Cell 1 Regional Coastal Monitoring Programme
Update Report 15: 'Partial Measures' Survey 2023

South Tyneside Council

South Tyneside Council
April 2023

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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)
	River Tyne to Marsden Bay
HAT	3.1
MHWS	2.4
MHWN	1.3
MLWN	-0.8
MLWS	-1.9

Source: UKHO Admiralty Tide Tables, 2020

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.

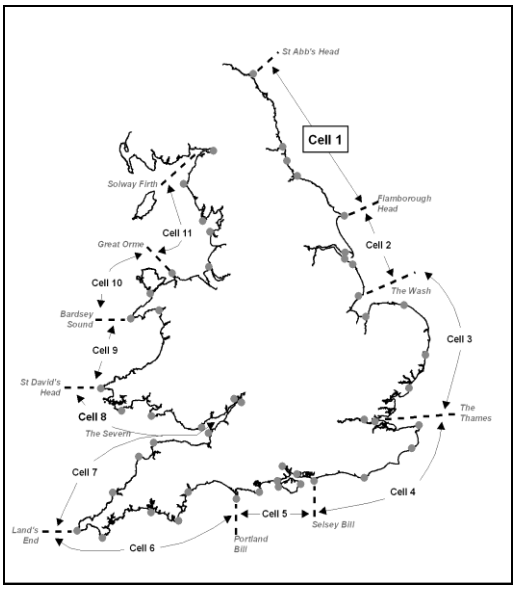


Figure 1 Sediment Cells in England and Wales

The programme commenced in its present guise in September 2008[1] and is managed by North Yorkshire Council on behalf of the North East Coastal Observatory. It is funded by the Environment Agency, working in partnership with the following organisations:

Northumberland County Council
North Tyneside Council
South Tyneside Council
Sunderland City Council
Durham County Council
Redcar & Cleveland Borough Council
Hartlepool Borough Council
North Yorkshire Council
East Riding of Yorkshire Council
Environment Agency
Natural England
The National Trust

[1] Prior to 2008, coastal monitoring was undertaken on a consistent basis across Northumberland and North Tyneside as part of the (then) Northumbrian Coastal Authorities Group's monitoring programme which commenced in 2002, whilst several authorities between the River Tyne and Flamborough Head undertook their own local monitoring programmes.

Royal HaskoningDHV has been appointed to provide Analytical Services in relation to the present phase of the Cell 1 Regional Coastal Monitoring Programme, between 2016 - 2027.

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
- LiDAR Surveys
- walk-over and coastal defence asset 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	Oct 12	
5	2012/13	Nov 12	Mar 13	Mar 13	Jun 13	
6	2013/14	Nov 13	Feb 14	Apr 14	Jul 14	
7	2014/15	Nov 14	Feb 15	Apr 15	Jul 15	
8	2015/16	Nov 15	Feb 16	Mar 16	Jul 16	Jun 16
9	2016/17	Nov 16	Feb 17	Mar 17	Jul 17	
10	2017/18	Oct 17	Feb 18	Apr 18	Jun 18	
11	2018/19	Nov 18	Jan 19	Feb 19	May 19	
12	2019/20	Sep 19	Nov 19	May 20	Jun 20	
13	2020/21	Sep 20	Oct 20	Apr 21	May 21	Aug 21
14	2021/22	Sep 21	Nov 21	Mar 22	Jul 22	
15	2022/23	Oct 22	Jan 23	Mar 23	Apr 23	

(*) The present report is **Update Report 15** and provides an analysis of the 2023 Partial Measures survey for South Tyneside Council's frontage.

1. Introduction

1.1 Study Area

South Tyneside Council's frontage extends from the mouth of the River Tyne Estuary to the outfall south of Whitburn. For the purposes of this report and for consistency with previous reporting, it has been sub-divided into four areas, namely:

- Littlehaven Beach
- Herd Sands
- Trow Quarry (incl. Frenchman's Bay)
- Marsden Bay

1.2 Methodology

Along South Tyneside Council's frontage, the following surveying is undertaken:

- Full Measures survey annually each autumn comprising:
    - Beach profile surveys along 17 transect lines (commenced 2008)
    - Topographic survey along Littlehaven Beach (commenced 2010)
    - Topographic survey along Herd Sands (commenced 2008
    - Topographic survey along Trow Quarry (commenced 2008). Note the 2008 surveys at profiles 1bSS11, 1bSS12 and 1bSS13 were undertaken at a different location to subsequent surveys and have therefore been removed from the analysis presented here

- Partial Measures survey annually each spring comprising:
    - Beach profile surveys along 11 transect lines (commenced 2008)
    - Topographic survey along Littlehaven Beach (commenced 2010)
    - Since 2014, Partial Measures survey has also included 2 additional profiles at Littlehaven. These are measured to record the new defence and beach profiles following completion of the sea defence works.

- Cliff top survey bi-annually at:
    - Cliff top survey at Trow Quarry (incl. Frenchman's Bay) (commenced 2008)

For all cliff-top surveys prior to Full Measures 2011, data was reported separately in Trow Quarry Coastal Defence Scheme - Monitoring Plan Year 2 (available from South Tyneside Council). The data was saved in '.kmz' format for plotting and comparison in Google Earth. For the present survey report, this data has been visualised in GIS, which revealed the quality was variable and reliable interpretations of cliff change could not be made. For this reason, the 'kmz' files are not presented or analysed as part of the present report. Therefore, cliff top survey data collected from Full Measures survey (autumn 2011) going forward is presented in this report. The location of these surveys is shown in Figure 2.

The Partial Measures survey was undertaken along this frontage between 6-7th March 2023. During this time weather conditions were variable; refer to the survey reports for details of the weather conditions over this survey period.

This Update Report presents the following:

- 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.

SURVEY LOCATIONS

Topographic Profile

- Annual
- Bi-Annual

Topographic Area

- 6 monthly
- yearly
- 5 yearly

- Cliff Top Survey Points (refer to Figure 3 for details)

Client:	Project:
North East Coastal Group	Cell 1 Regional Coastal Monitoring Programme

Title:

Figure 2 - Map 1

LITTLEHAVEN BEACH to MARSDEN BAY

South Tyneside Council Frontage

Report: Survey Report

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	n/a	TC	NJC	A4	1:25,000

Co-ordinate system: British National Grid

Royal HaskoningDHV
Enhancing Society Together

North East Coastal Observatory

2. Analysis of Survey Data

2.1 Littlehaven Beach

Survey Date	Description of Changes Since Last Survey	Interpretation
6th – 7th March 2023	**Beach Profiles:** Littlehaven Beach is covered by four beach profile lines for the Partial Measures surveys, distributed between South Groyne and South Pier (1bSS1, 1bSS2, 1bSS3 and 1bSS4). The previous survey was the Full Measures survey undertaken in October 2022 and the previous Partial Measures survey was undertaken in March 2022. Profiles 1bSS1 and 1bSS3 were last surveyed during the Partial Measures spring survey 2022. Profiles 1bSS2 and 1bSS4 were last surveyed during the Full Measures autumn survey 2022. Profile **1bSS1** is located towards the north of Littlehaven Beach, in the lee of a rocky outcrop and harbour wall. The back dunes have undergone little change, with sections of accretion and erosion limited to ±0.1m. The hollow at chainage 48m has risen by up to 0.2m, whilst the crest of the foredune has lowered slightly by less than 0.1m. The lower dune face has prograded seaward slightly by up to 0.25m. The upper and middle beach between the dune toe and chainage 121m has lowered by up to 0.2m on the upper beach and less than 0.1m on the middle beach. Beach levels on the lower beach have risen by up to 0.2mto the exposed rock patch at chainage 150m. Overall, the dunes are at a high level and the beach is at a medium level compared to the range recorded from previous surveys Profiles **1bSS2 to 1bSS4** extend seawards from the new sea wall that was completed in 2014. At profile **1bSS2**, beach levels at the toe of the seawall have risen by less than 0.1m to chainage -2m. There has been very little change between chainage -2m to 6m, before switching to accretion between chainages 6-18m by up to 0.1m. The upper beach between chainages 18-67m has lowered by up to 0.8m. Seaward of chainage 67m the lower beach has risen by up to 0.3m to the end of the survey. Overall, the upper and middle beach profile are at a medium-low level and the lower beach is at a medium-high level compared to the range recorded from previous surveys. At profile **1bSS3** there has been a small accumulation of sediment at the toe of the seawall by less than 0.1m to chainage -35m. The rest of the upper beach between chainages -35m to -1m has lowered by up	Overall, there has been alternating bands of erosion and accretion across Littlehaven beach. Generally, all profiles have lowered, often by less than 0.1m. **Longer term trends:** When compared with previous profile surveys, profiles 1bSS1 to 1bSS4 range between a low to high level. The profiles indicate normal seasonal behaviour with no clear trend.

