90
100
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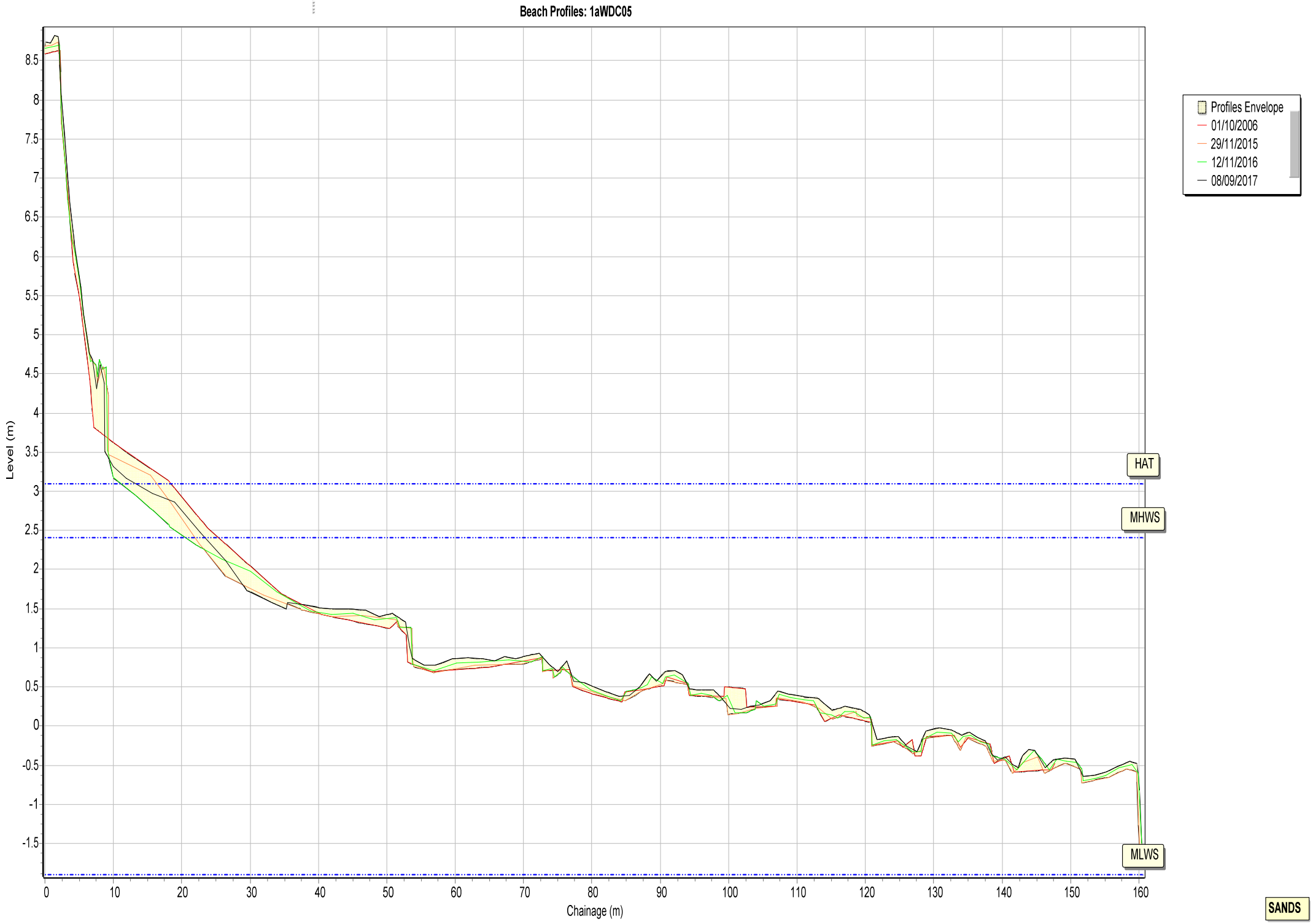
180
190
SANDS


Beach Profiles: 1aWDC05
Profiles Envelope
01/10/2006
29/11/2015
12/11/2016
08/09/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
8.5
8
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
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110
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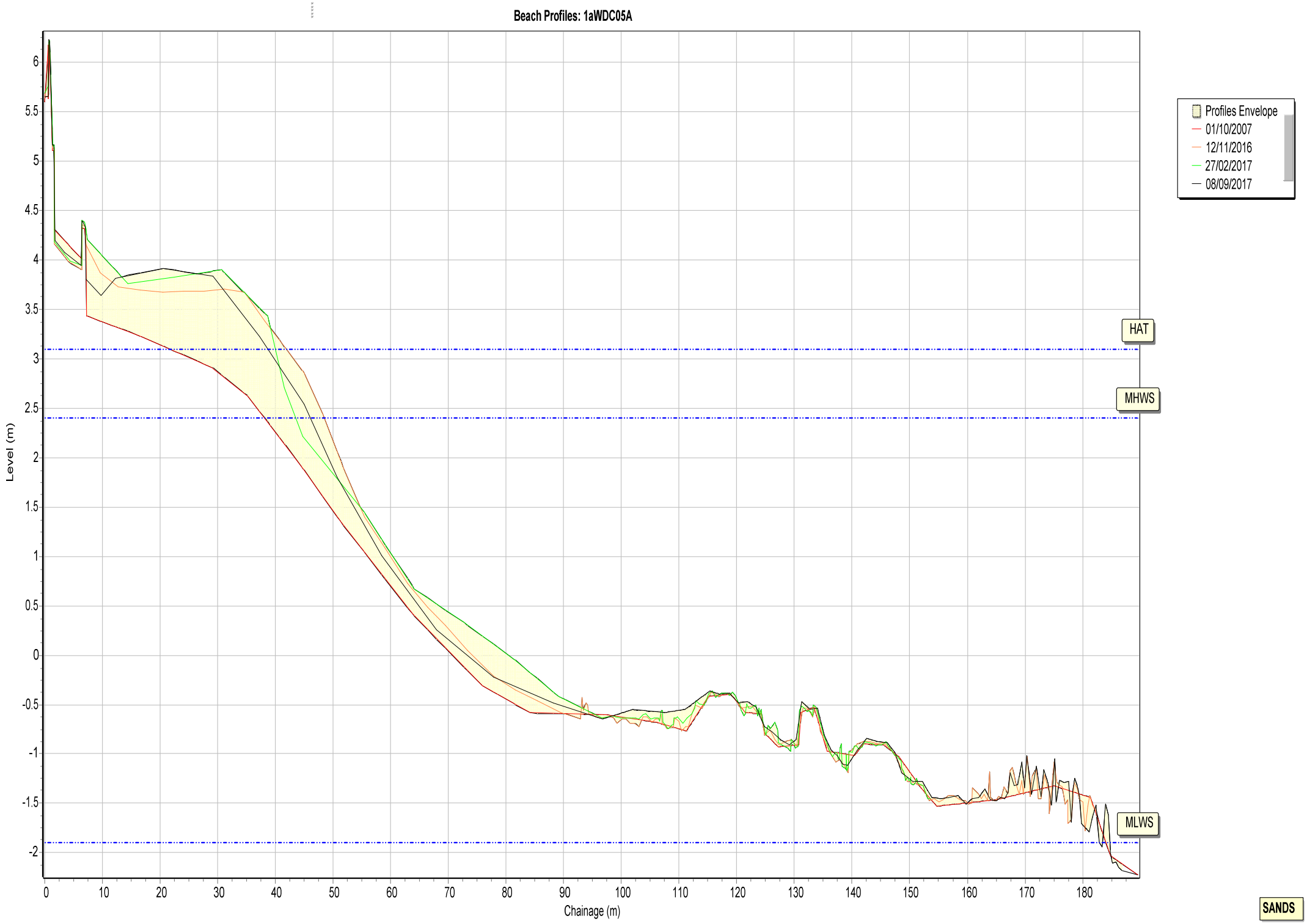
160
SANDS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Profiles Envelope
01/10/2007
12/11/2016
27/02/2017
08/09/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
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50
60
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80
90
100
110
120
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140
150
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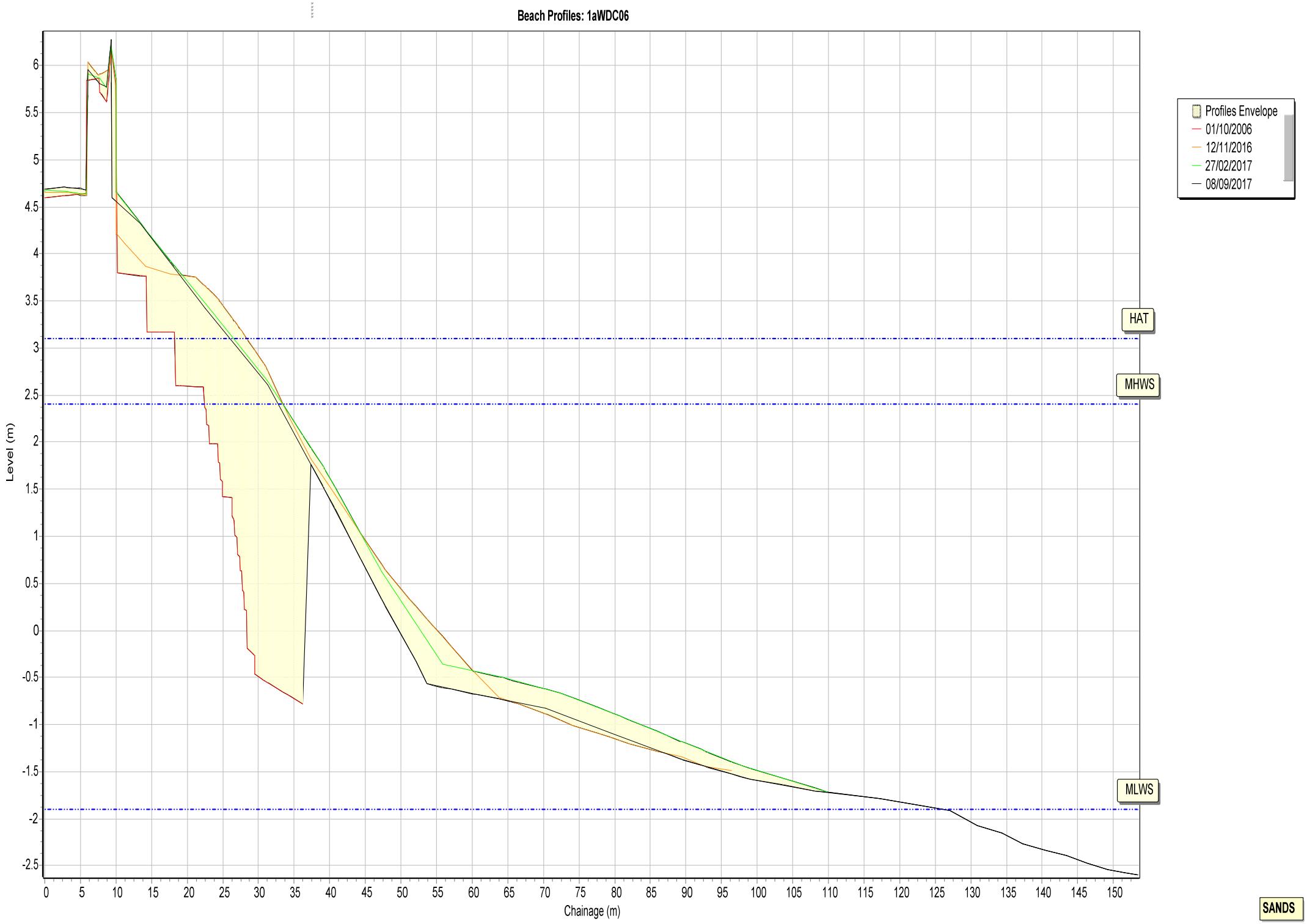
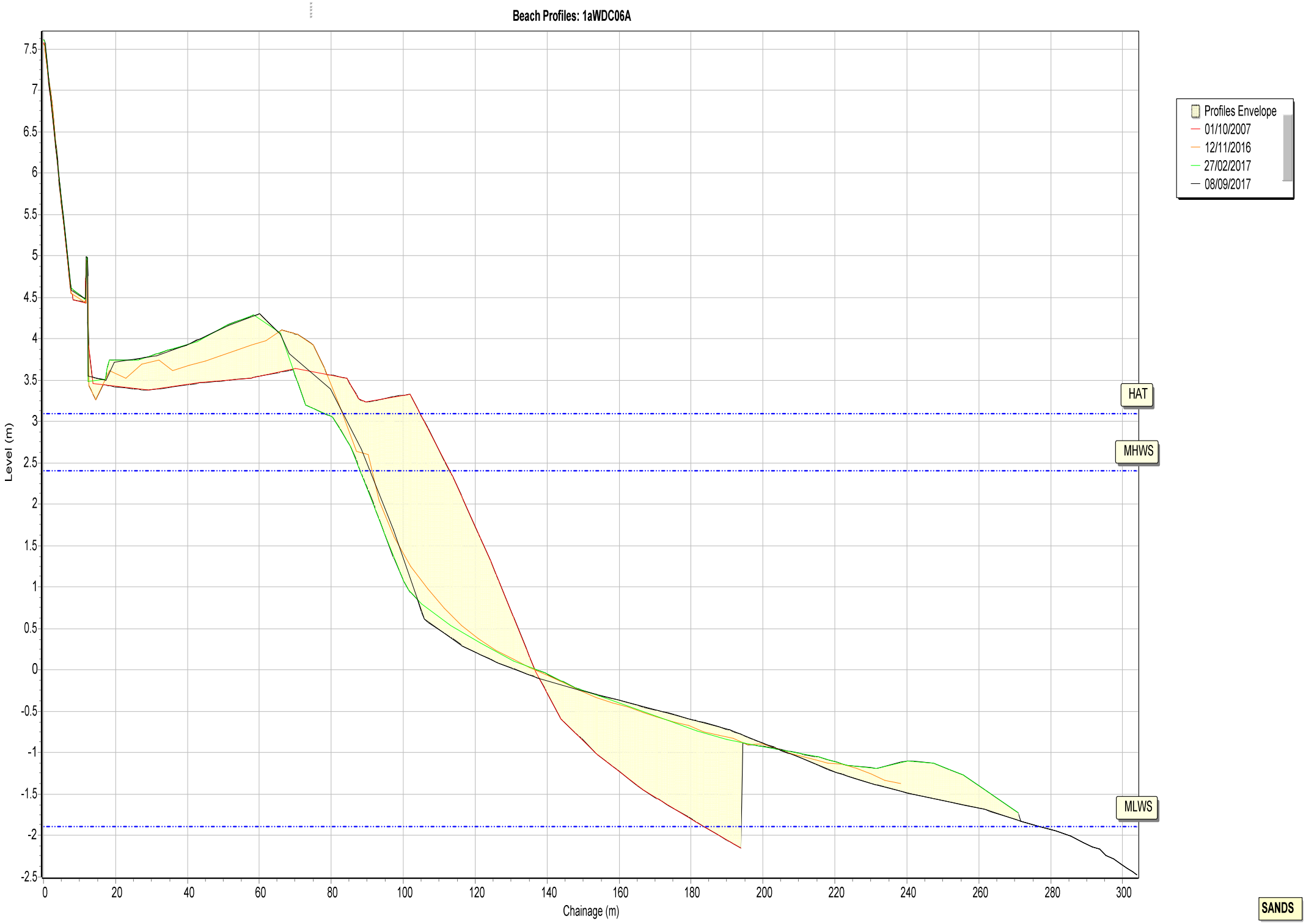
170
180


Beach Profiles: 1aWDC06
Profiles Envelope
01/10/2006
12/11/2016
27/02/2017
08/09/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS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Profiles Envelope
01/10/2007
12/11/2016
27/02/2017
08/09/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
7.5
7
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
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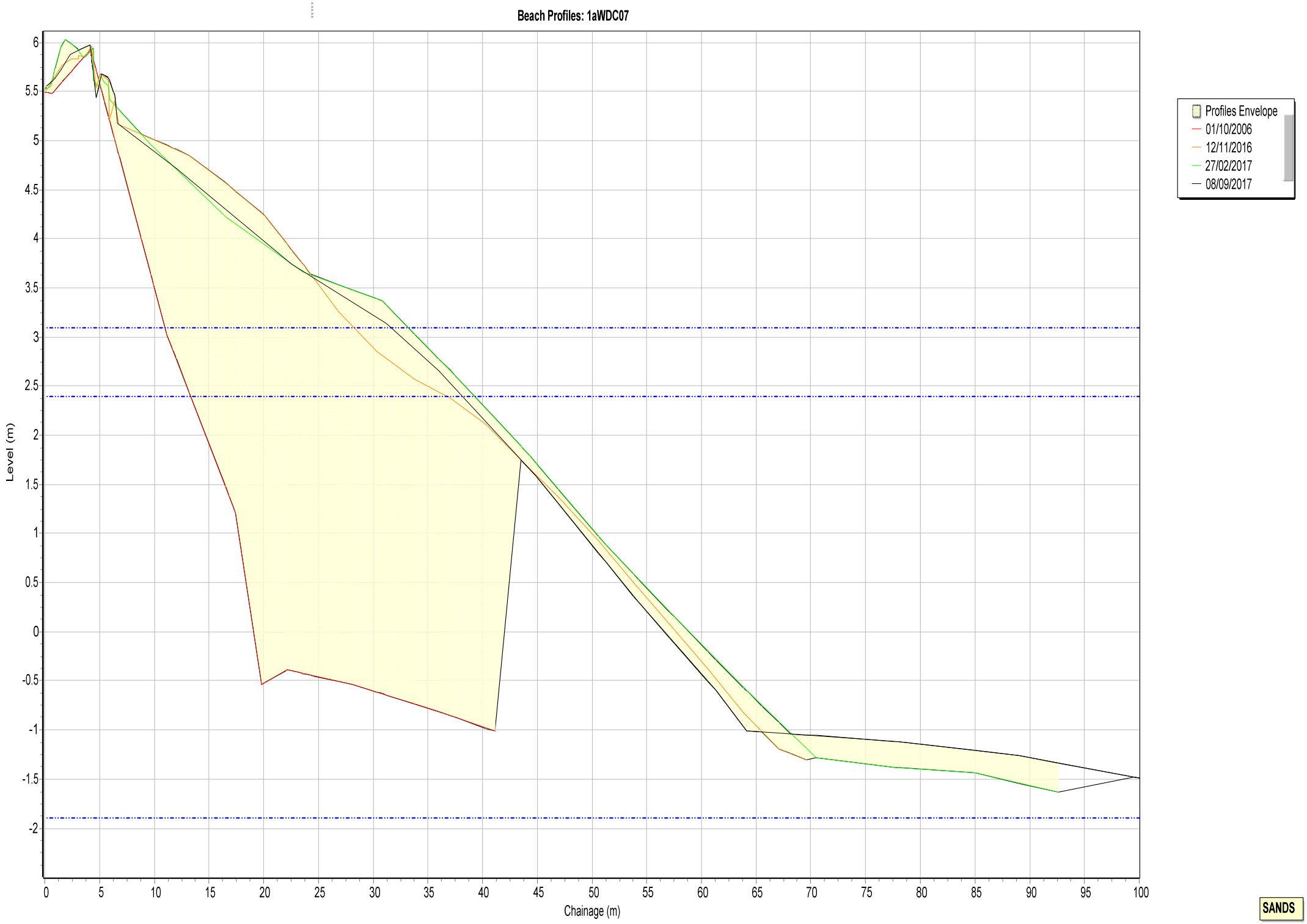
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Profiles Envelope
01/10/2006
12/11/2016
27/02/2017
08/09/2017
Level (m)
Chainage (m)
SANDS

Beach Profile

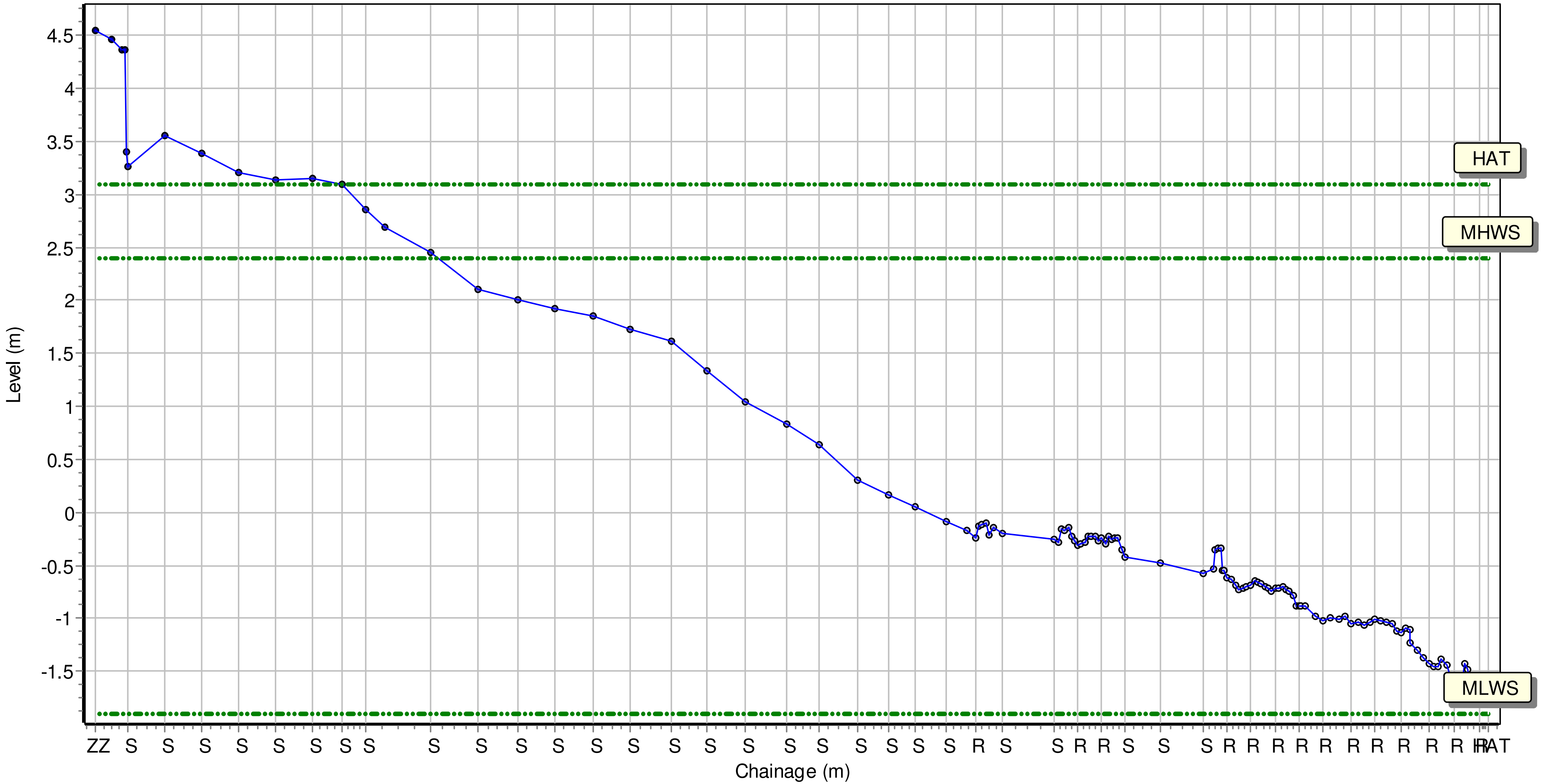
Location: **1aNWB1**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431665.429 **Northing:** 588007.636 **Profile Bearing:** 212 ° from North



Beach Profile

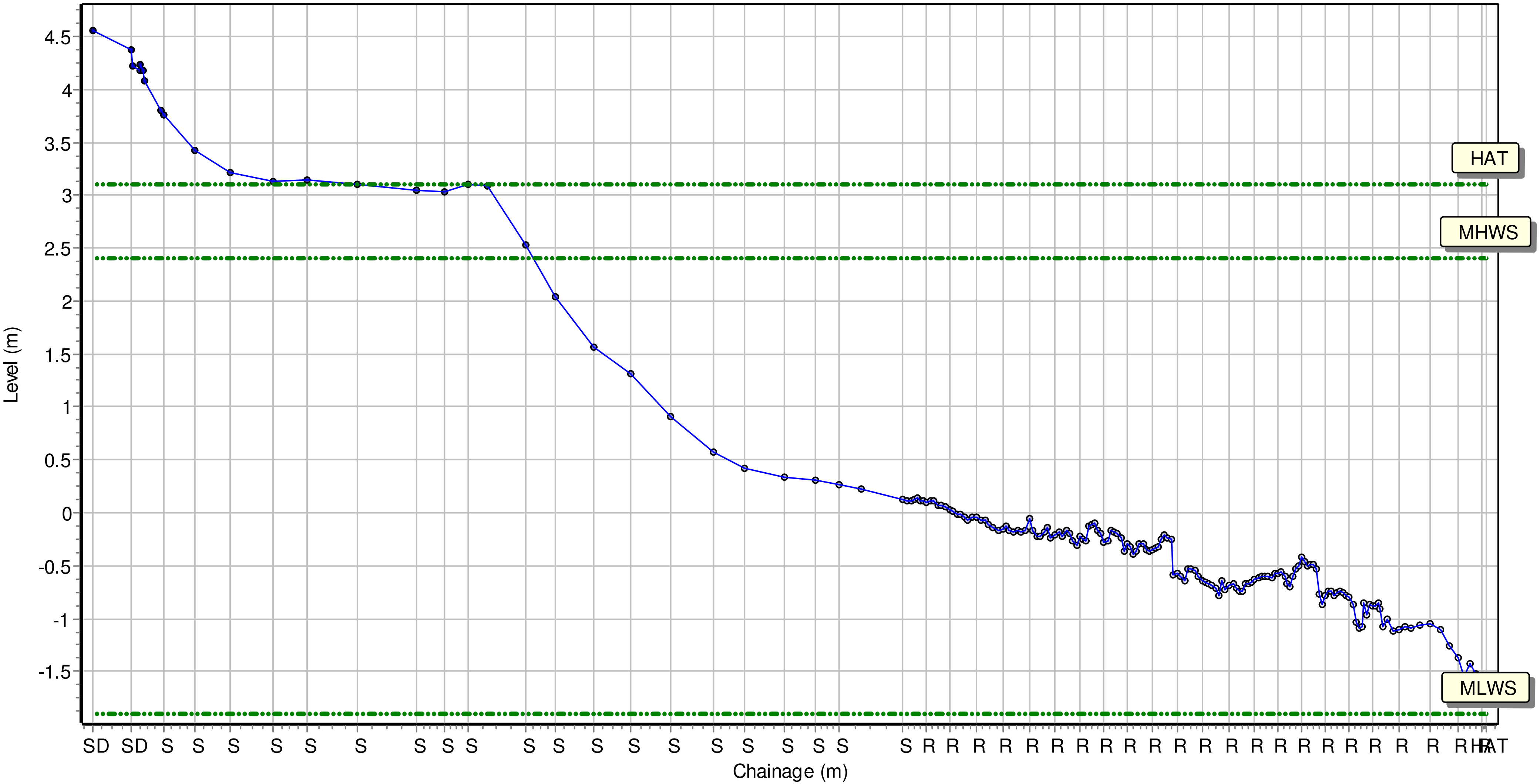
Location: **1aNWB2**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431618.236 **Northing:** 588035.356 **Profile Bearing:** 202 ° from North



Beach Profile

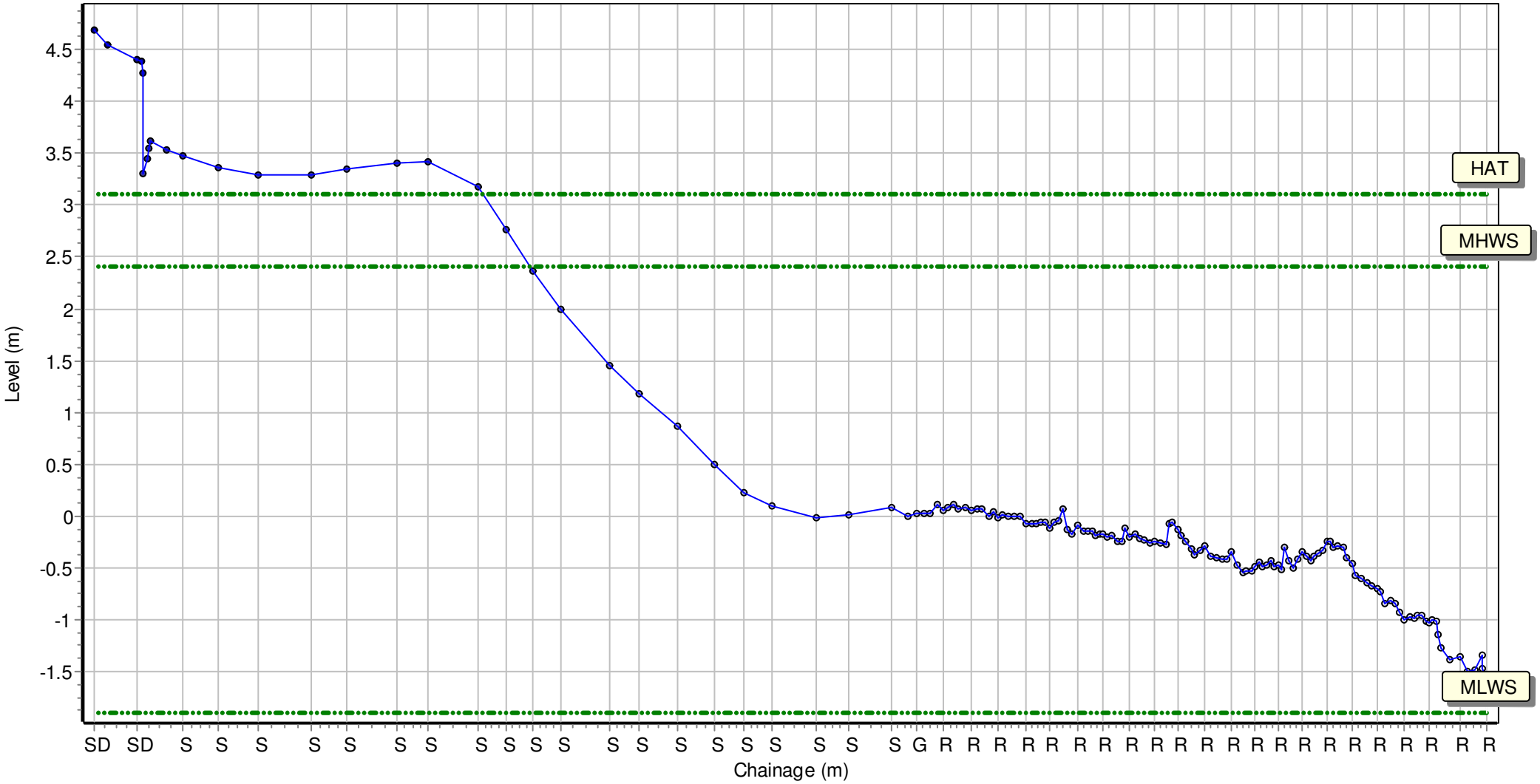
Location: **1aNWB3**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431573.455 **Northing:** 588049.149 **Profile Bearing:** 193 ° from North



Beach Profile

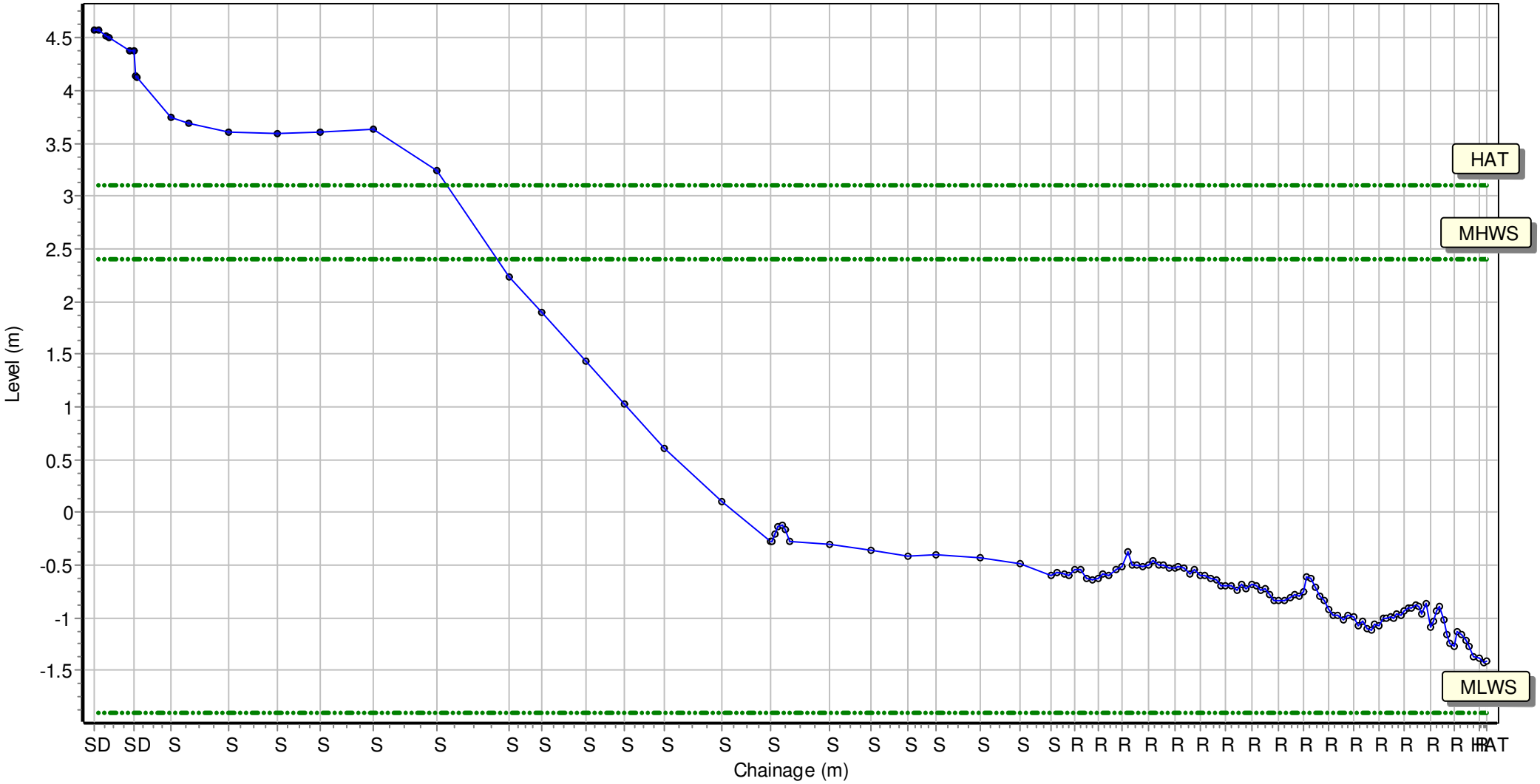
Location: **1aNWB4**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431523.116 **Northing:** 588054.727 **Profile Bearing:** 184 ° from North



Beach Profile

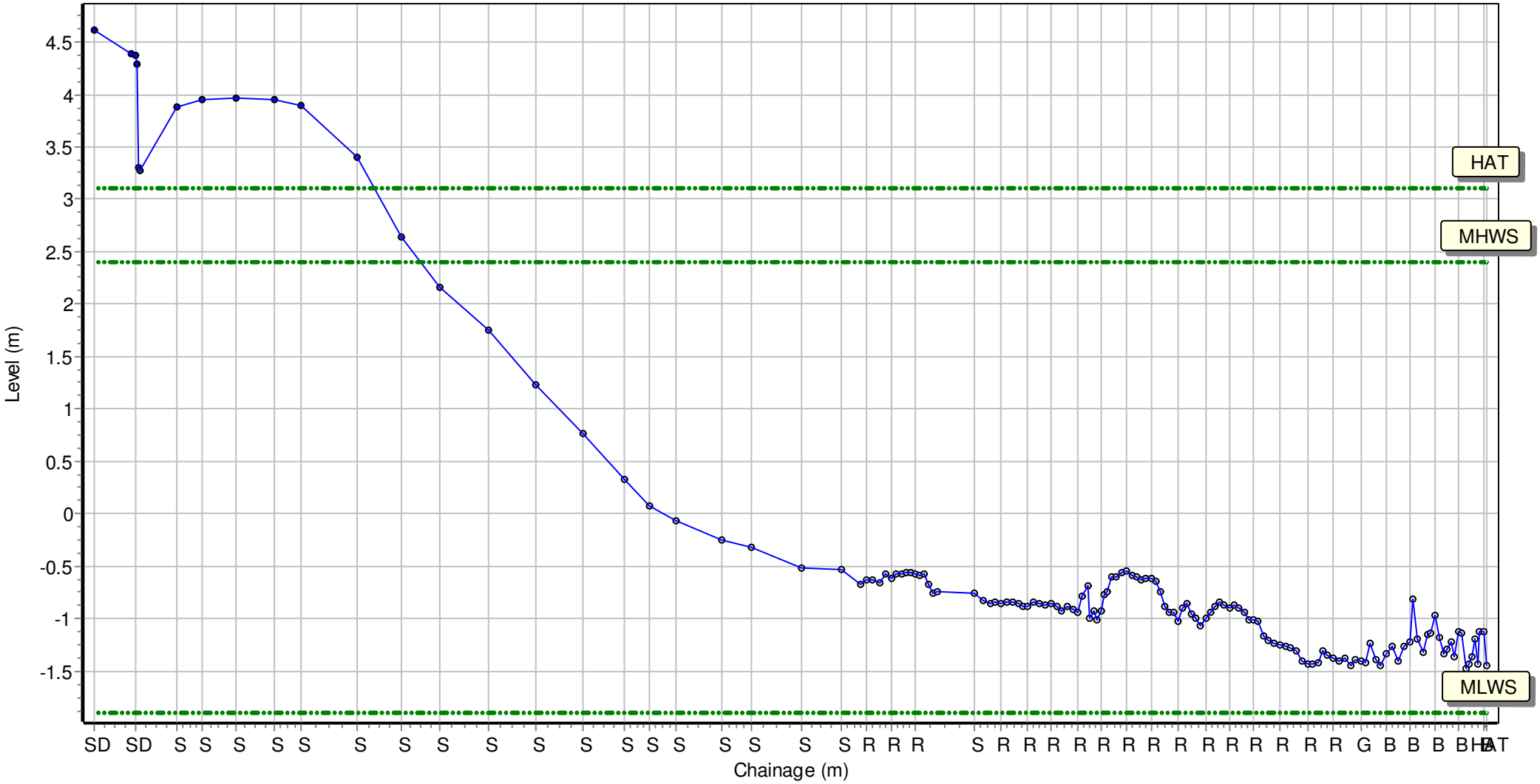
Location: **1aNWB5**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431473.586 **Northing:** 588048.504 **Profile Bearing:** 174 ° from North



Beach Profile

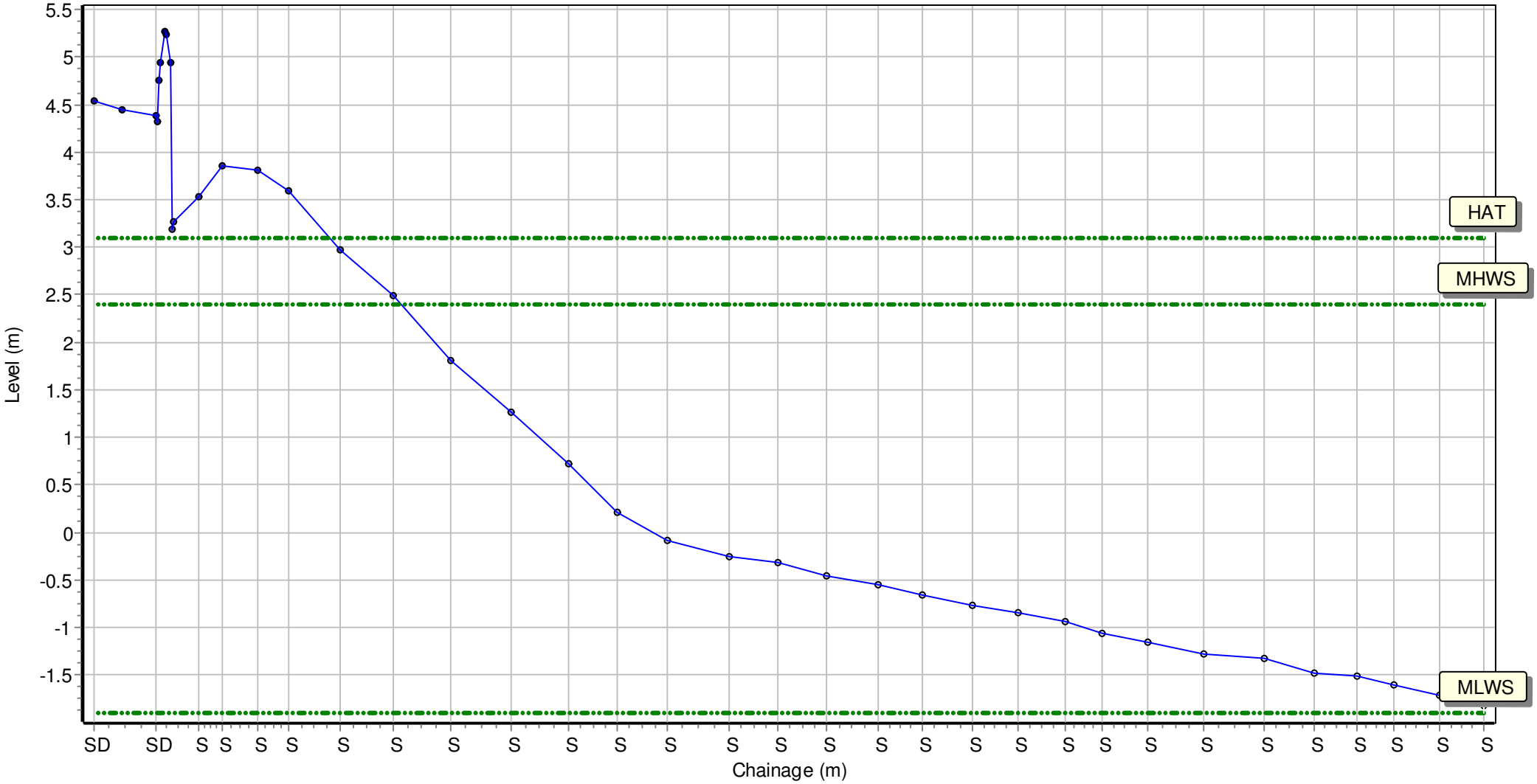
Location: **1aNWB6**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431424.56 **Northing:** 588032.268 **Profile Bearing:** 164 ° from North