Survey Date	Description of Changes Since Last Survey	Interpretation
	to 0.1m. The middle beach rises slightly between chainages -1m and 10m by up to 0.2m before lowering between chainages 10-40m. The lower beach seaward of chainage 40m has risen by up to 0.3m. Overall, the upper beach is at a high level and the middle and lower beach is at a medium level compared with the range recorded from previous surveys. At profile **1bSS4** the beach profile has generally lowered across the entire profile by up to 0.1m on the upper beach, less than 0.1m on the middle beach and 0.8m on the lower beach. The only exception to this is on the upper beach between chainages 42-52m where the beach rises by less than 0.1m. Overall, the upper beach is at a medium-high level, whilst the middle-lower beach is at a low level compared to the range recorded from previous surveys, particularly between chainages 75-81m and 106-117m which are at their lowest levels recorded.	
March 2023	**Topographic Survey:** Littlehaven Beach is covered by bi-annual topographic survey between the South Groyne and the South Pier, which commenced in March 2010. Data from the most recent topographic survey (Partial Measures, spring 2023) have been used to create a DGM (Appendix B – Map 1a) using a Geographical Information System (GIS). A difference plot has also been produced using the DGM (Appendix B – Map 1b) produced from the last produced topographic survey (Full Measures, autumn 2022) and the present survey. The difference plot shows a clear a pattern of change across the beach, which reflects the beach profile data. The plots show, in general terms, alternating bands of change, which extend from north to south, and comprise: (i) a band of patchy accretion / erosion (±1.0m) on the upper beach in the north of the bay; (ii) a band of erosion on the middle beach which widens towards the south of the bay; and (iii) a band of accretion / little change (±0.1m) on the lower beach which is at its widest on the central beach (except in the south which shows erosion on the lower beach). Change is limited to ±0.5-0.75m. The pattern of alternating bands of erosion and accretion suggests cross-shore movements of sediment. The dunes at the northern end of the bay generally remained stable.	The pattern of beach elevation change observed from the topographic difference plot indicates distinct areas of erosion and accretion, associated with migration of sand bars across the beach face. The plot is similar to previous years.

2.2 Herd Sands

Survey Date	Description of Changes Since Last Survey	Interpretation
6th – 7th March 2023	**Beach Profiles:** Herd Sands is covered by three beach profile lines for the Partial Measures survey (Appendix A). The previous survey was the Full Measures survey undertaken in autumn 2022. Profile **1bSS5** is located towards the northern end of Herd Sands, in the lee of the breakwater. Sand fences were constructed on the dunes in 2012 to encourage accretion and stabilisation. Generally, the dunes have lowered since the previous survey by up to 0.2m to chainage 145m. The only exception is the dune crest which has risen slightly by up to 0.2m. The dune face, dune toe and upper beach has risen by up to 0.2m to chainage 321m. The lower beach has lowered by up to 0.8m. The dunes remain at a high level compared to the range recorded from previous surveys. The upper and middle beach are at a high level, dropping to a medium level on the lower beach. Profile **1bSS8** is located to the south of Herd Sands. The beach at the toe of the dunes has lowered by up to 0.2m between chainages 4-11m. This is followed by an accretion of up to 0.4m between chainages 11-25m and erosion of up to 0.1m to chainage 48m. The rest of the beach has risen by up to 0.2m on the middle beach and up to 0.8m on the lower beach. The upper beach profile is at a medium level, rising to a high level on the middle and lower beach, particularly seaward of chainage 185m which is now at its highest level recorded. Profile **1bSS9** is located to the south of Herd Sands where dunes have lowered by up to 0.1m to chainage 22m. The dune has risen by up to 0.2m to chainage 26m, switching to erosion on the upper beach by up to 0.2m to chainage 64m. The middle beach between chainages 64-165m has risen by up to 0.3m. The lower beach has lowered by less than 0.1m. Overall, the dunes and beach profile are at a high level compared to the range recorded from previous surveys.	Since the last survey, the dunes at Herd Sands have remained stable, with some small sections of accretion and erosion. The beach profiles have mostly risen since the previous survey. **Longer term trends:** On the whole, the beach is in a medium-high range of levels seen in earlier surveys. The lower beach seaward of chainage 185m is now at its highest level recorded at profile 1bSS8.

2.3 Trow Quarry (incl. Frenchman's Bay)

Survey Date	Description of Changes Since Last Survey	Interpretation
6th – 7th March 2023	**Beach Profiles:** Trow Quarry is covered by four beach profile lines for the Partial Measures survey (Appendix A), two in Graham's Sand and two in Southern Bay. The previous survey was the Full Measures survey undertaken in autumn 2022. Profiles **1bSS10** and **1bSS11** are located in Graham's Bay. At profile **1bSS10,** there has been slight changes in movement of boulders between chainages 0-65m. The beach between chainages 65-80m has lowered by up to 0.5m, switching to accretion between chainage 80-102m by up to 0.1m. The survey ends at chainage 102m, approximately 40m shorter than the previous survey. Overall, the beach profile is at a medium level compared to the range recorded from previous surveys. At profile **1bSS11**, the beach profile has remained stable since the previous survey. Profiles **1bSS12** and **1bSS13** are located in Southern Bay. At both locations the beach profile has remained stable since the previous survey.	Since the last survey at Graham's Bay and Southern Bay the cliff, rock revetment and upper boulder/cobble rocky beach have remained stable. In Southern Bay, there is no change evident from the profiles, but the presence of cobble-sized beach material in the gaps between rock armour blocks (evident in the survey photographs) indicates sufficient wave energy to move this material. **Longer term trends:** At both Graham's Bay and Southern Bay the beach levels are within the range of levels seen in previous surveys, indicating changes are within typical seasonal variation.
March 2023	**Cliff-top Survey:** Cliff top survey data collected for the baseline survey (autumn, 2011), Full Measures survey (autumn, 2022) and the present Partial Measures survey (spring, 2023) is presented in this report. Six ground control points (numbered 1 – 6) were established along the cliff top at Trow Point in 2011 to monitor cliff erosion at the headland adjacent to the site of a former landfill. Note: the numbering of ground control points is not intended to correlate with that of the beach profile lines and reference should be made to Appendix C – Map 1 for the location of ground control points. These cliff top surveys are undertaken bi-annually. Measurements are taken from each ground control point along a fixed bearing to the edge of the cliff top. The results from the cliff top monitoring are anticipated to have an accuracy of ±0.2m due to the technique used. The results from the cliff top survey are presented in Appendix C – Table C1, showing the position from the ground control point to	Since the last survey no ground control points have experience erosion greater than the survey error. **Longer term trends:** Very limited change has been detected since surveys began in September 2011.

Survey Date	Description of Changes Since Last Survey	Interpretation
	the edge of the cliff top along a defined bearing. Results show that since the last survey in October 2022, no ground control points recorded erosion/accretion greater than the survey No ground control point has an erosion rate greater than the survey error over the long term (2011 – 2023).	

2.4 Marsden Bay

Survey Date	Description of Changes Since Last Survey	Interpretation
6th – 7th March 2023	**Beach Profiles:** Marsden Bay is covered by two beach profile lines for the Partial Measures survey (Appendix A). The previous survey was the Full Measures survey undertaken in autumn 2021. Profile **1bSS14** is located to the north of the bay and covers the cliffs and former lifeguard station adjacent to the Redwell Steps. The survey report notes that '*a section of cliff face could not be measured due to ground conditions being unsafe*'. The beach seaward of this point has lowered by up to 0.4m, exposing a patch of rocks between chainages 132-160m. Overall, the beach profile is at a low level compared to the range recorded from previous surveys. Profile **1bSS17** is located to the south of the bay. There is no change in the position of the cliff top. There has been an apparent seaward movement of the cliff toe, however this is assumed to be due to rock falls immediately below the cliff face. Between chainage 61-71m the beach has mostly lowered by up to 0.1m, with one small section of accretion between chainages 66-69m by up to 0.1m. Seaward of chainage 71m the rocky beach and shore platform has not changed in profile. Overall, the profile is at a low level compared to the range recorded from previous surveys.	Both profiles generally show a lowering of the beach profile, with no change in the shore platform at profile 1bSS17. since the previous survey. **Longer term trends:** At profile 1bSS14 and 1bSS17 the beach levels are within the bounds of previous changes, indicating fluctuating seasonal or interannual behaviour with no particular trend.

3. Problems Encountered and Uncertainty in Analysis

Individual Profiles / Topographic Survey

- A section of cliff face could not be surveyed at profile 1bSS14 due to ground conditions being unsafe. The original Redwell Steps and adjacent lifeguard station and canoe store were demolished in 2020 due to their deteriorating condition and public health and safety risk. In 2021 a new access was constructed comprising three flights of timber access steps and localised works to the existing concrete ramp landward from the steps. The new Redwell Steps were opened to the public in late 2021.

Cliff Top Surveys

- Surveying any cliff top is difficult due to the need for a consistent interpretation of the cliff edge in successive surveys, which can be challenging, especially when vegetation is thick. For these reasons, it has been assumed that any changes of ±0.2m may be considered as being within the accuracy of the surveying technique and that any indication of an advancing cliff line is error.

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

- No changes are recommended at the present time.

5. Conclusions and Areas of Concern

- At Littlehaven Beach, the recorded profiles and topographic survey present no causes for concern. Overall, beach profiles have experienced alternating bands of erosion and accretion, with all profiles dominated by erosion of less than 0.1m since the previous survey.
- At Herd Sands, the dunes have remained stable. The beach profiles are dominated by accretion. The recorded profiles present no causes for concern.
- At Trow Quarry, the recorded profiles present no causes for concern. The cliffs to the north west of Trow Headland appear to have remained stable.
- At Marsden Bay, the recorded profiles present no causes for concern. The beach has lowered at profile 1bSS14.