Beach Profile

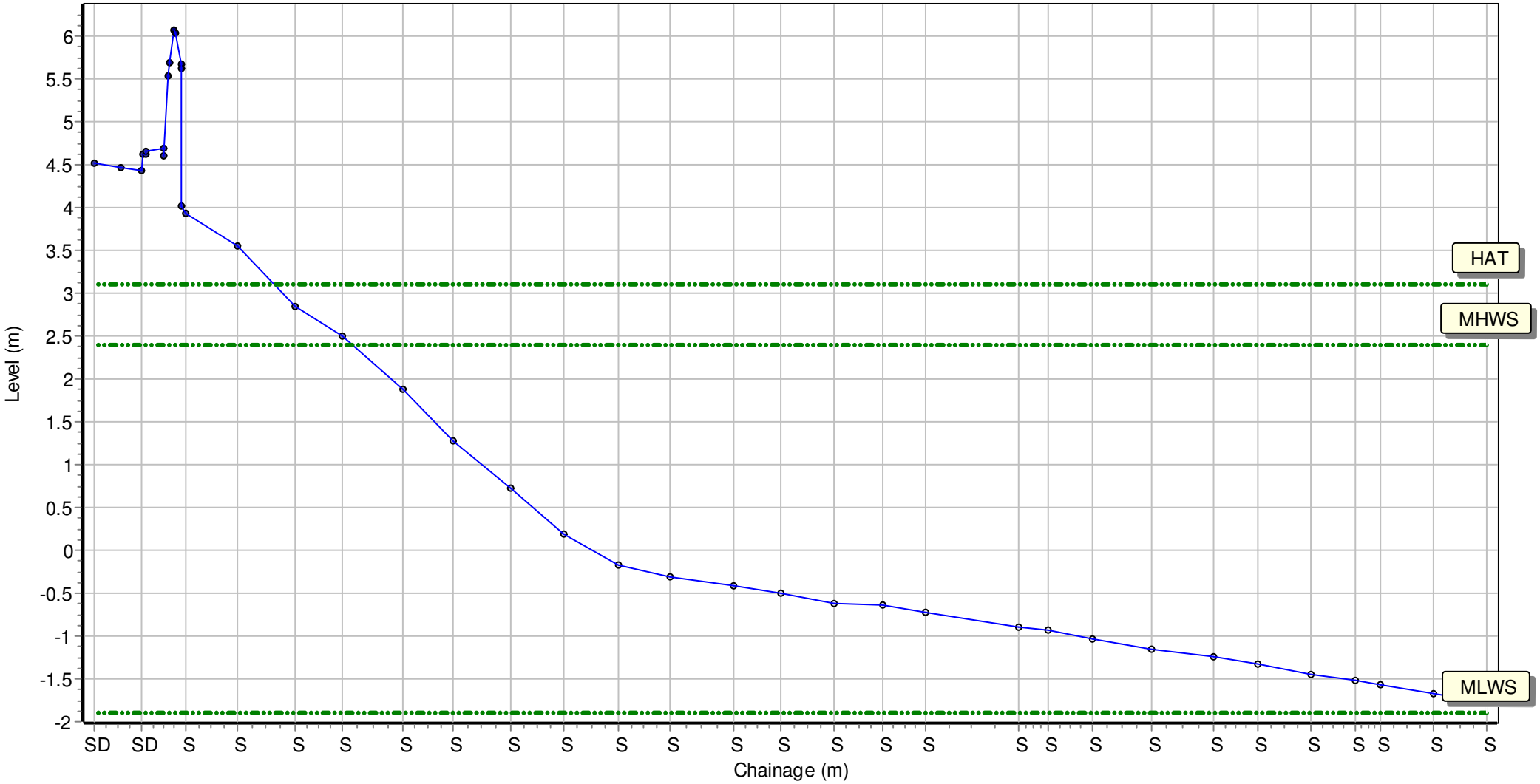
Location: **1aNWB7**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431379.622 **Northing:** 588011.712 **Profile Bearing:** 165 ° from North



Beach Profile

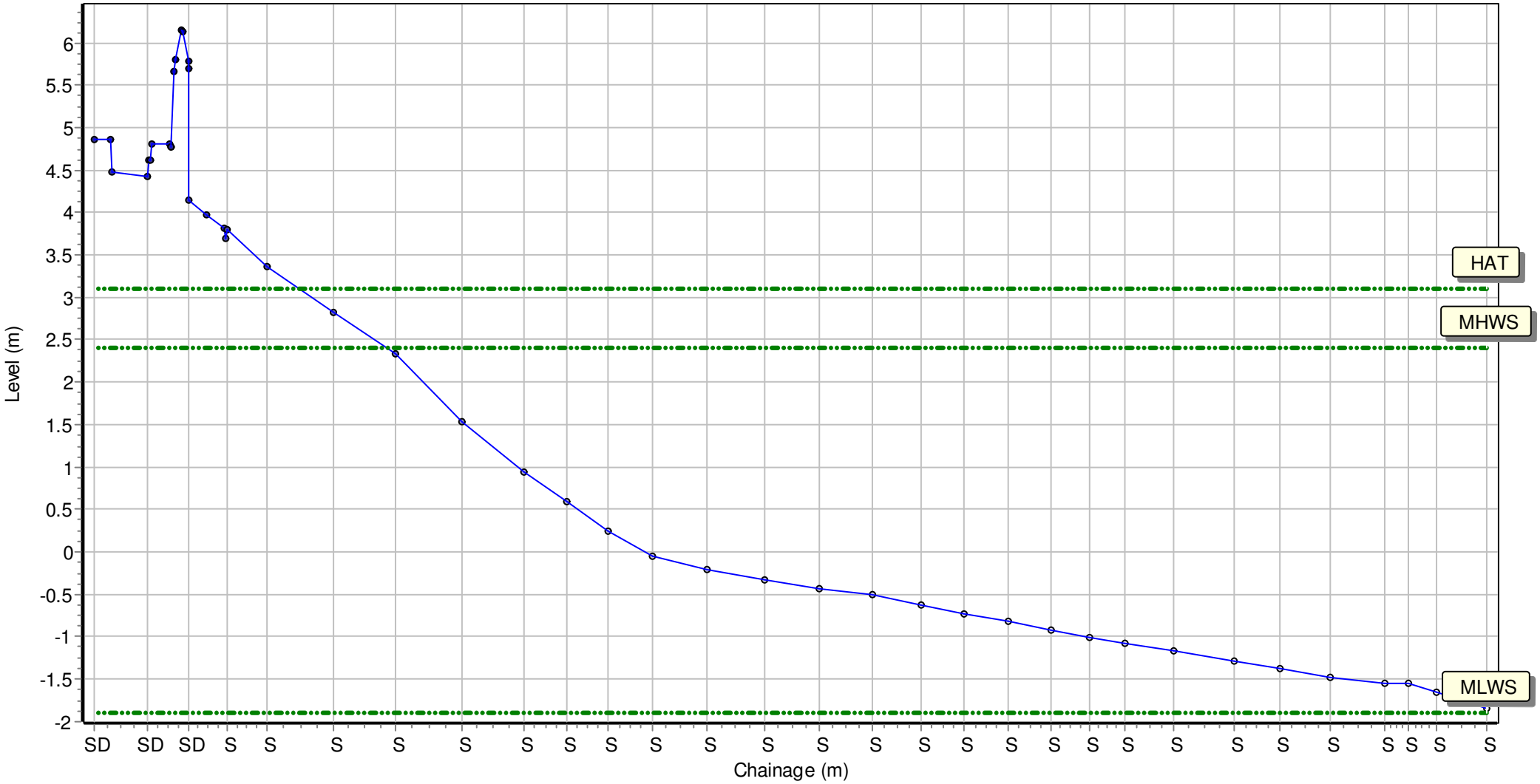
Location: **1aNWB8**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431332.62 **Northing:** 587988.039 **Profile Bearing:** 144 ° from North



Beach Profile

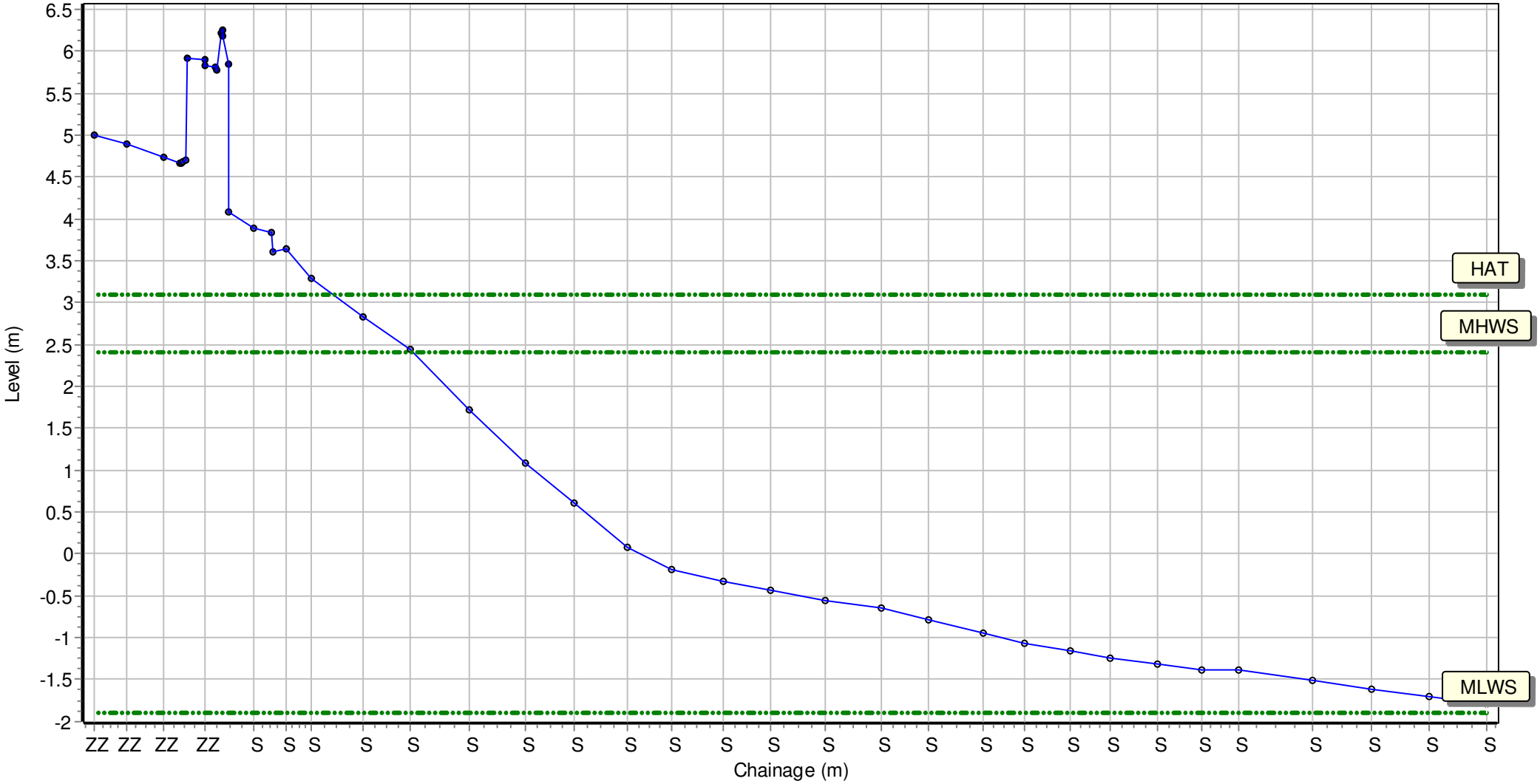
Location: **1aNWB9**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431288.421 **Northing:** 587963.979 **Profile Bearing:** 142 ° from North



Beach Profile

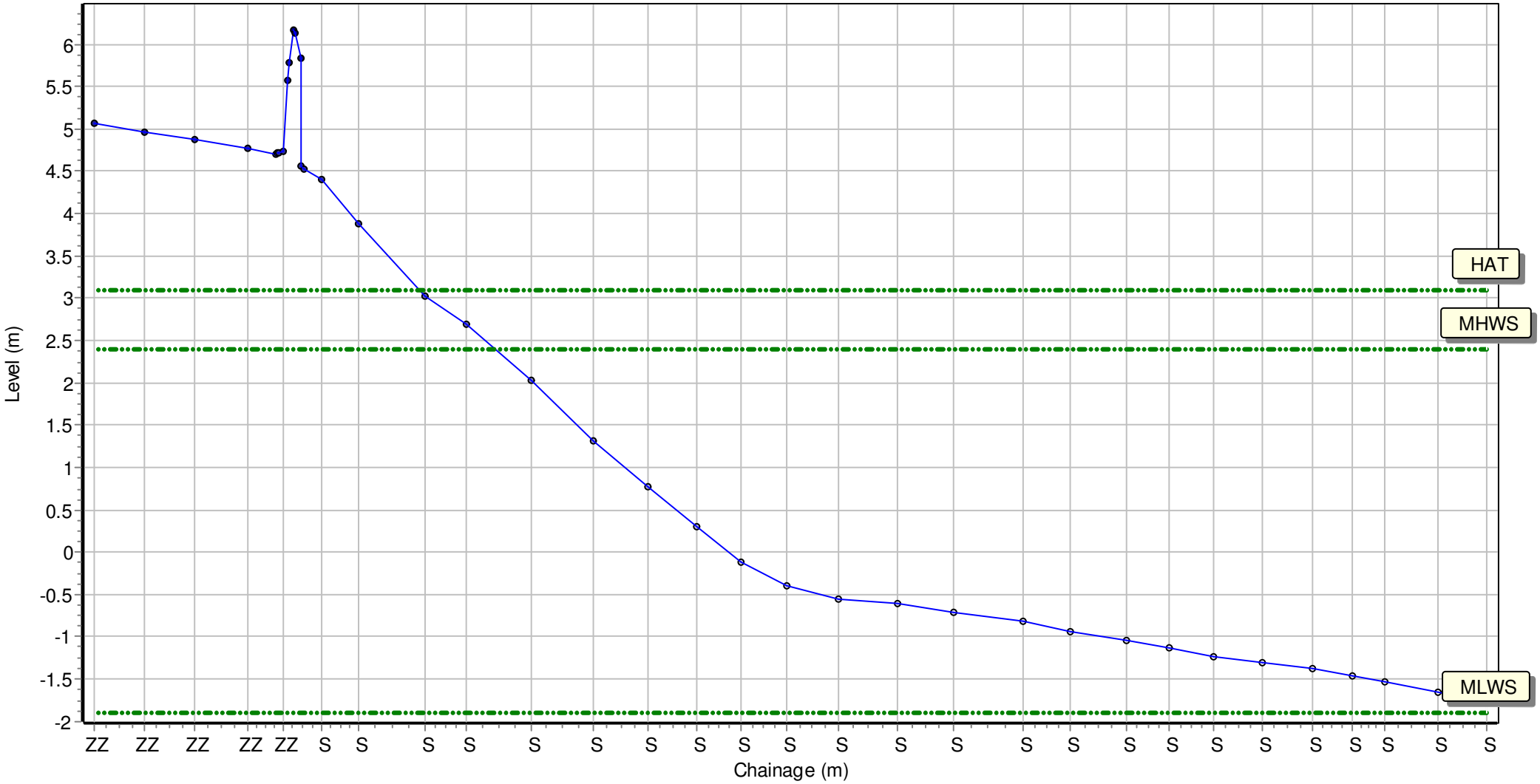
Location: **1aNWB10**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431244.074 **Northing:** 587936.575 **Profile Bearing:** 139 ° from North



Beach Profile

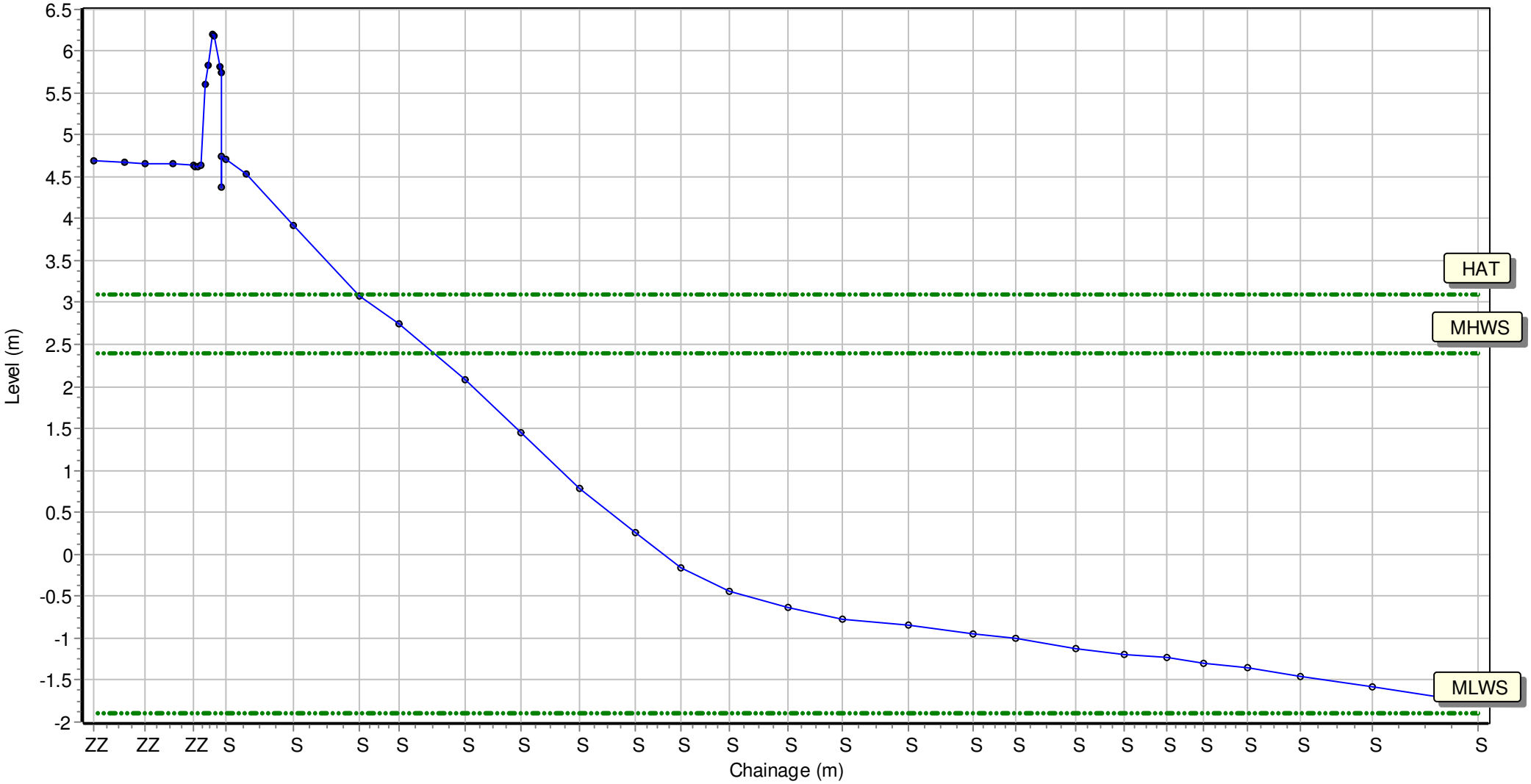
Location: **1aNWB11**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431211.343 **Northing:** 587896.891 **Profile Bearing:** 135 ° from North



Beach Profile

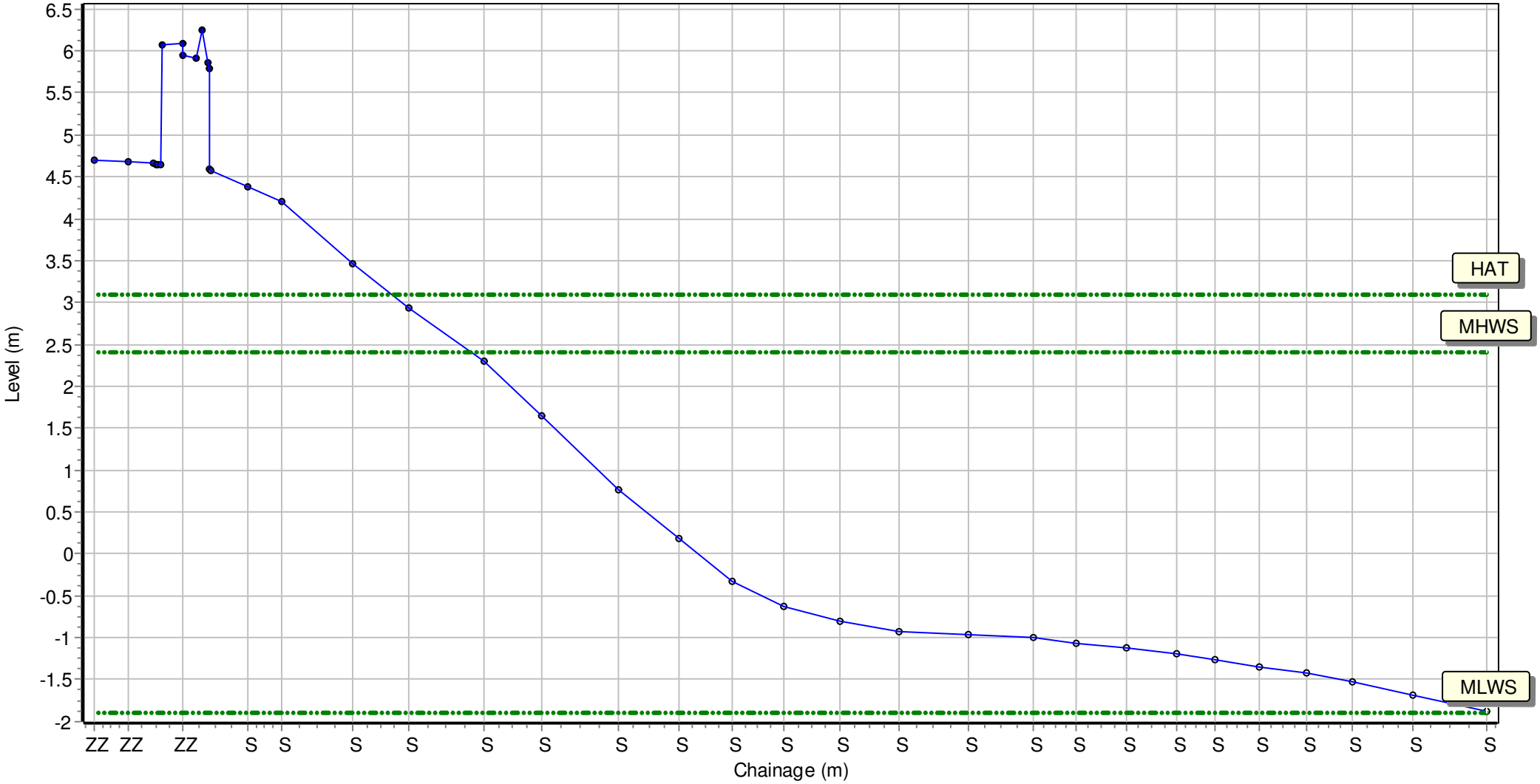
Location: **1aNWB12**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431176.844 **Northing:** 587860.651 **Profile Bearing:** 132 ° from North



Beach Profile

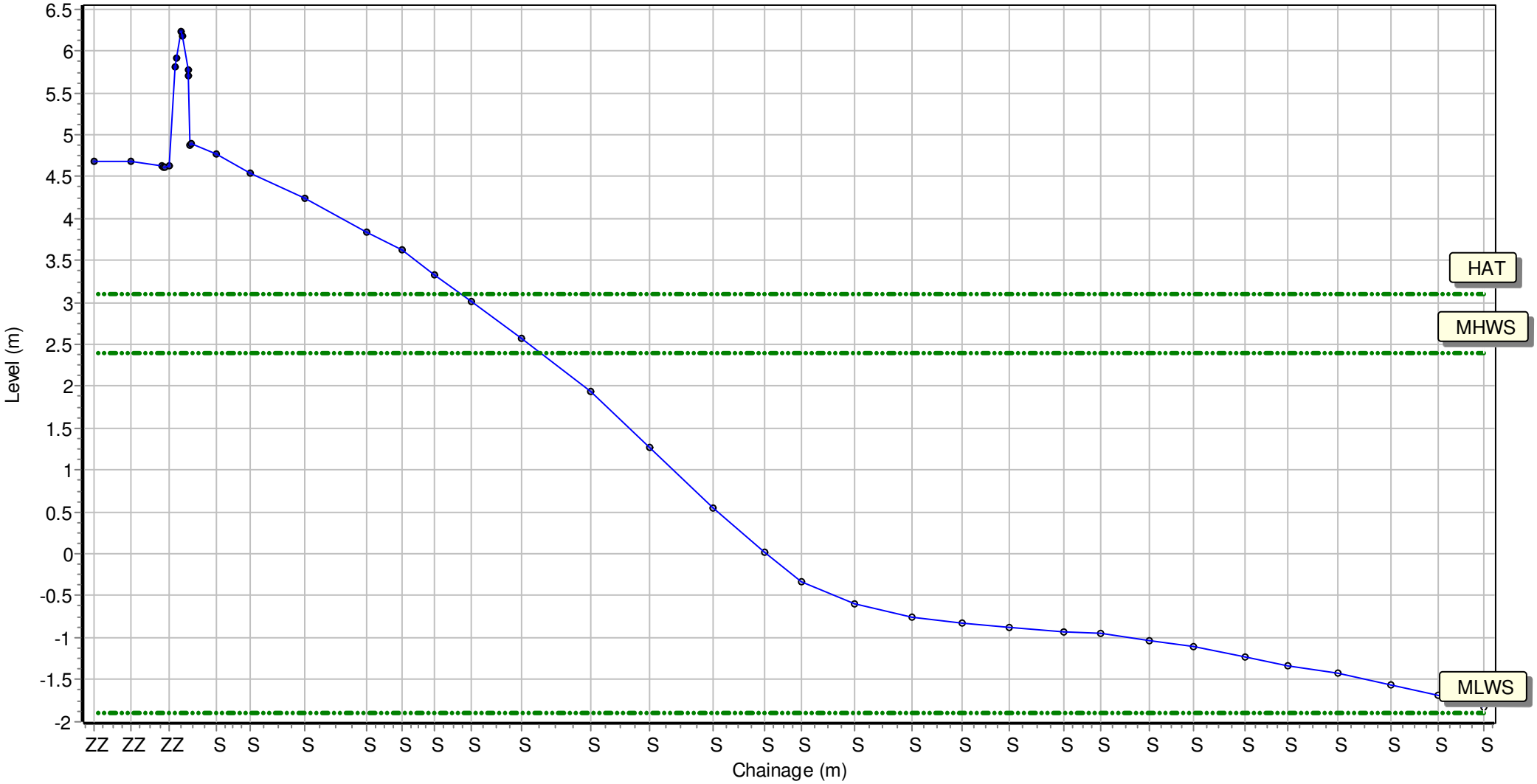
Location: **1aNWB13**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431143.784 **Northing:** 587821.594 **Profile Bearing:** 129 ° from North



Beach Profile

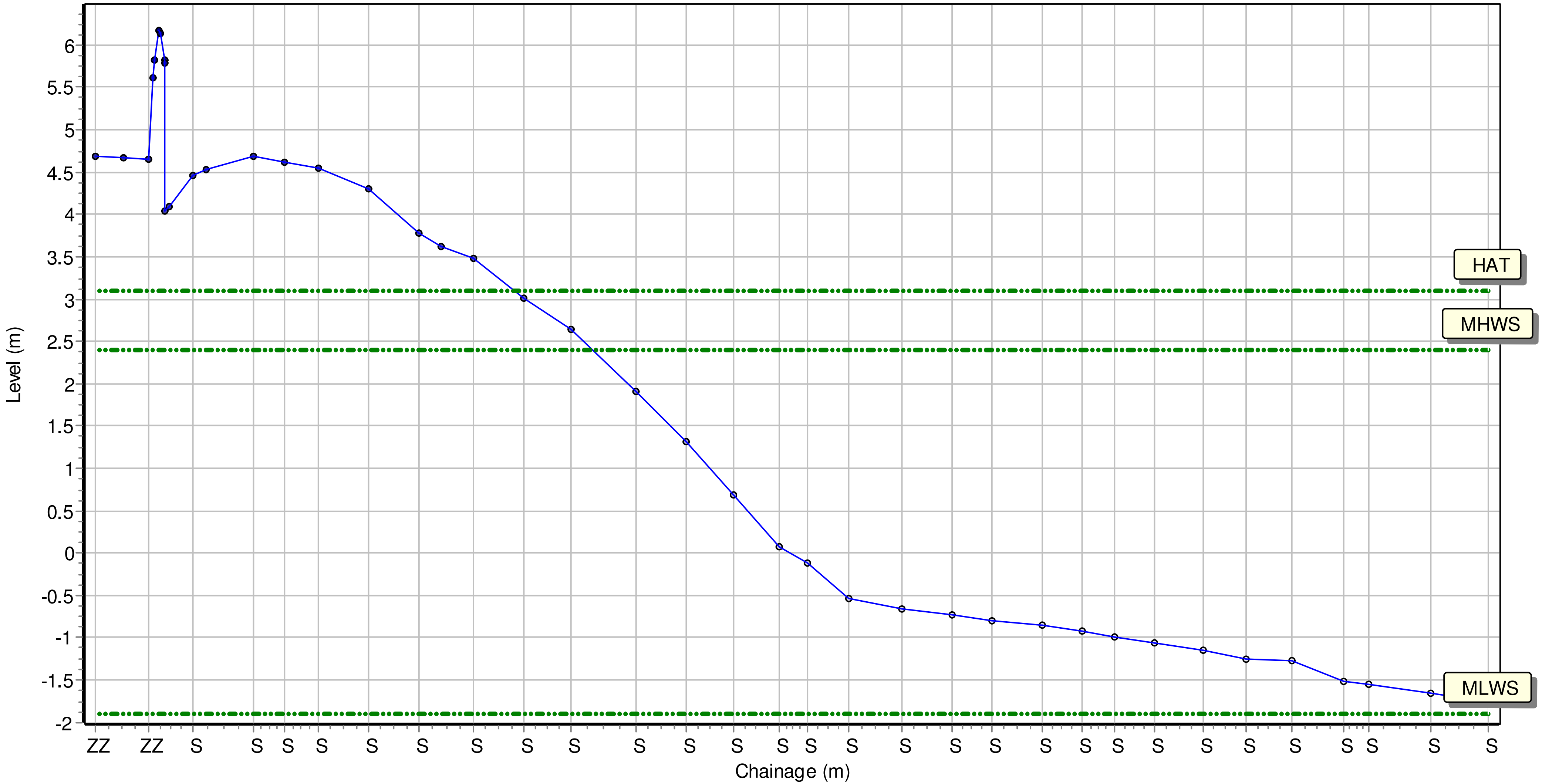
Location: 1aNWB14

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431113.86 **Northing:** 587780.727 **Profile Bearing:** 115 ° from North



Beach Profile

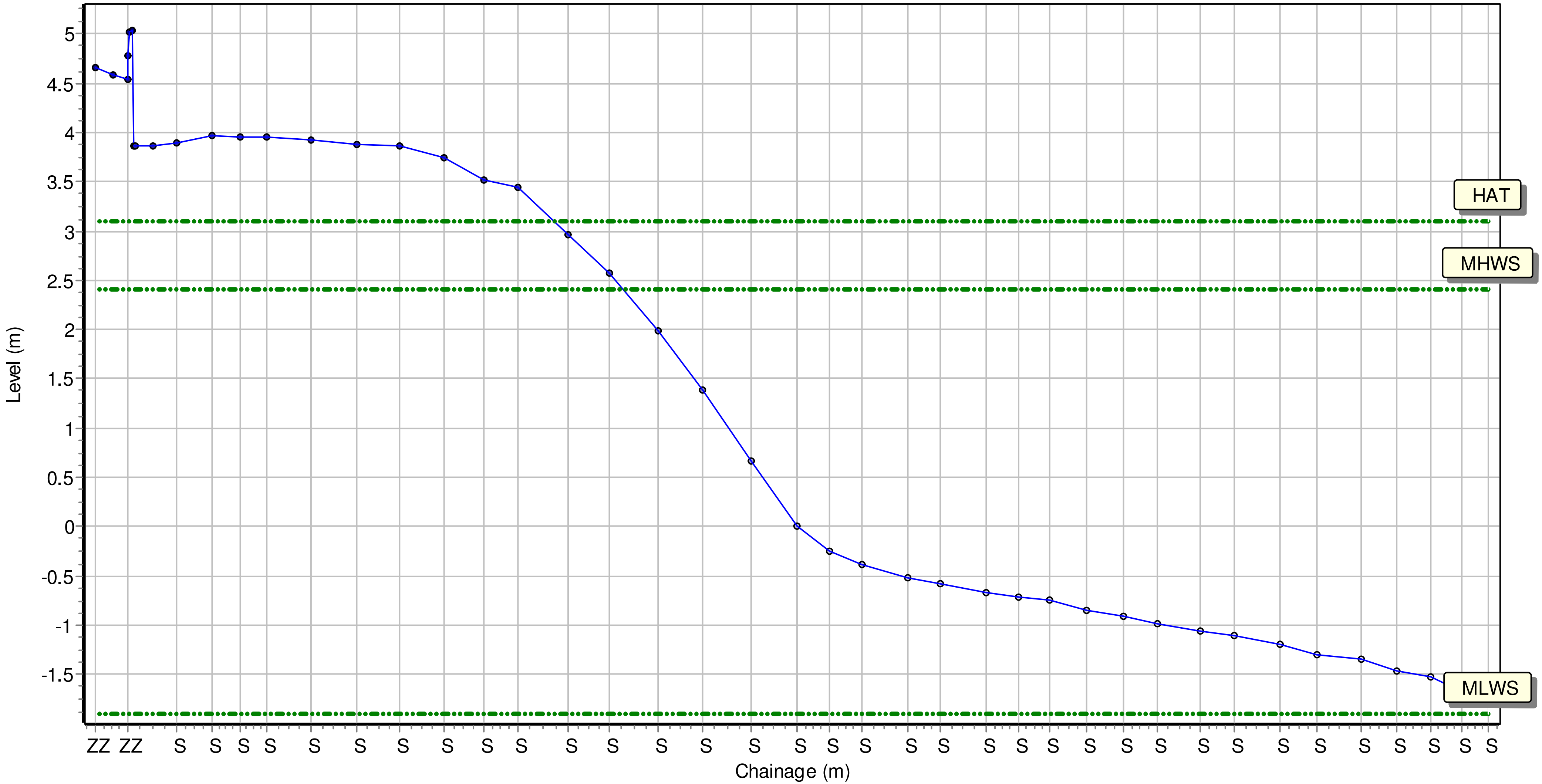
Location: 1aNWB15

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431088.458 **Northing:** 587739.577 **Profile Bearing:** 125 ° from North



http://www.sandsuser.com

SANDS

Beach Profile

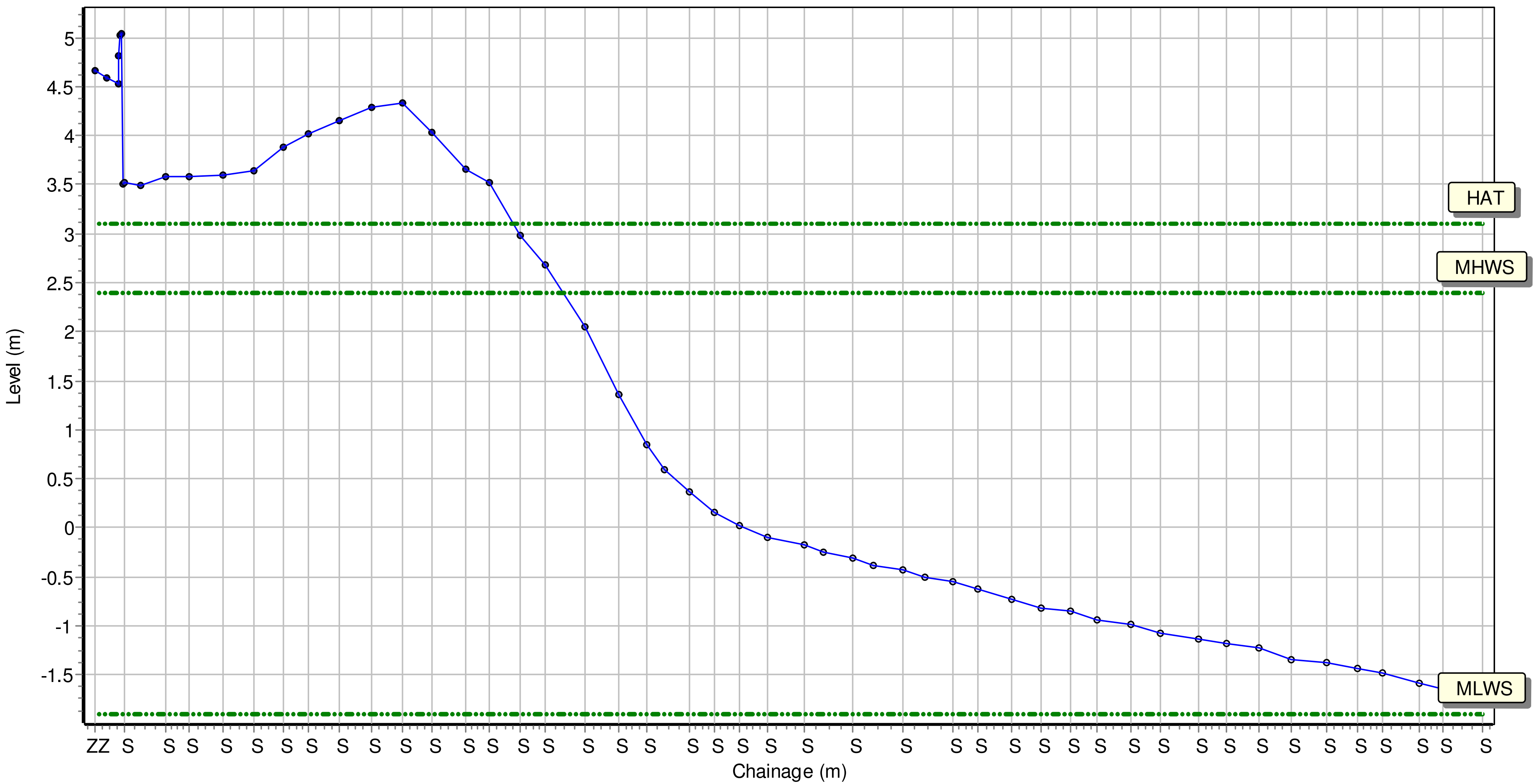
Location: **1aNWB16**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431063.789 **Northing:** 587695.893 **Profile Bearing:** 119 ° from North



http://www.sandsuser.com

SANDS

Beach Profile

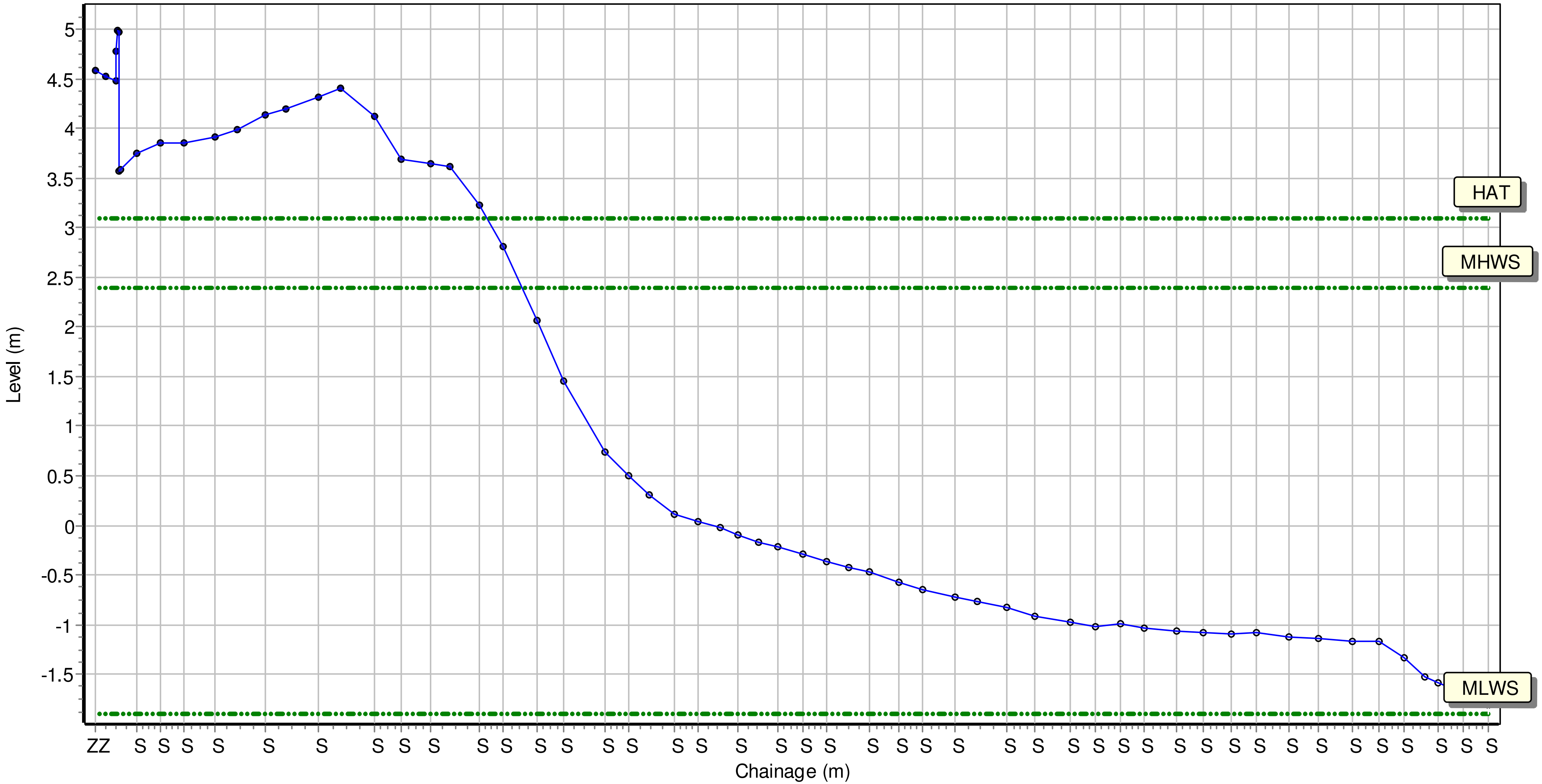
Location: 1aNWB17

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431042.191 **Northing:** 587650.627 **Profile Bearing:** 116 ° from North