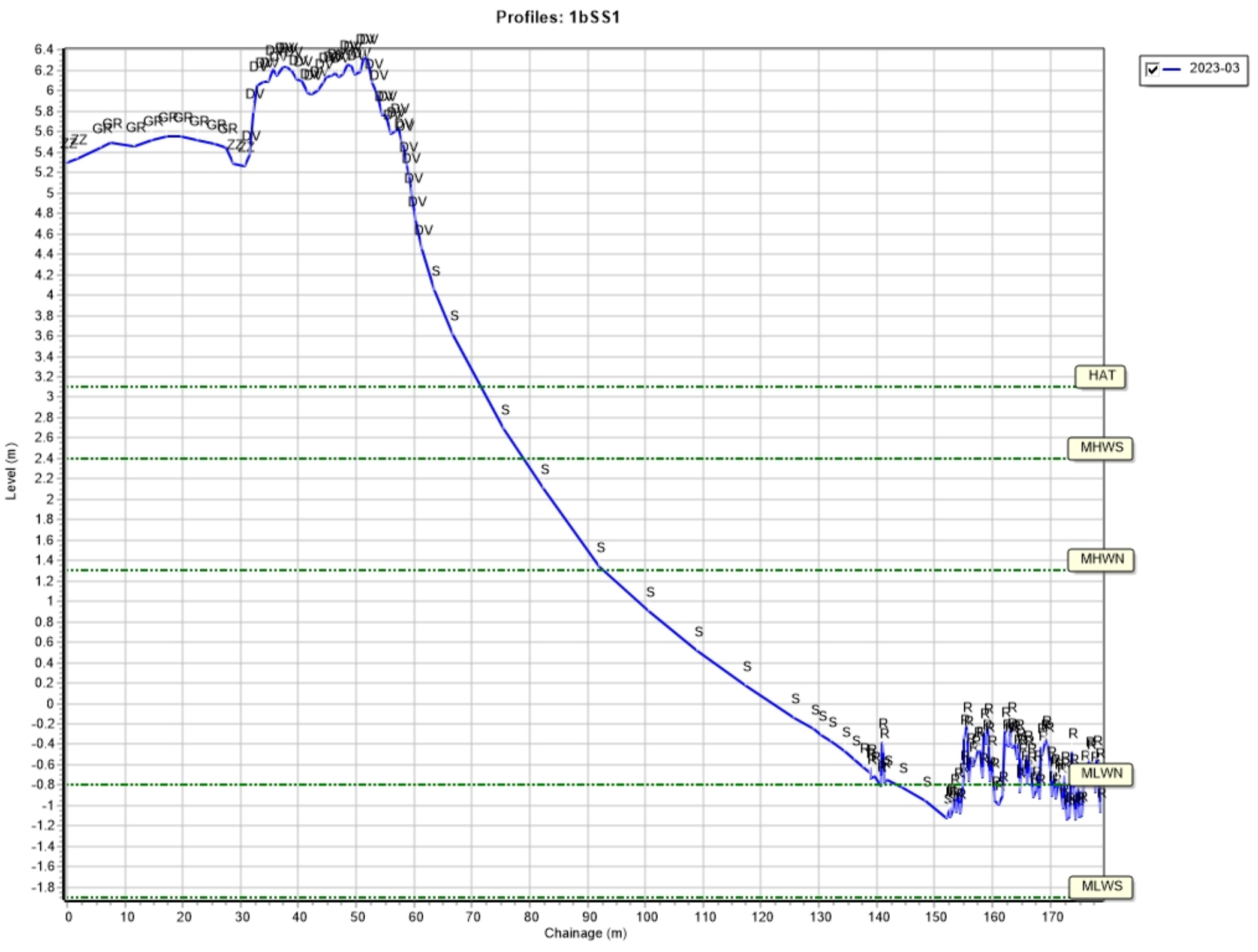
Appendices

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


Profiles: 1bSS1
2023-03
HAT
MHWS
MHWN
MLWN
MLWS
Level (m)
Chainage (m)
6.4
6.2
6
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
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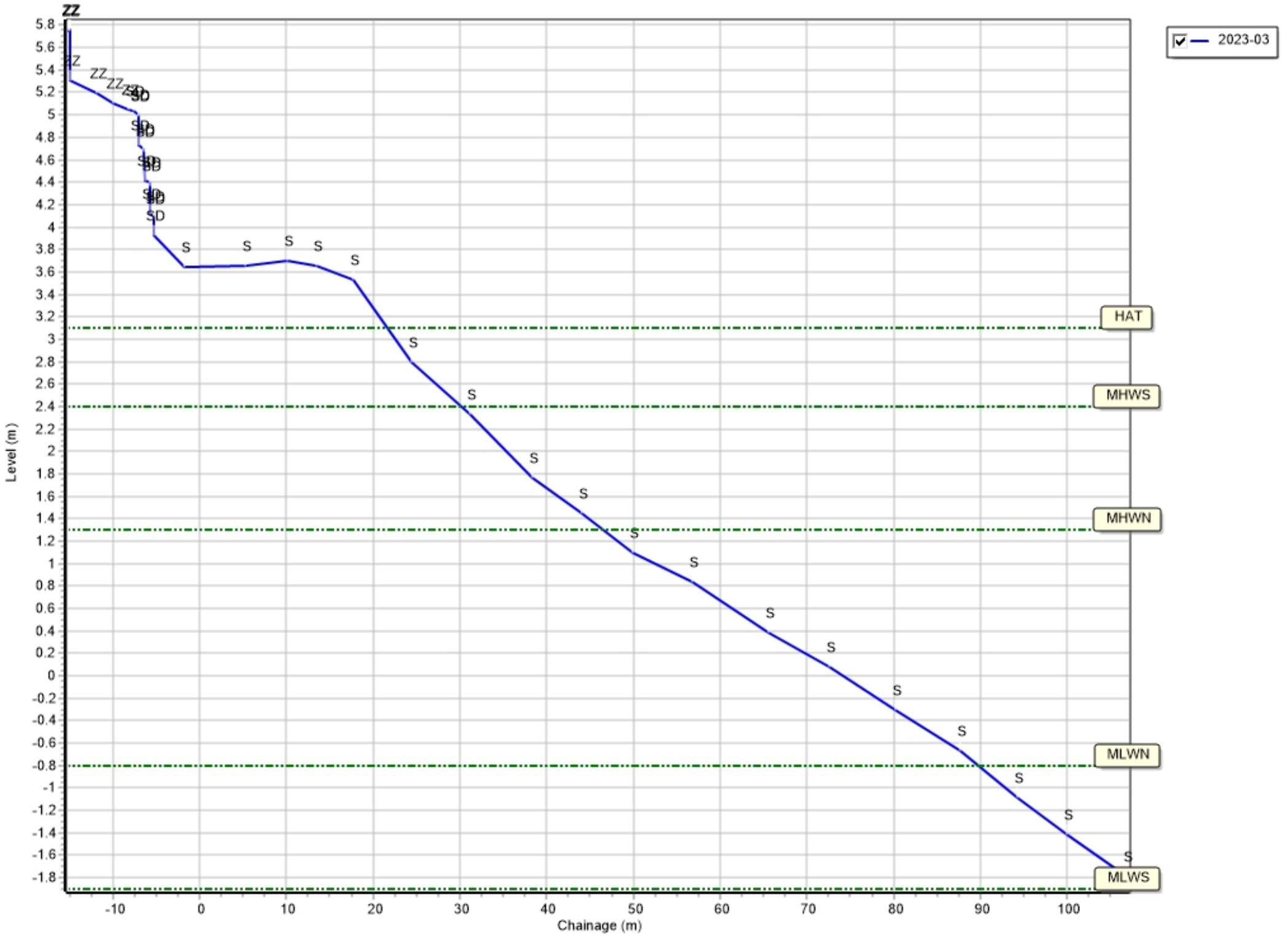
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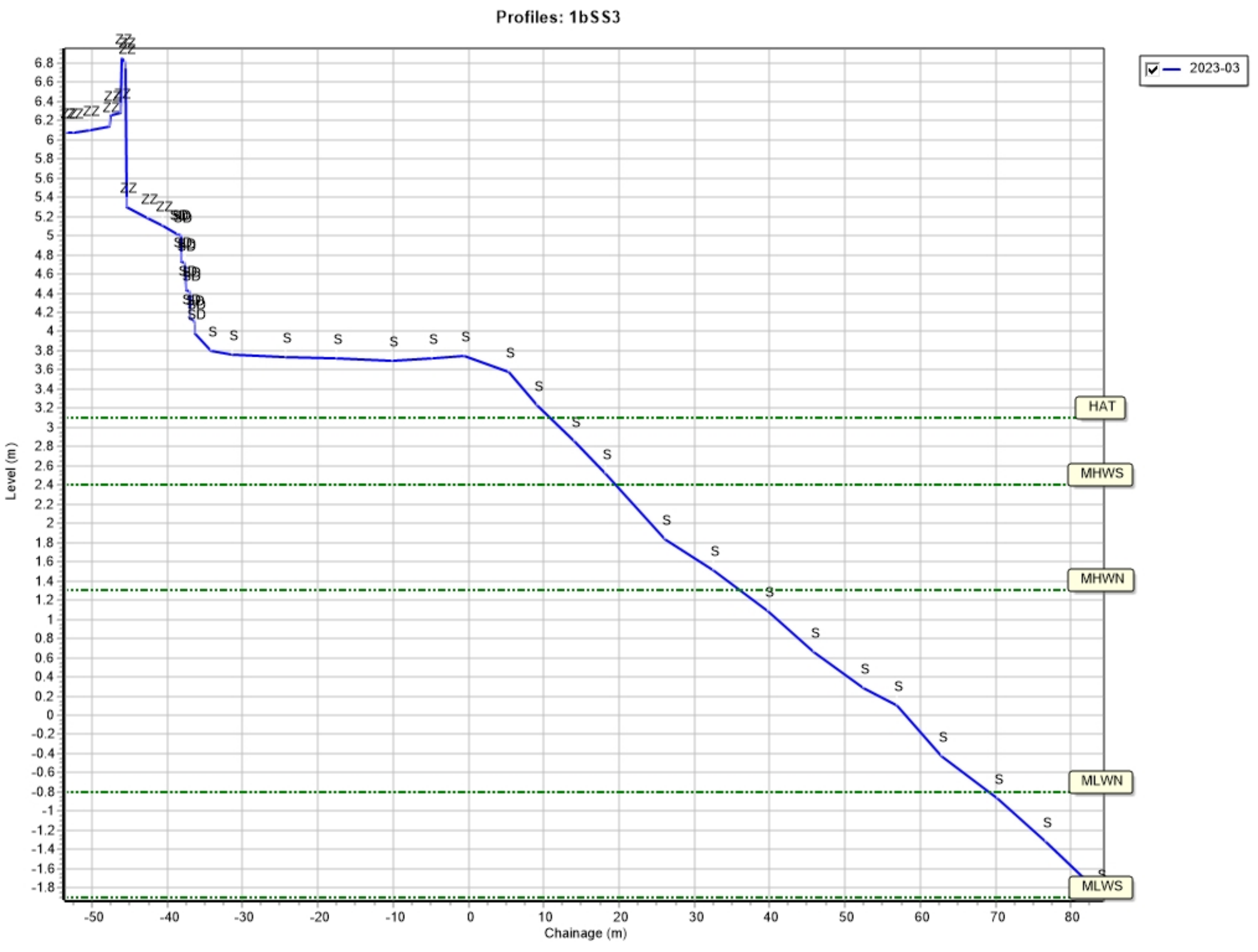
2023-03
HAT
MHWS
MHWN
MLWN
MLWS
Level (m)
Chainage (m)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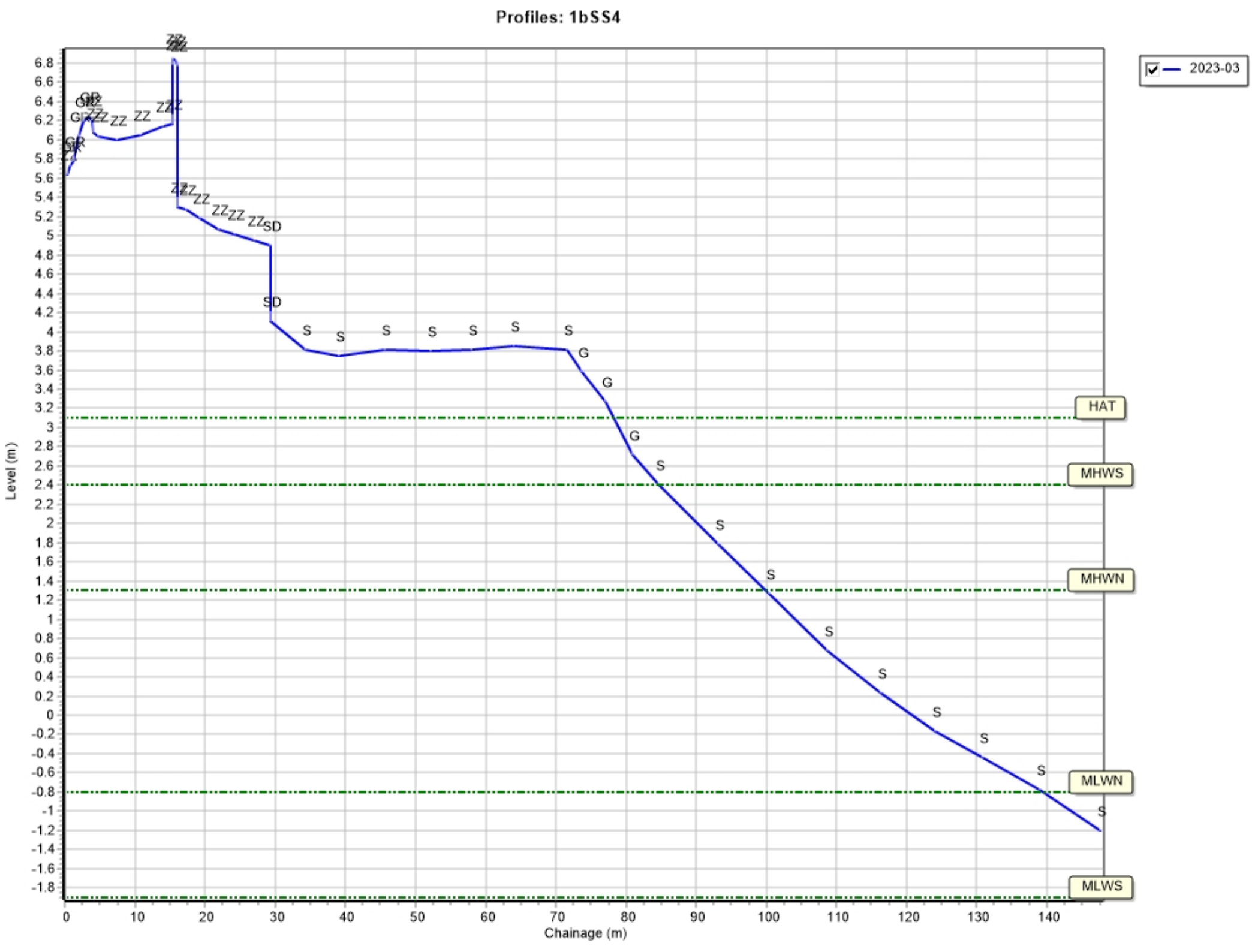
MLWS
Level (m)
Chainage (m)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HAT
MHWS
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Level (m)
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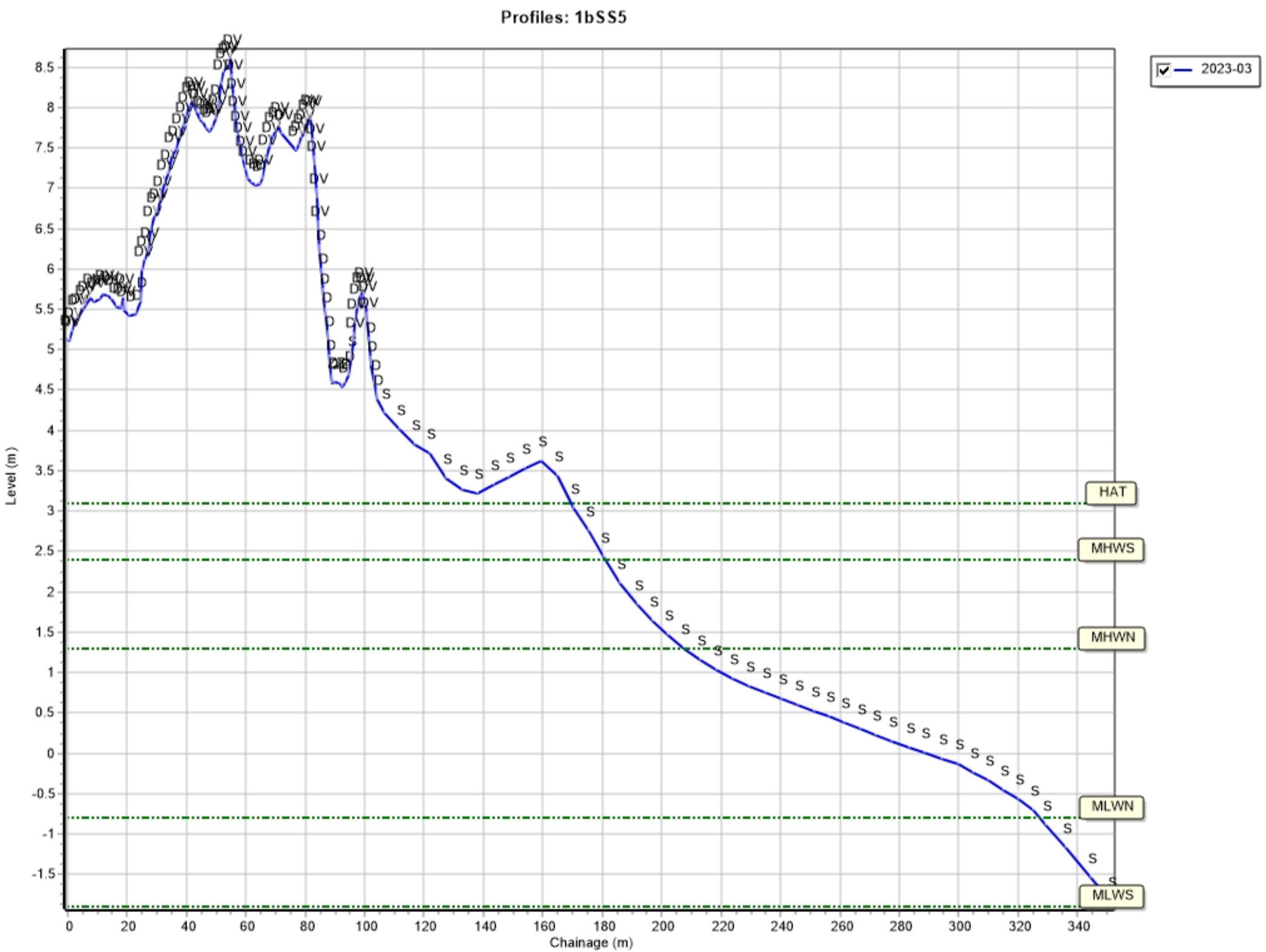
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5.5
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4.5
4
3.5
3
2.5
2
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1