Beach Profile

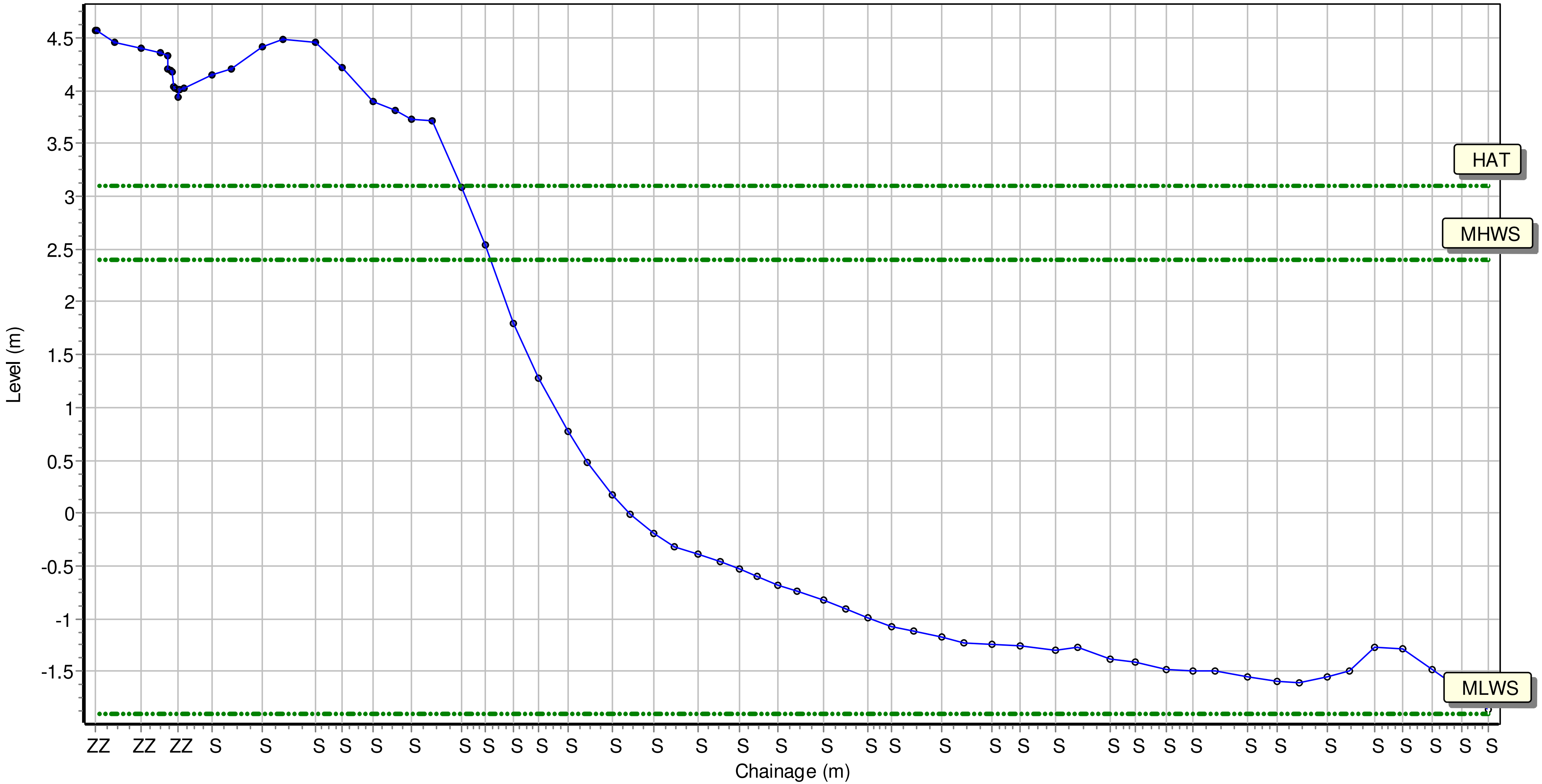
Location: 1aNWB18

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431024.999 **Northing:** 587608.929 **Profile Bearing:** 113 ° from North



http://www.sandsuser.com

SANDS

Beach Profile

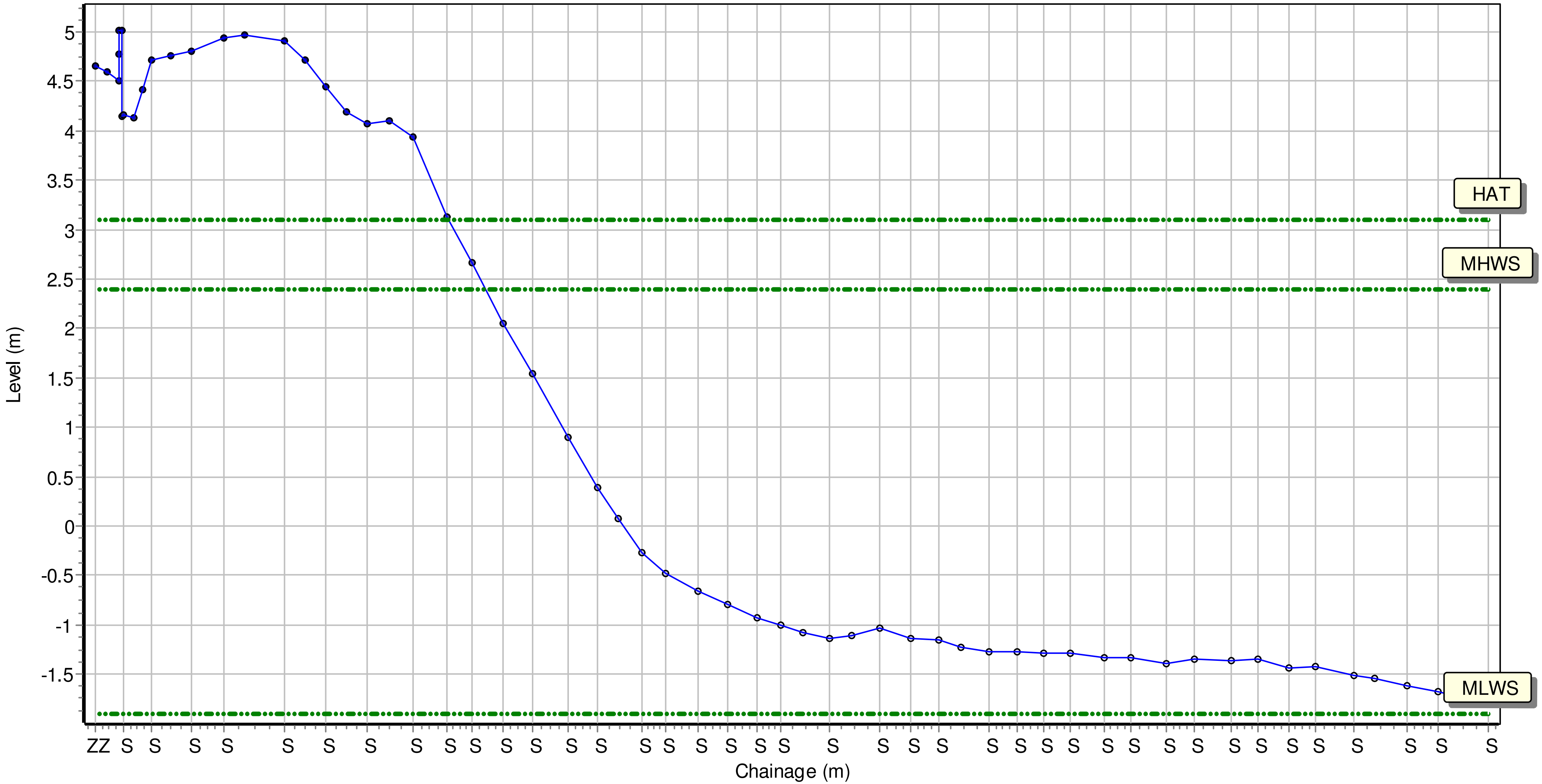
Location: 1aNWB19

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431007.485 **Northing:** 587556.656 **Profile Bearing:** 109 ° from North



http://www.sandsuser.com

SANDS

Beach Profile

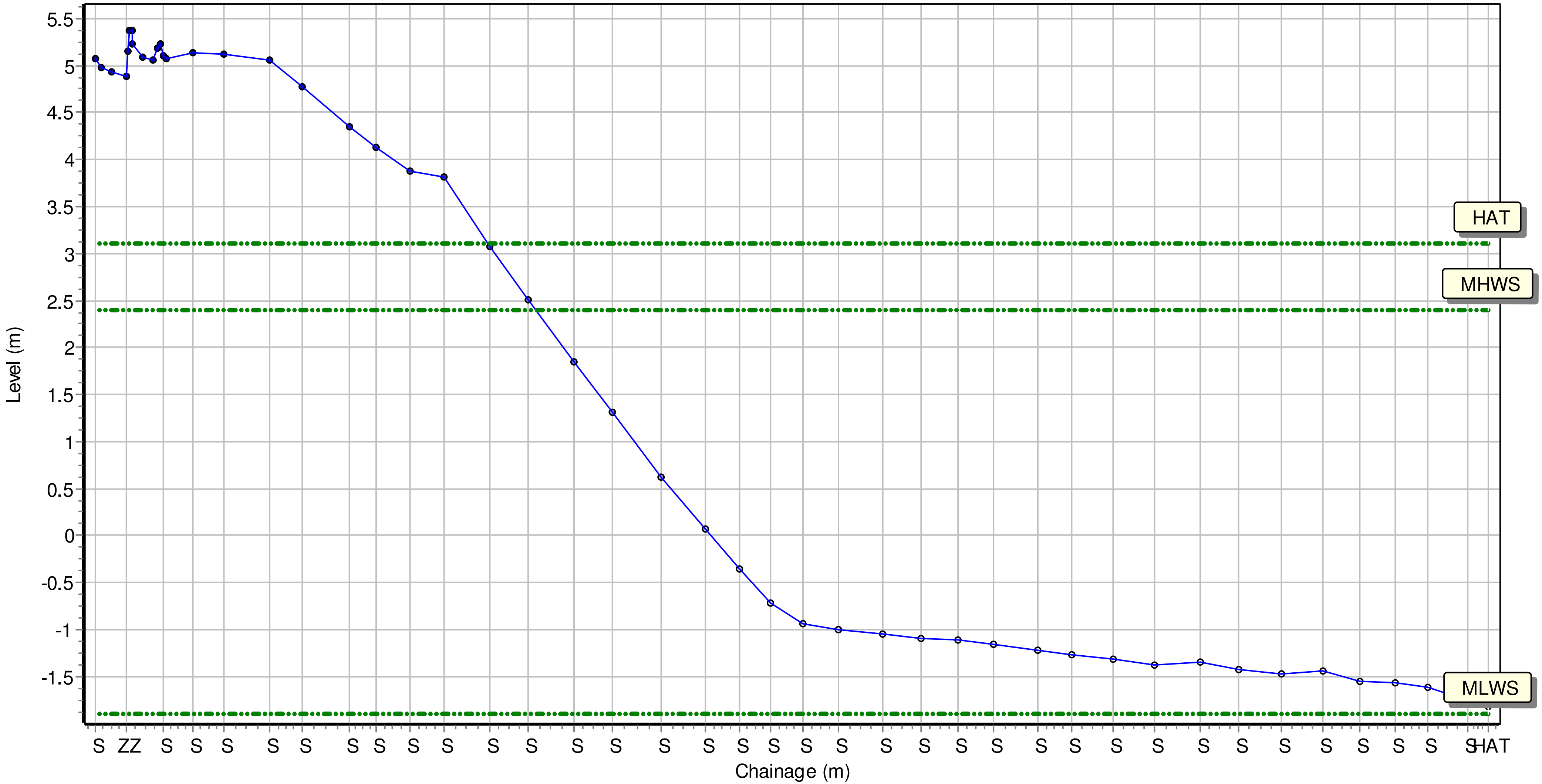
Location: **1aNWB20**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430992.437 **Northing:** 587508.87 **Profile Bearing:** 102 ° from North



http://www.sandsuser.com

SANDS

Beach Profile

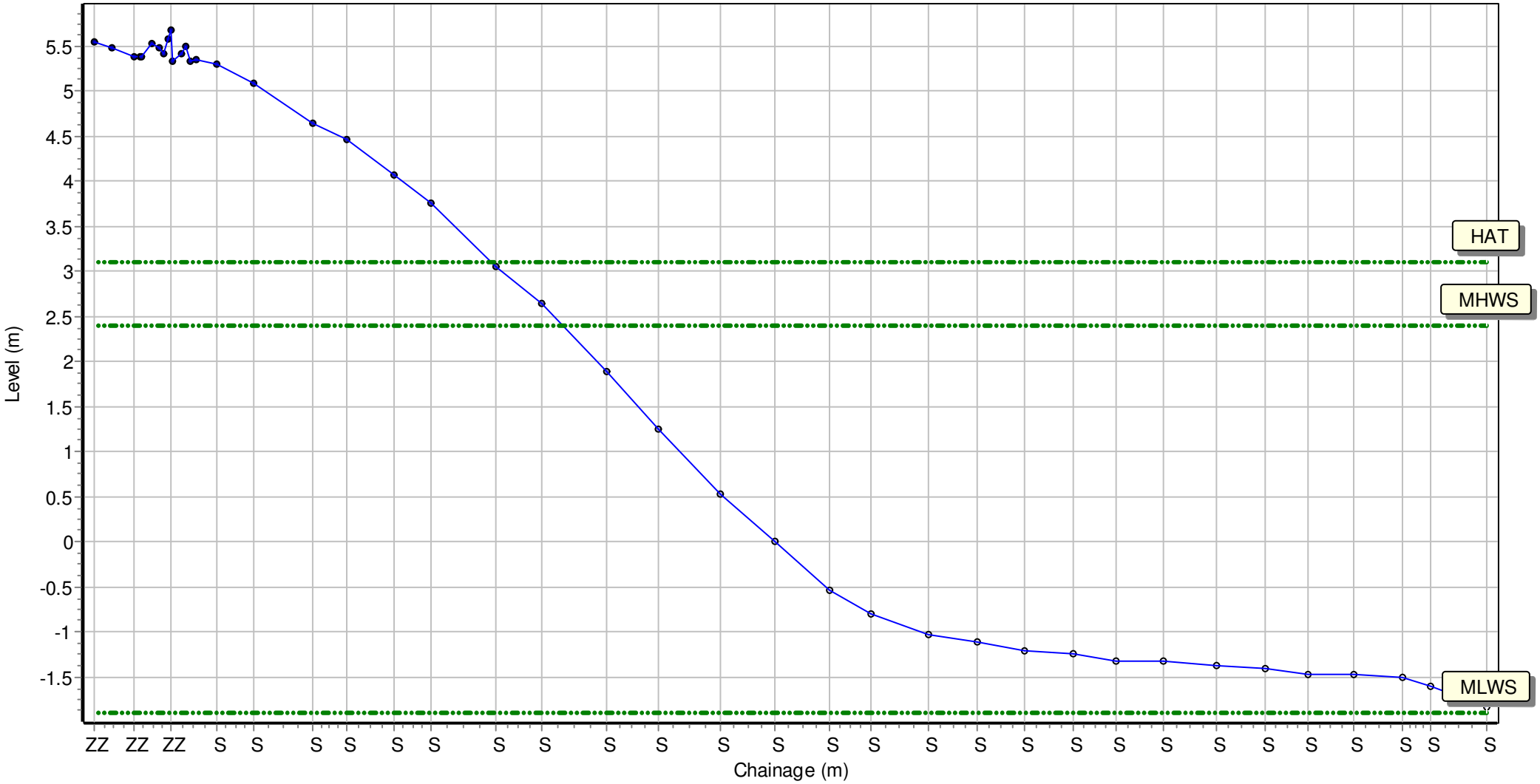
Location: **1aNWB21**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430978.85 **Northing:** 587460.577 **Profile Bearing:** 102 ° from North



Beach Profile

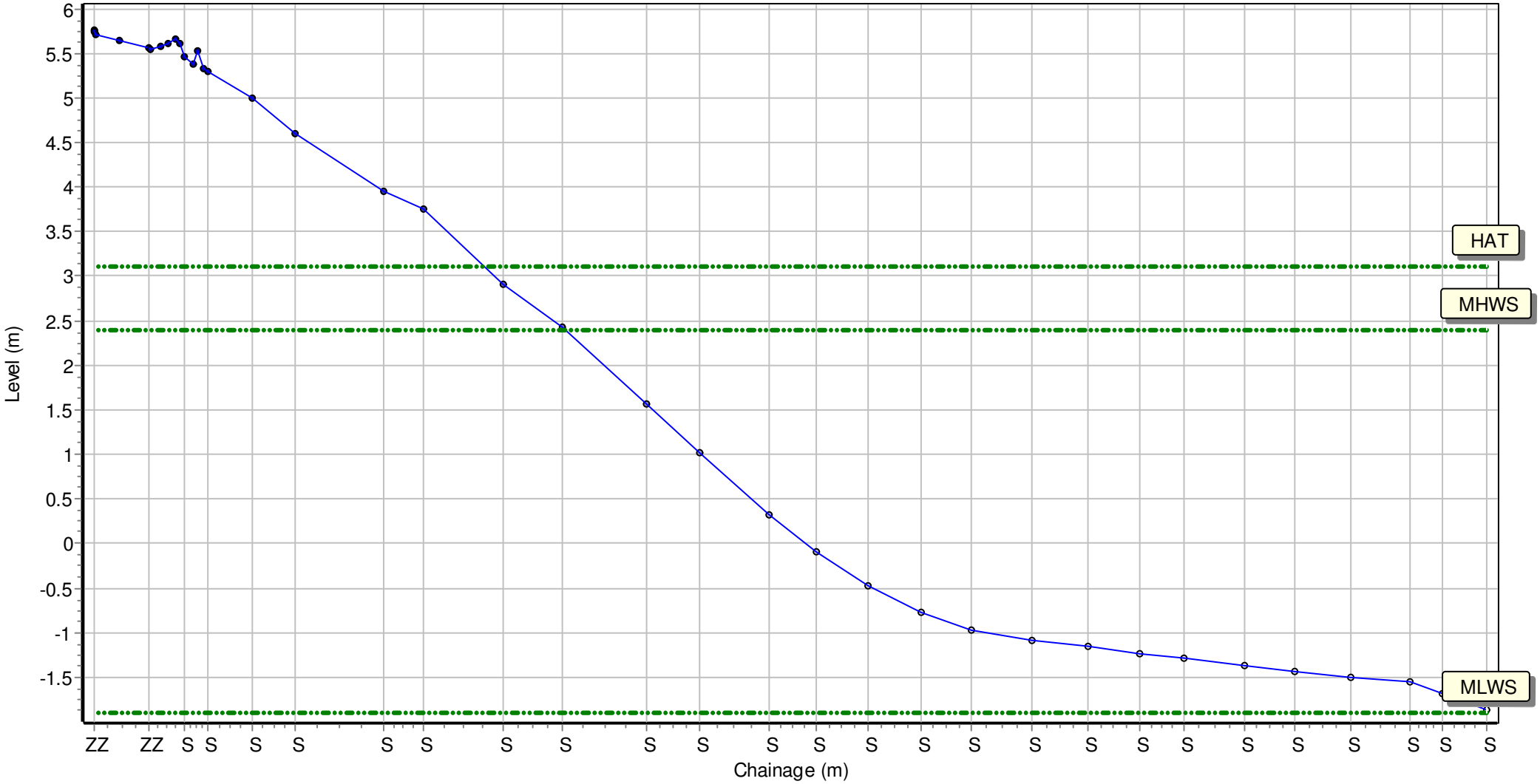
Location: **1aNWB22**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430967.686 **Northing:** 587411.684 **Profile Bearing:** 99 ° from North



Beach Profile

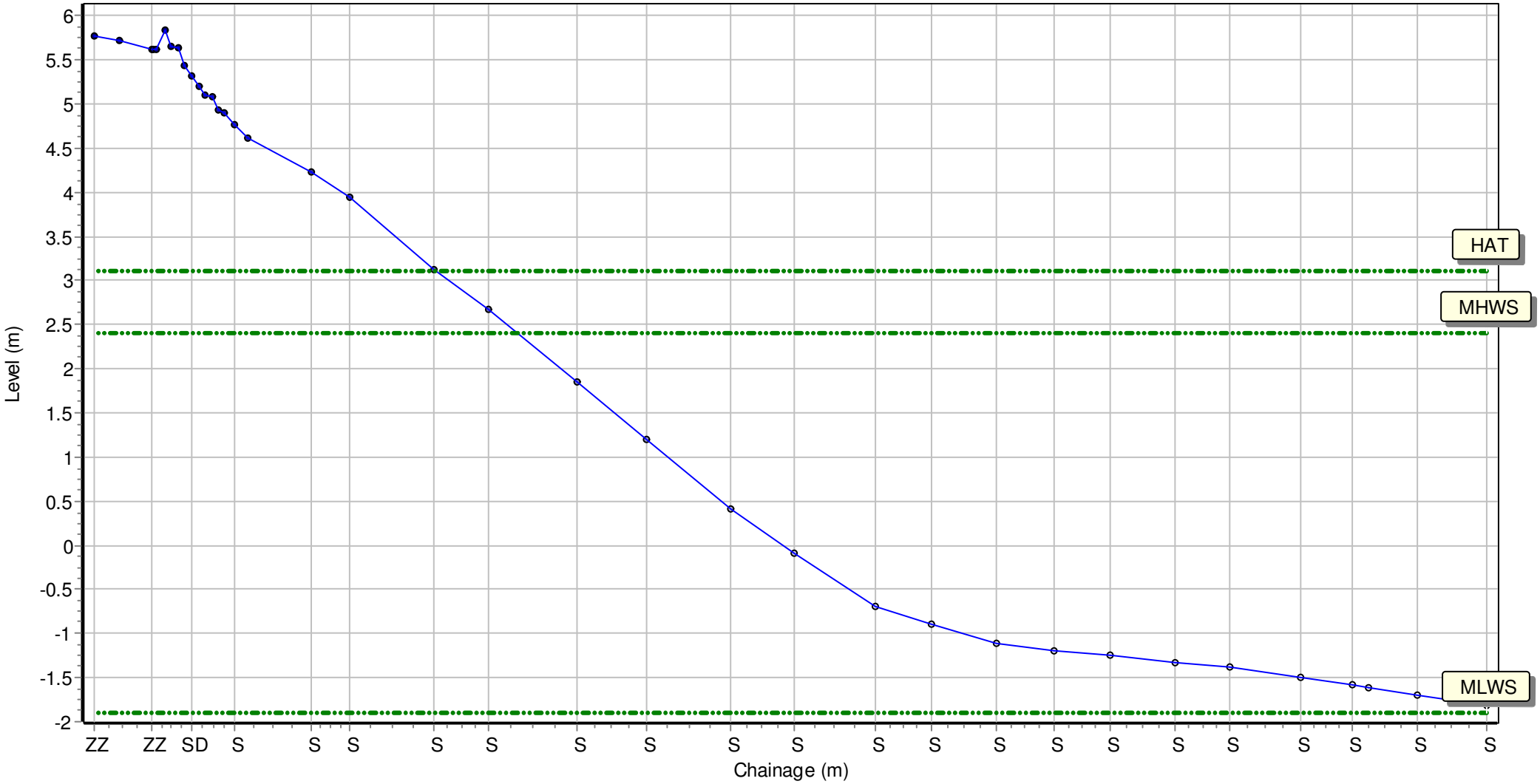
Location: **1aNWB23**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430959.877 **Northing:** 587362.168 **Profile Bearing:** 96 ° from North



Beach Profile

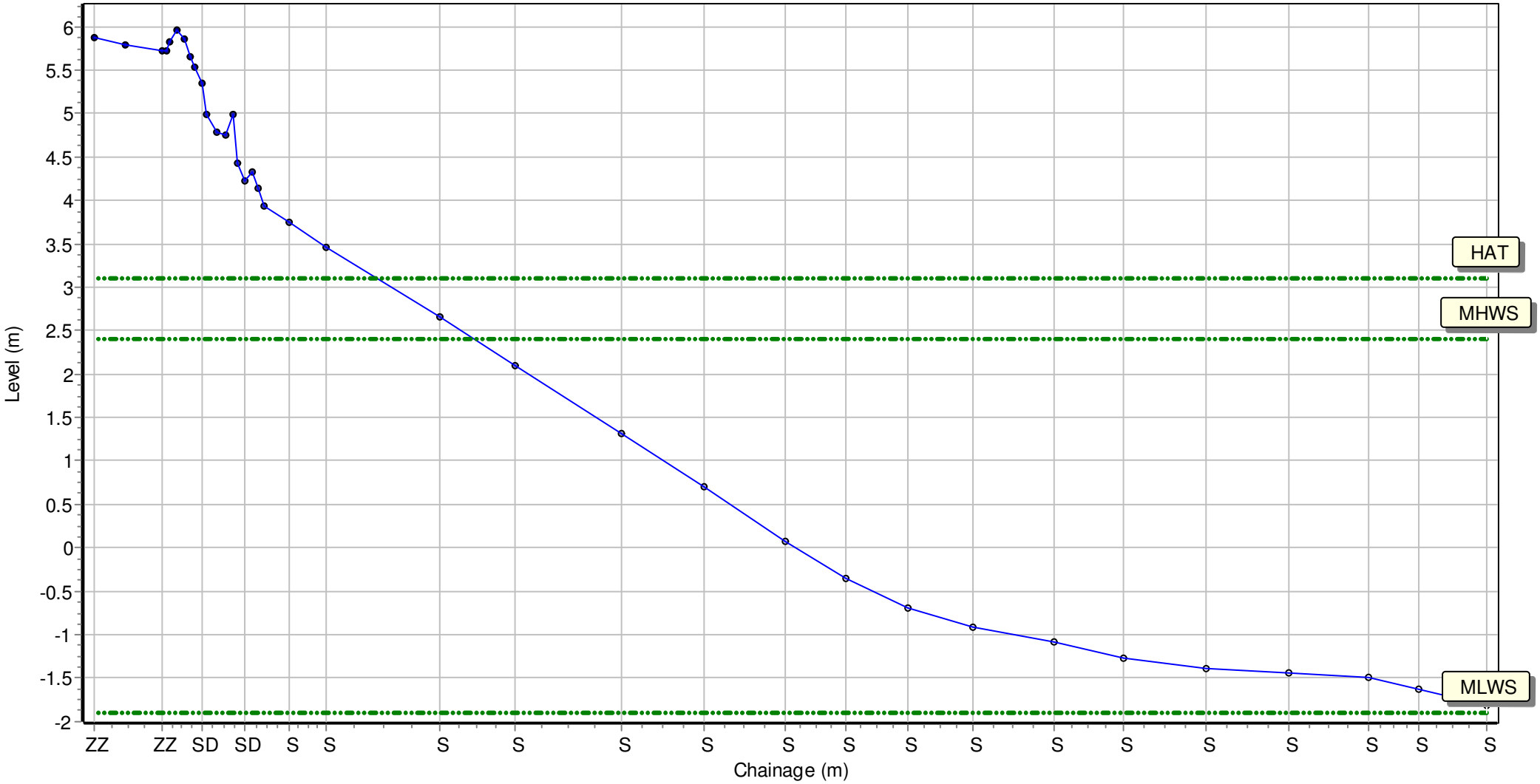
Location: **1aNWB24**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430956.511 **Northing:** 587312.153 **Profile Bearing:** 92 ° from North



Beach Profile

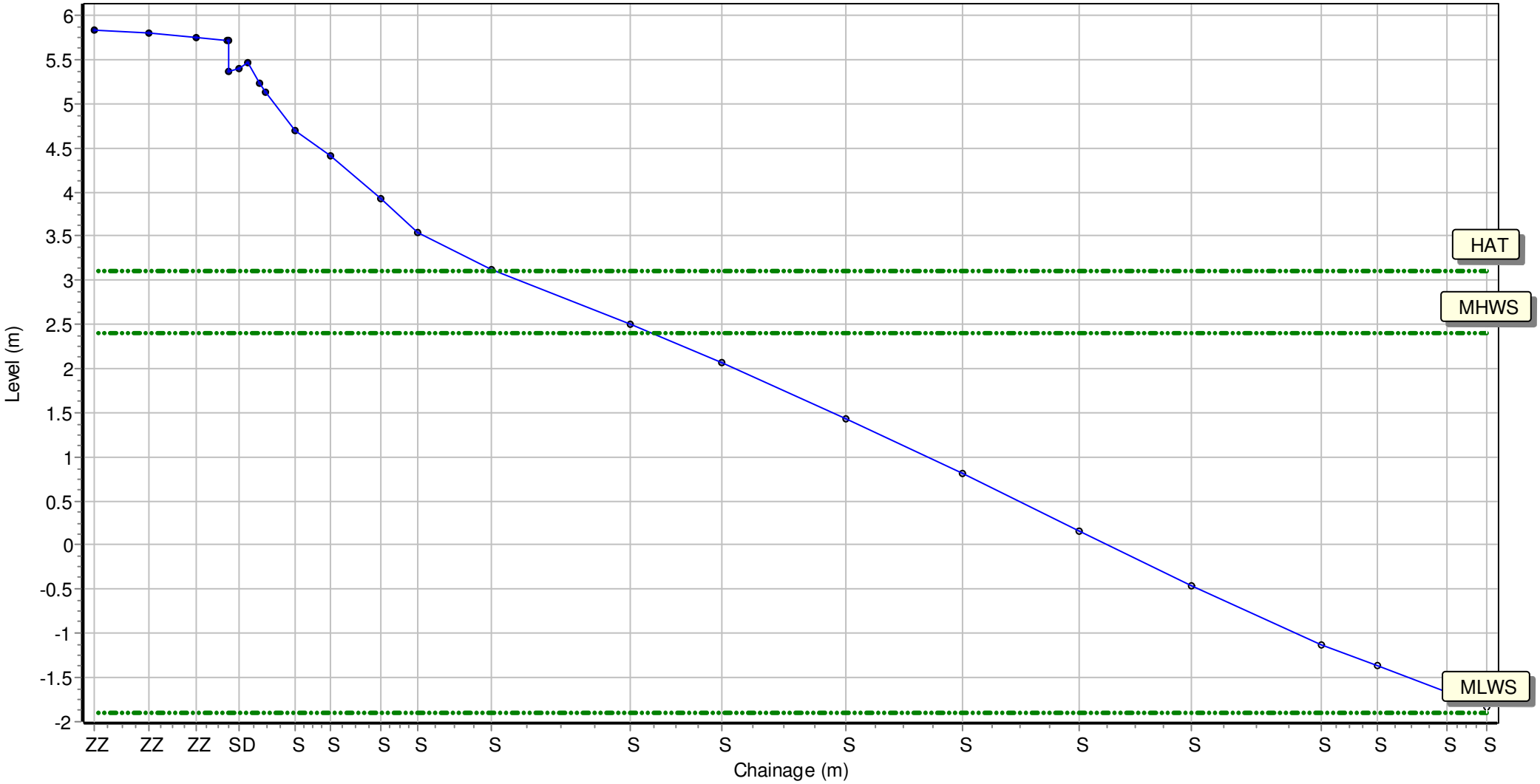
Location: **1aNWB25**

Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430953.984 **Northing:** 587261.982 **Profile Bearing:** 89 ° from North



Beach Profile

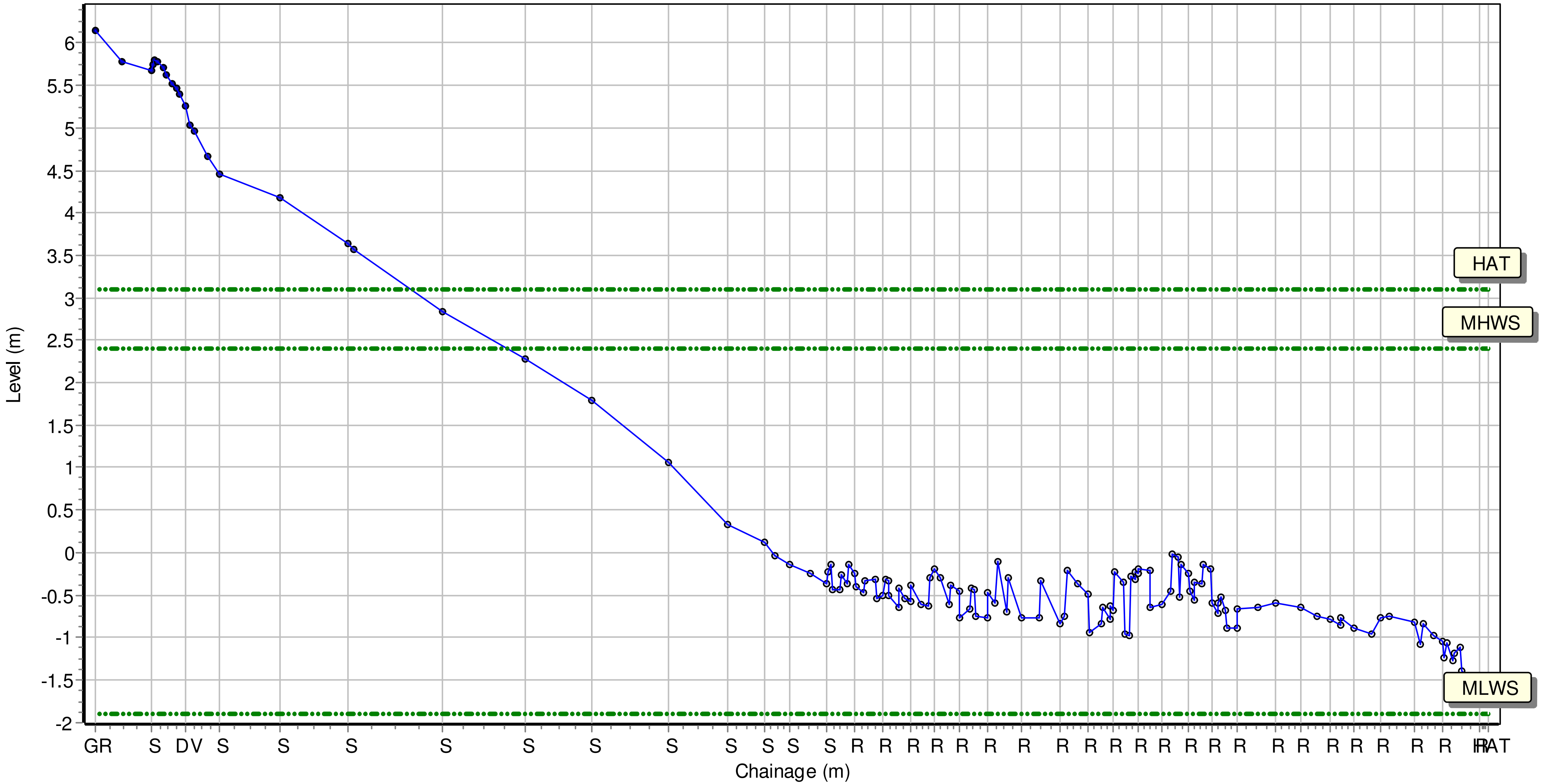
Location: **1aNWB26**

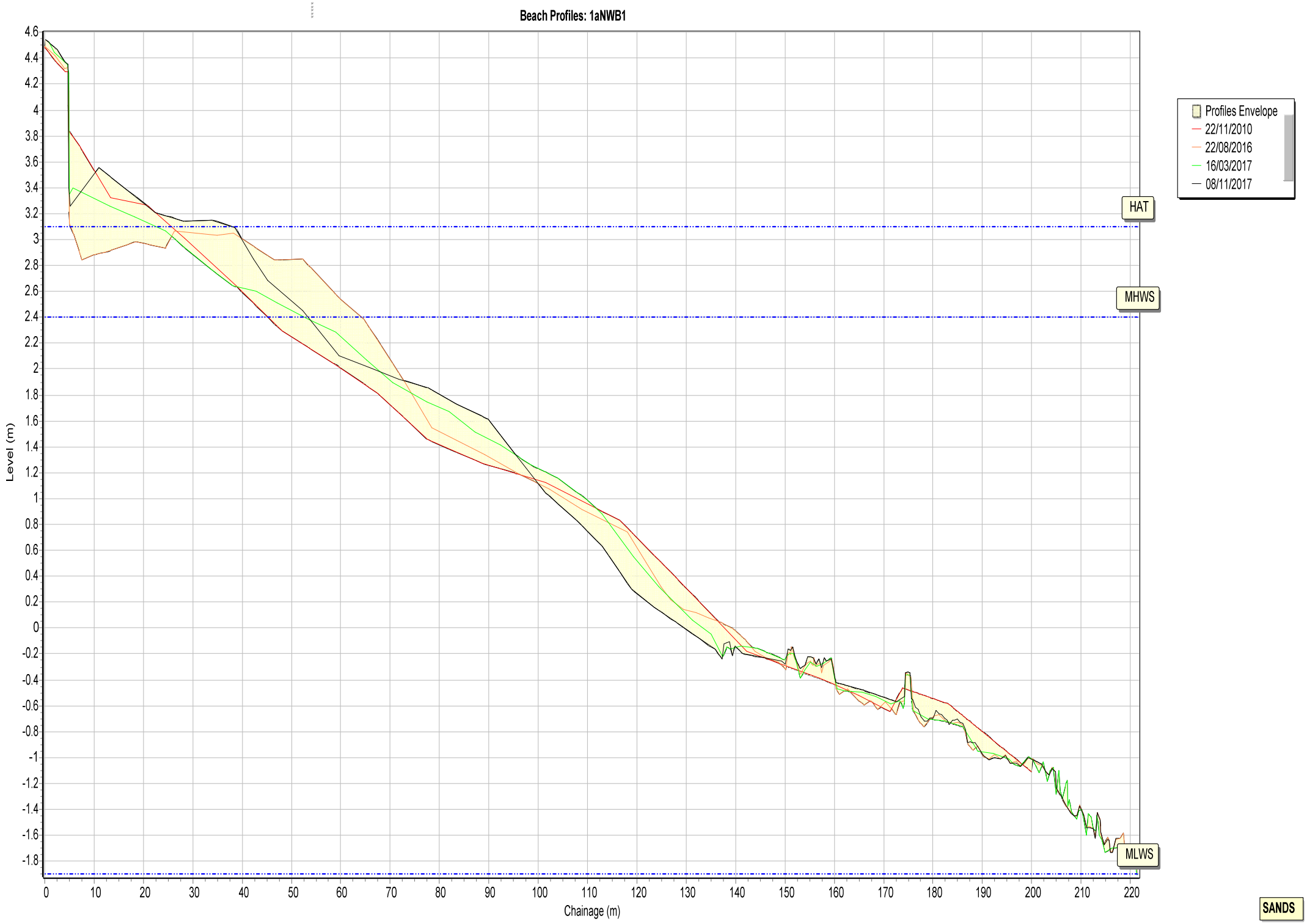
Date: 08/11/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

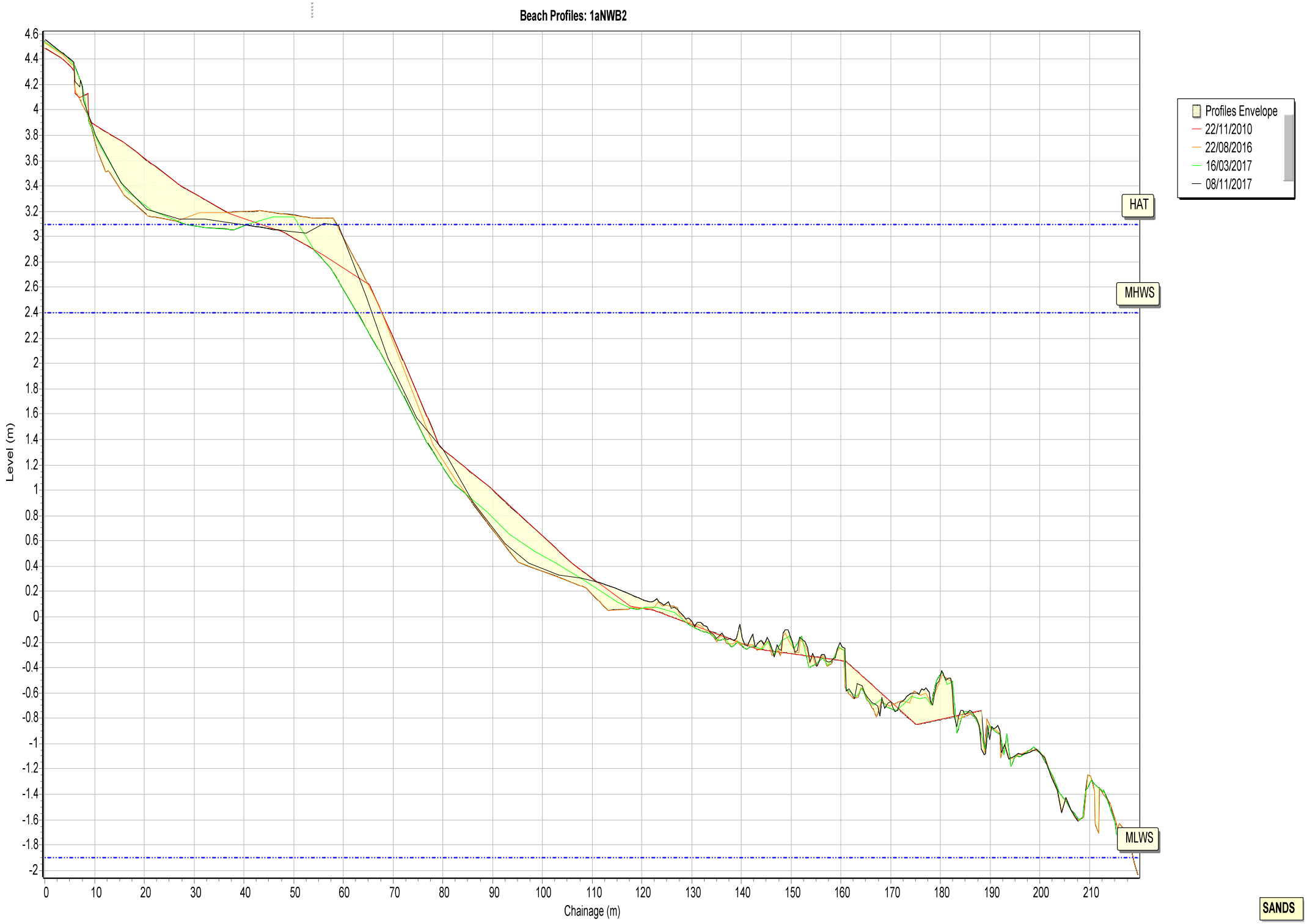
Wind **Sea State:** **Visibility:** **Rain:**

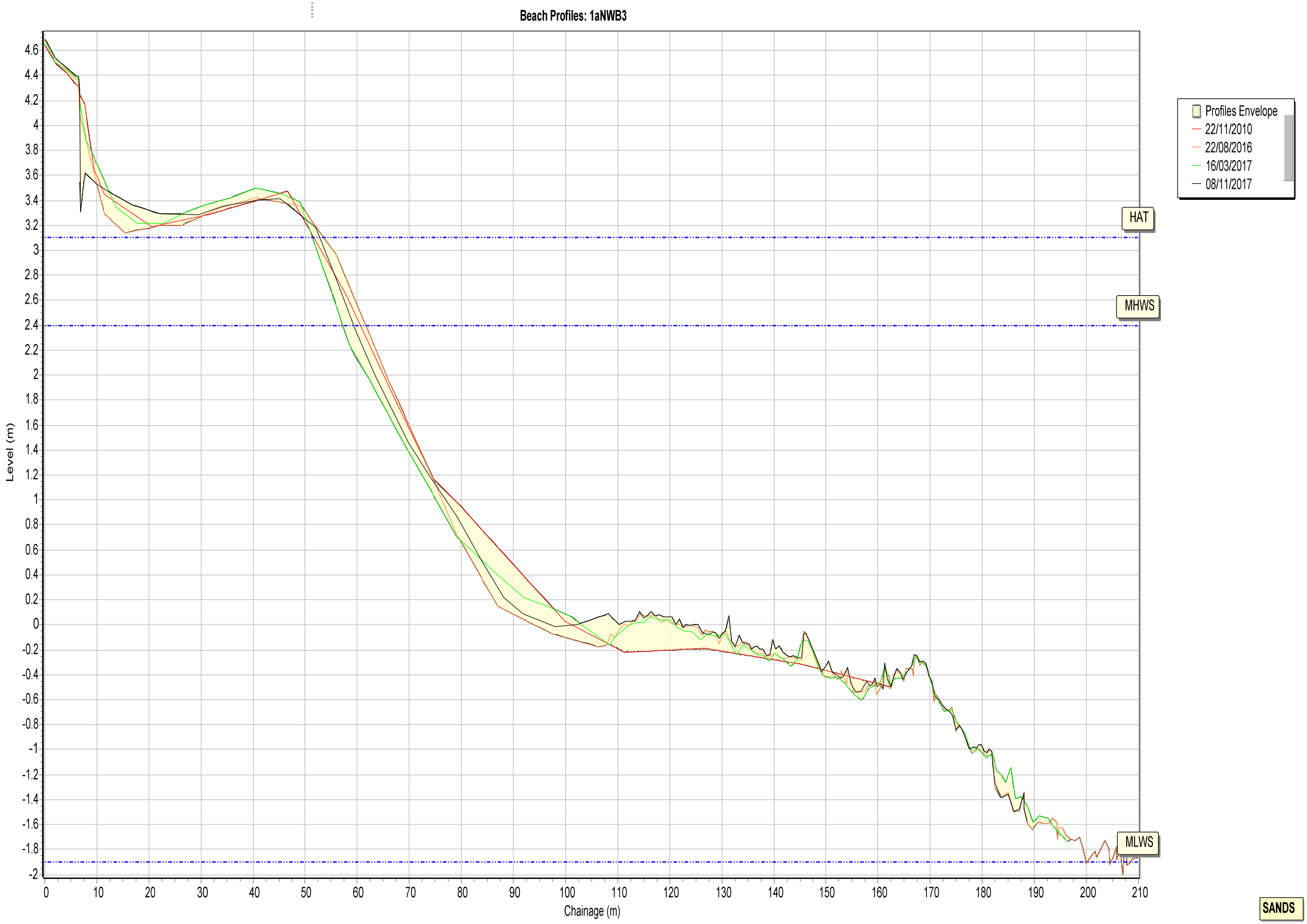
Summary: 2017 Full Measures Topo Survey

Easting: 430960.828 **Northing:** 587212.152 **Profile Bearing:** 86 ° from North

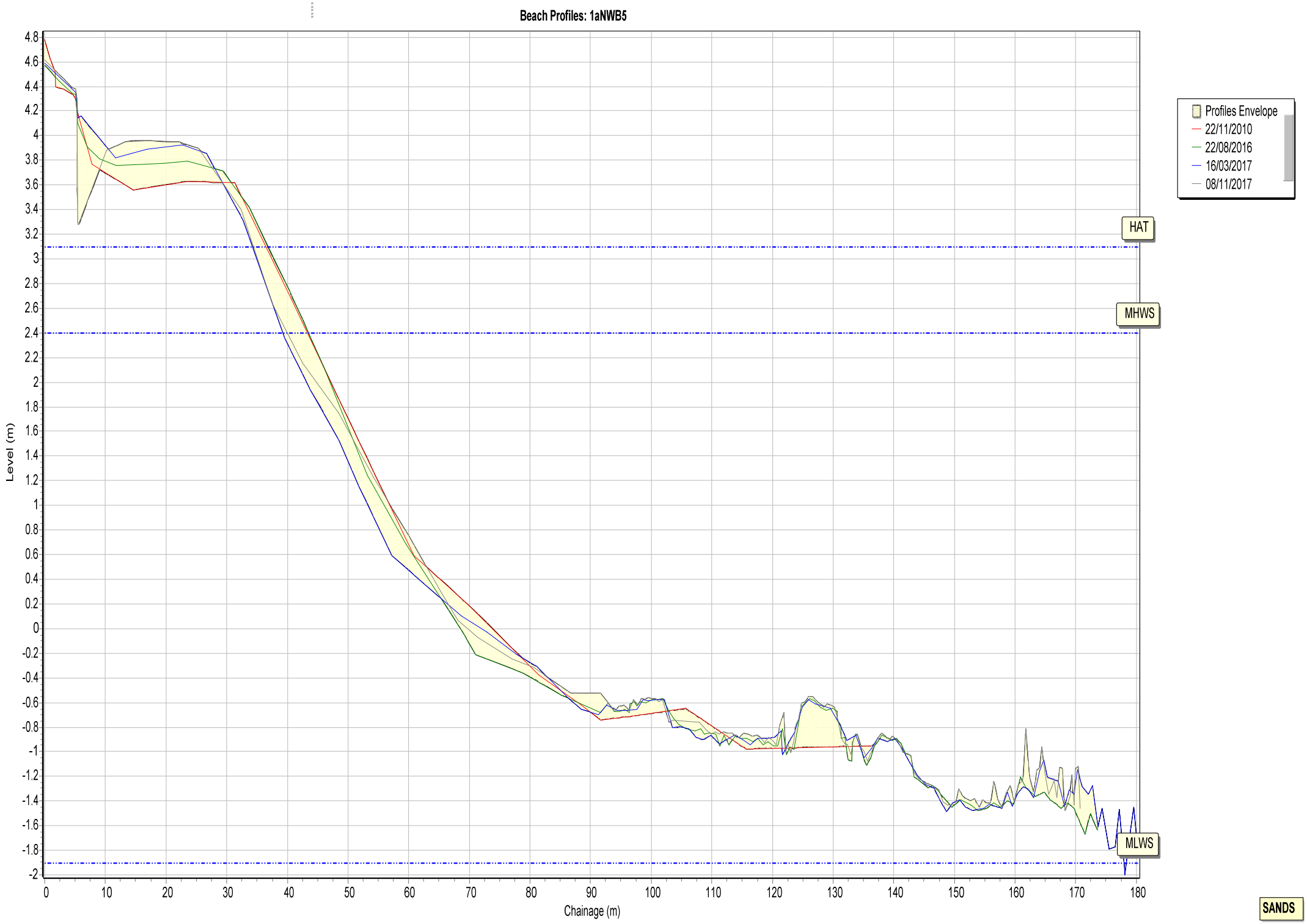



Beach Profiles: 1aNWB1
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB2
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB3
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB4
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB5
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
0
10
20
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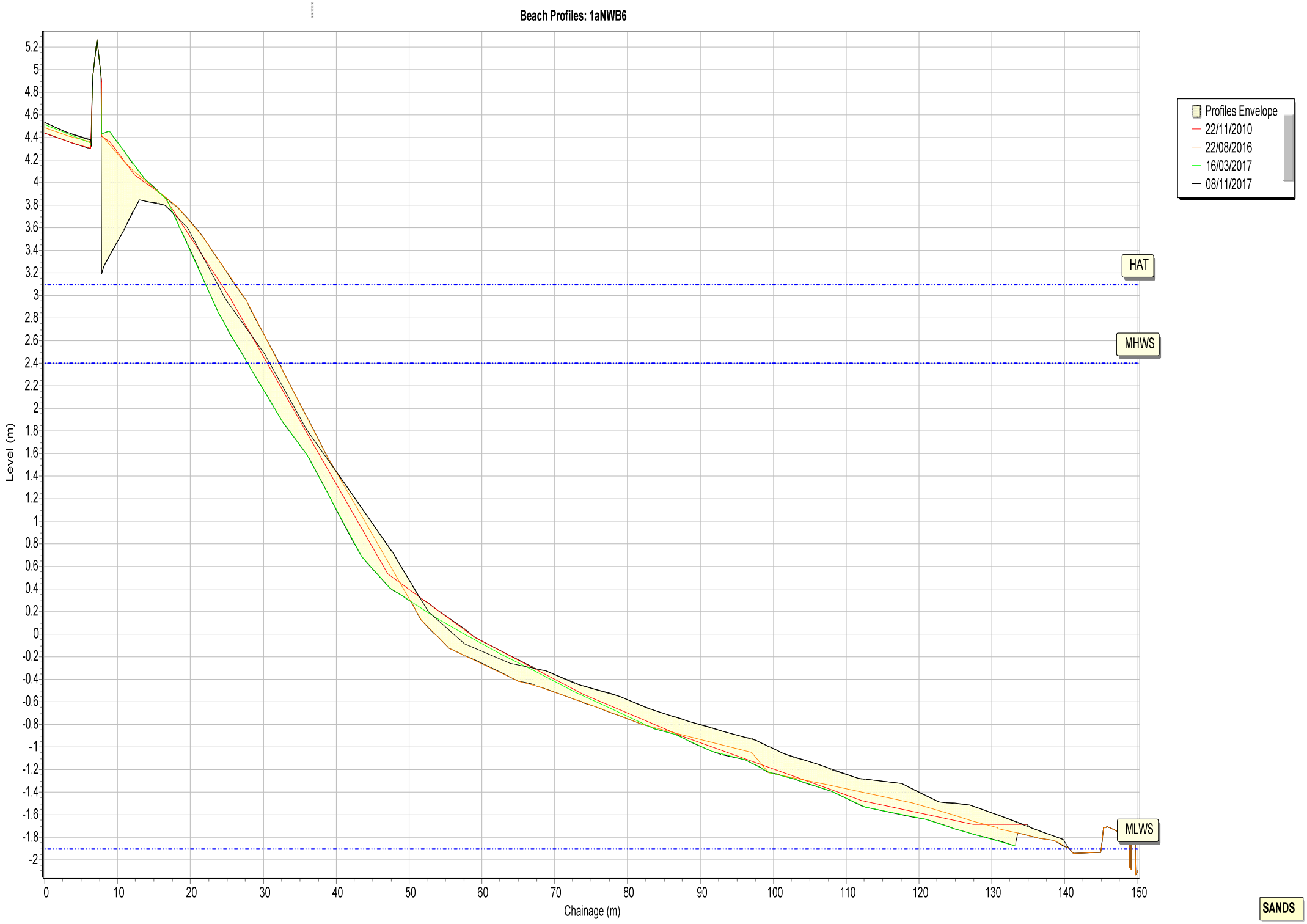
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
SANDS


Beach Profiles: 1aNWB6
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
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10
20
30
40
50
60
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80
90
100
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120
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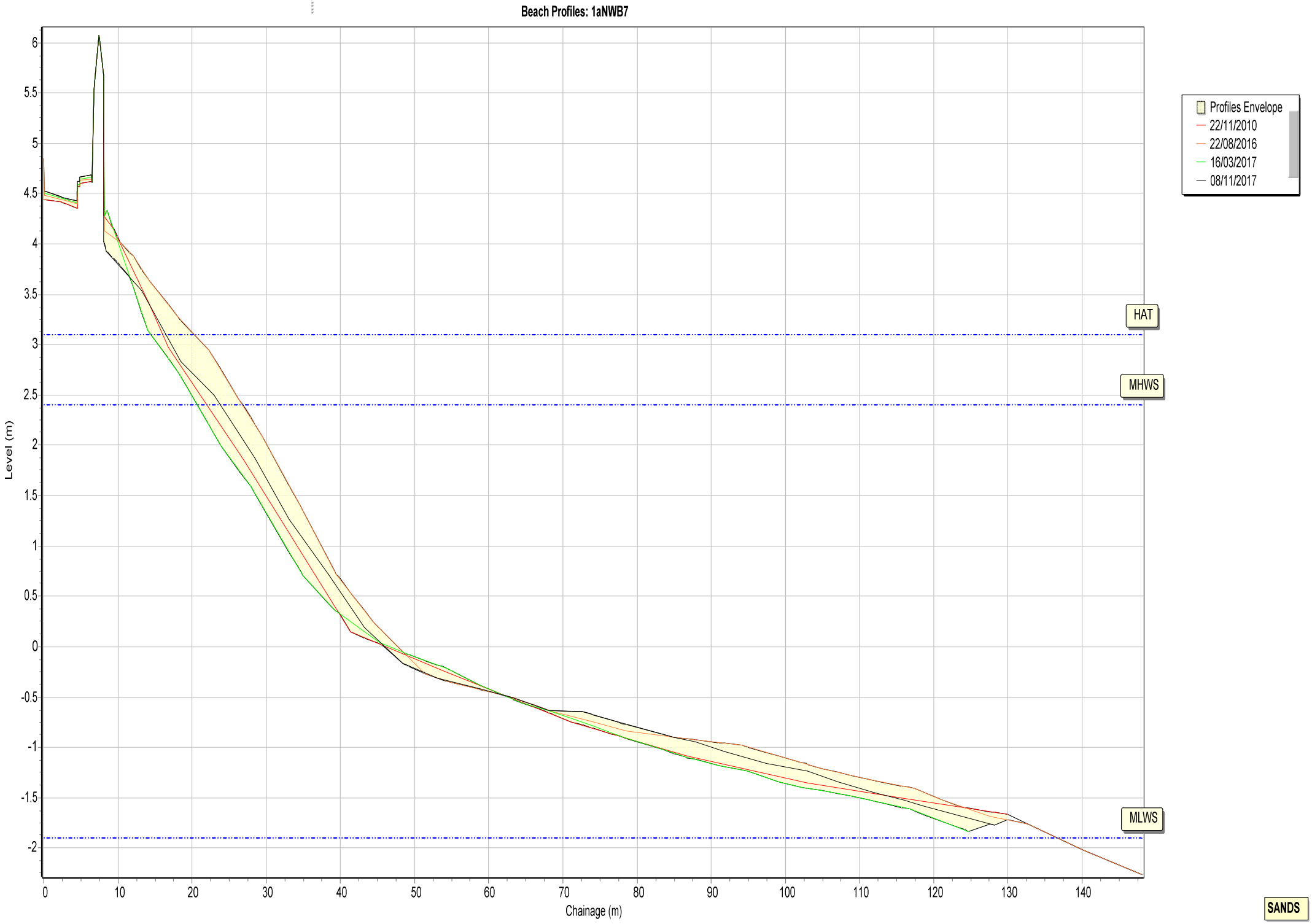
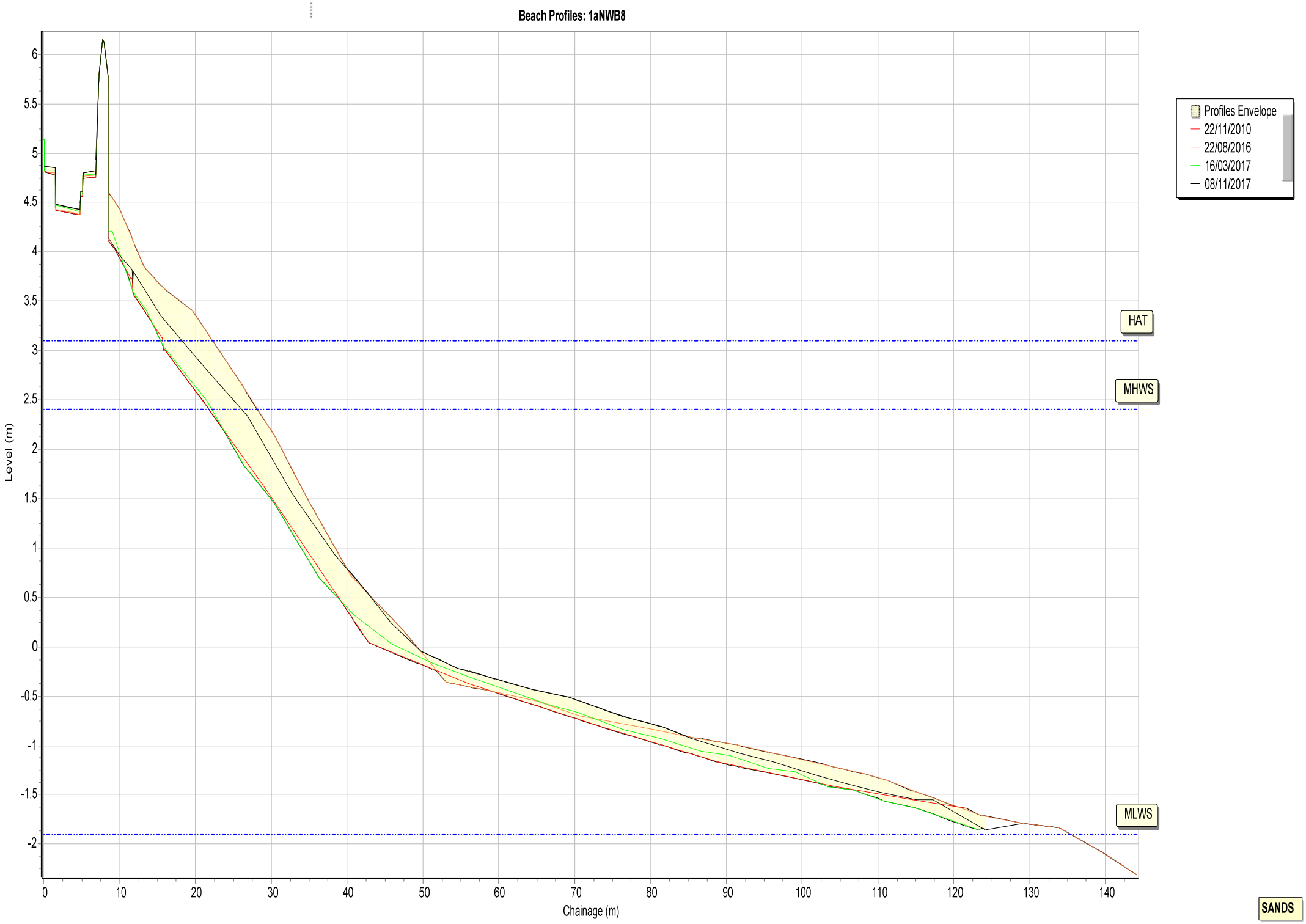
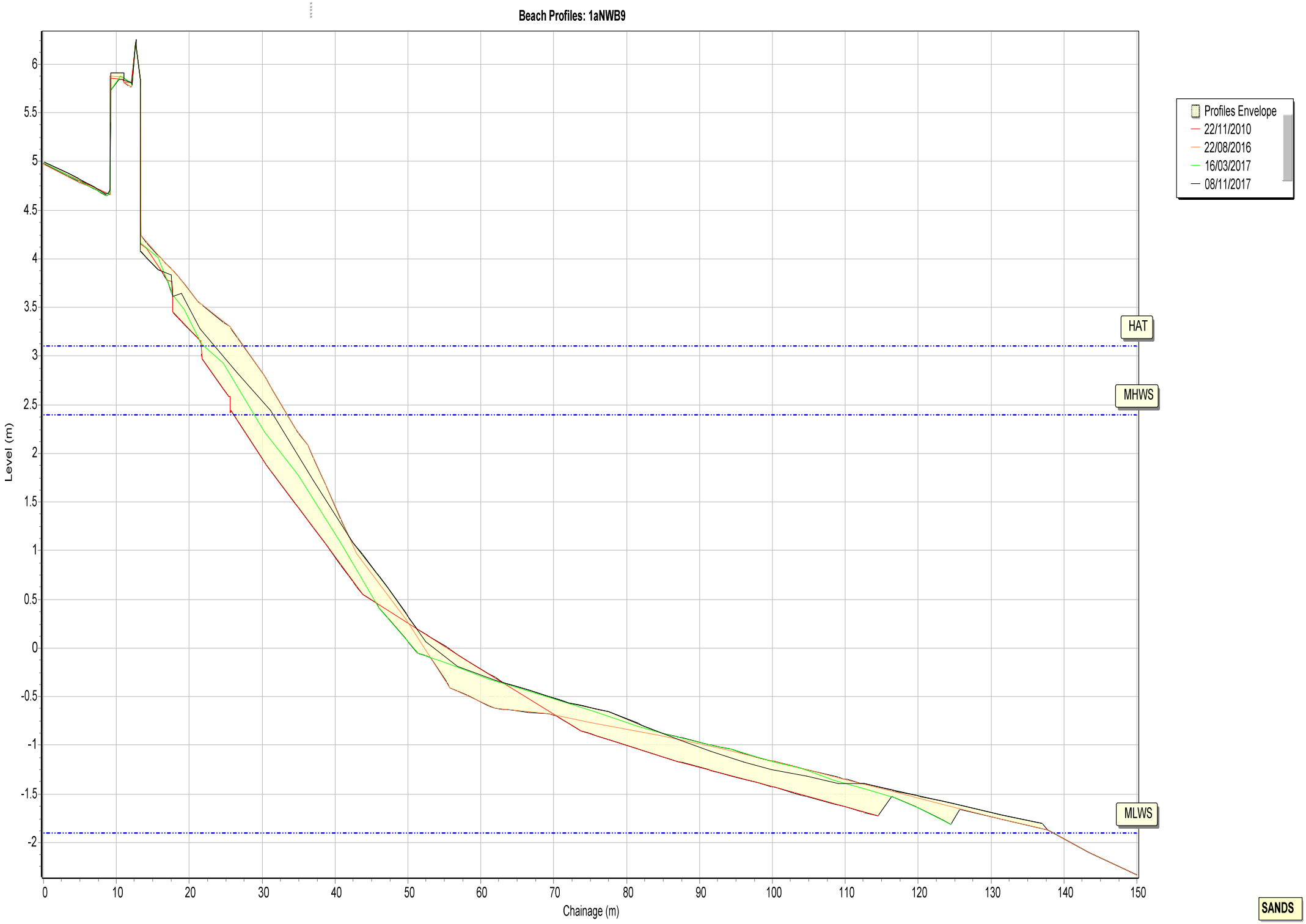
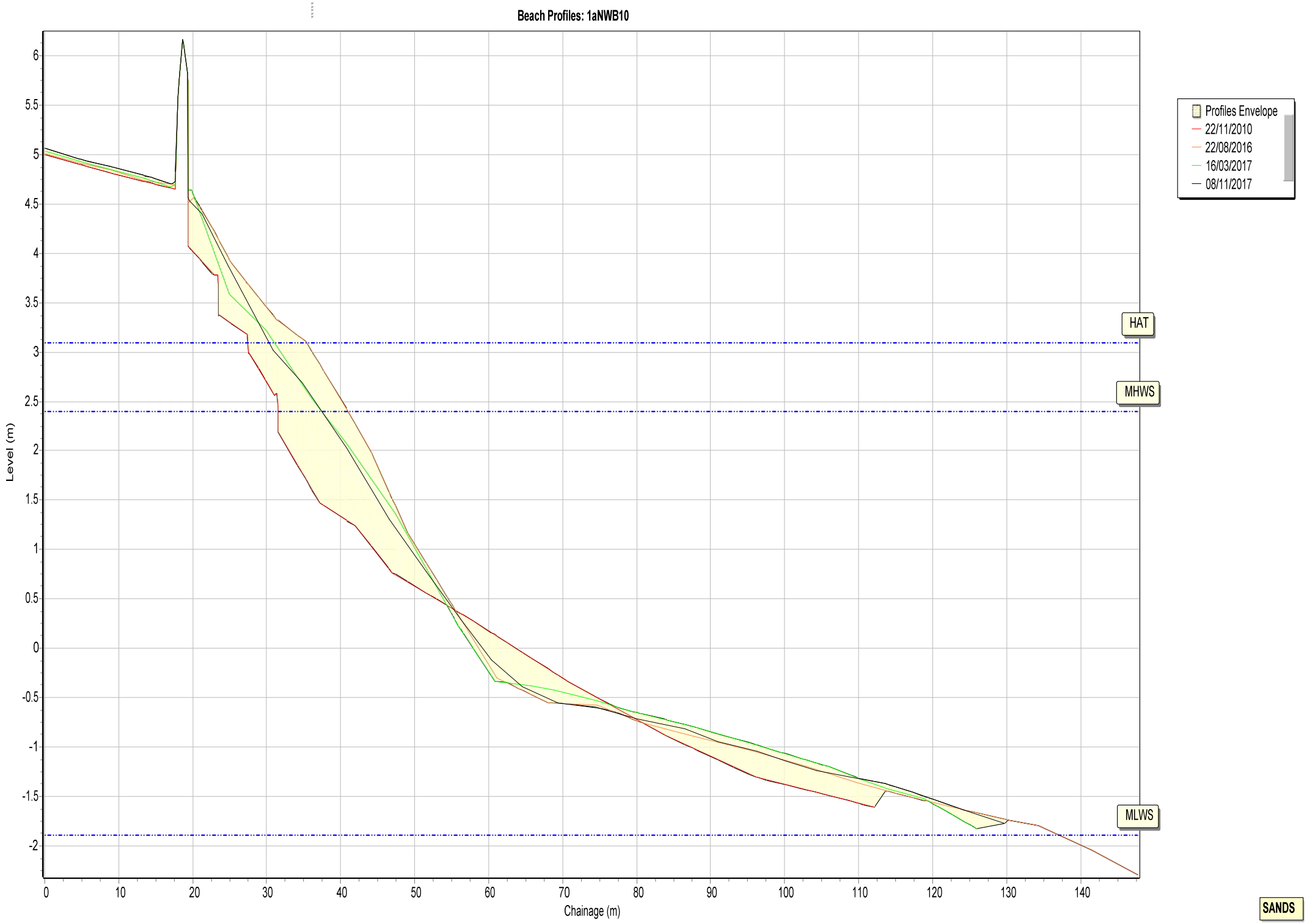
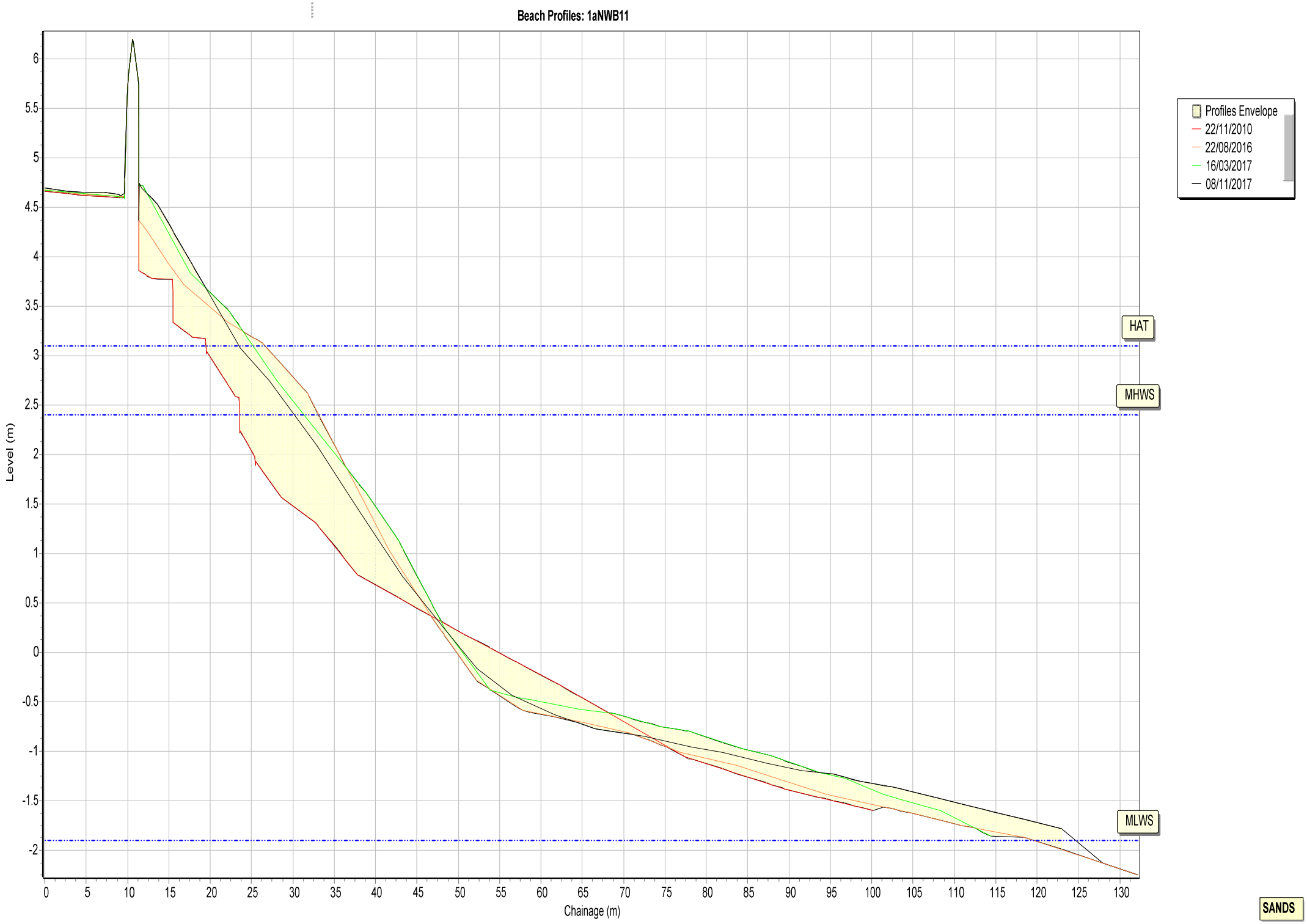
140
150


Beach Profiles: 1aNWB7
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140


Beach Profiles: 1aNWB8
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140


Beach Profiles: 1aNWB9
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150


Beach Profiles: 1aNWB10
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140


Beach Profiles: 1aNWB11
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
5
10
15
20
25
30
35
40
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55
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85
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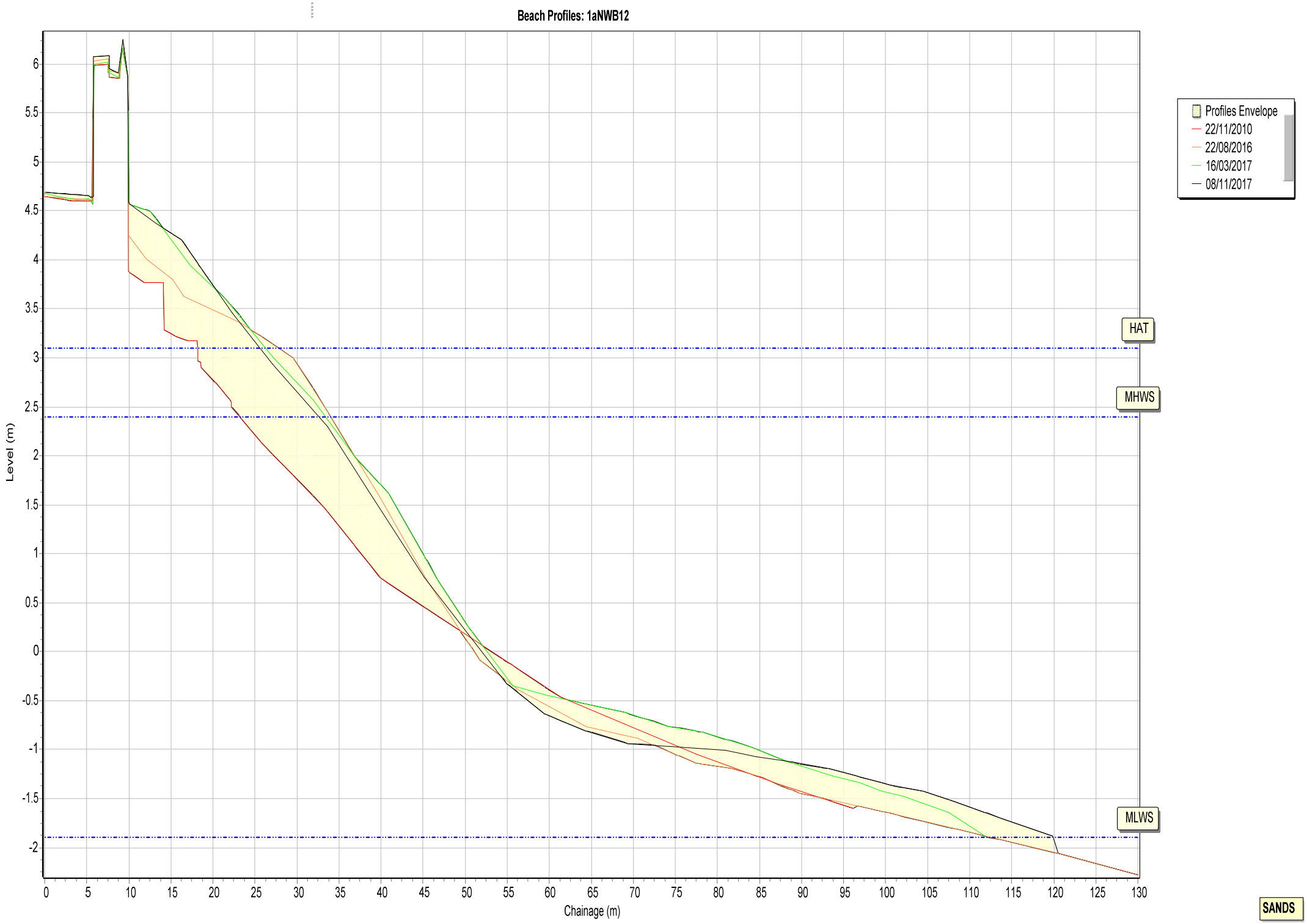
95
100
105
110
115
120
125
130


Beach Profiles: 1aNWB12
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
5
10
15
20
25
30
35
40
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55
60
65
70
75
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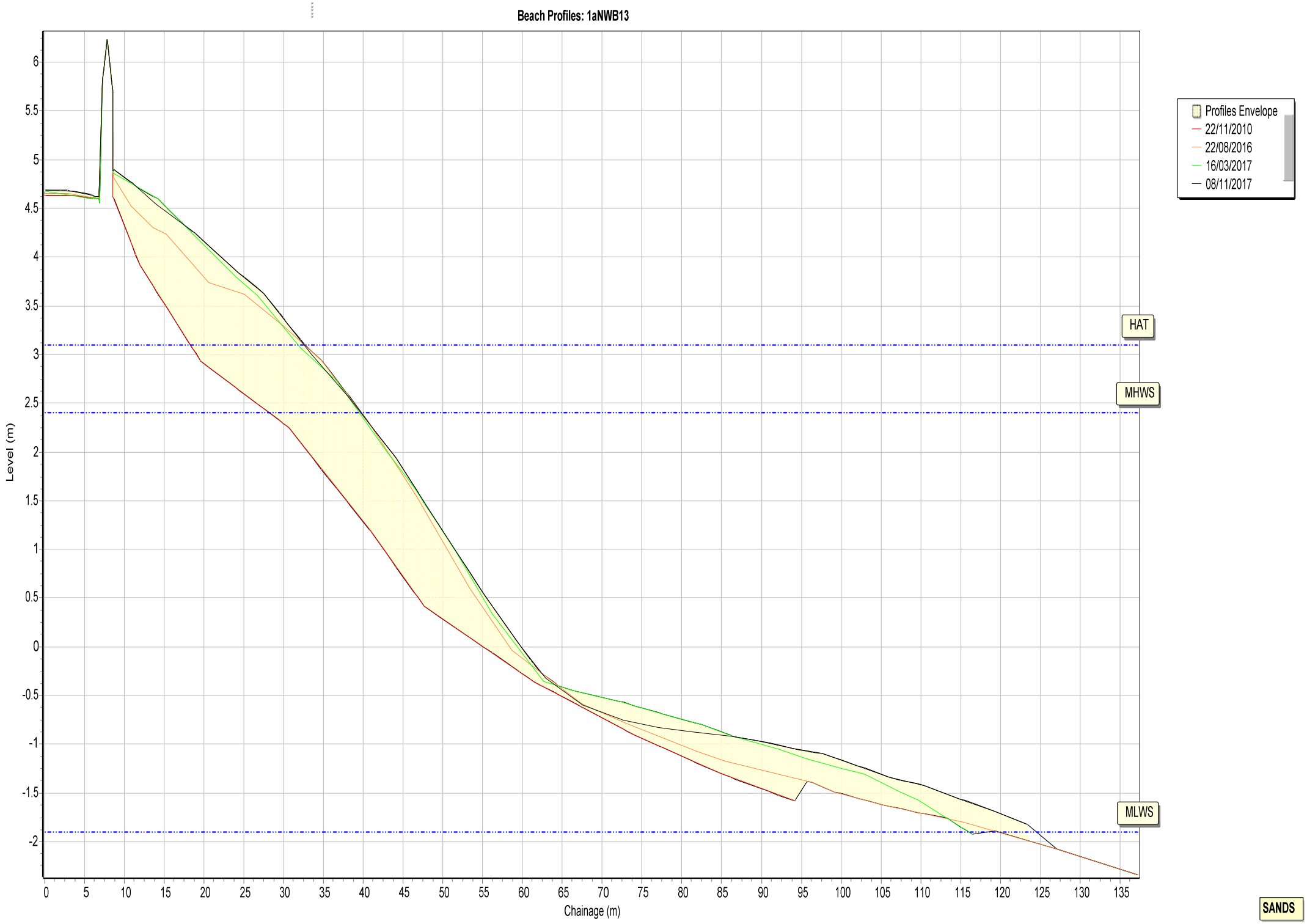
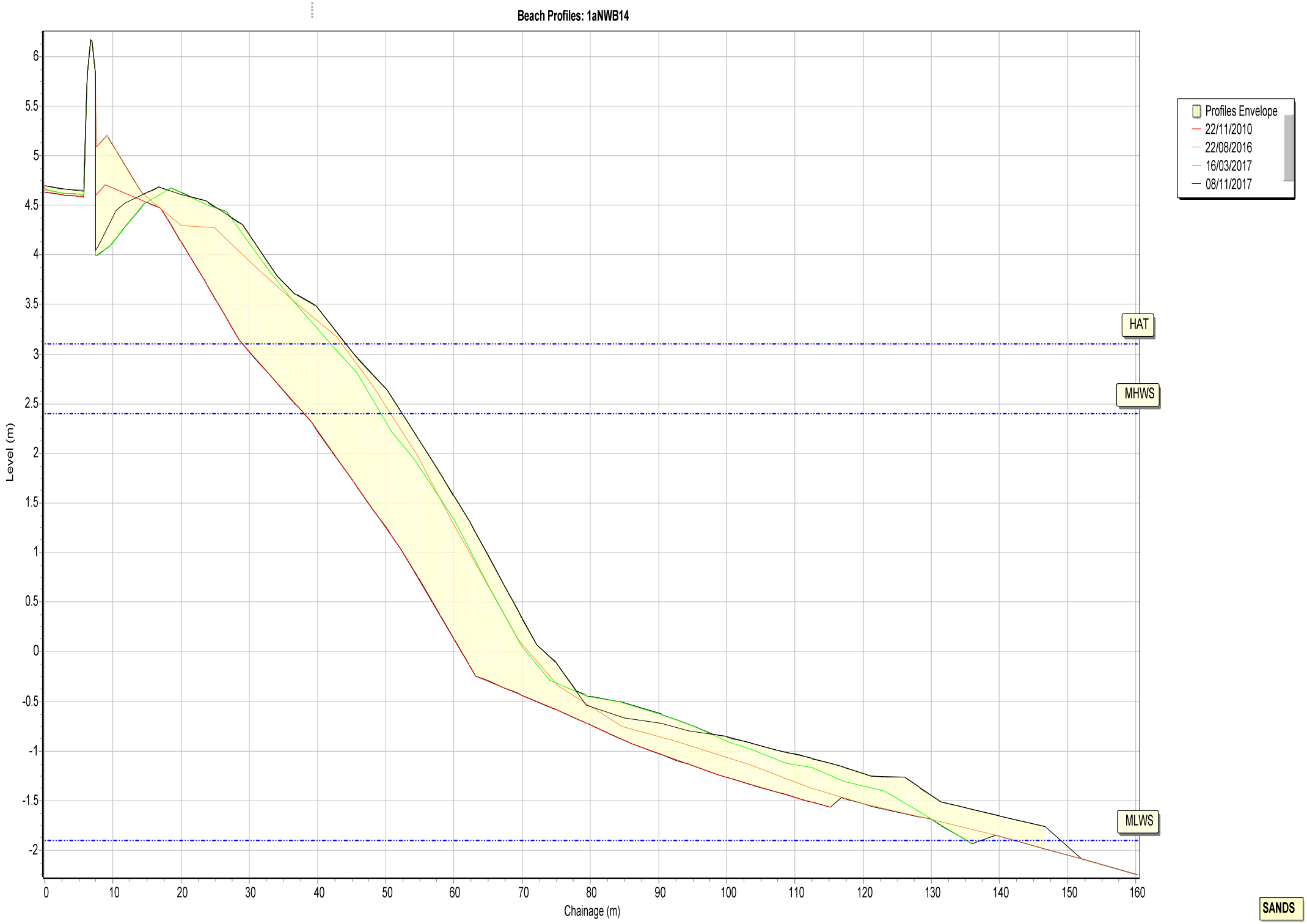
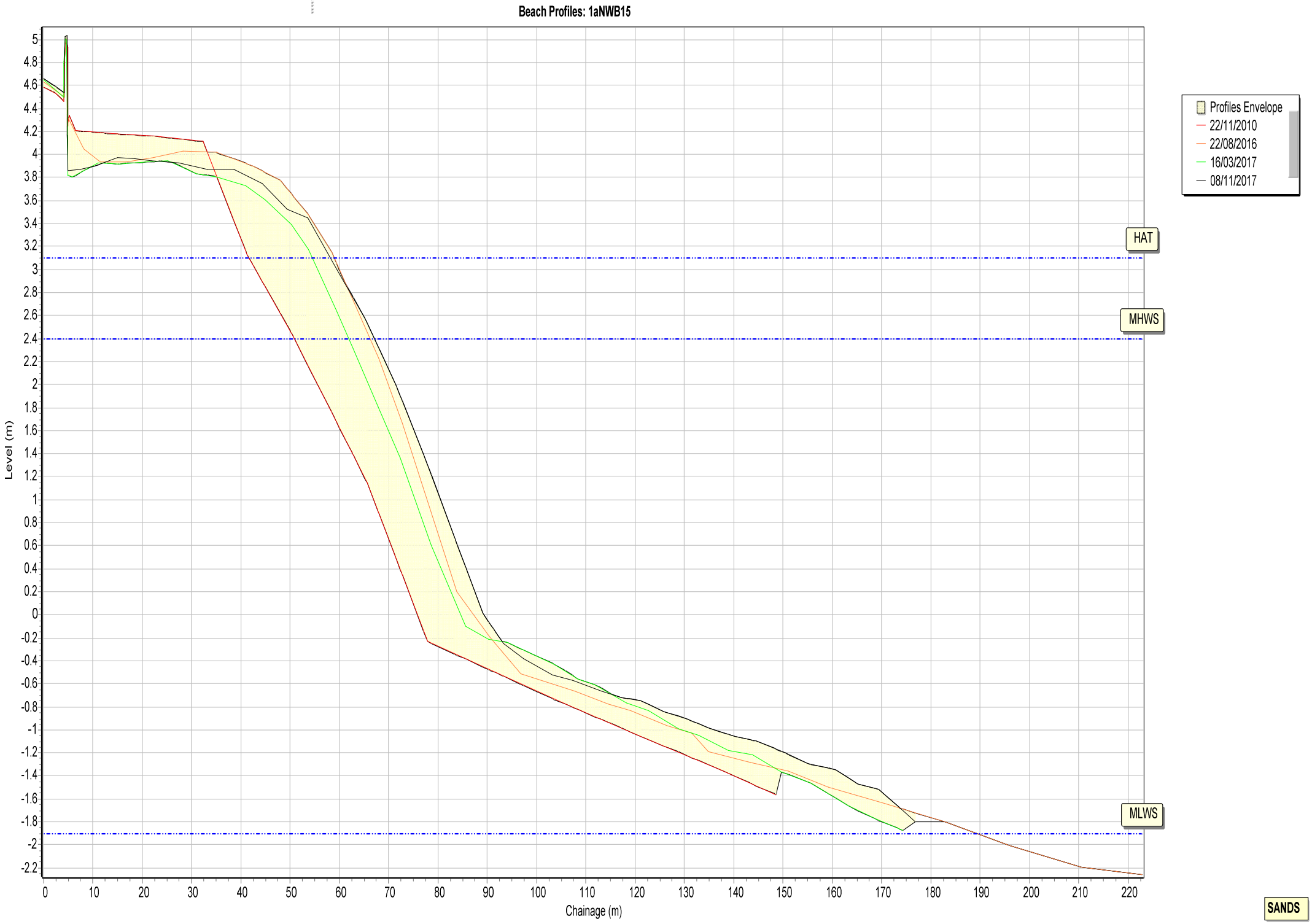
85
90
95
100
105
110
115
120
125
130


Beach Profiles: 1aNWB13
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB14
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
SANDS