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0
-0.5
-1
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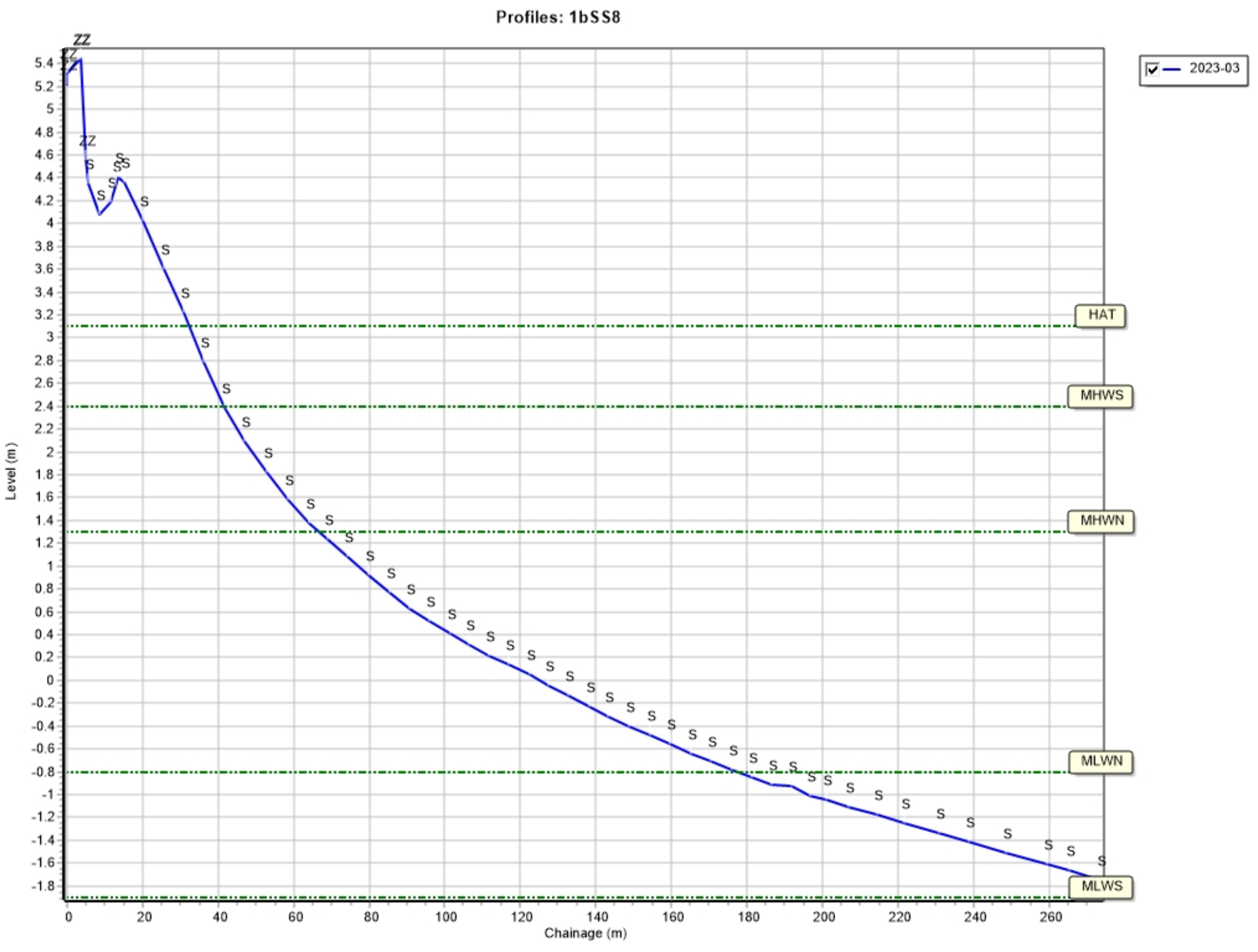
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4.2
4
3.8
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
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0.6
0.4
0.2
0
-0.2
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-0.6
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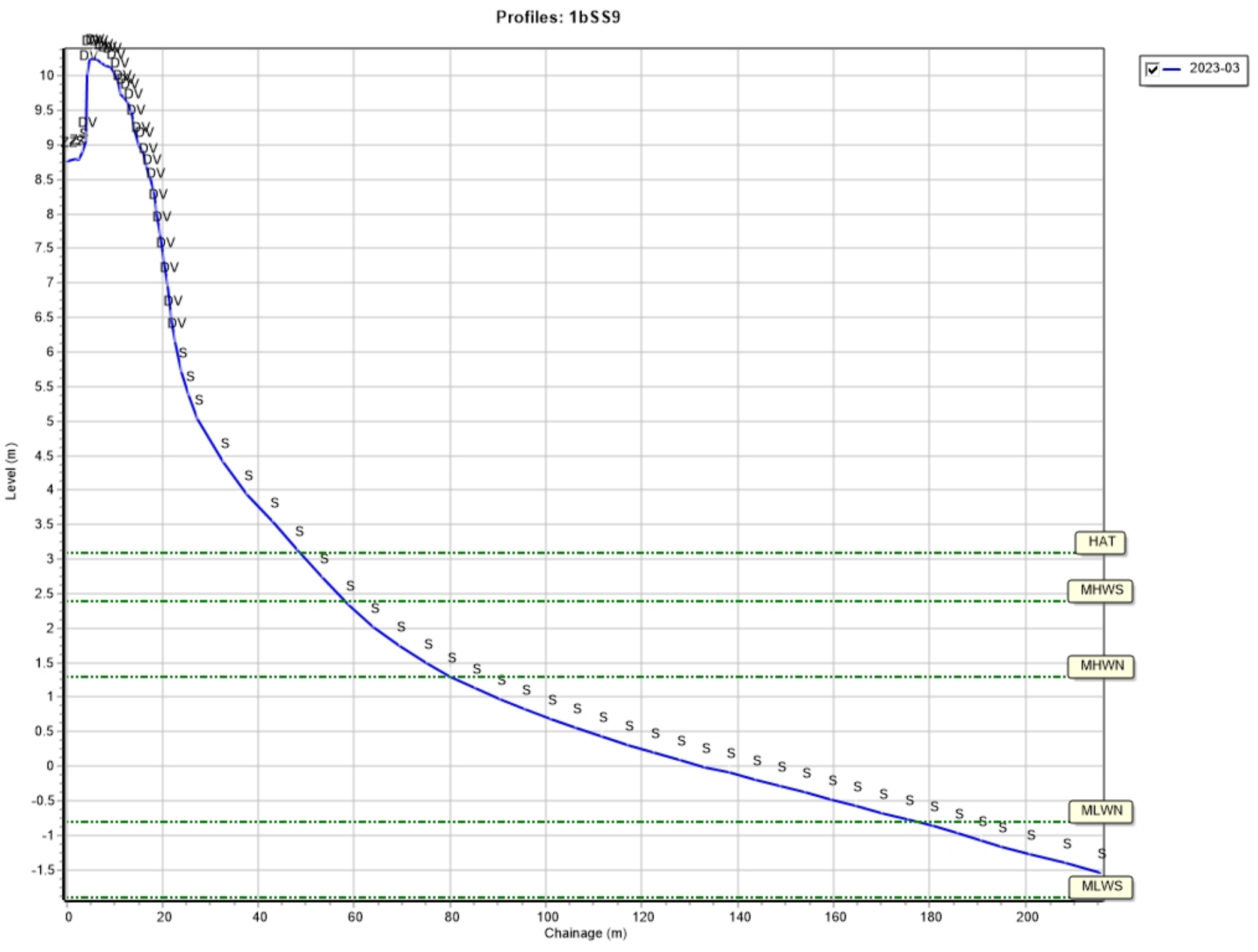