Beach Profiles: 1aNWB15
Profiles Envelope
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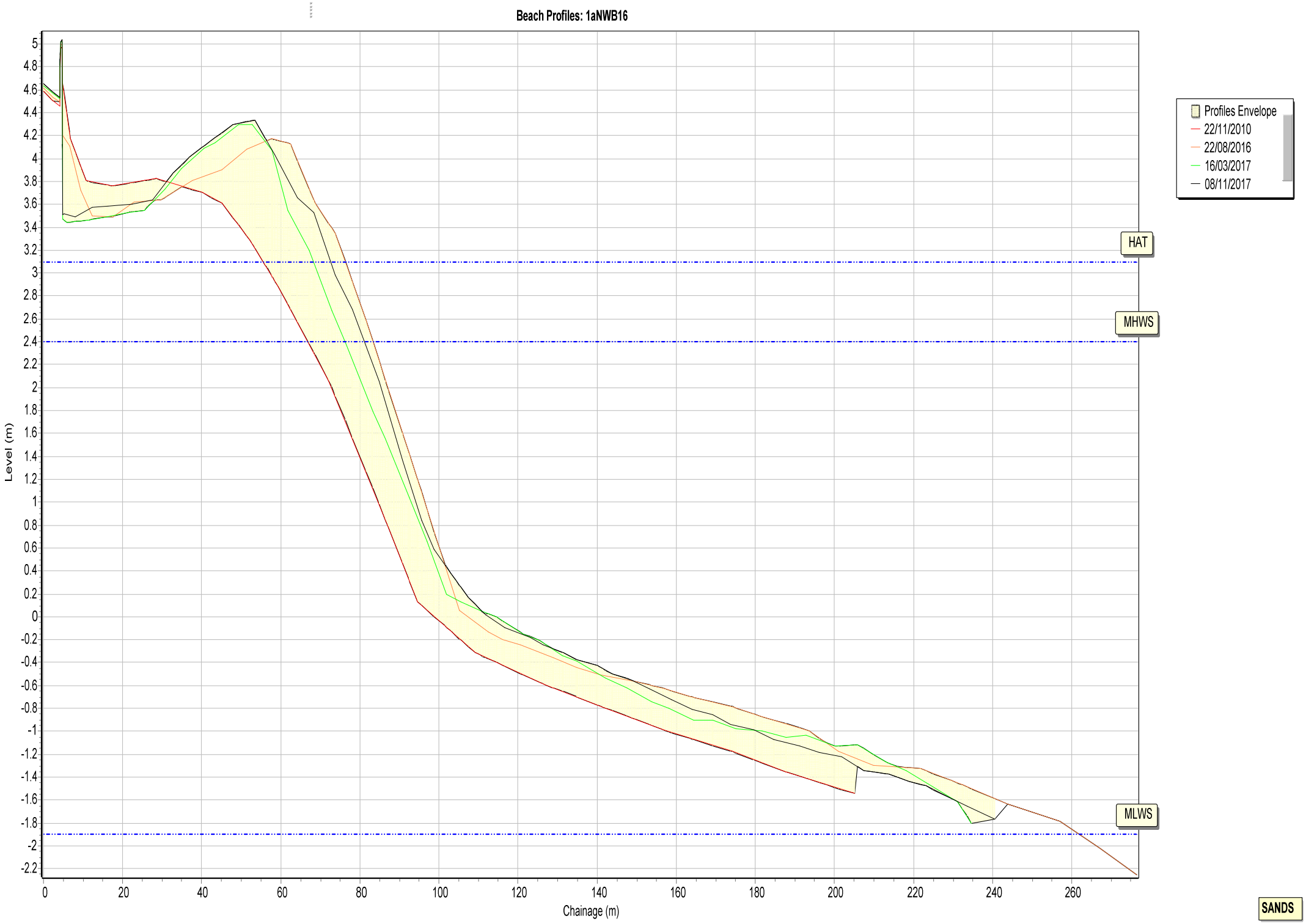
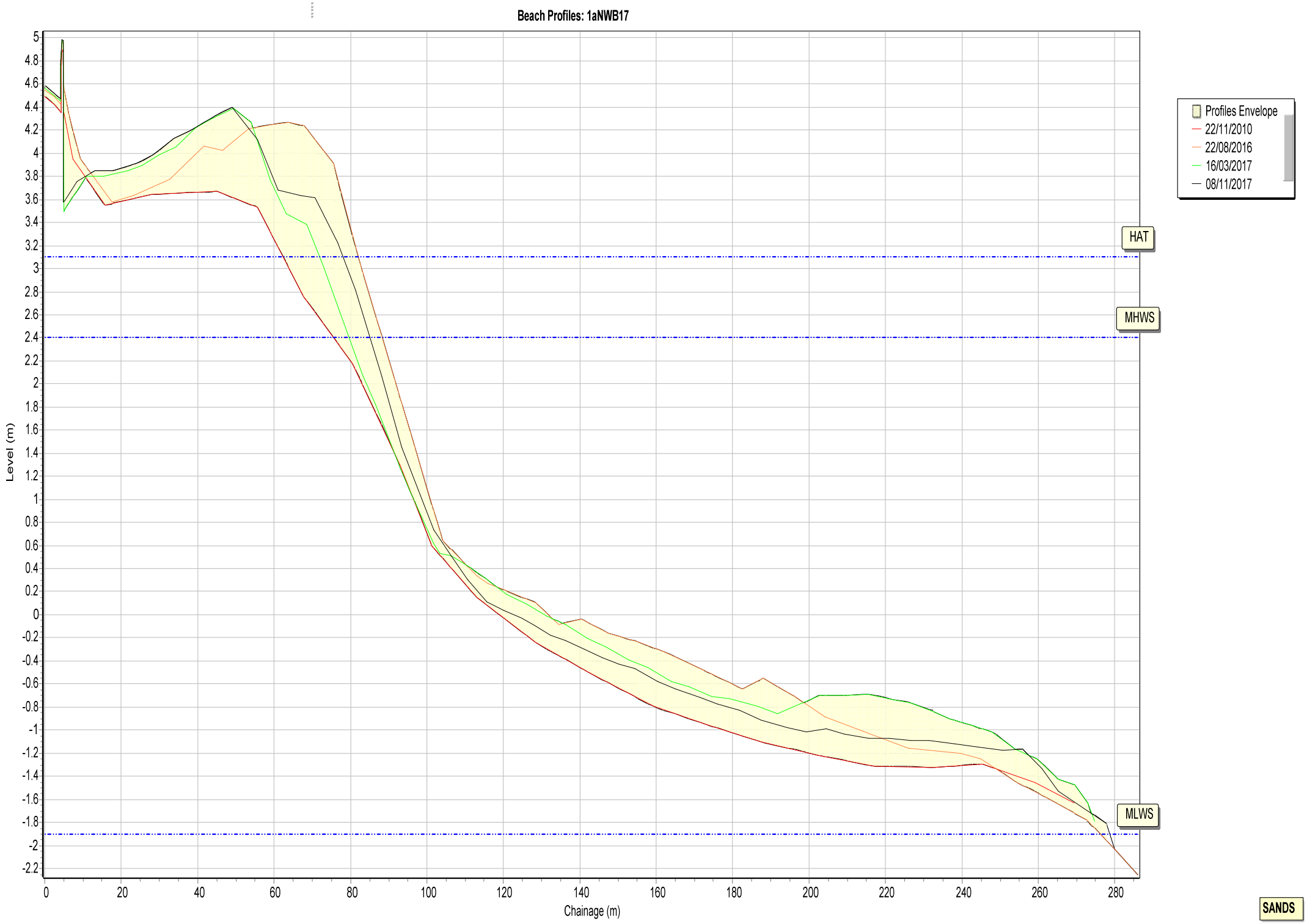
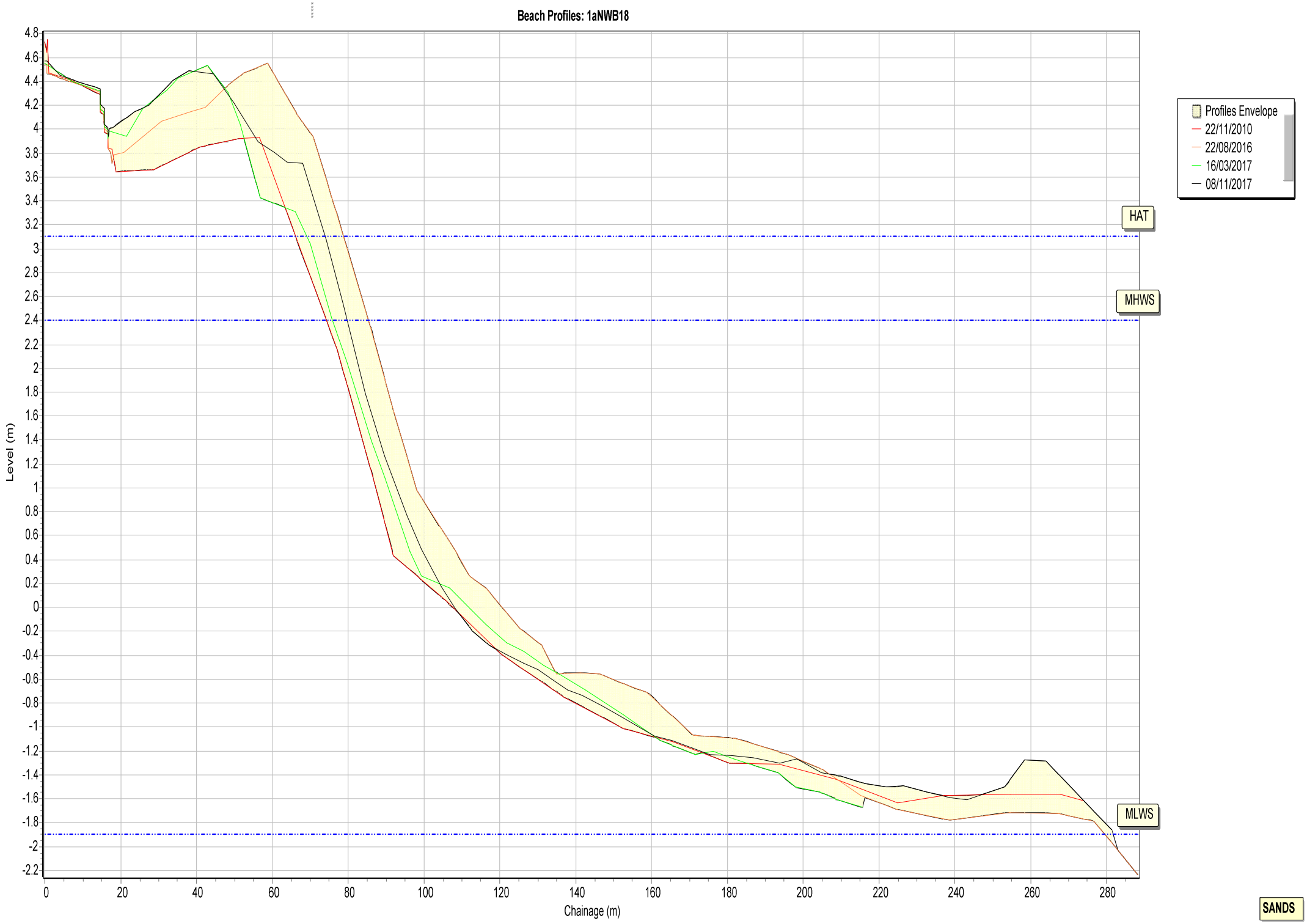
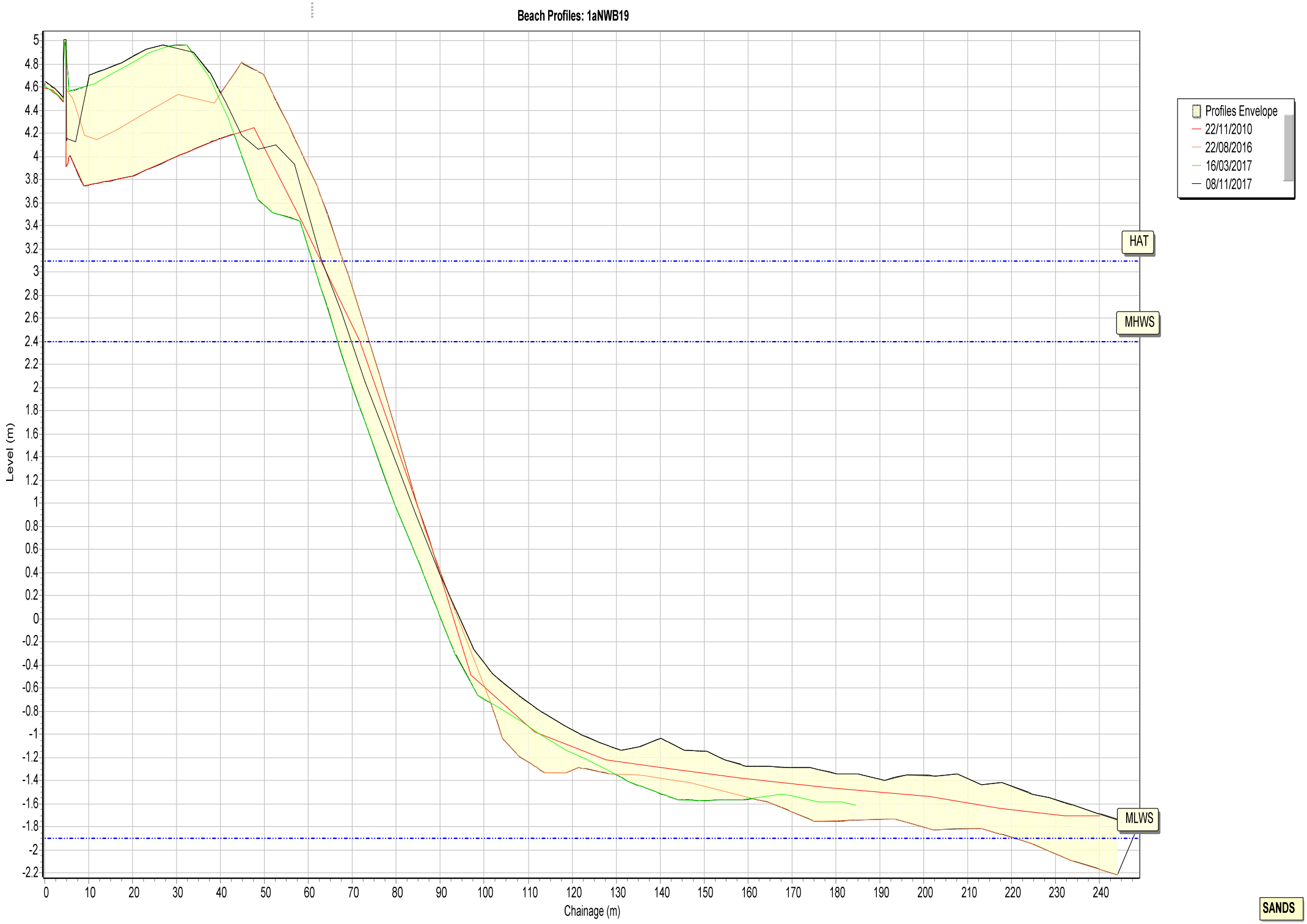
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB16
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB17
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB18
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB19
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
-2.2
0
10
20
30
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150
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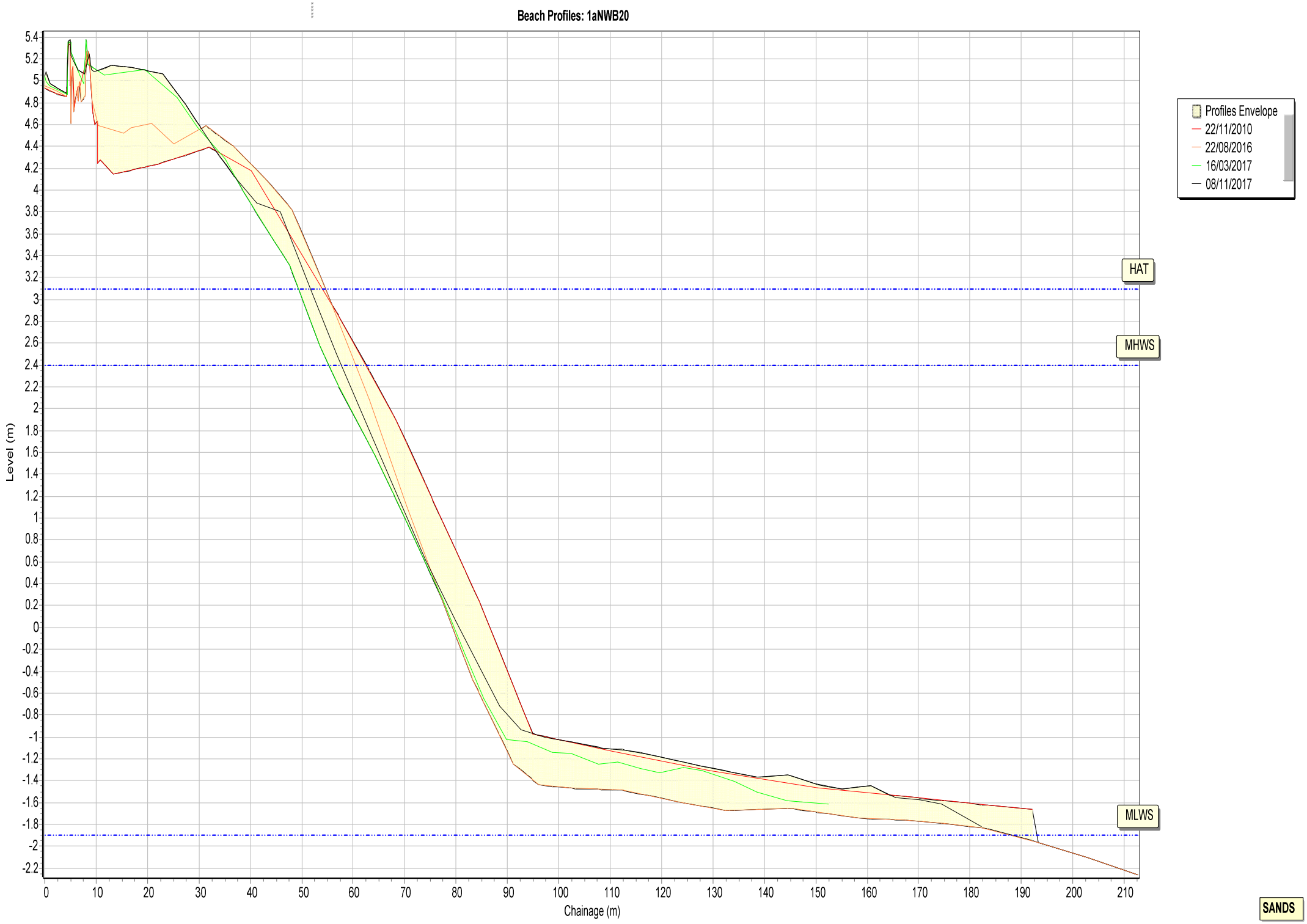
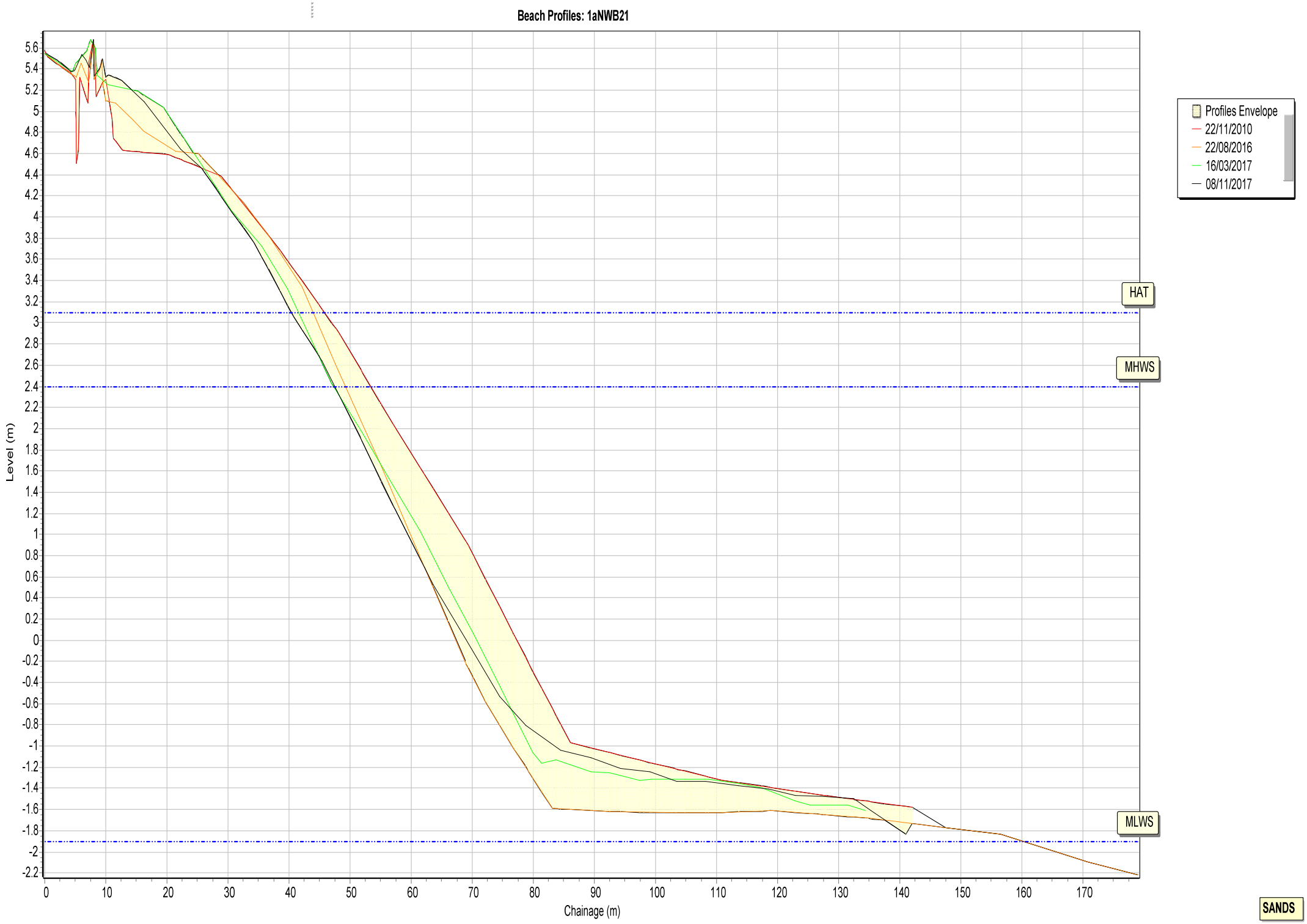
170
180
190
200
210
220
230
240


Beach Profiles: 1aNWB20
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS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Profiles Envelope
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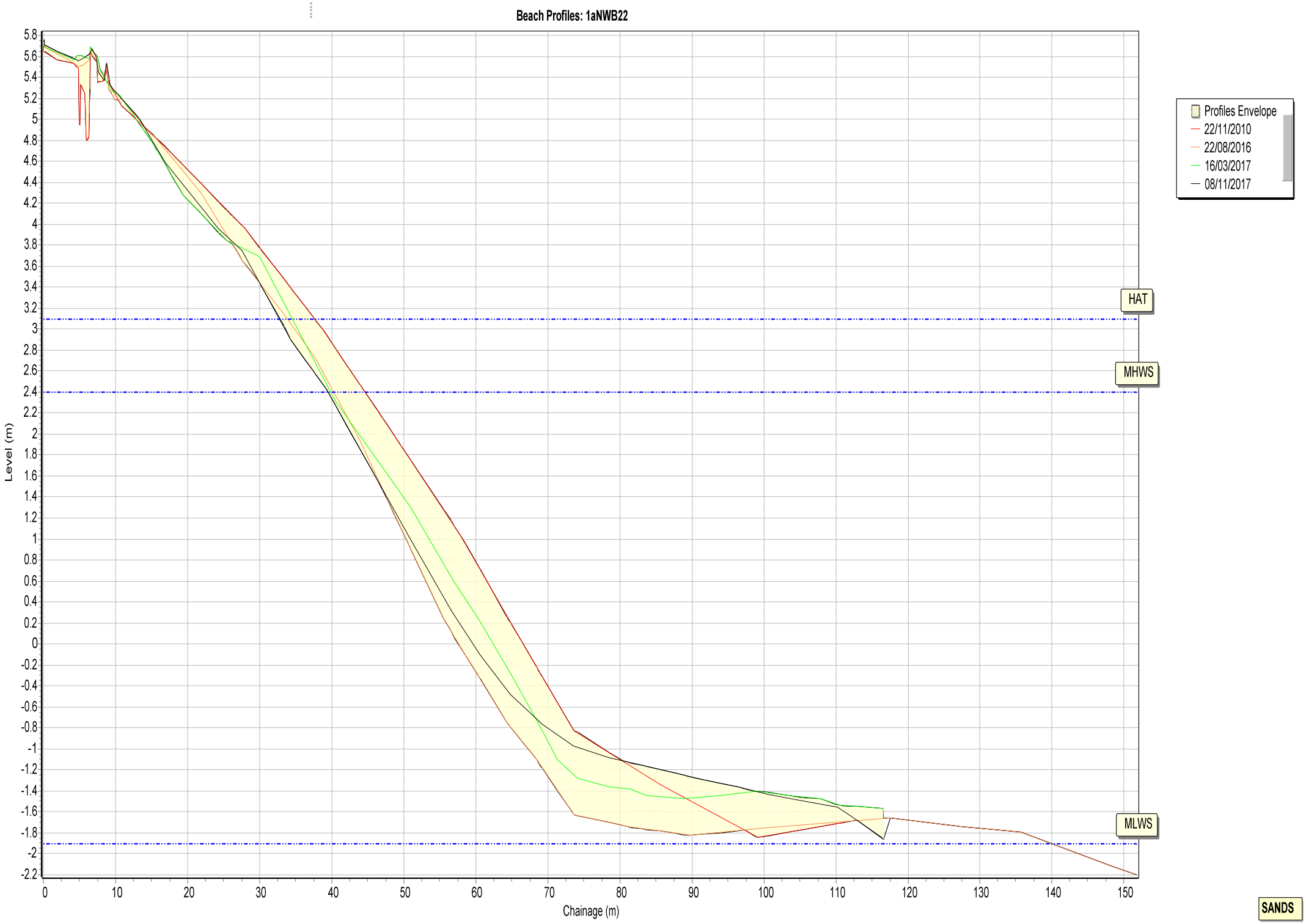
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB22
Profiles Envelope
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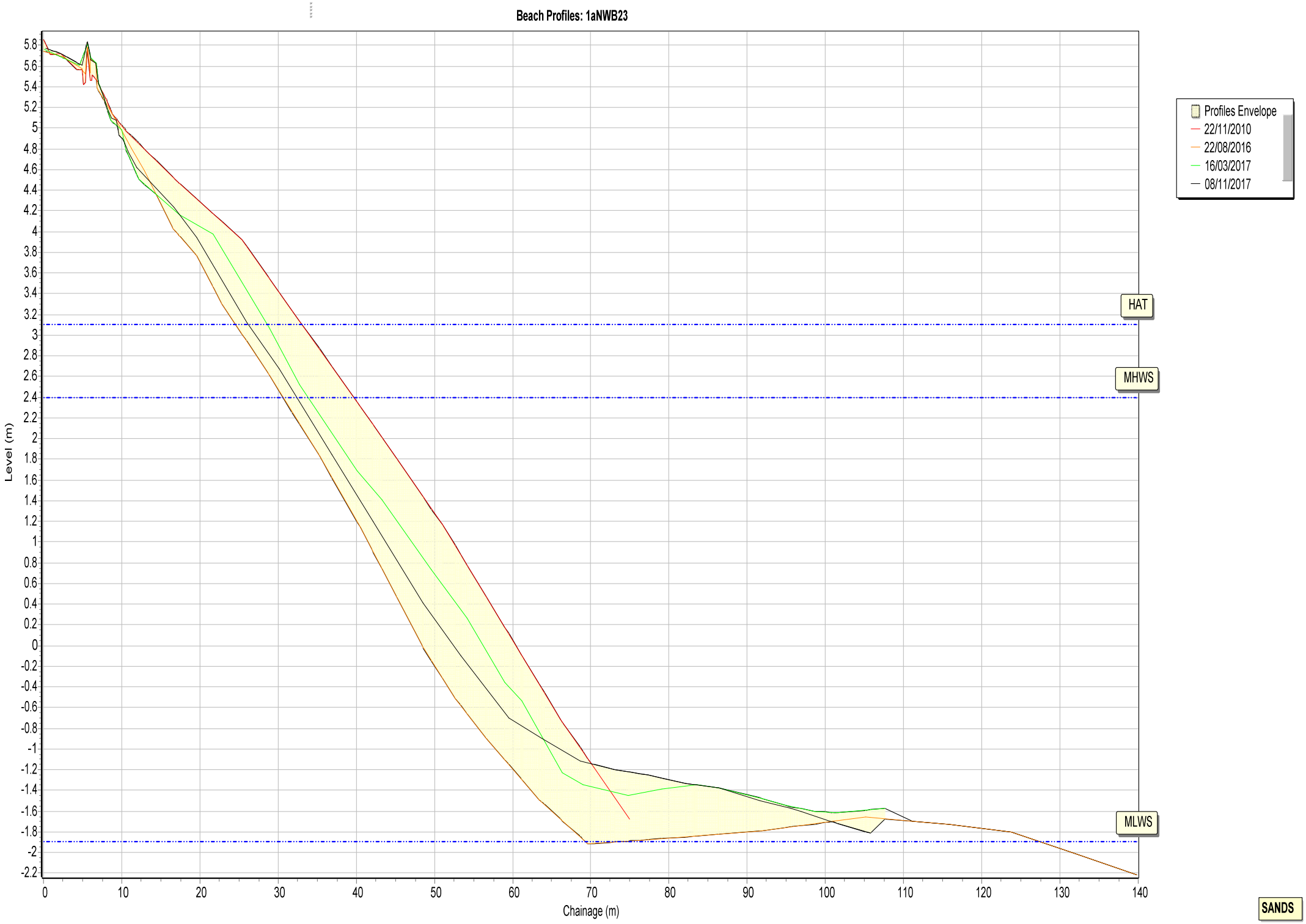
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB23
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
SANDS
Level (m)
Chainage (m)
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
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0.2
0
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-0.4
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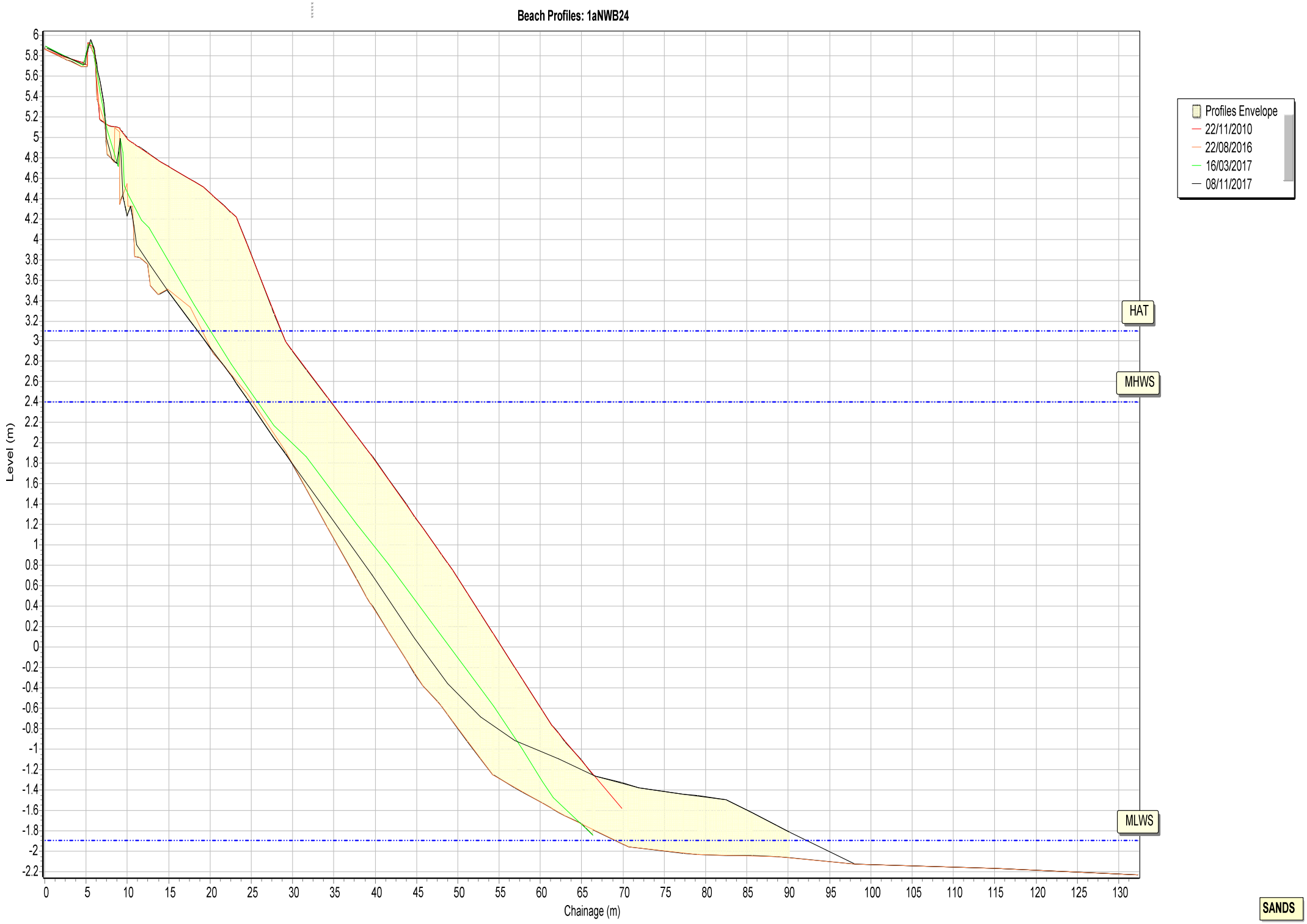
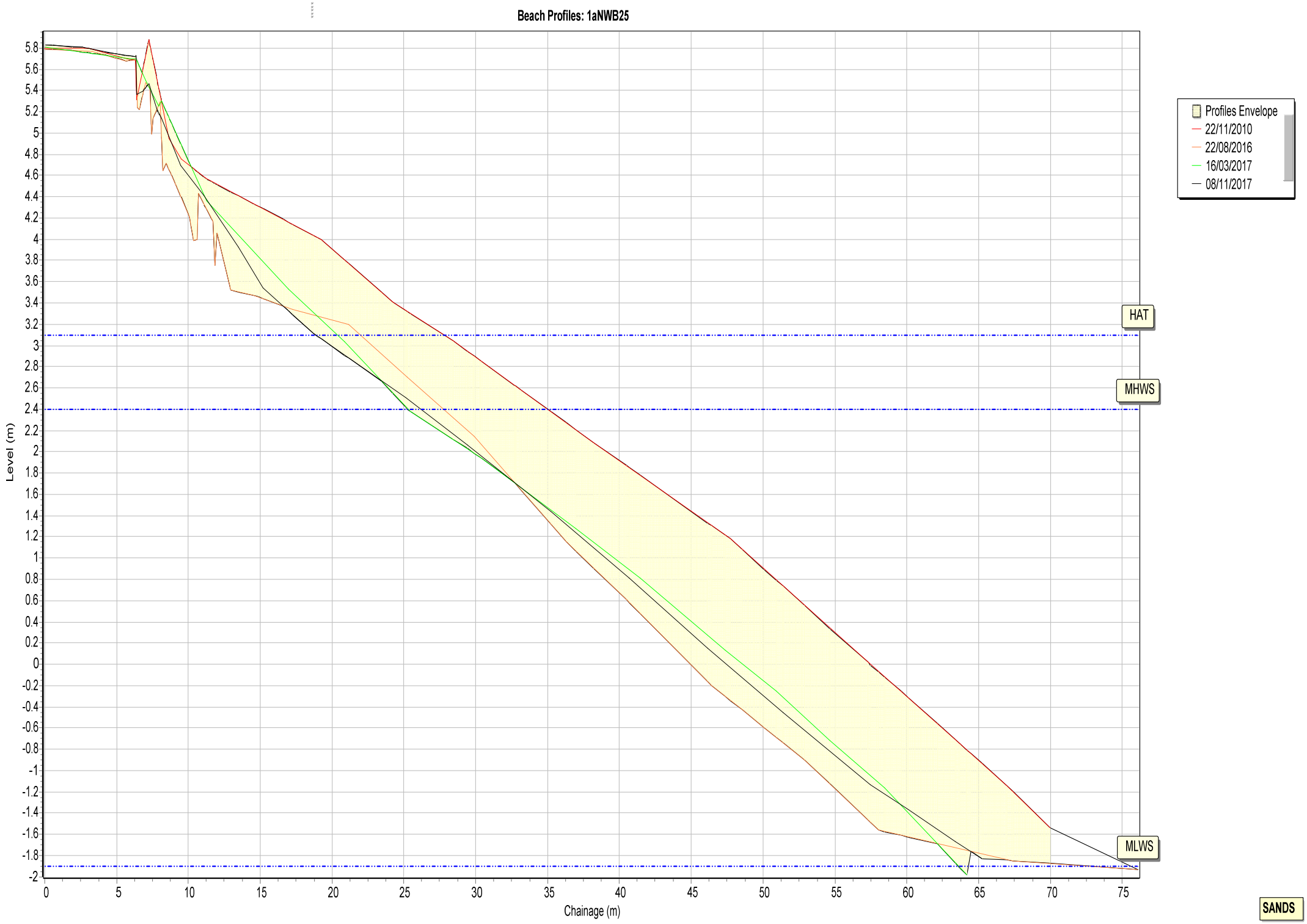
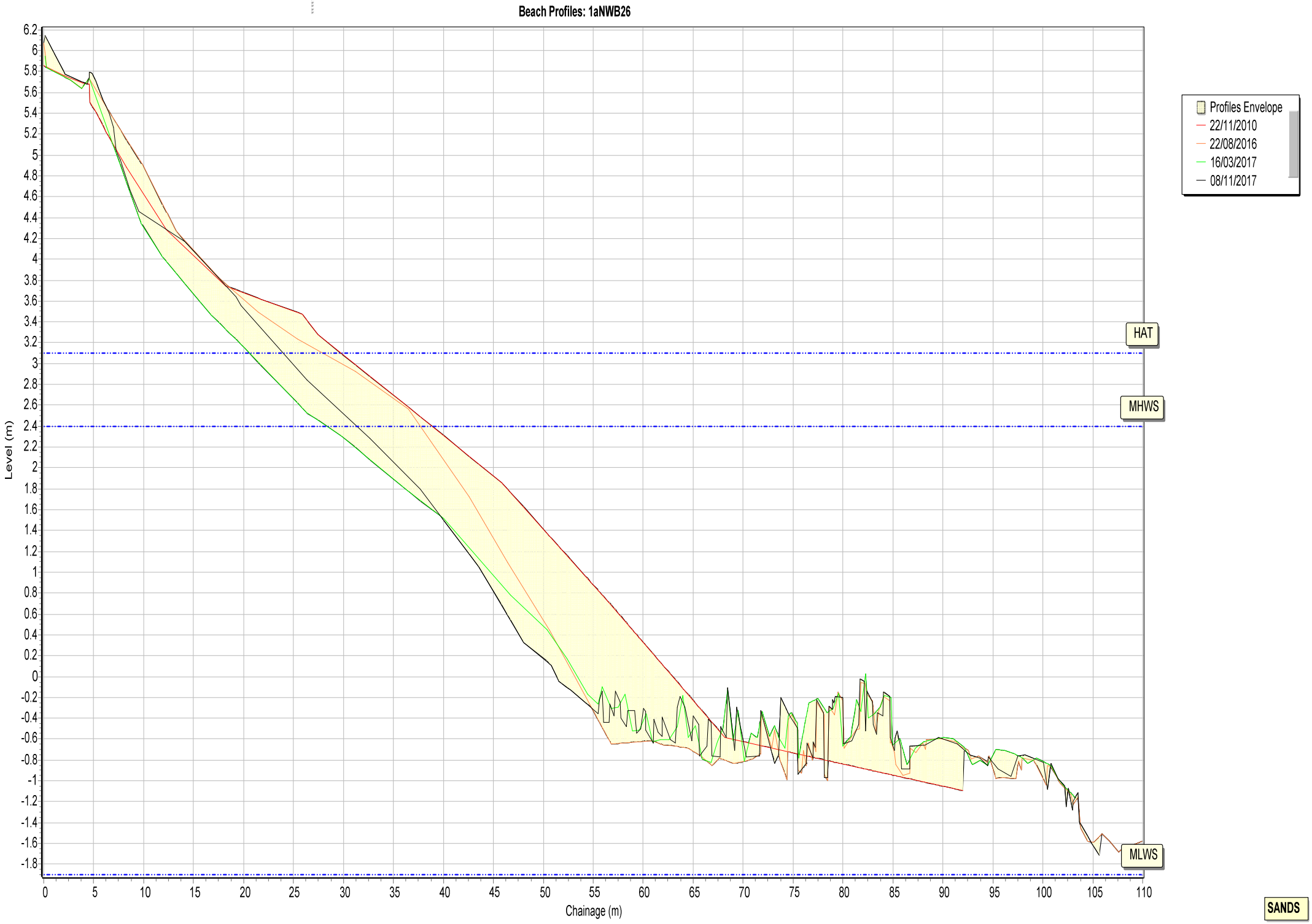

Beach Profiles: 1aNWB24
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB25
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS


Beach Profiles: 1aNWB26
Profiles Envelope
22/11/2010
22/08/2016
16/03/2017
08/11/2017
HAT
MHWS
MLWS
Level (m)
Chainage (m)
SANDS

Beach Profile

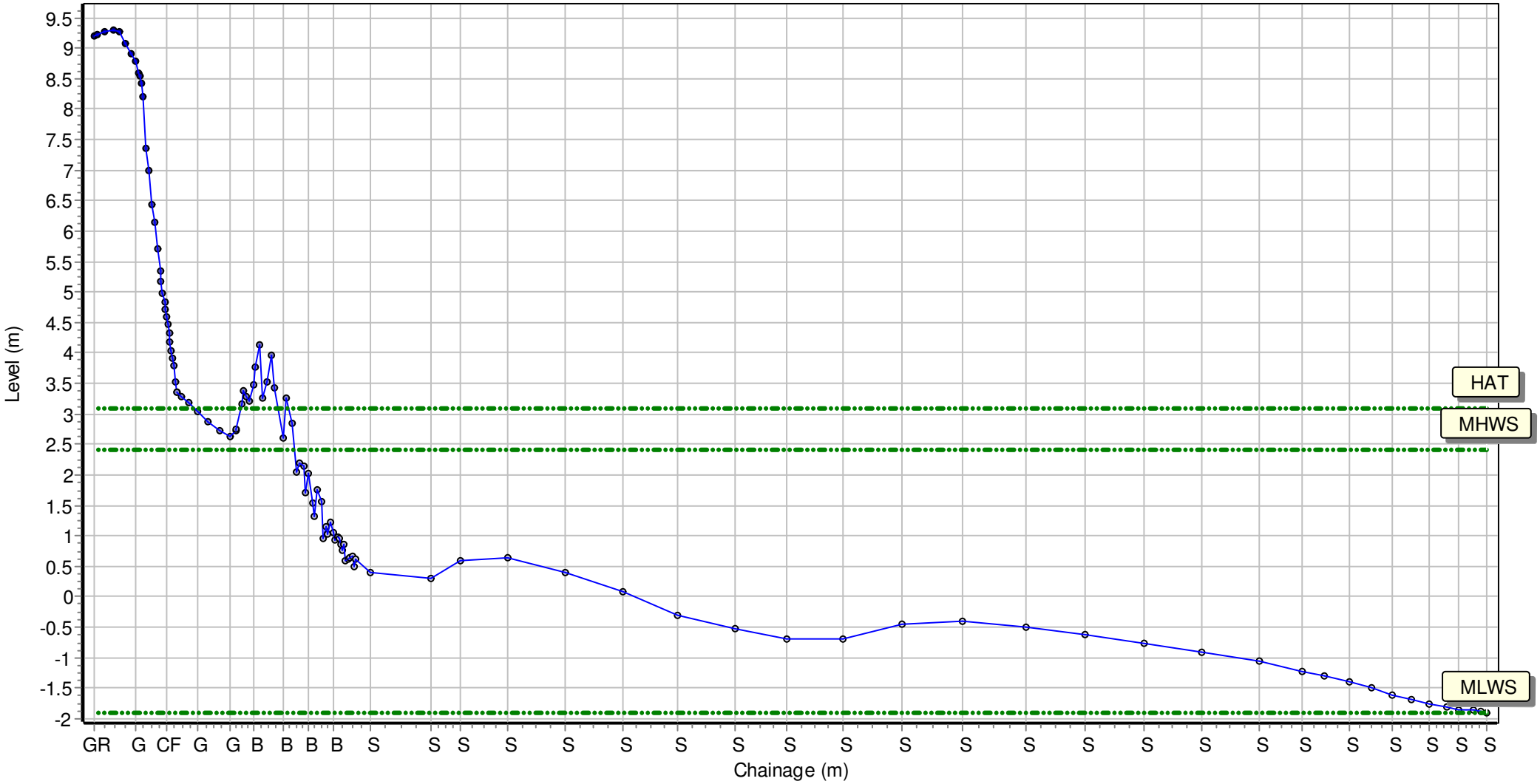
Location: **1aWDC08**

Date: 07/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430440.056 **Northing:** 585865.943 **Profile Bearing:** 105 ° from North



Beach Profile

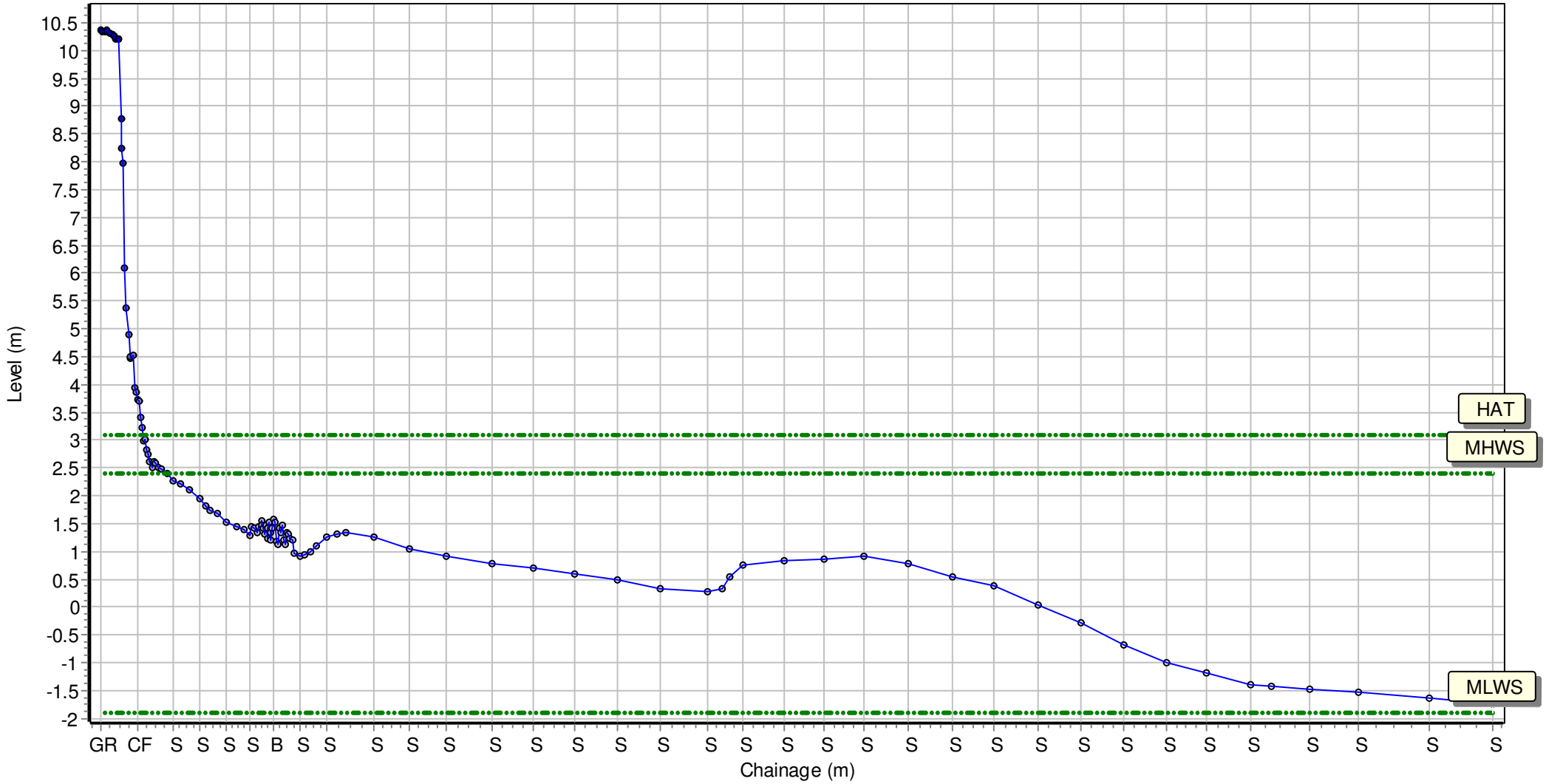
Location: **1aWDC09**

Date: 07/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430361.278 **Northing:** 585559.12 **Profile Bearing:** 130 ° from North



Beach Profile

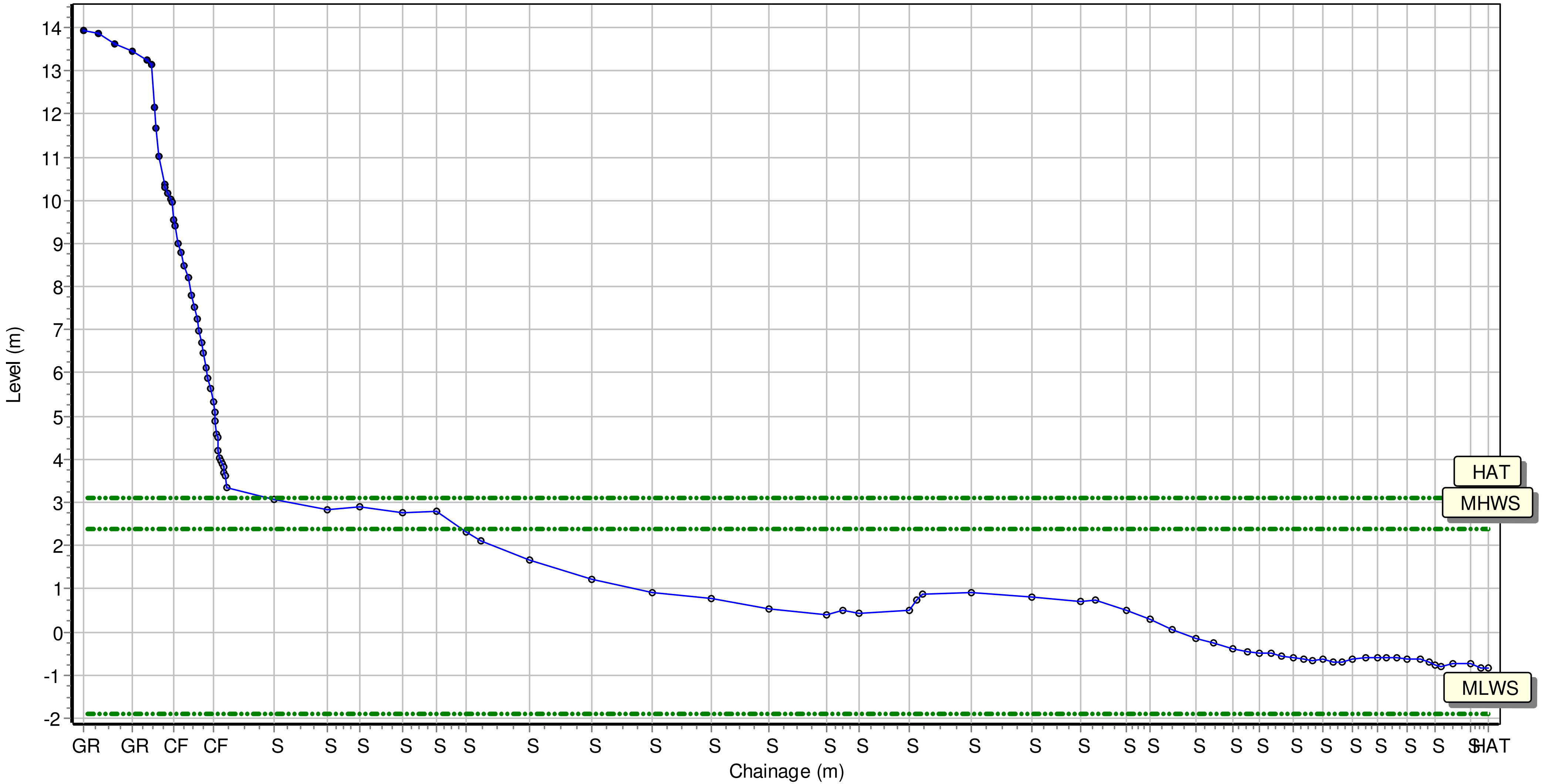
Location: 1aWDC10

Date: 07/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430247.175 **Northing:** 585191.003 **Profile Bearing:** 71 ° from North



Beach Profile

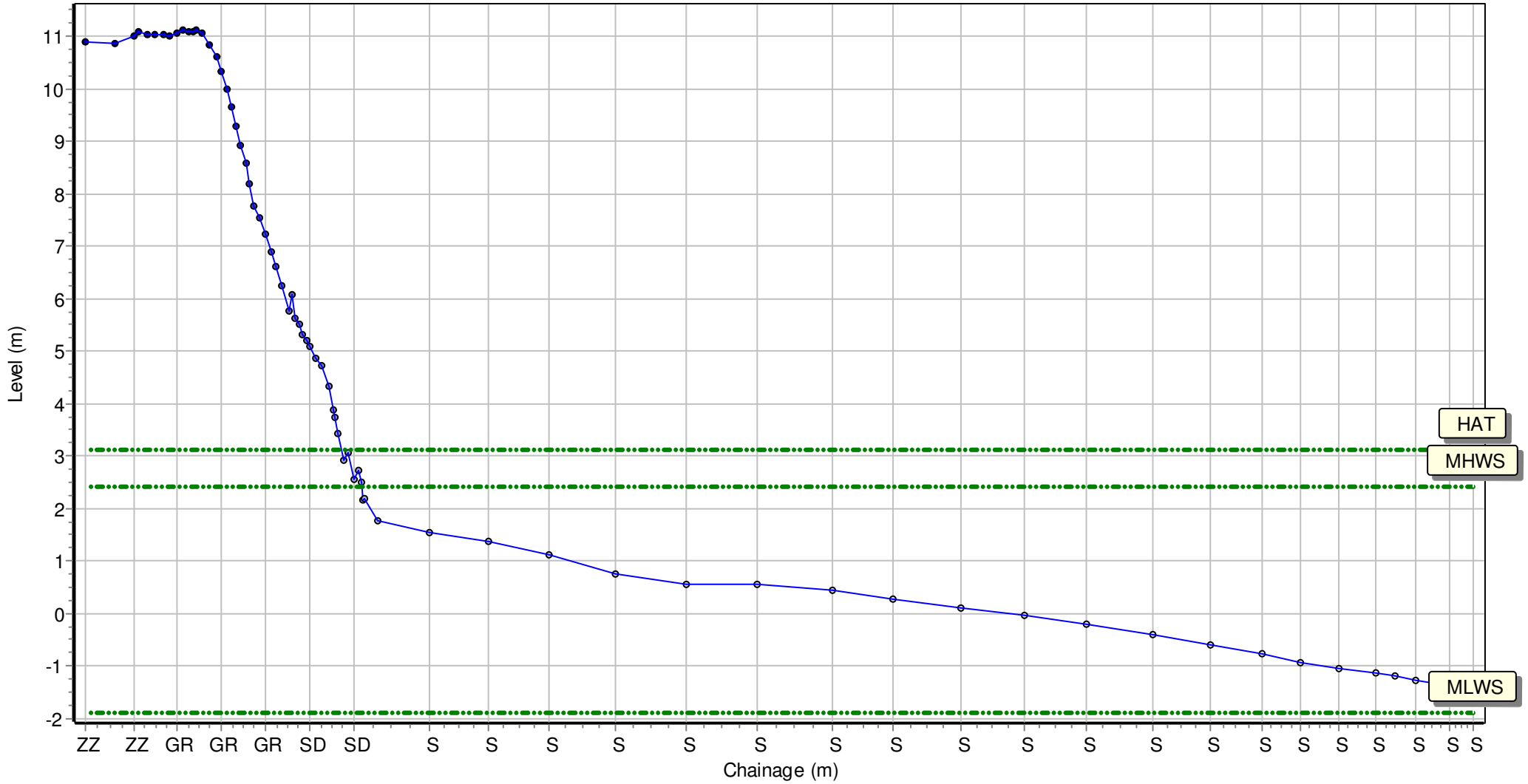
Location: **1aWDC11**

Date: 07/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430397.4 **Northing:** 584739.609 **Profile Bearing:** 74 ° from North



Beach Profile

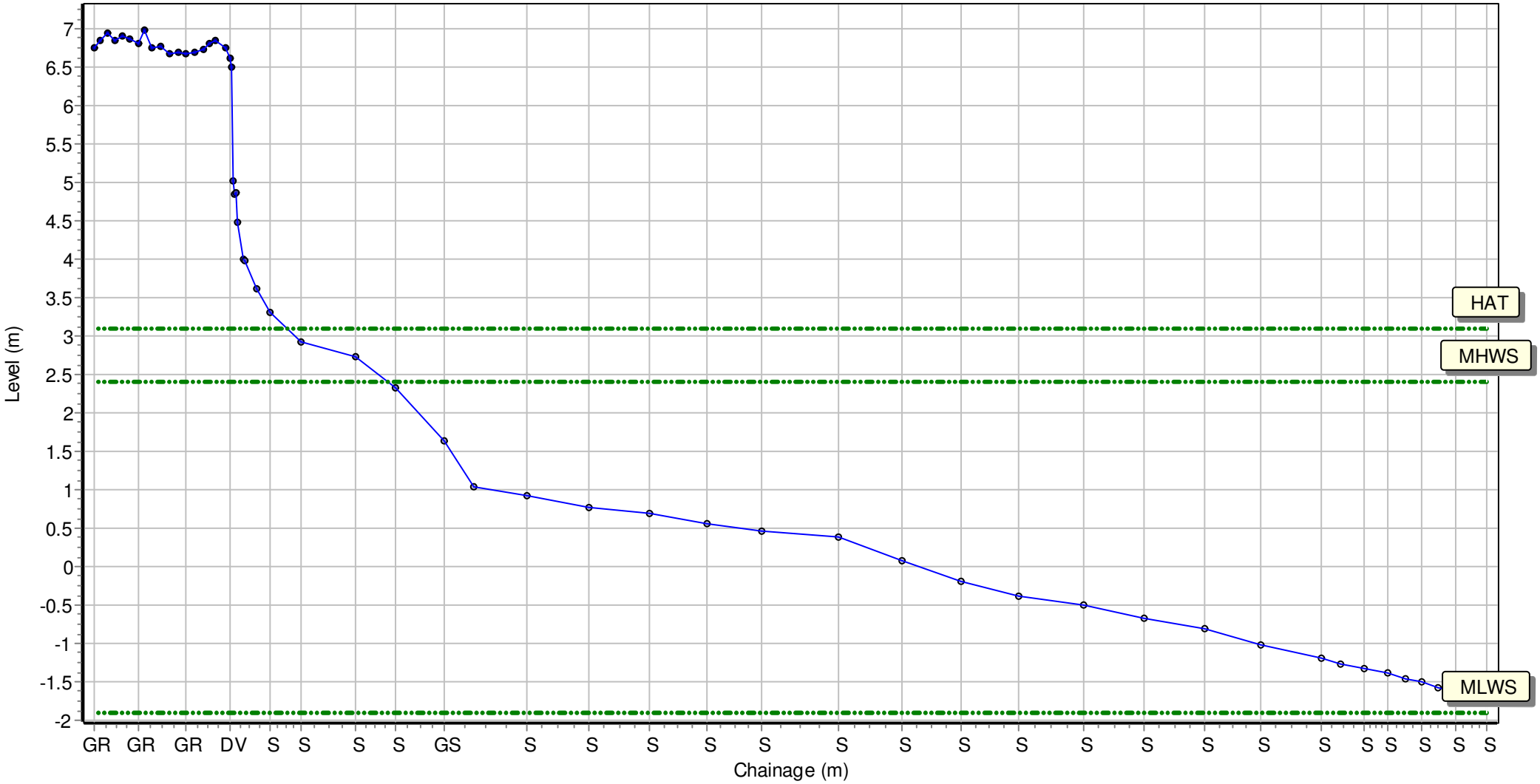
Location: **1aWDC12**

Date: 07/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430549.164 **Northing:** 584058.468 **Profile Bearing:** 73 ° from North



Beach Profile

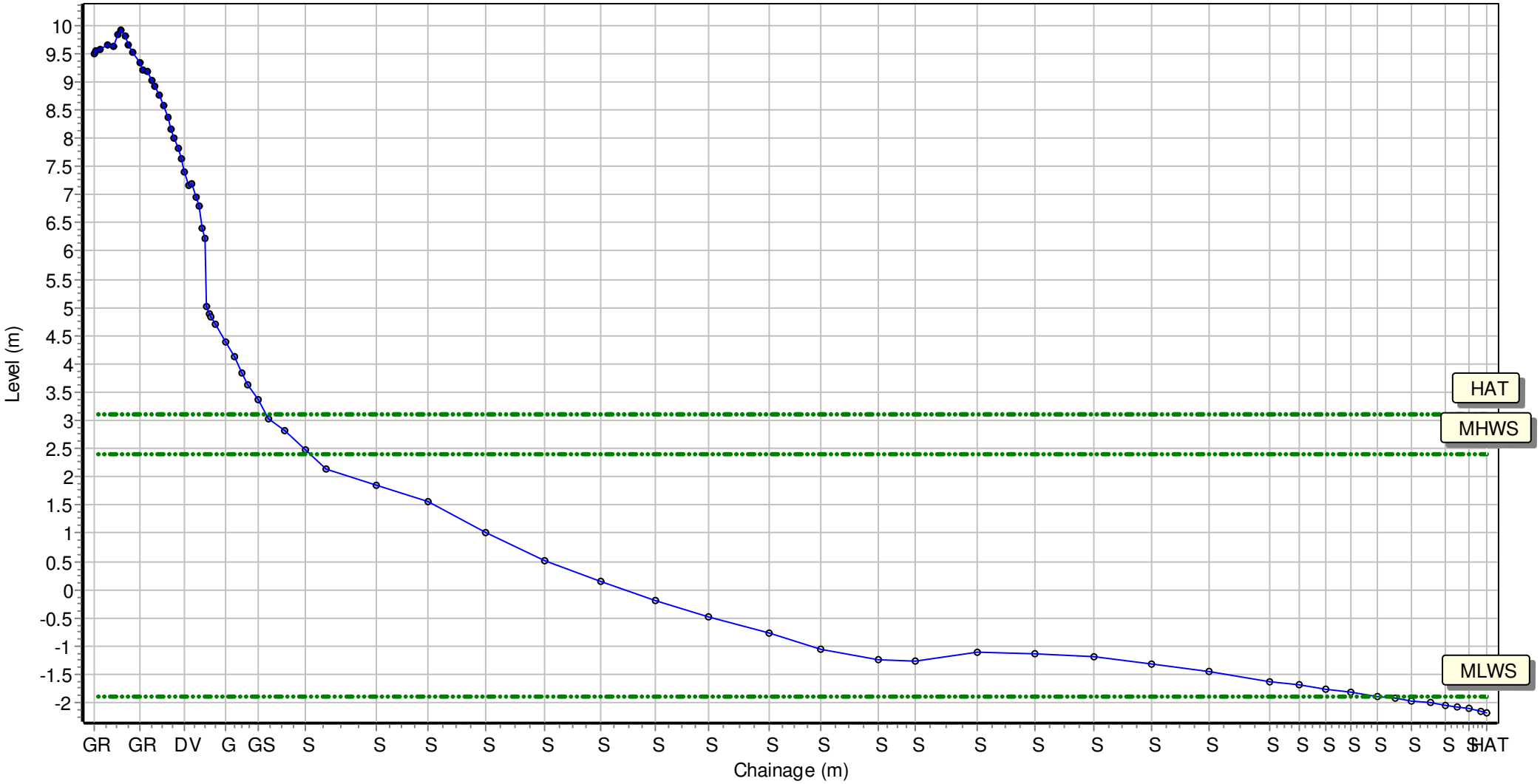
Location: 1aWDC13

Date: 07/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 430983.324 **Northing:** 583146.489 **Profile Bearing:** 62 ° from North



Beach Profile

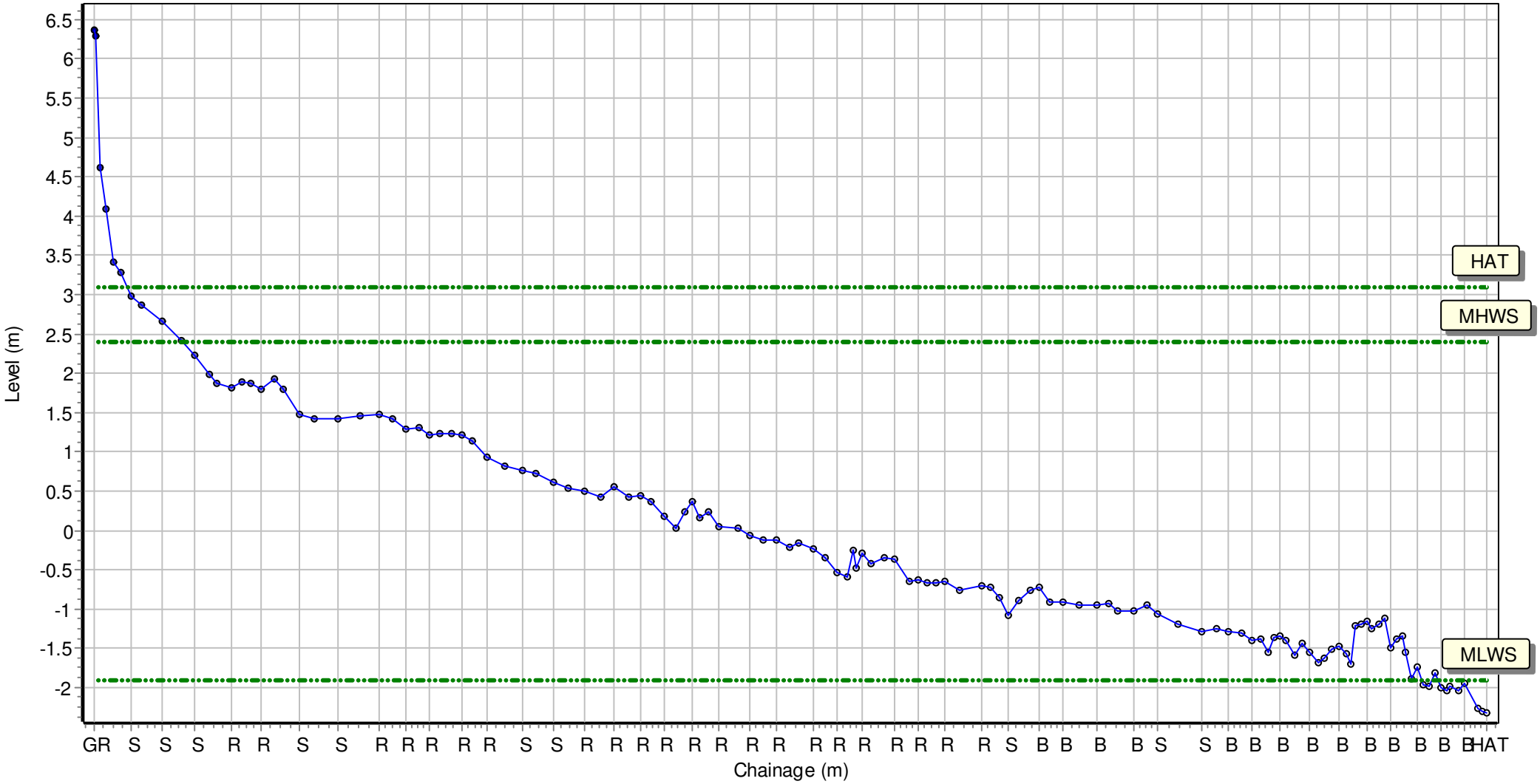
Location: **1aWDC14**

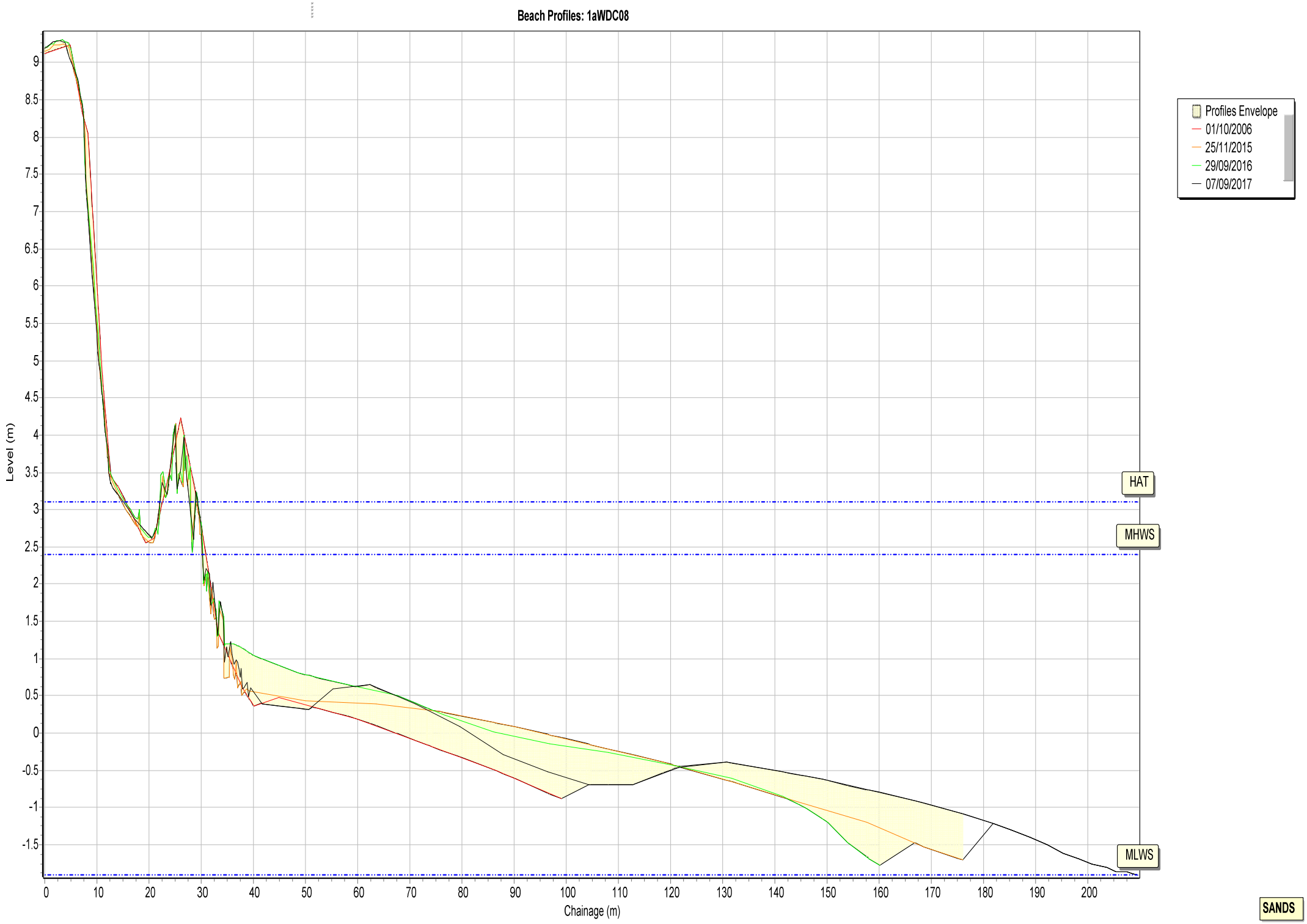
Date: 07/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 431317.646 **Northing:** 582642.372 **Profile Bearing:** 62 ° from North




Beach Profiles: 1aWDC08
Profiles Envelope
01/10/2006
25/11/2015
29/09/2016
07/09/2017
HAT
MHWS
MLWS
SANDS
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Chainage (m)
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3.5
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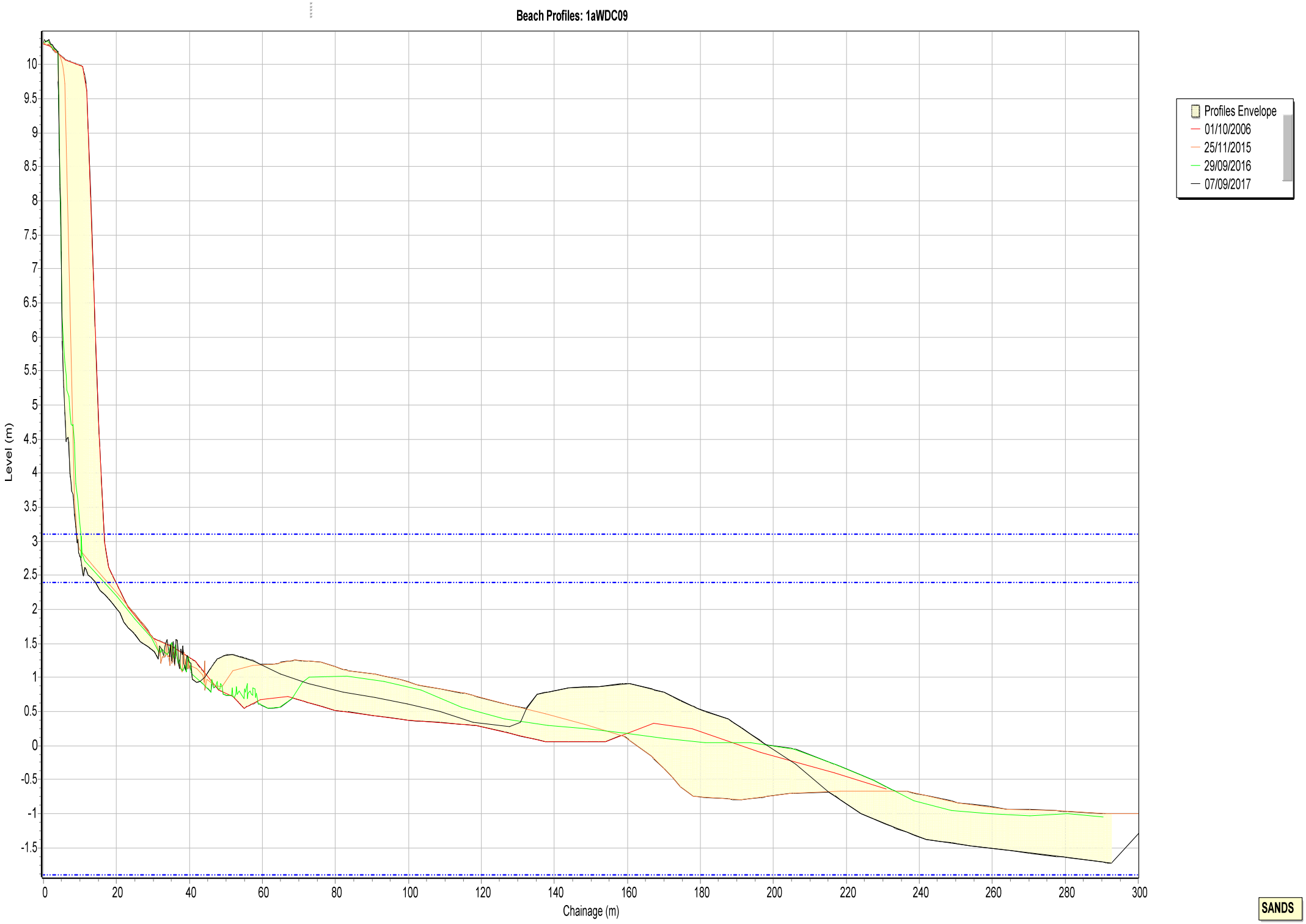
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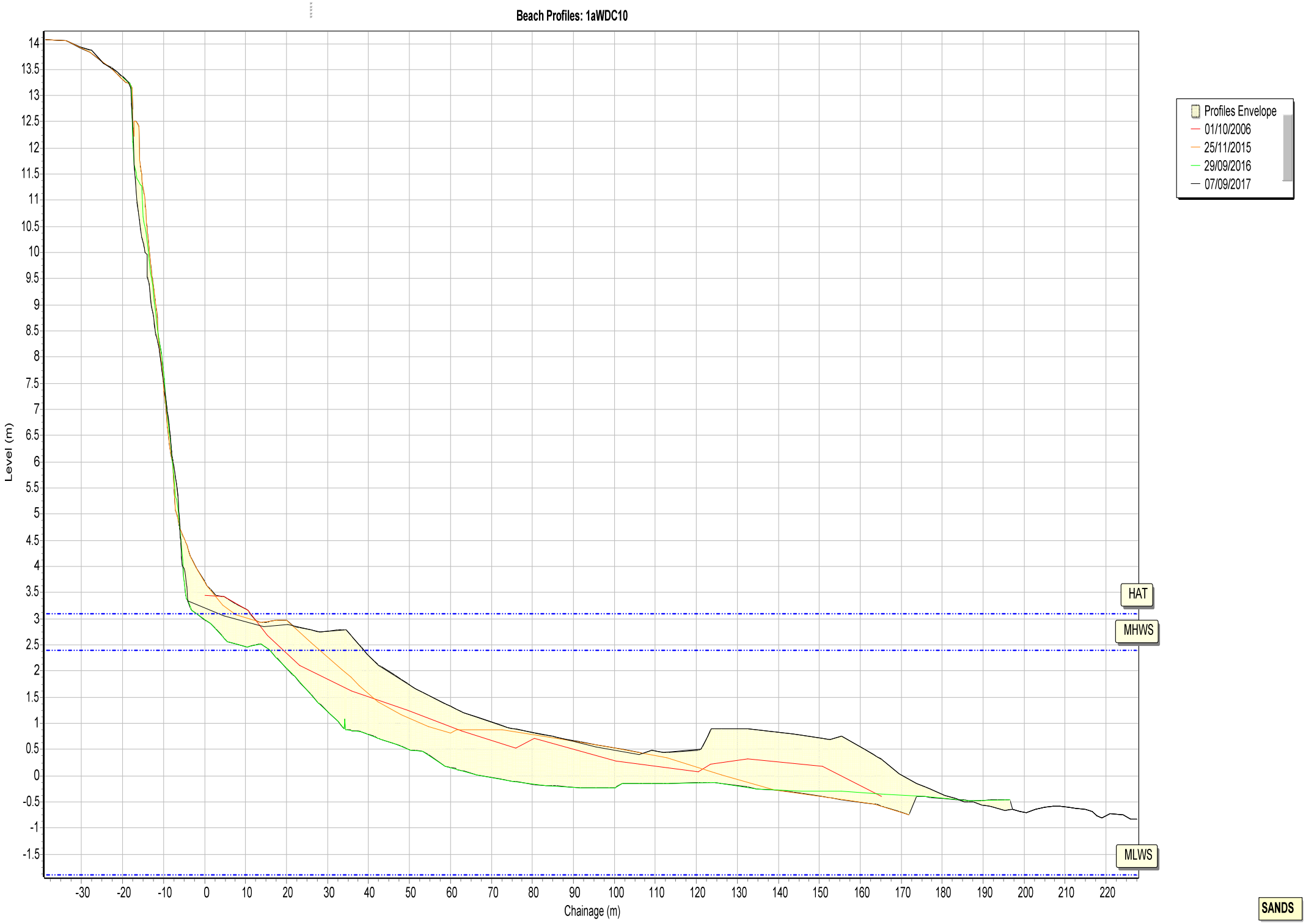
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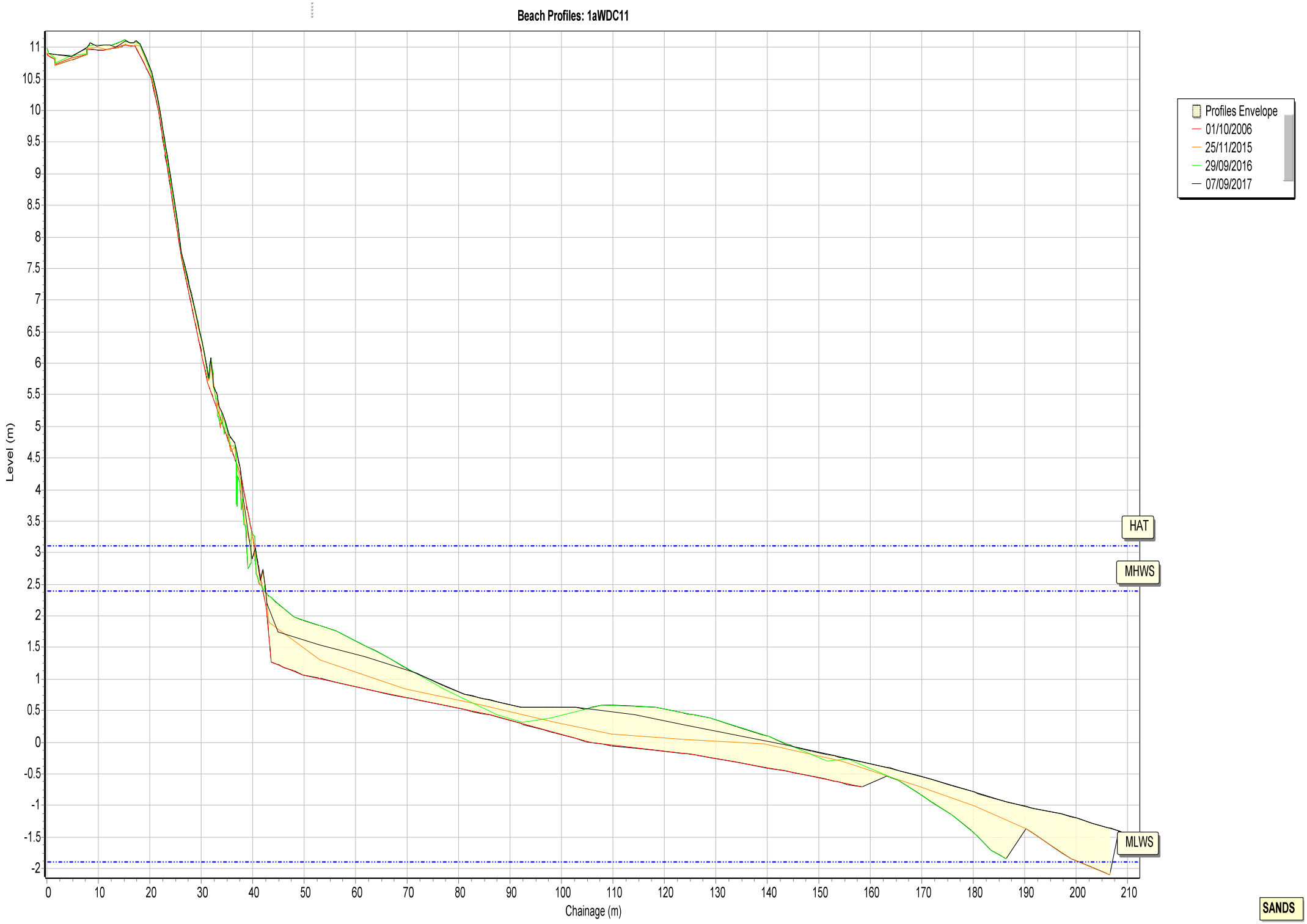
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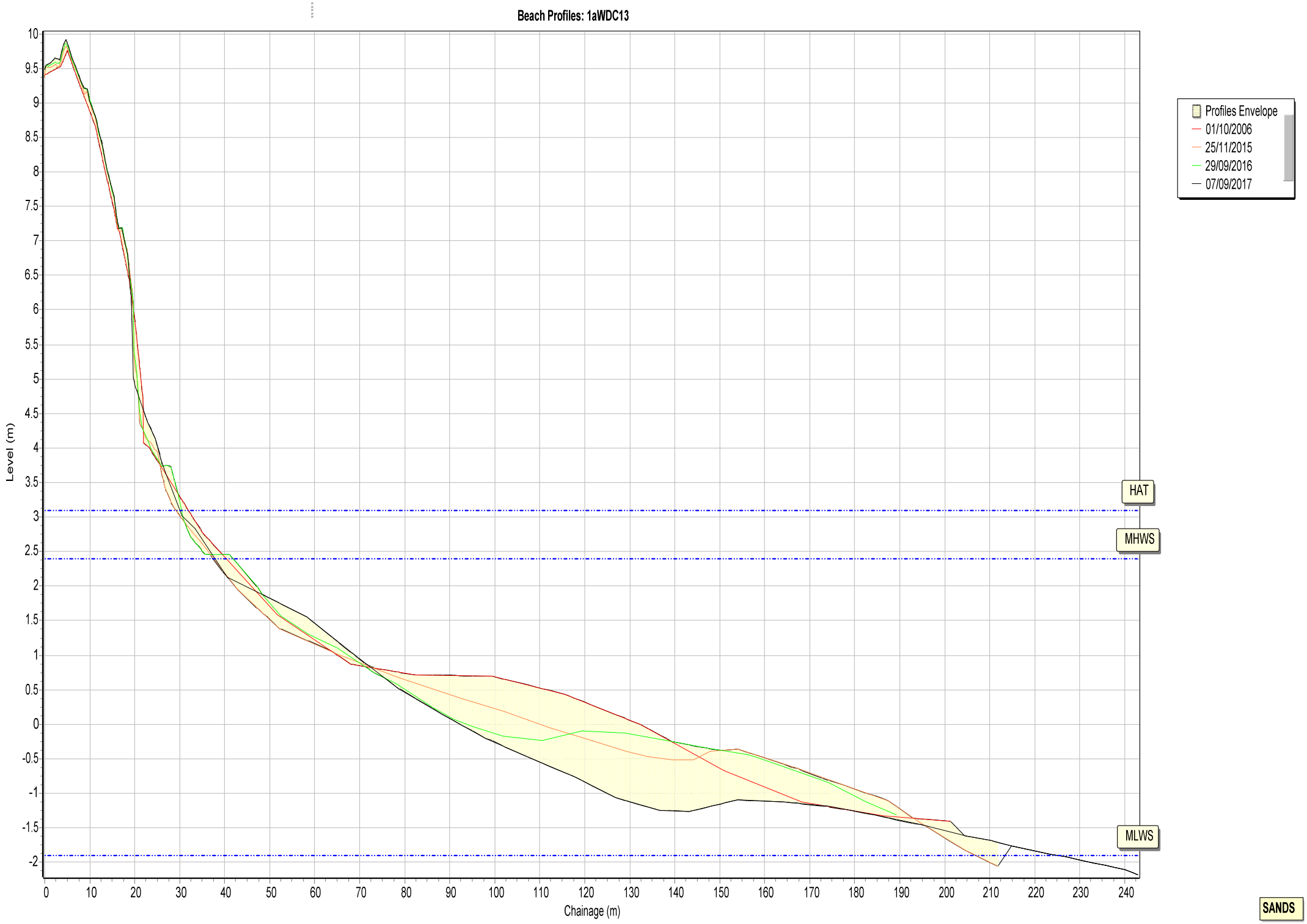
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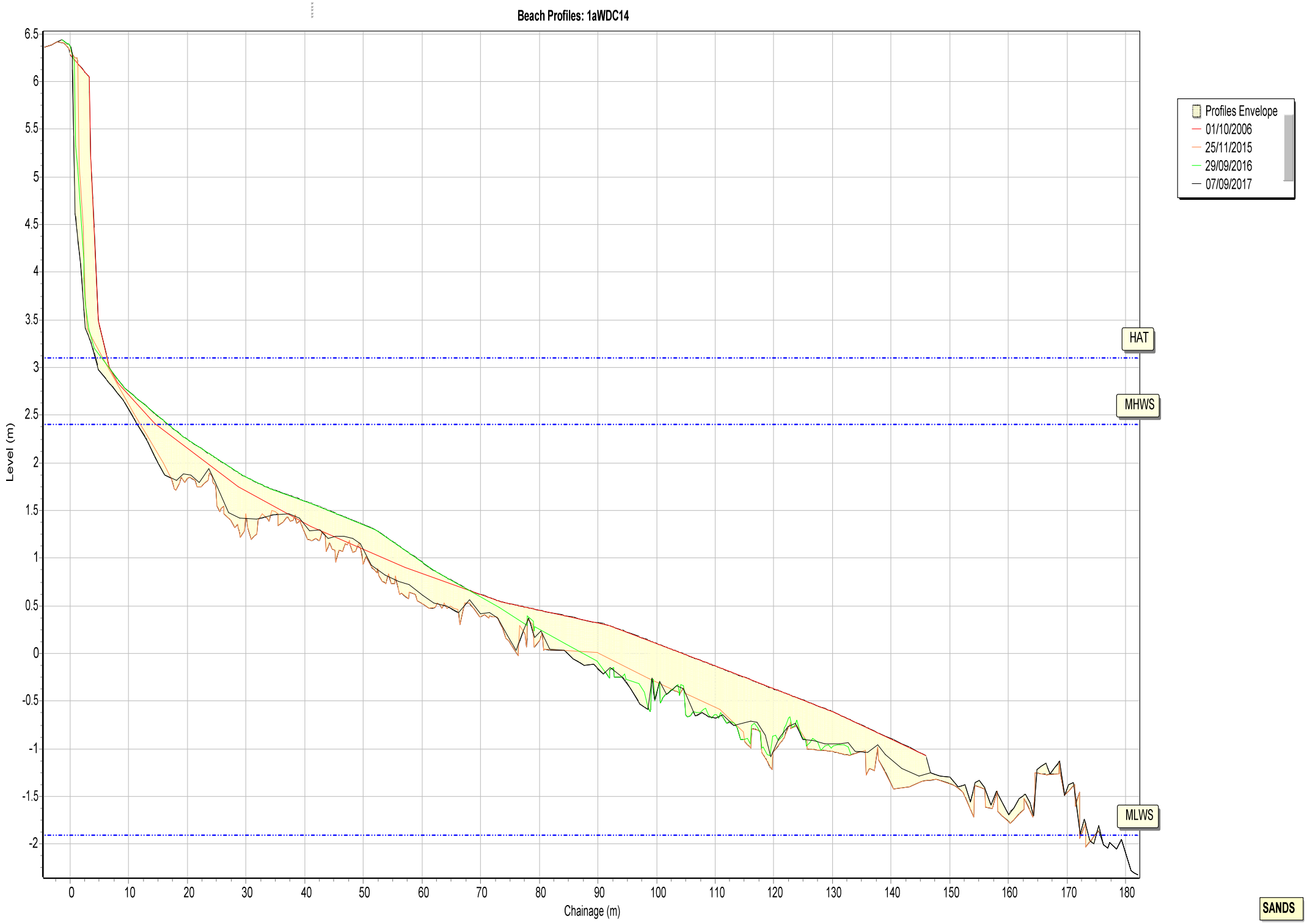
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150
160
170
180