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5.5
5
4.5
4
3.5
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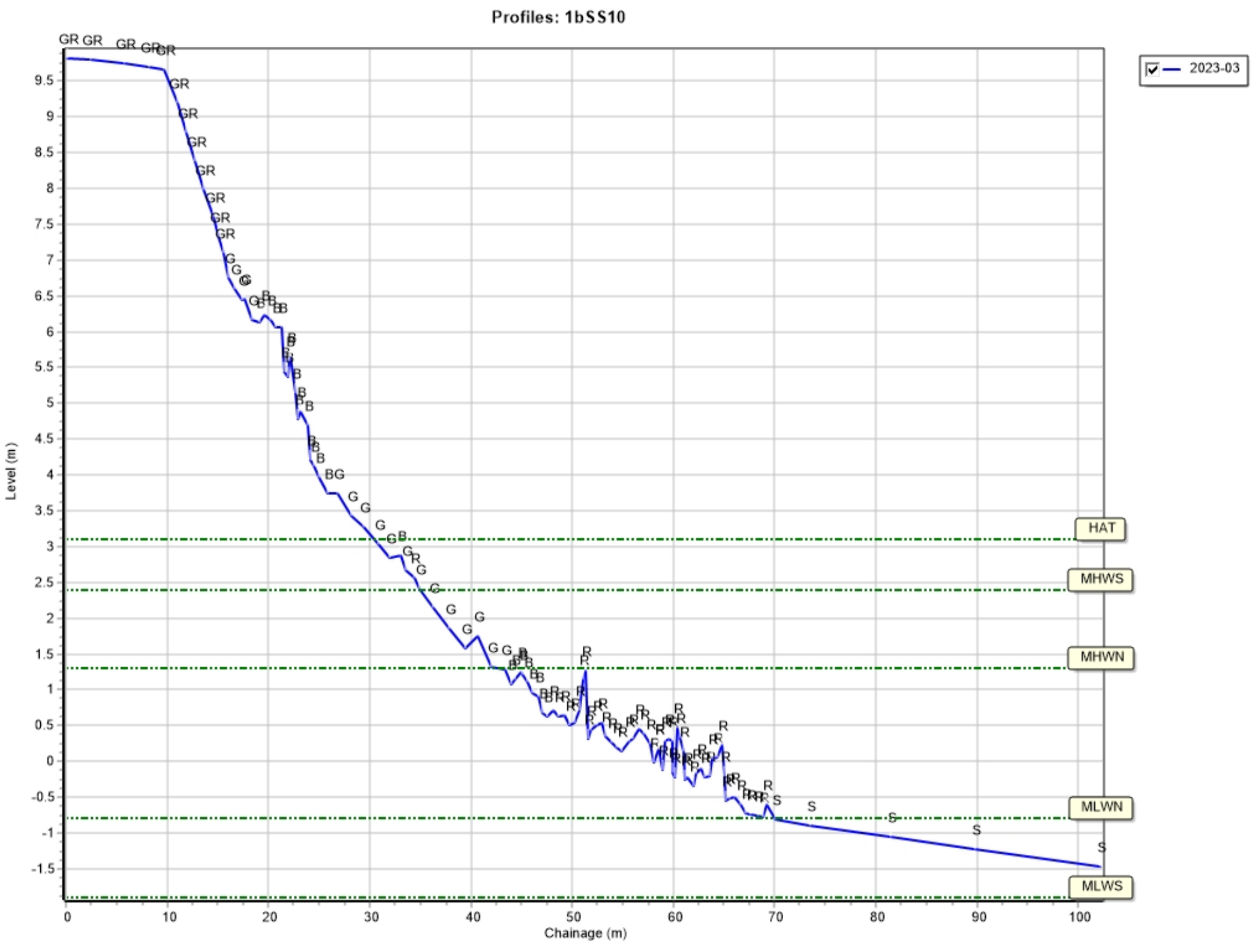
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MLWS
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6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
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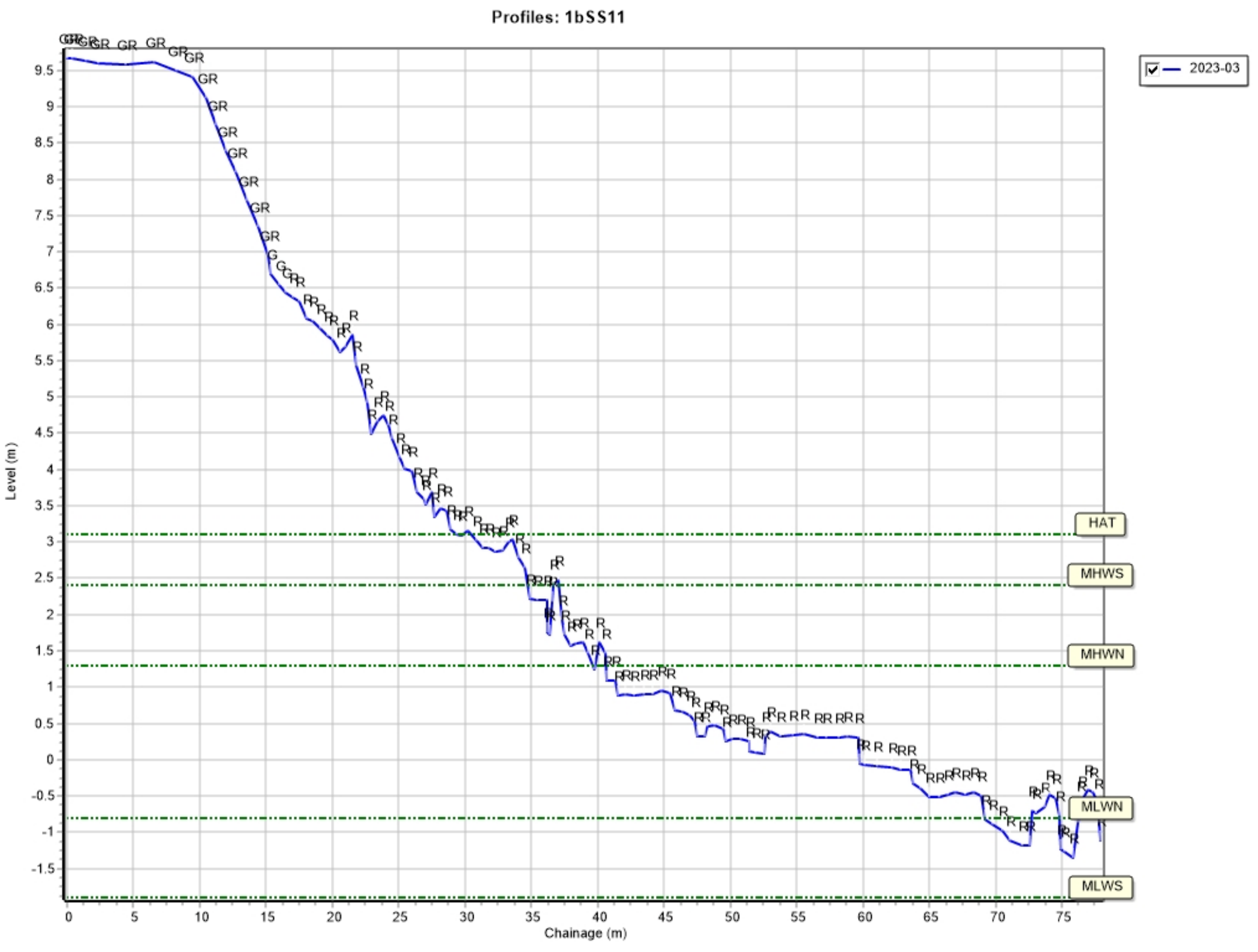
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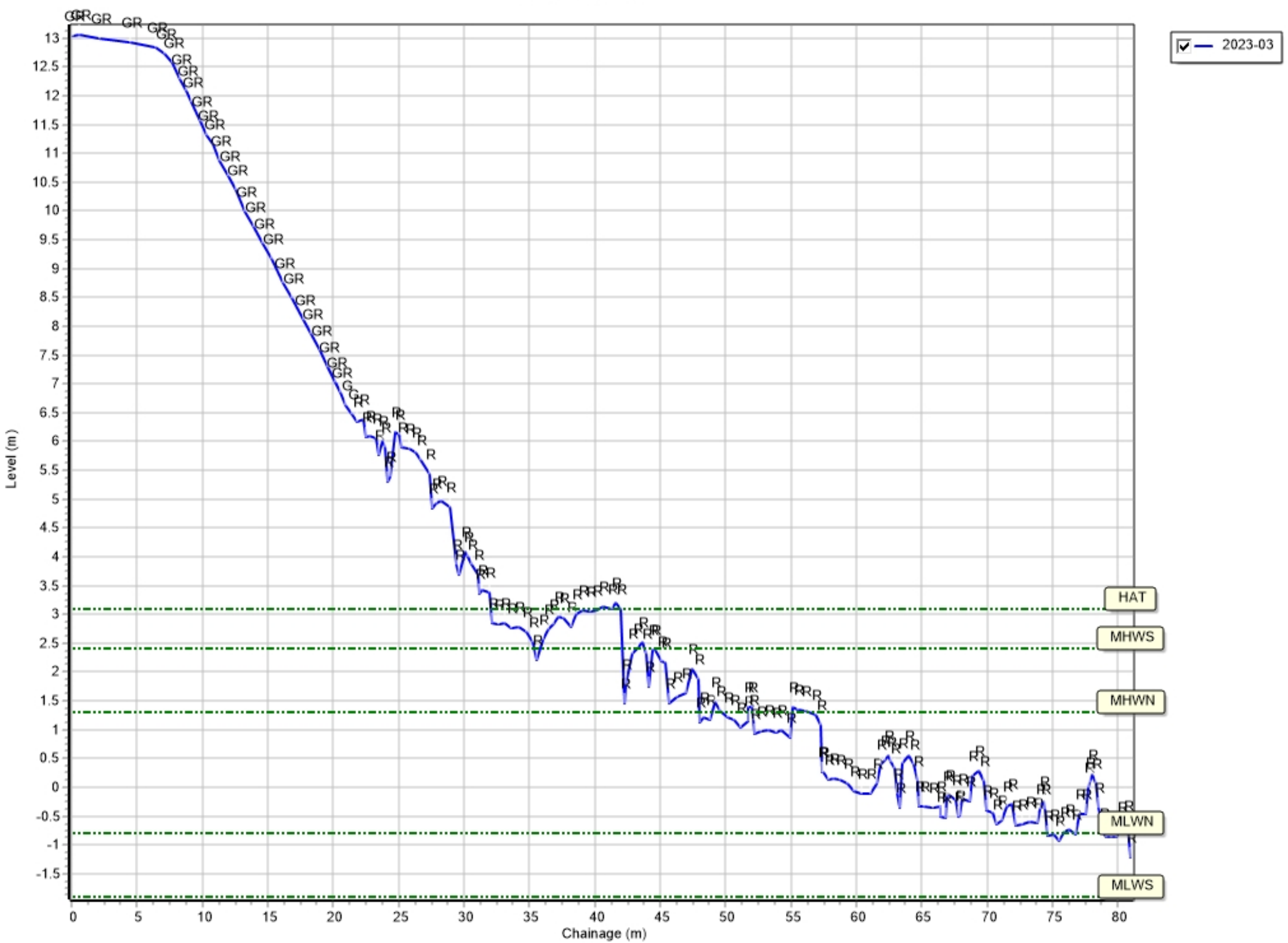