Beach Profile

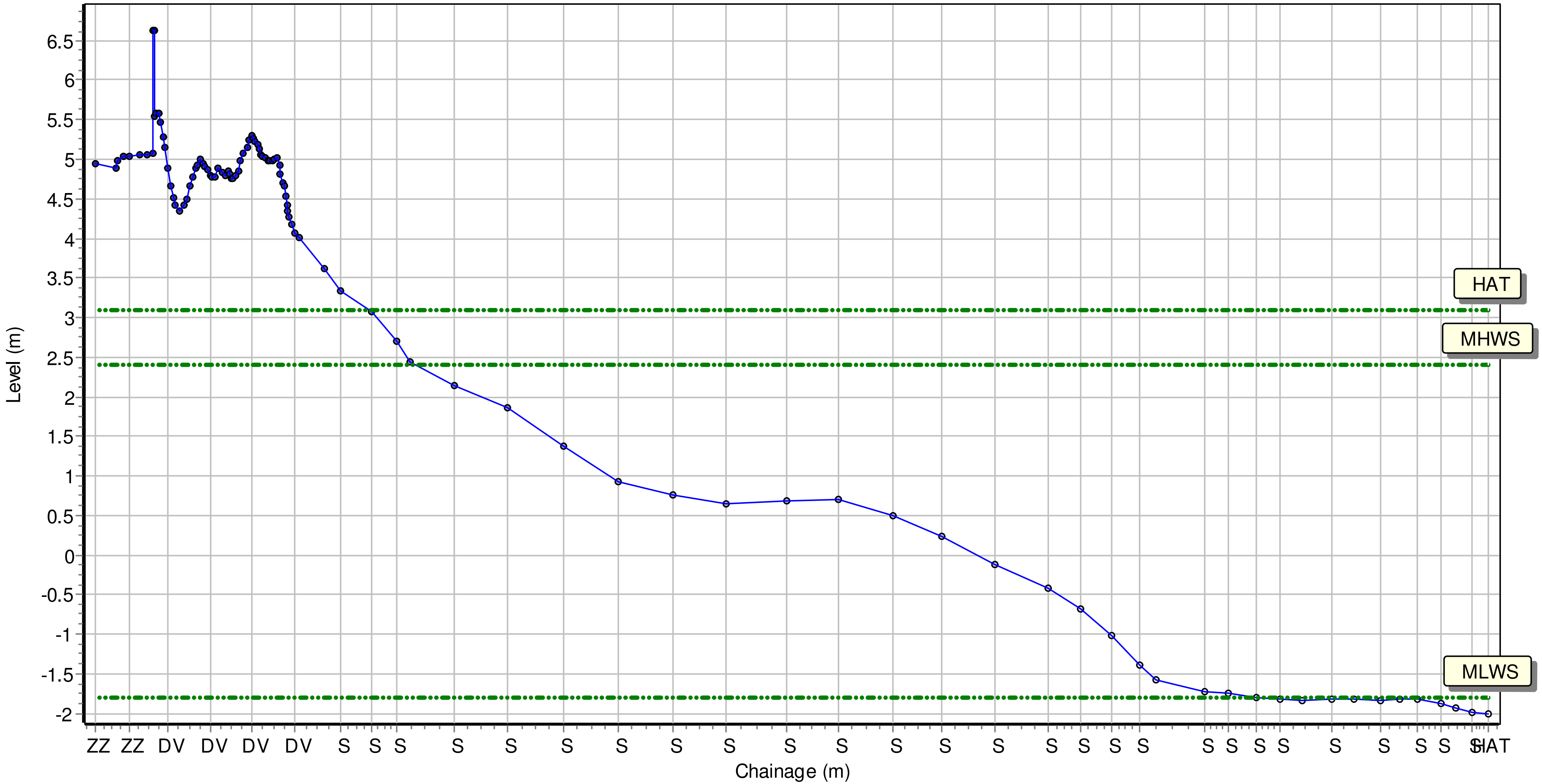
Location: **1aBVBC01**

Date: 06/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 432171.107 **Northing:** 580411.515 **Profile Bearing:** 113 ° from North



Beach Profile

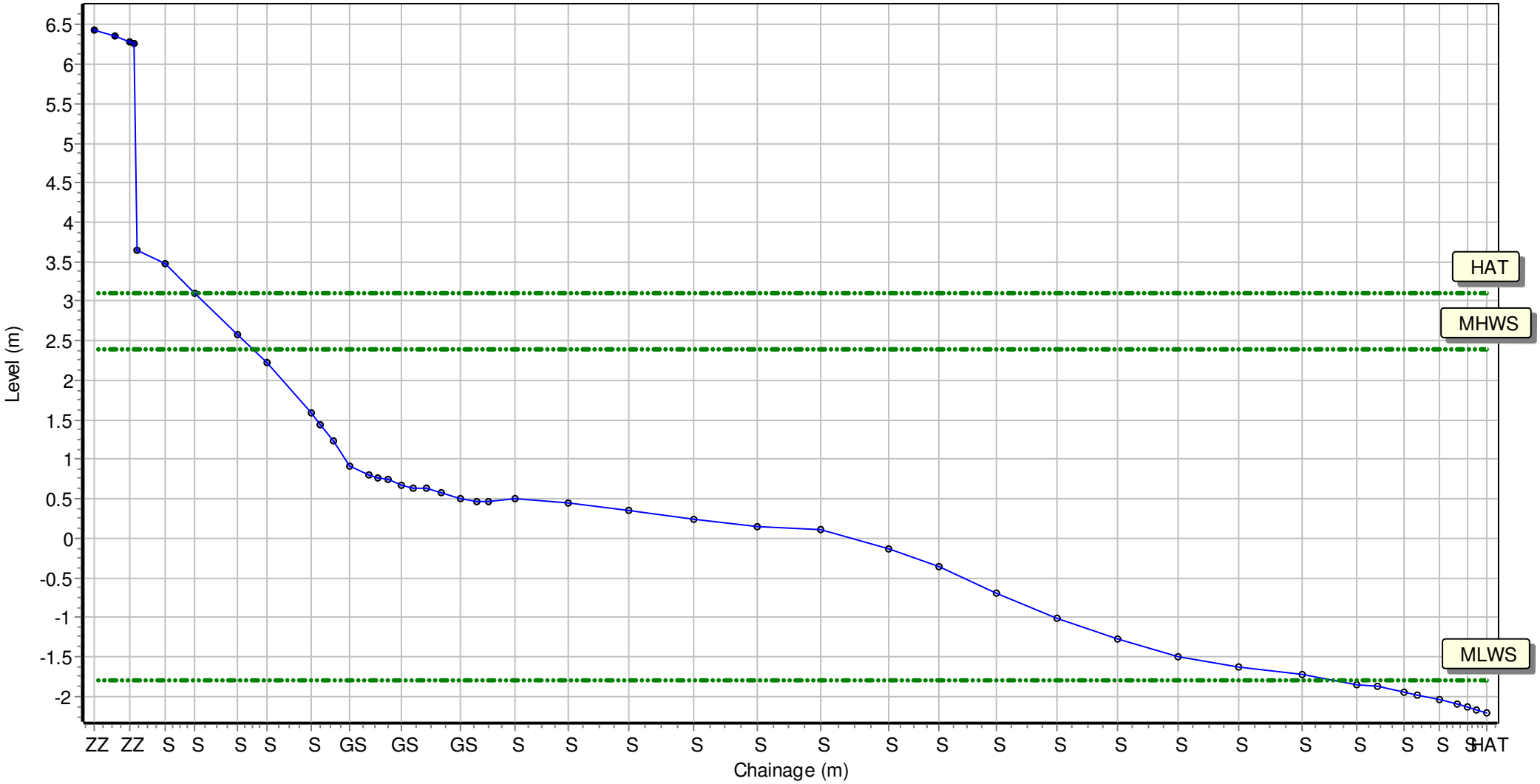
Location: **1aBVBC02**

Date: 06/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 432072.788 **Northing:** 579668.162 **Profile Bearing:** 77 ° from North



Beach Profile

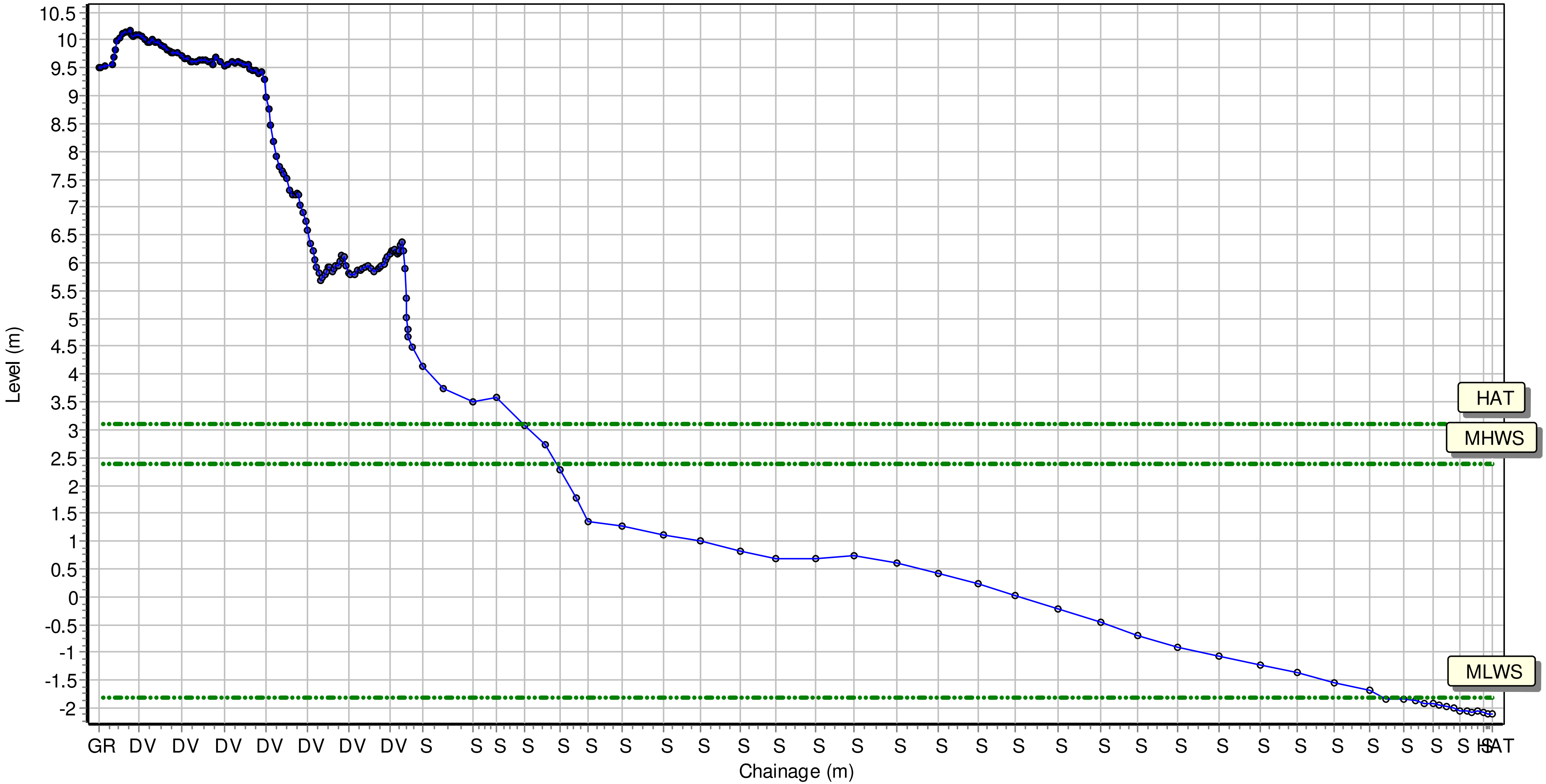
Location: 1aBVBC03

Date: 06/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 432120.659 **Northing:** 578982.375 **Profile Bearing:** 71 ° from North



http://www.sandsuser.com

SANDS

Beach Profile

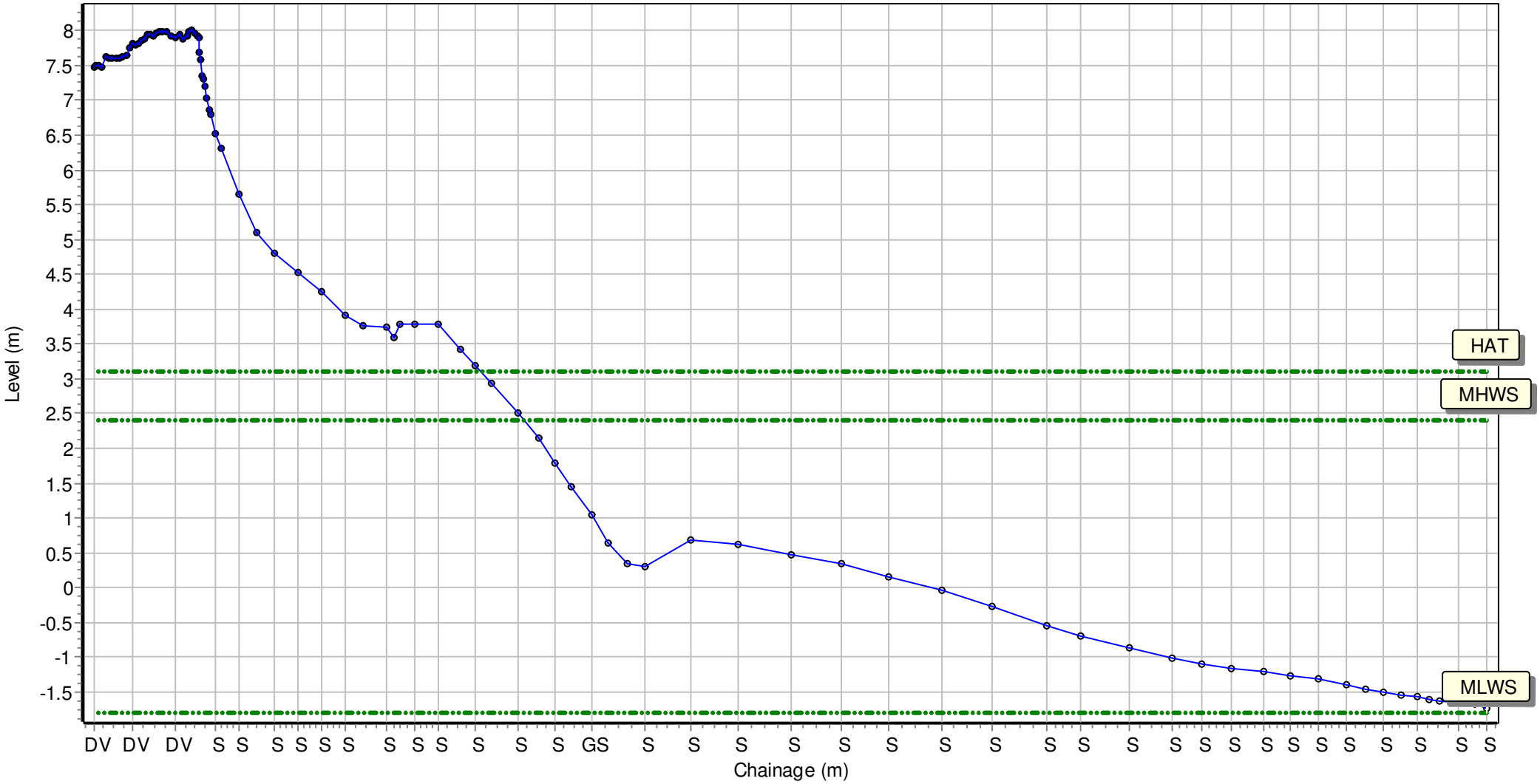
Location: **1aBVBC04**

Date: 06/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 432398.19 **Northing:** 578463.878 **Profile Bearing:** 60 ° from North



Beach Profile

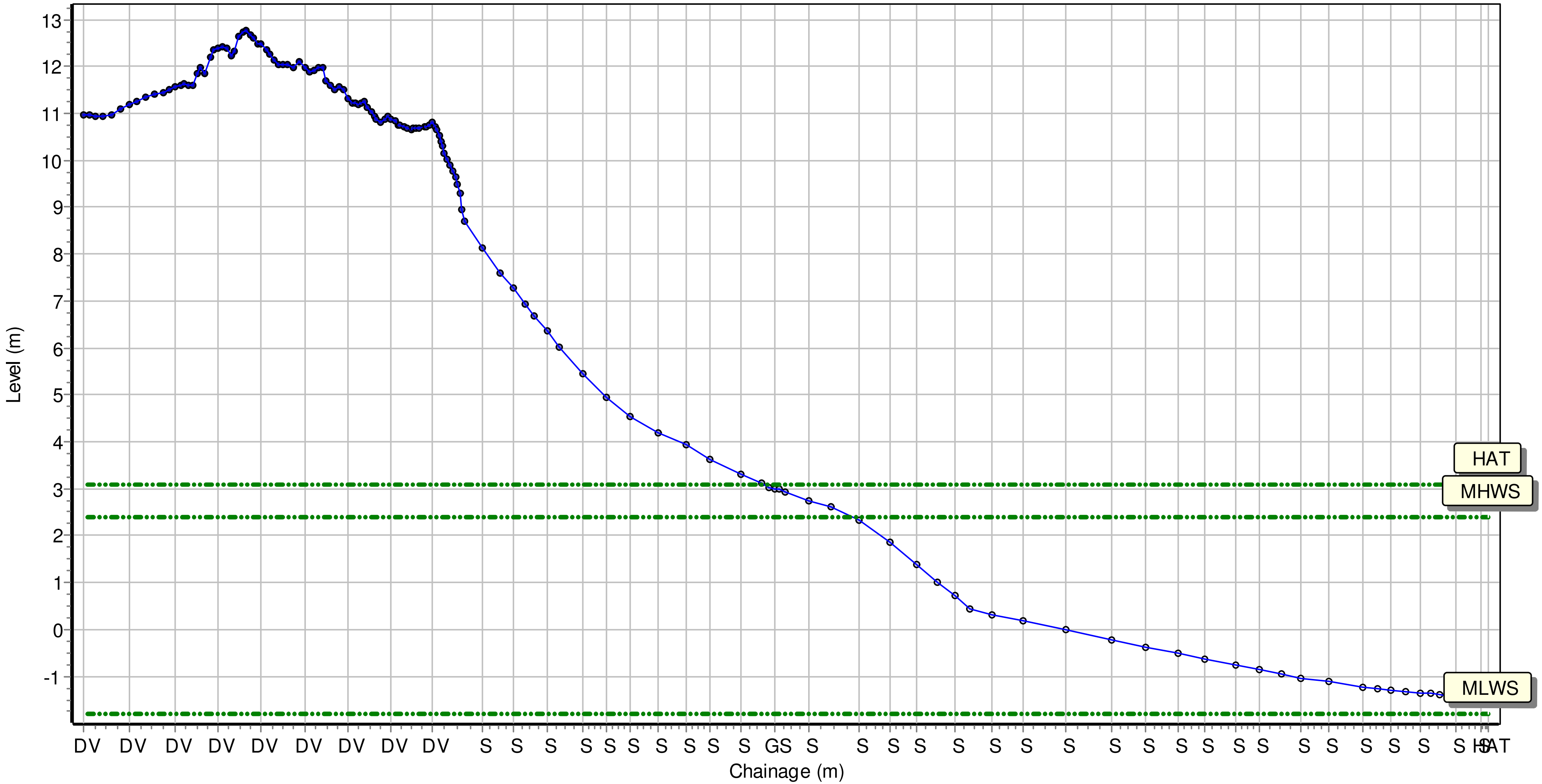
Location: **1aBVBC05**

Date: 06/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 432667.046 **Northing:** 577891.873 **Profile Bearing:** 60 ° from North



http://www.sandsuser.com

SANDS

Beach Profile

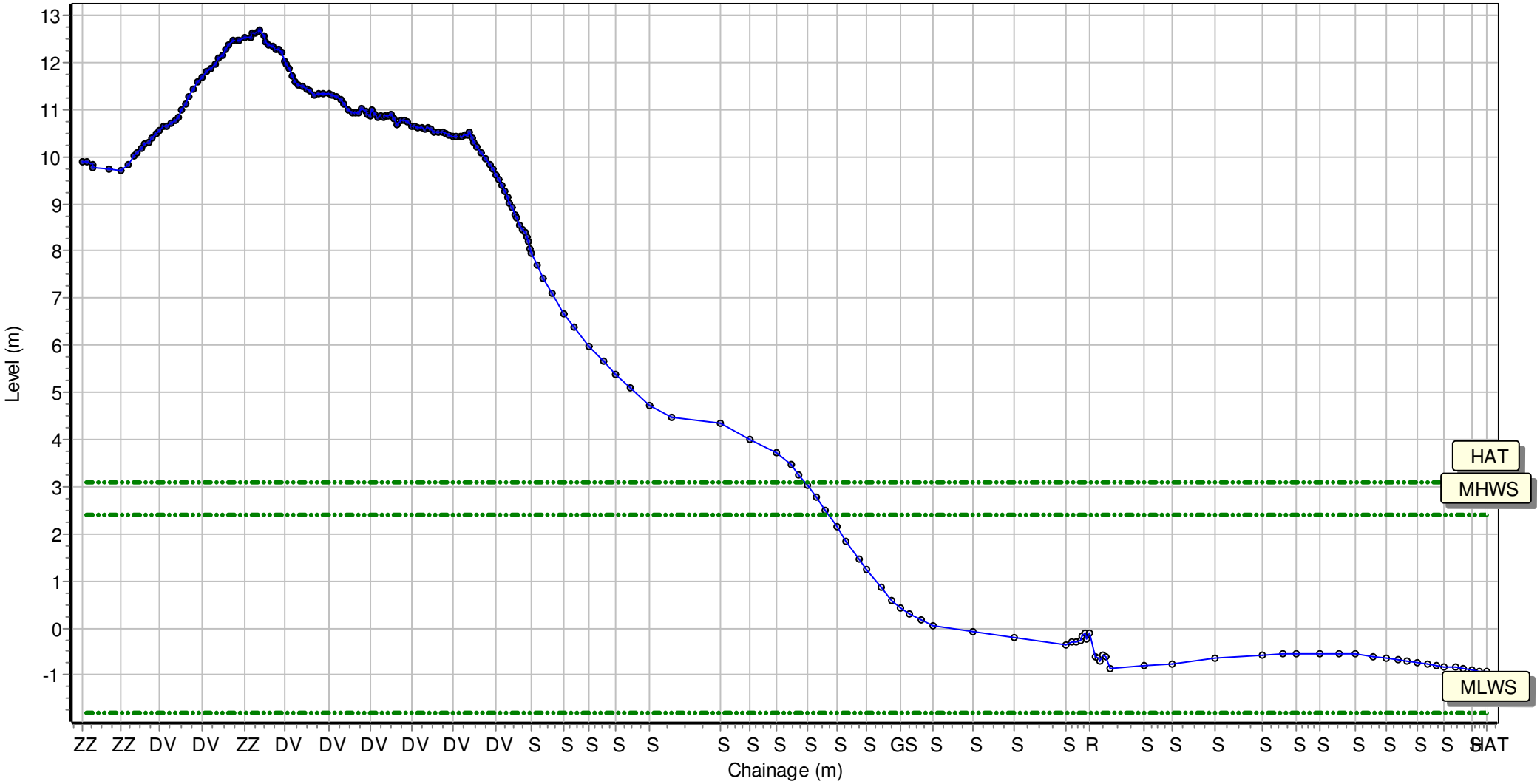
Location: **1aBVBC06**

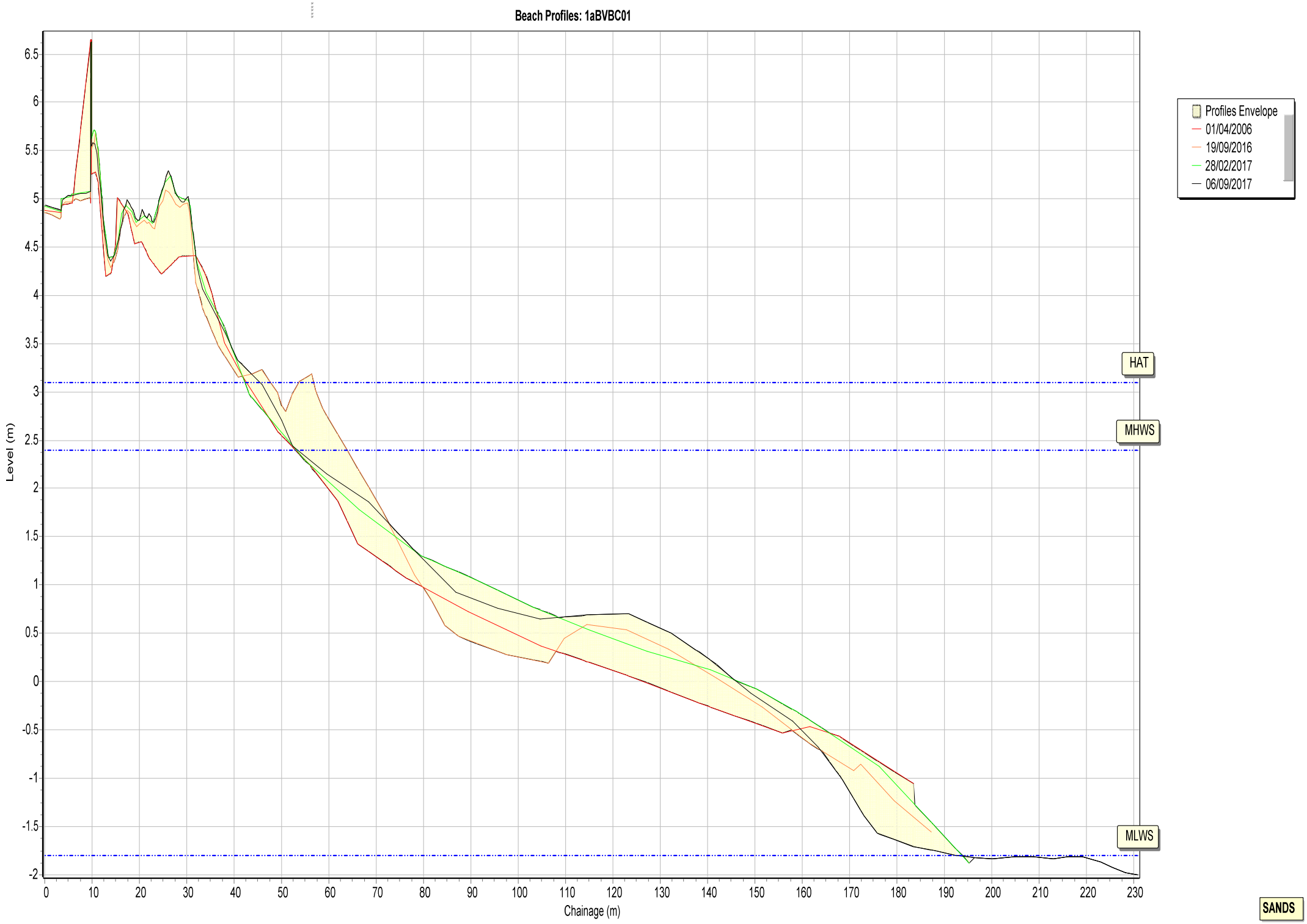
Date: 06/09/2017 **Inspector:** AG **Low Tide:** **Low Tide Time:**

Wind **Sea State:** **Visibility:** **Rain:**

Summary: 2017 Full Measures Topo Survey

Easting: 433247.516 **Northing:** 577032.054 **Profile Bearing:** 53 ° from North

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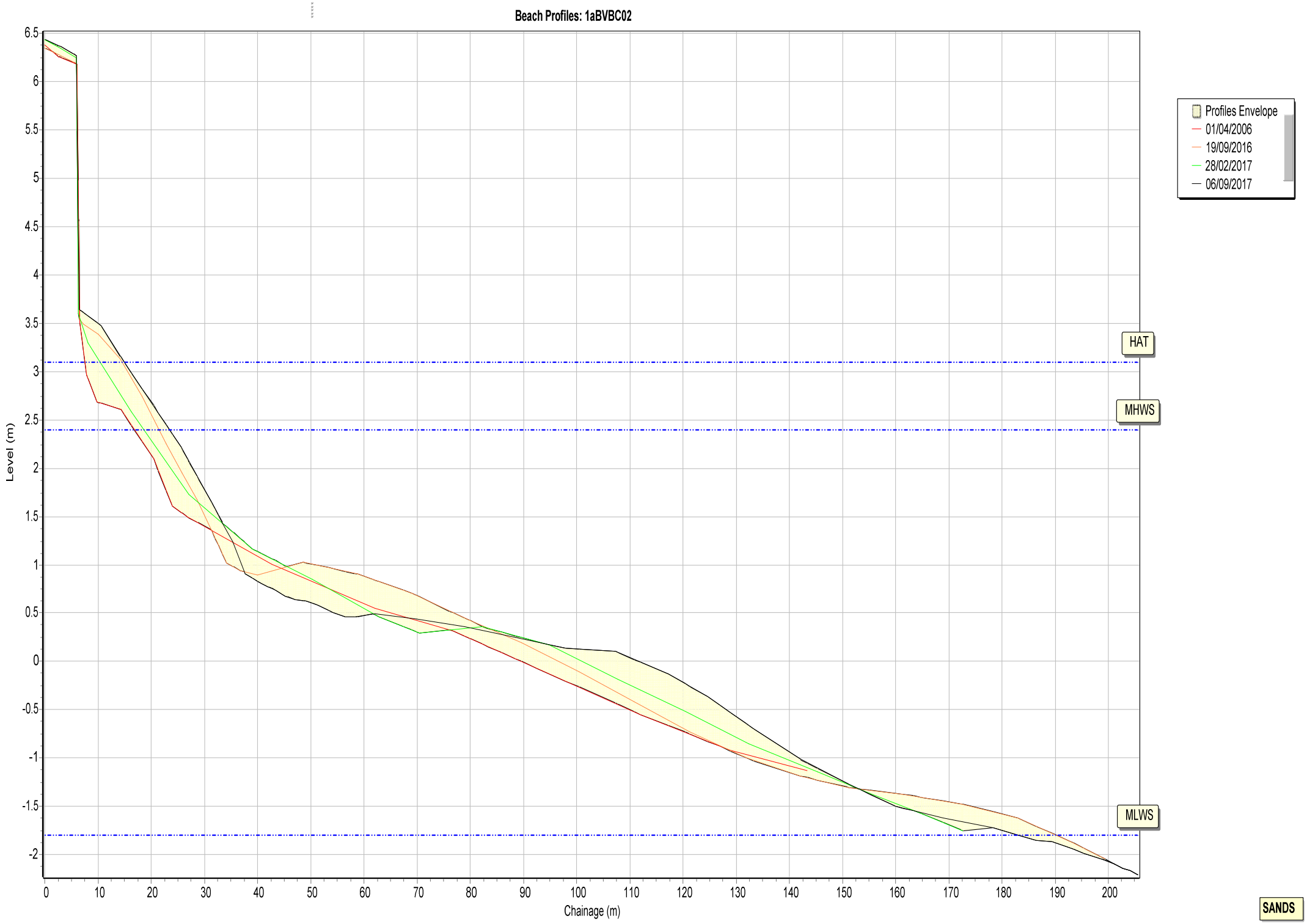
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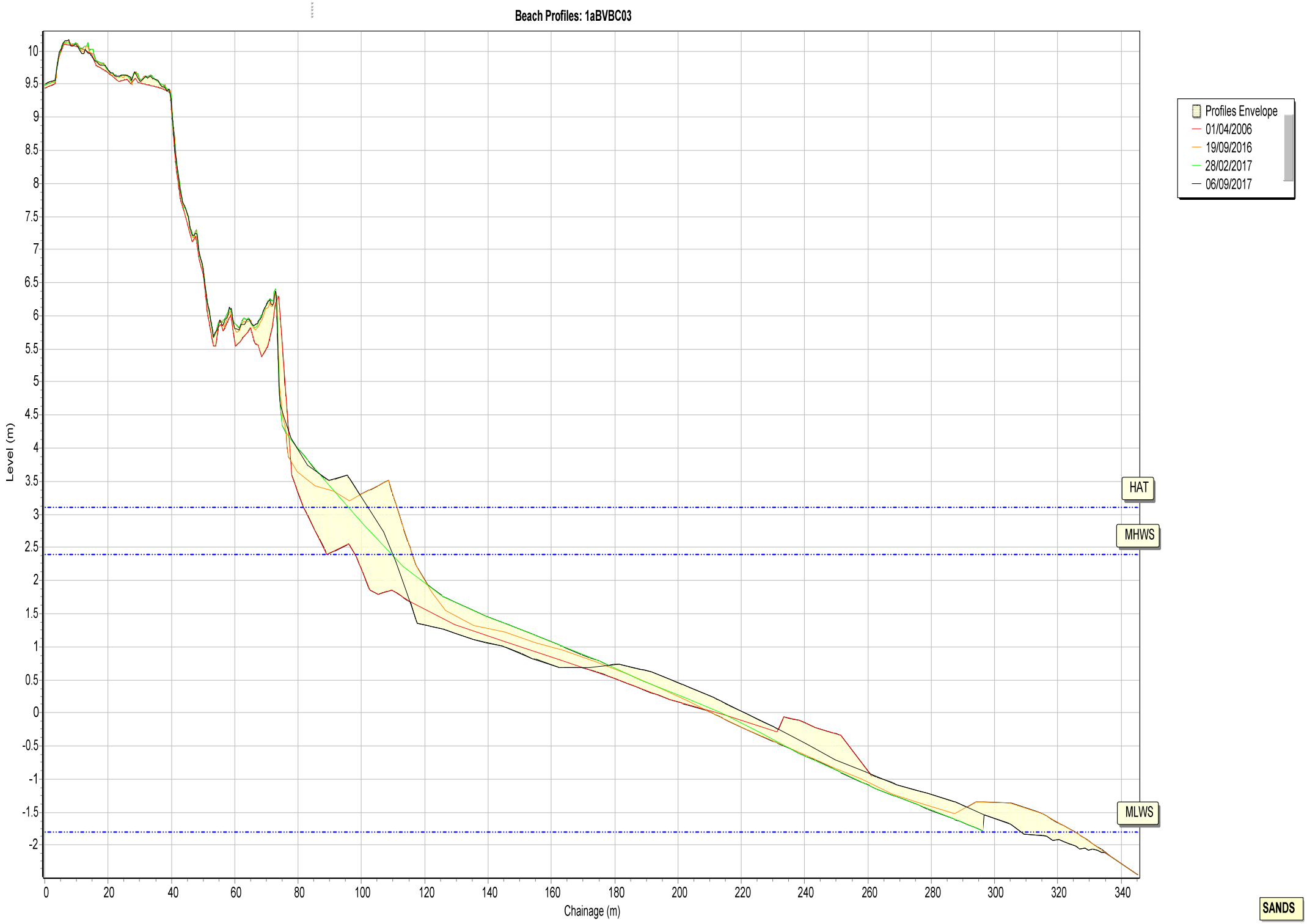
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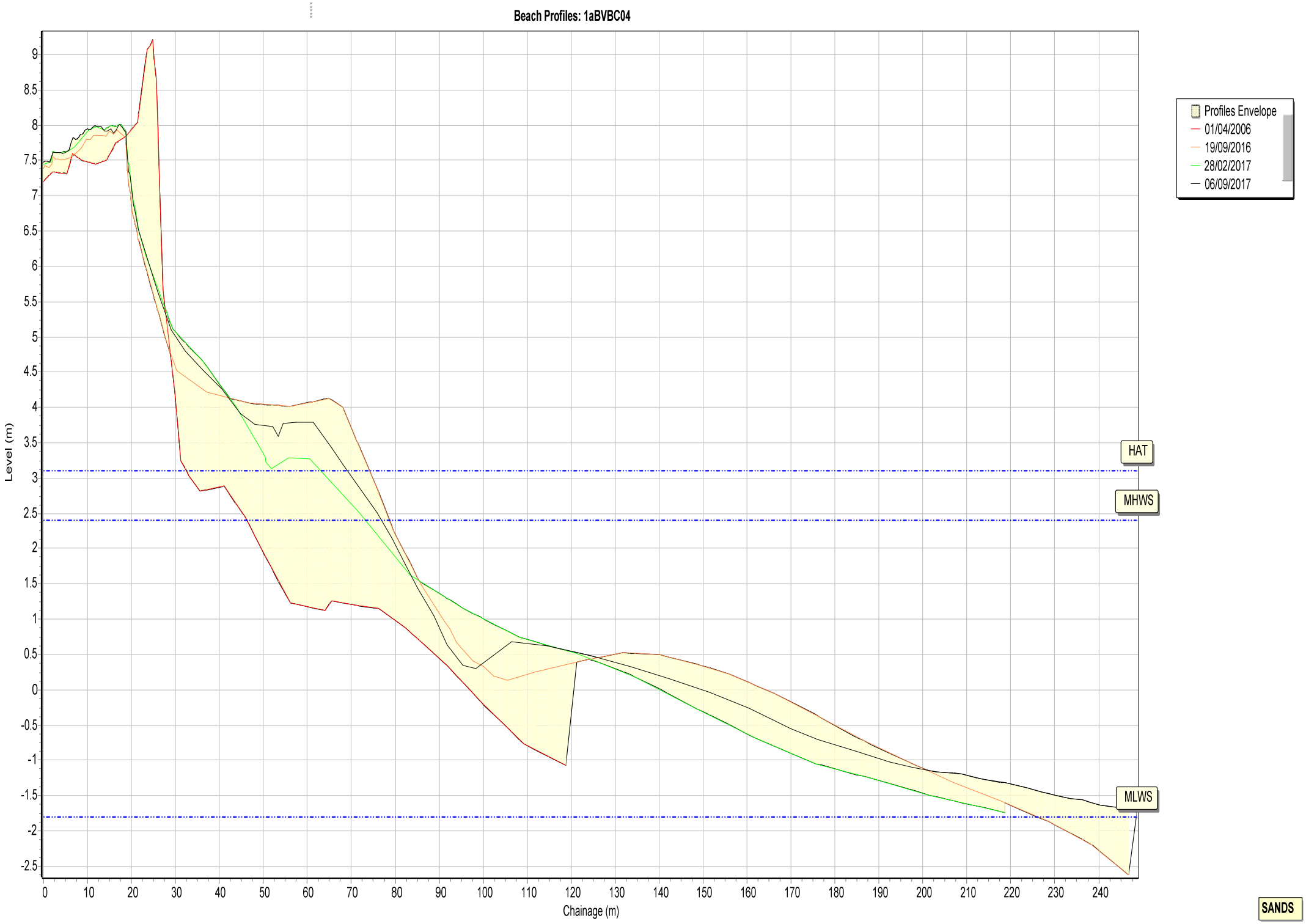
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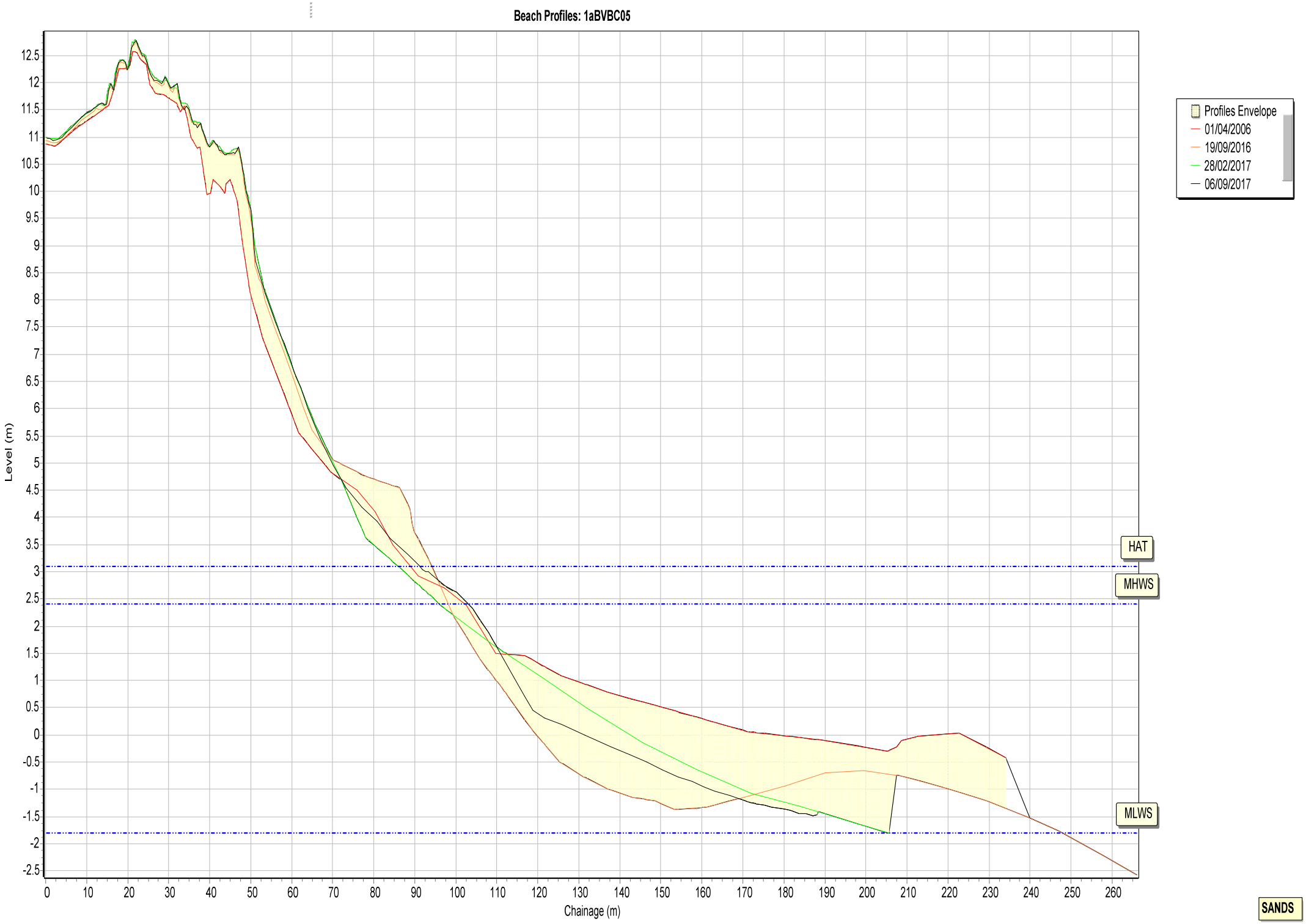
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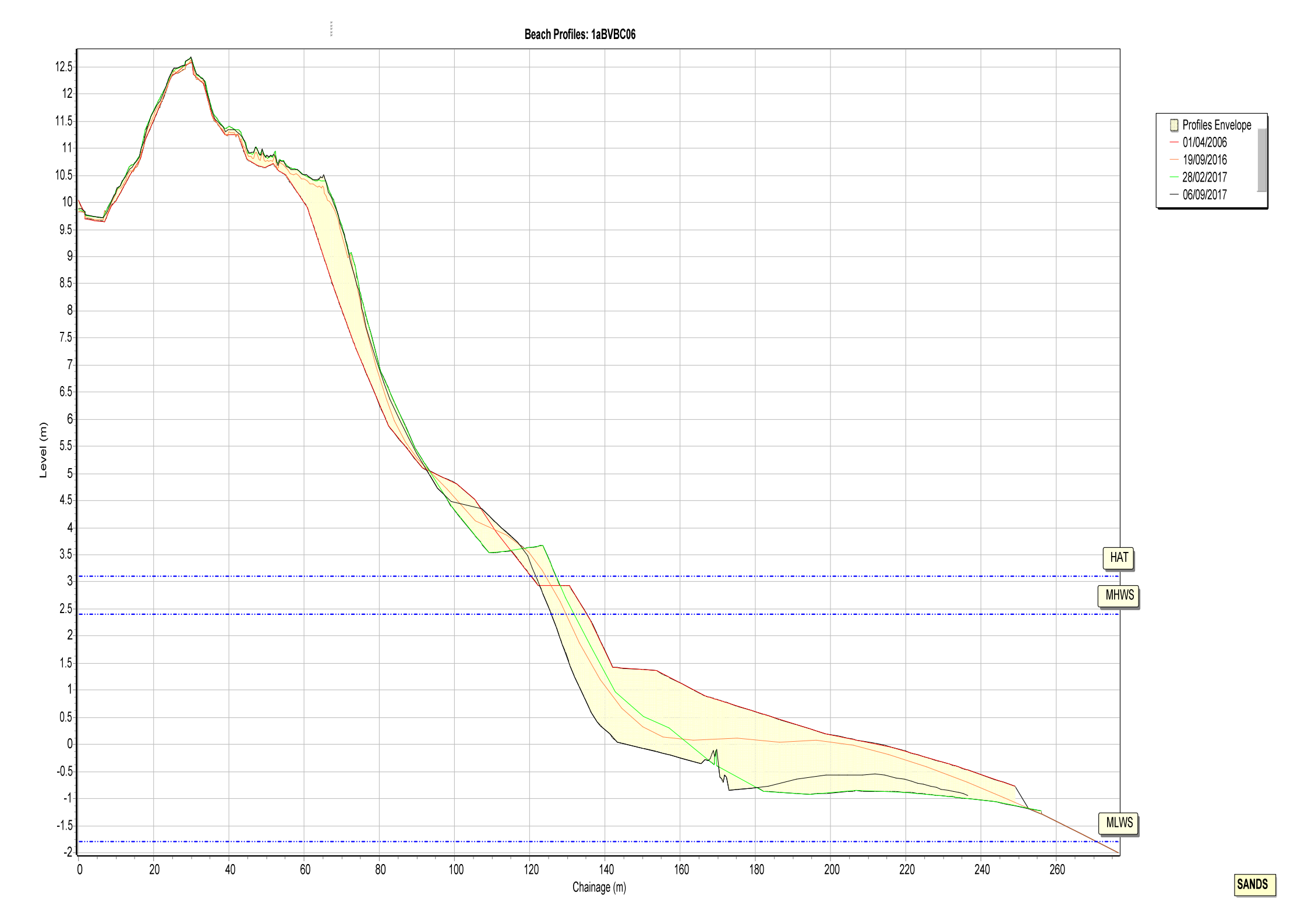
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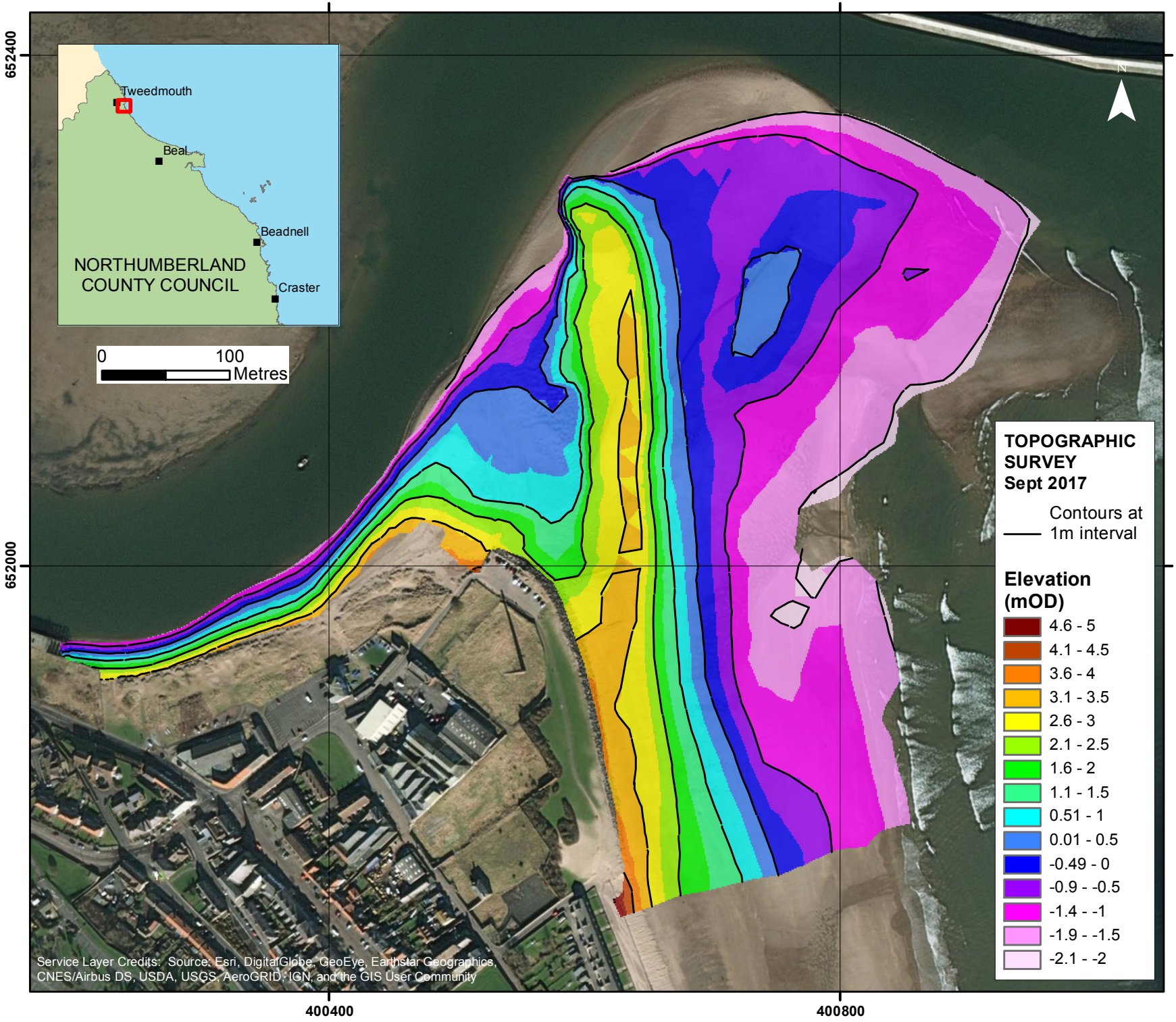
Appendix B

Topographic Survey



Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Appendix B - Map 1

BERWICK

Northumberland County Council Frontage

Analytical Report
'Full Measures' Survey 2017

Drawing Scale at A4 1:4,000

WATER
Royal HaskoningDHV
Marlborough House
Marlborough Crescent
Newcastle upon Tyne
NE1 4EE

Tel: +44 (0)191 211 1300
Fax: +44 (0)191 211 1313
www.royalhaskoningdhv.com

Royal HaskoningDHV
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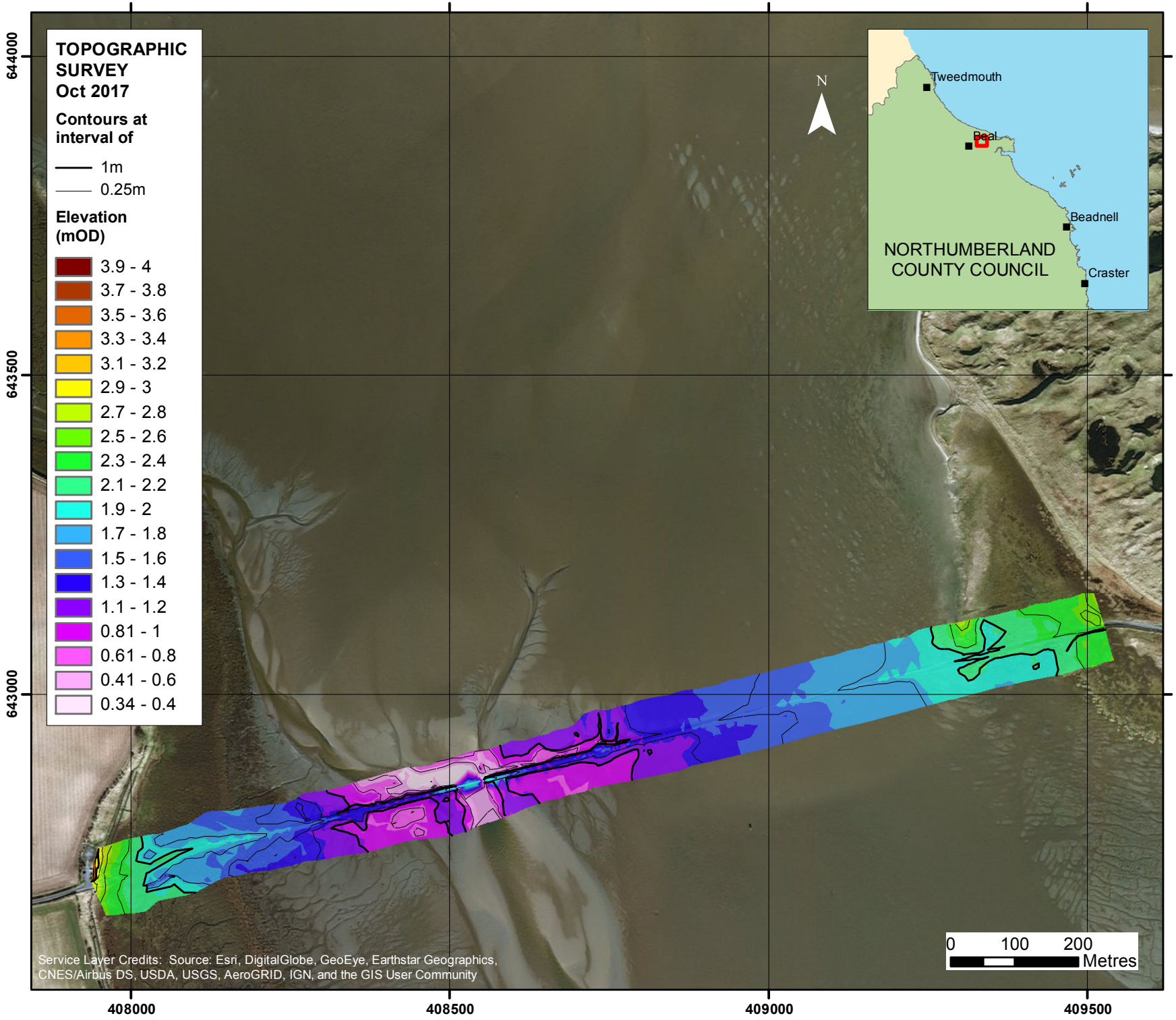

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Appendix B - Map 2

HOLY ISLAND CAUSEWAY

Northumberland County Council Frontage

Analytical Report
'Full Measures' Survey 2017

Drawing Scale at A4 1:8,000

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Newcastle upon Tyne
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www.royalhaskoningdhv.com

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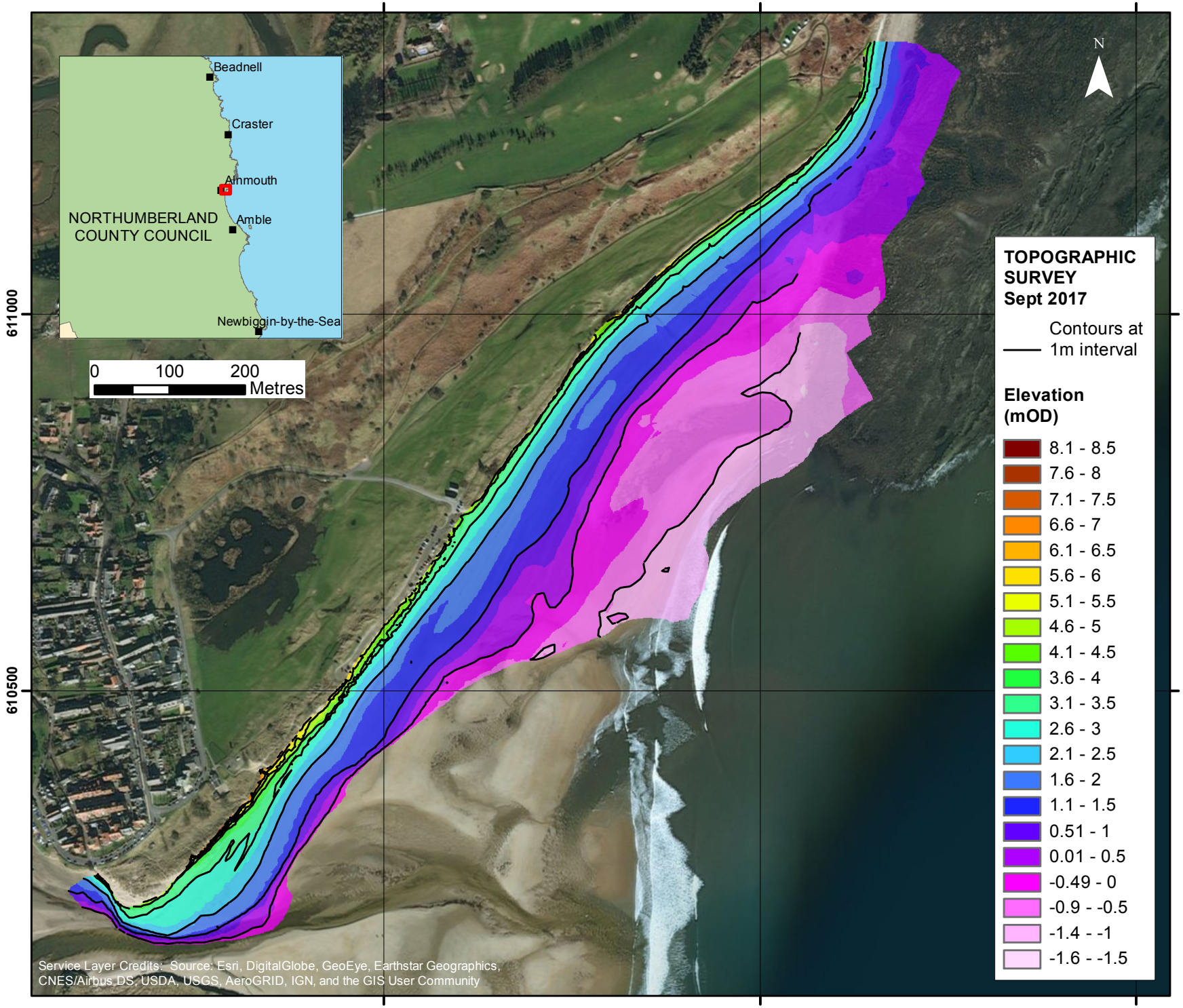

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Appendix B - Map 3

ALNMOUTH

Northumberland County Council Frontage

Analytical Report
'Full Measures' Survey 2017

Drawing Scale at A4 1:6,821

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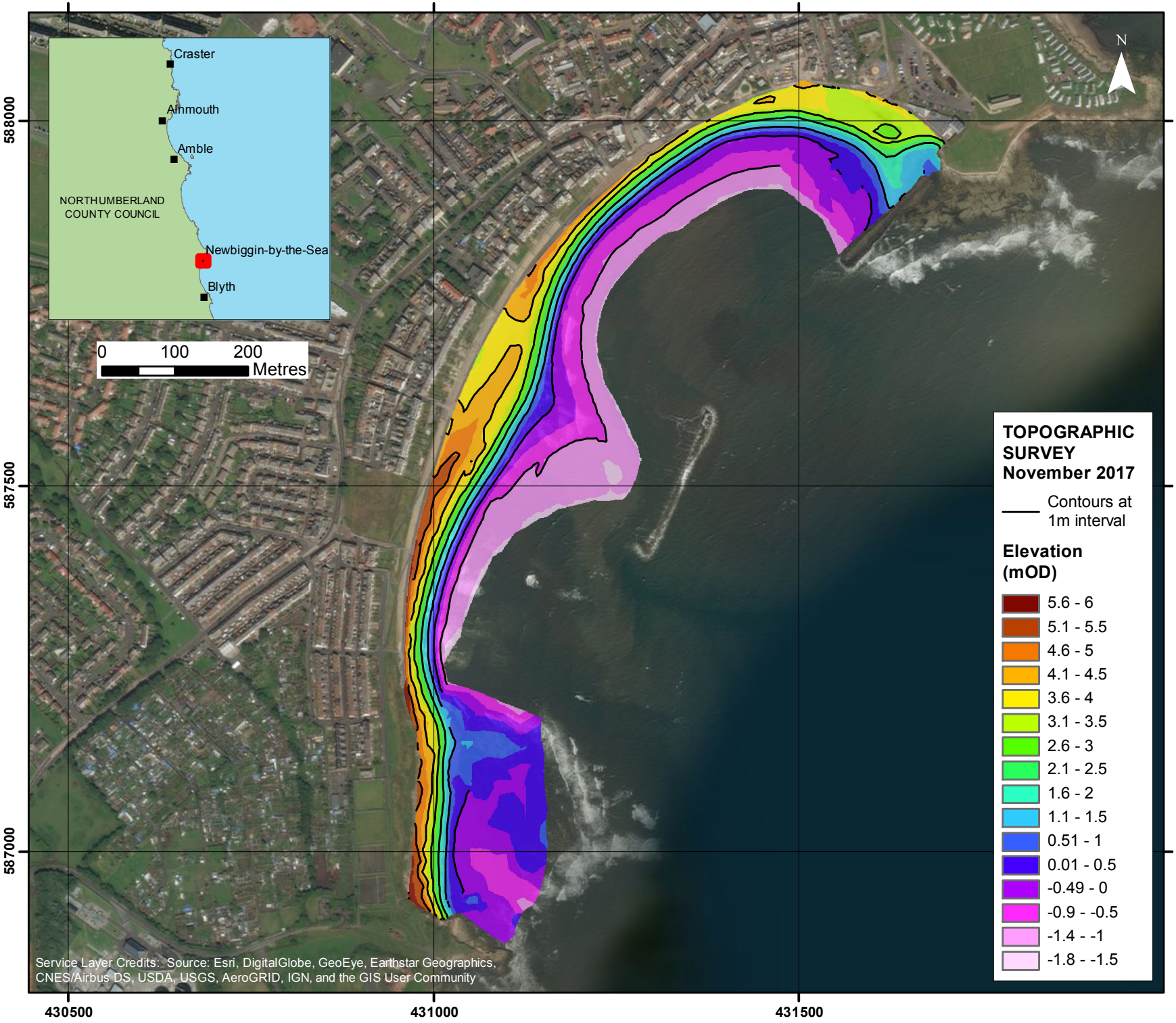

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Appendix B - Map 4

NEWBIGGIN-BY-THE-SEA

Northumberland County Council Frontage

Analytical Report
'Full Measures' Survey 2017

Drawing Scale at A4 1:7,000

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Fax: +44 (0)191 211 1313
www.royalhaskoningdhv.com

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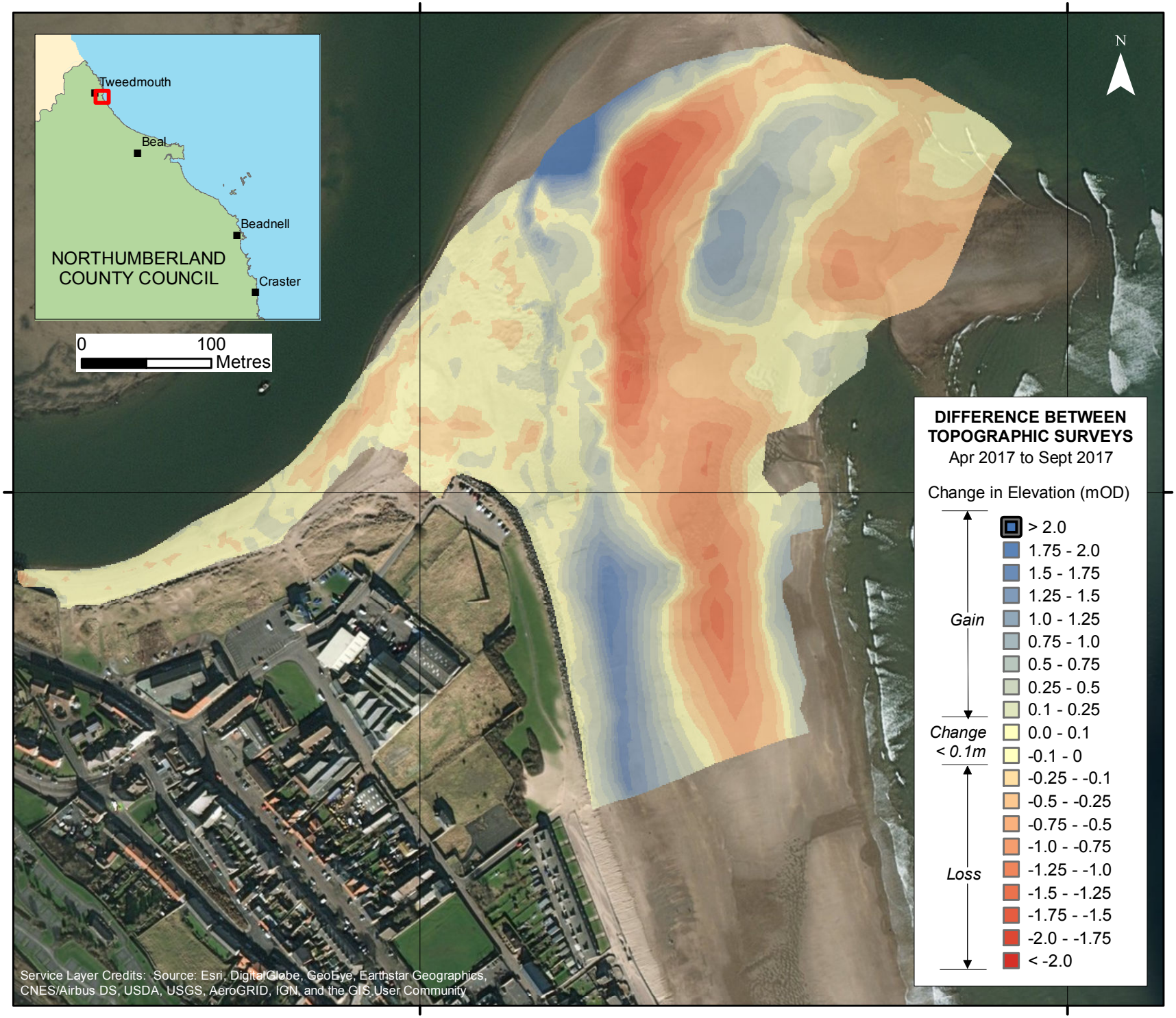

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Appendix B - Map 5

BERWICK

Northumberland County Council Frontage

Analytical Report
'Full Measures' Survey 2017

Drawing Scale at A4 1:4,000

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Fax: +44 (0)191 211 1313
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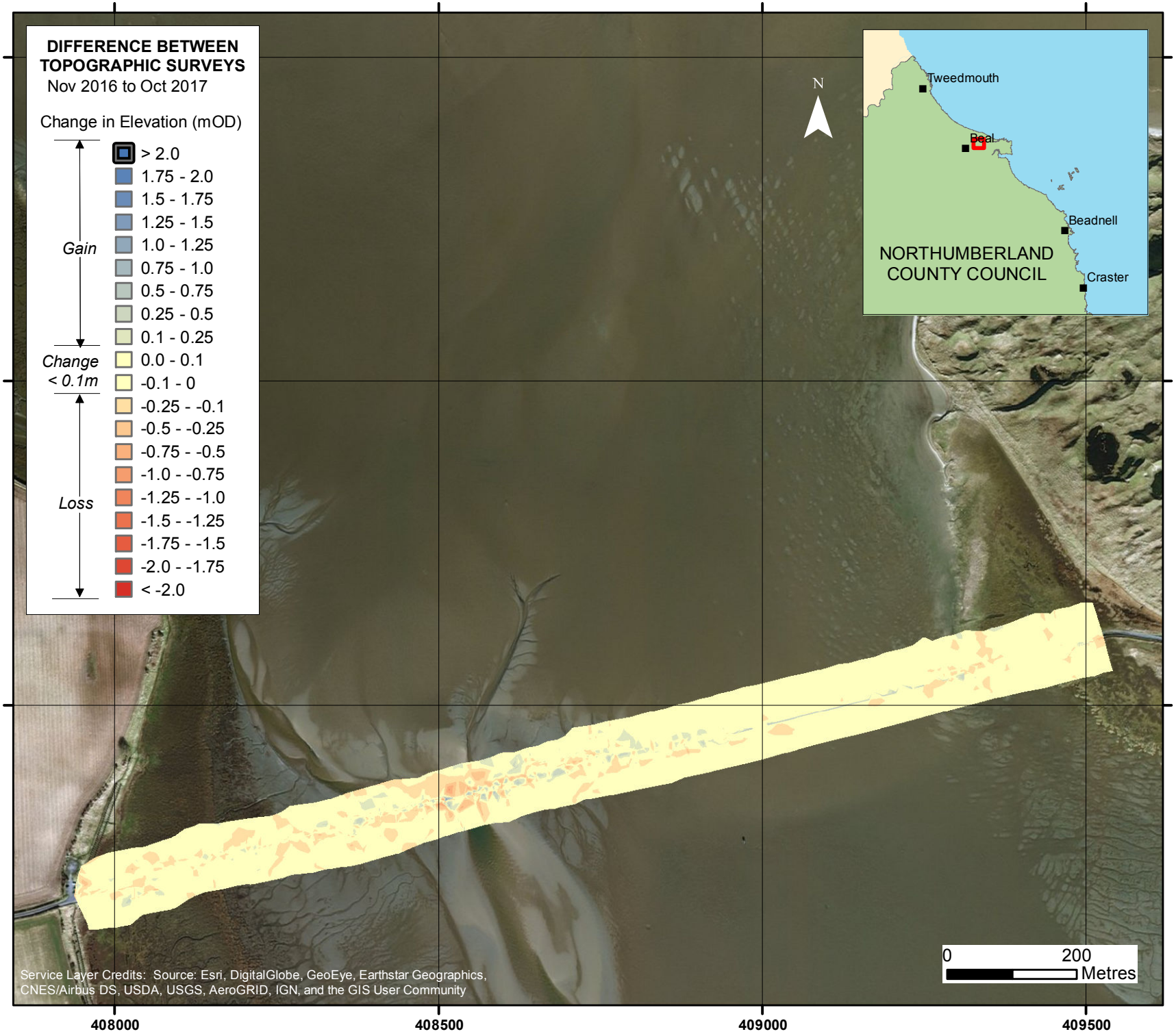

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Appendix B - Map 6

HOLY ISLAND CAUSEWAY

Northumberland County Council Frontage

Analytical Report
'Full Measures' Survey 2017

Drawing Scale at A4 1:8,000

WATER
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Fax: +44 (0)191 211 1313
www.royalhaskoningdhv.com

Royal HaskoningDHV
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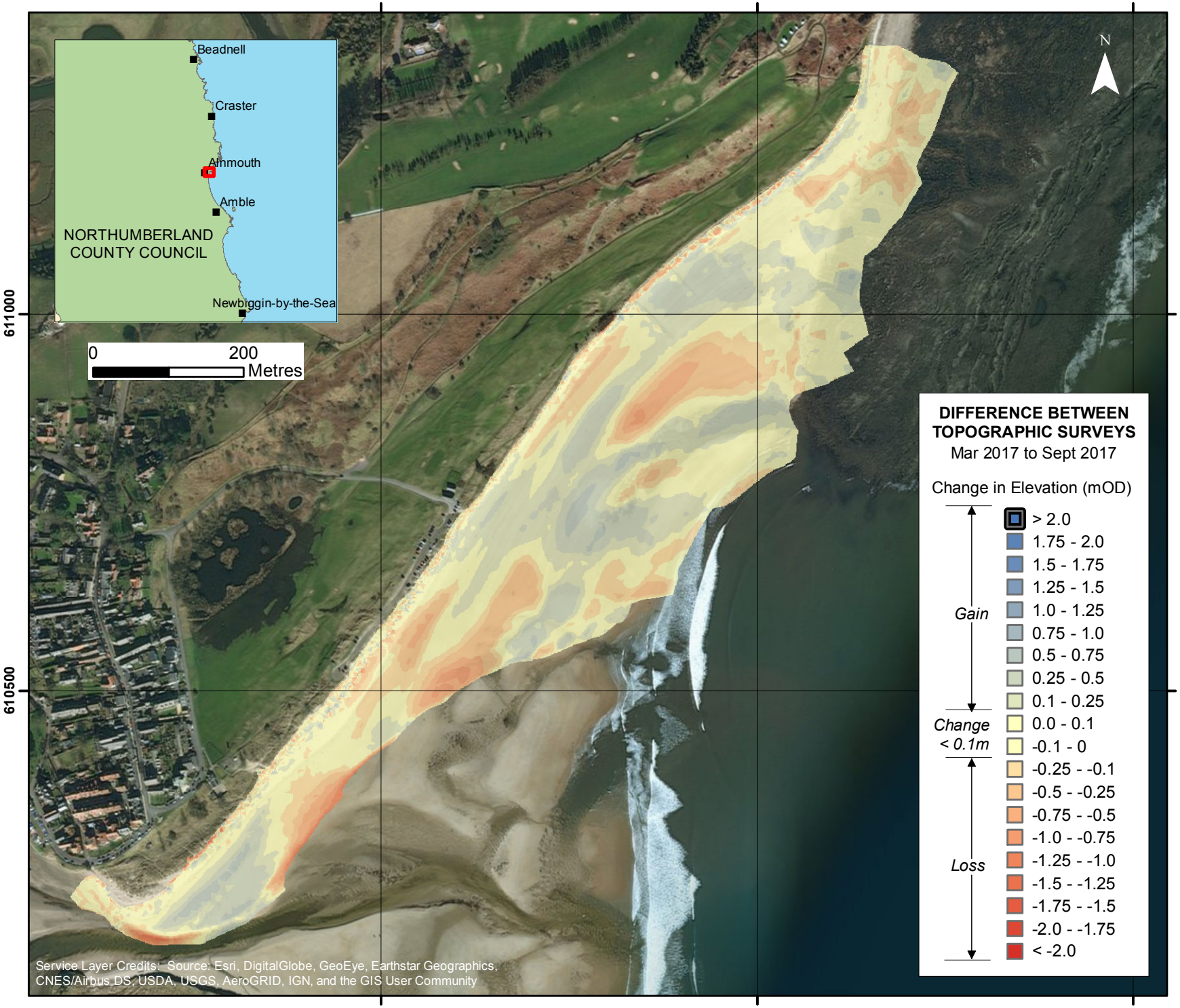

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Appendix B - Map 7

ALNMOUTH

Northumberland County Council Frontage

Analytical Report
'Full Measures' Survey 2017

Drawing Scale at A4 1:6,821

WATER
Royal HaskoningDHV
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Newcastle upon Tyne
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www.royalhaskoningdhv.com

Royal HaskoningDHV
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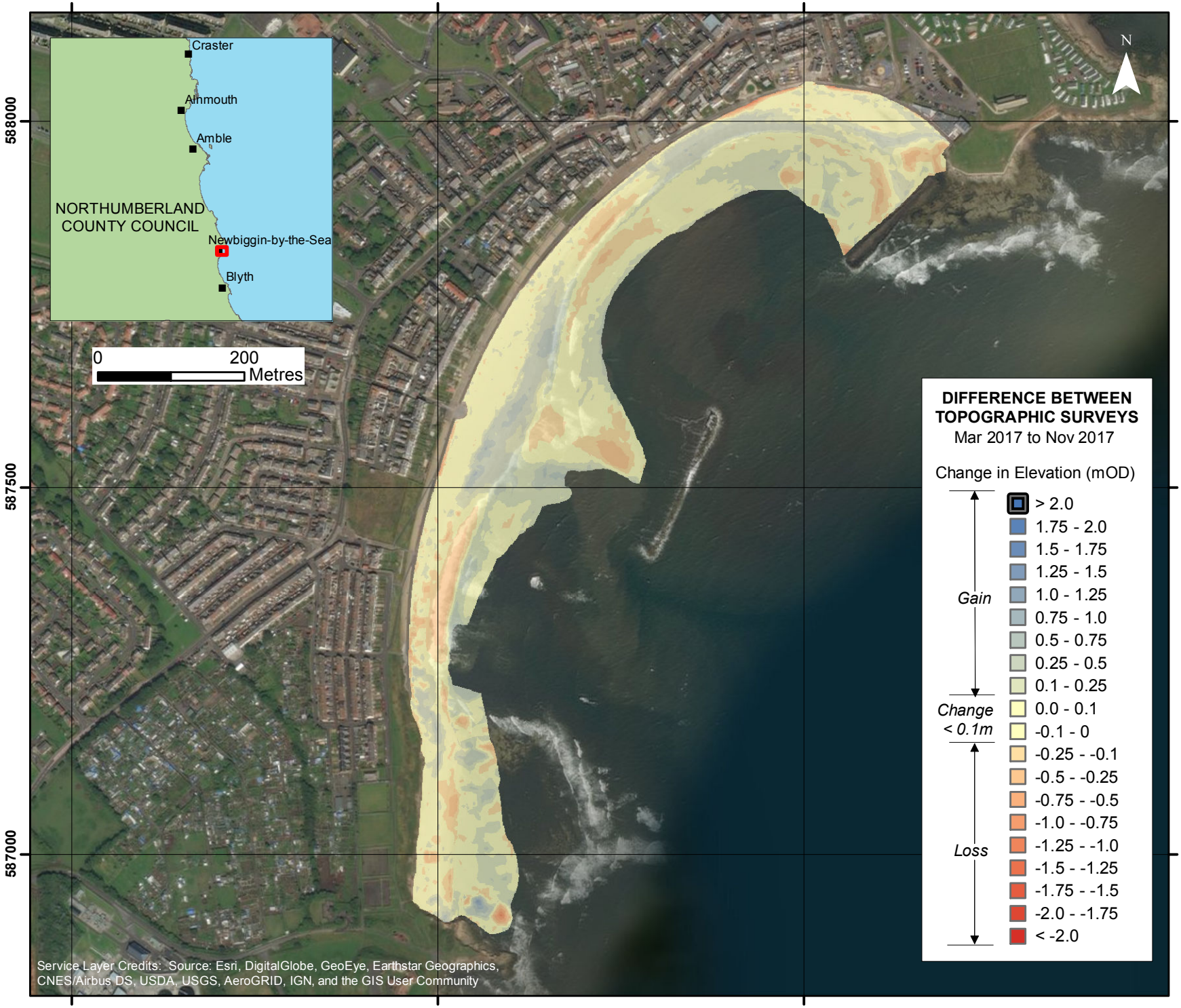

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Appendix B - Map 8

NEWBIGGIN-BY-THE-SEA

Northumberland County Council Frontage

Analytical Report
'Full Measures' Survey 2017

Drawing Scale at A4 1:7,000

WATER
Royal HaskoningDHV
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Marlborough Crescent
Newcastle upon Tyne
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Fax: +44 (0)191 211 1313
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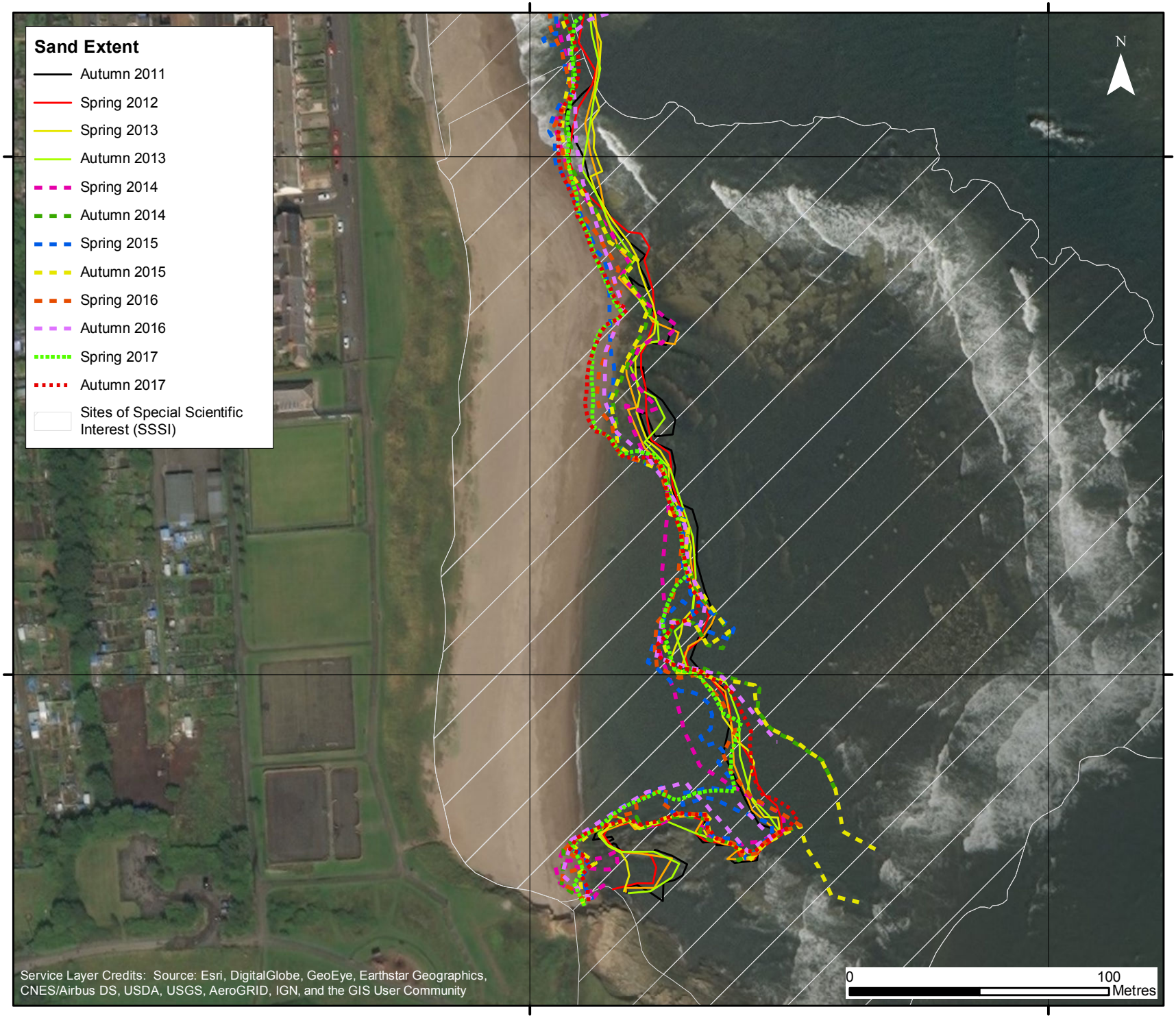
Appendix D

Sand Extent Survey



Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

NEWBIGGIN-BY-THE-SEA SAND EXTENT

Northumberland County Council Frontage

Update Report
'Full Measures' Survey 2017

Drawing Scale at A4 1:2,000

WATER
Royal HaskoningDHV
Marlborough House
Marlborough Crescent
Newcastle upon Tyne
NE1 4EE

Tel: +44 (0)191 211 1300
Fax: +44 (0)191 211 1313
www.royalhaskoningdhv.com

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