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4.5
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0
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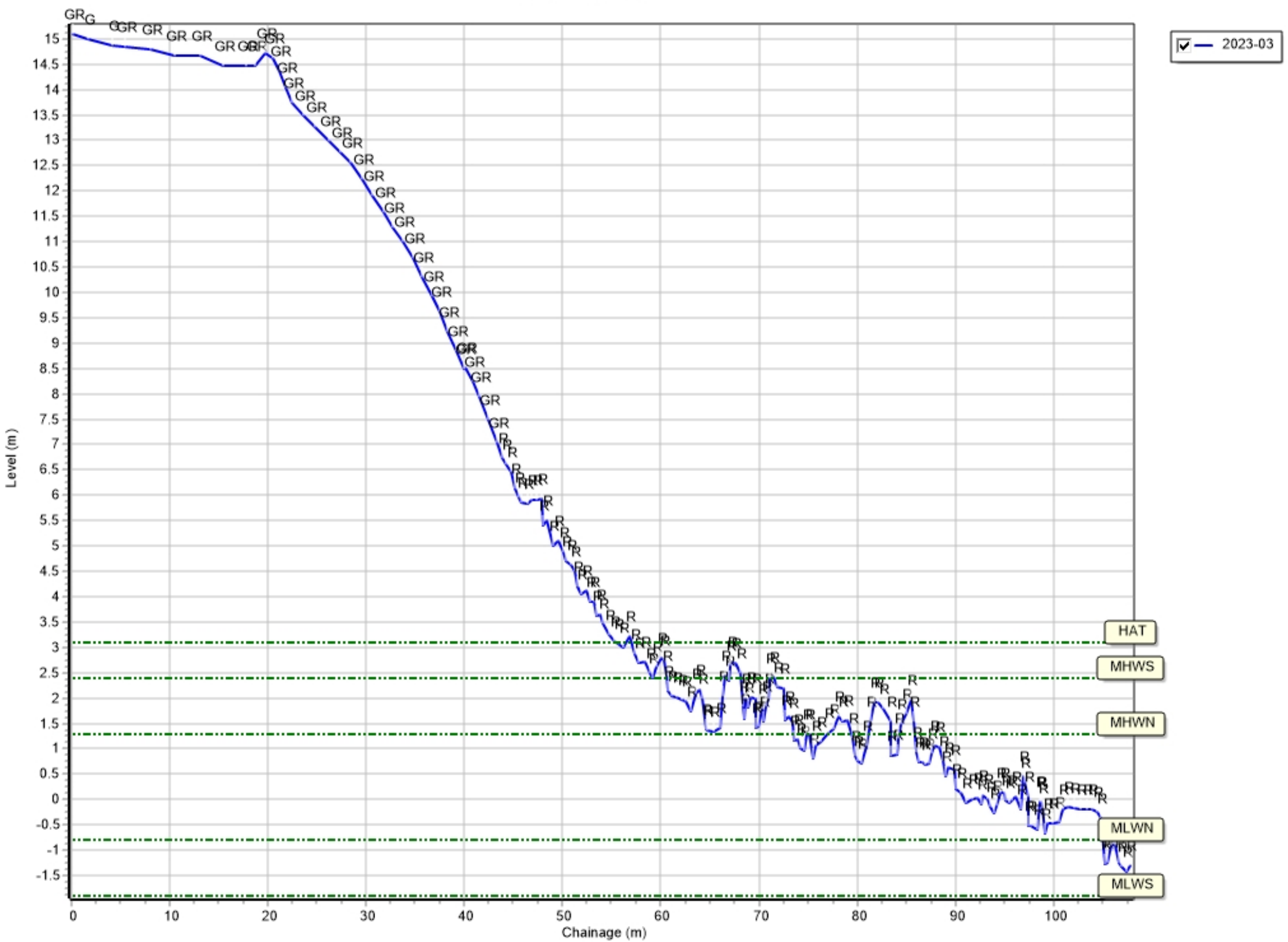
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7
6.5
6
5.5
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4.5
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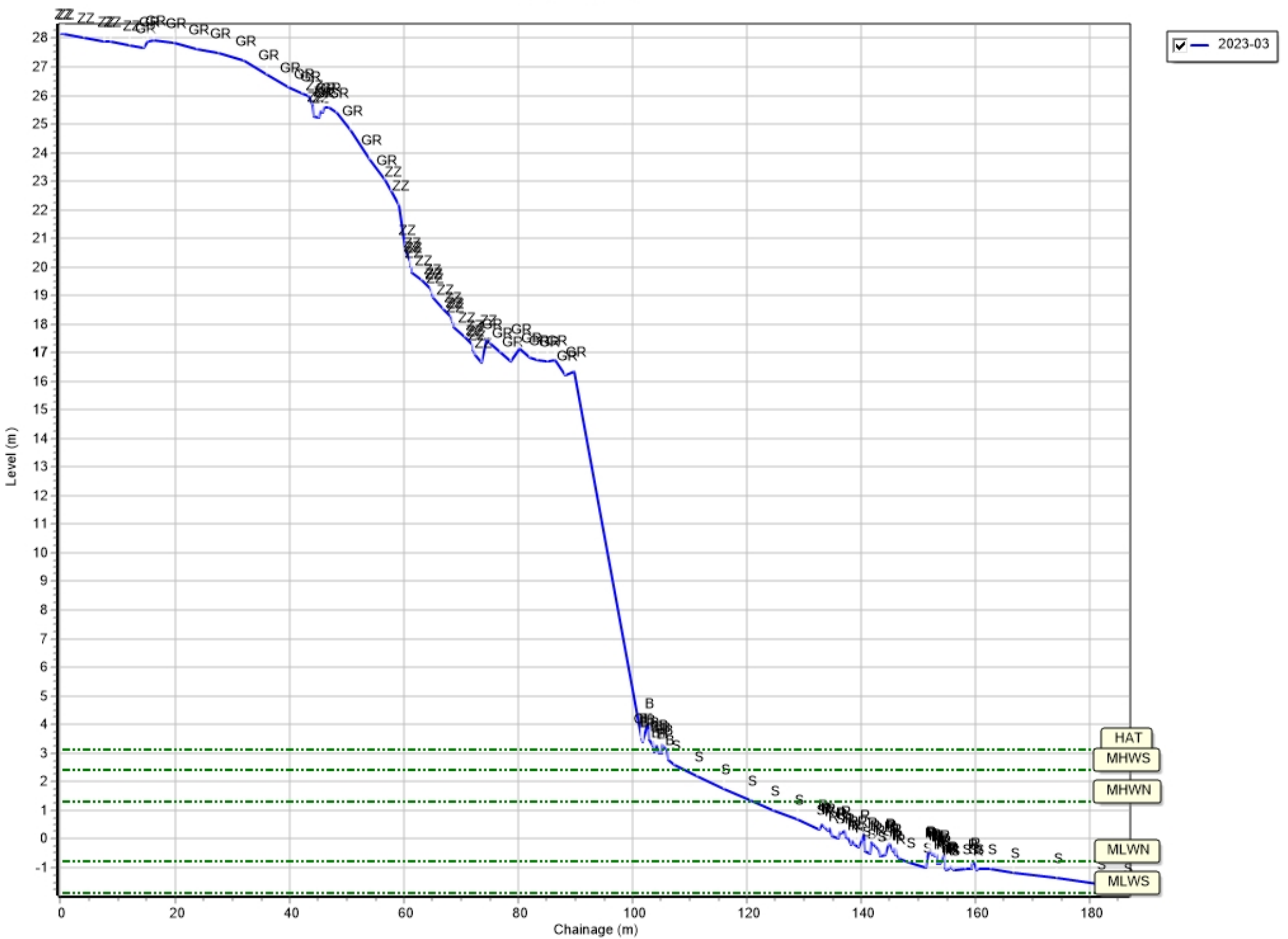
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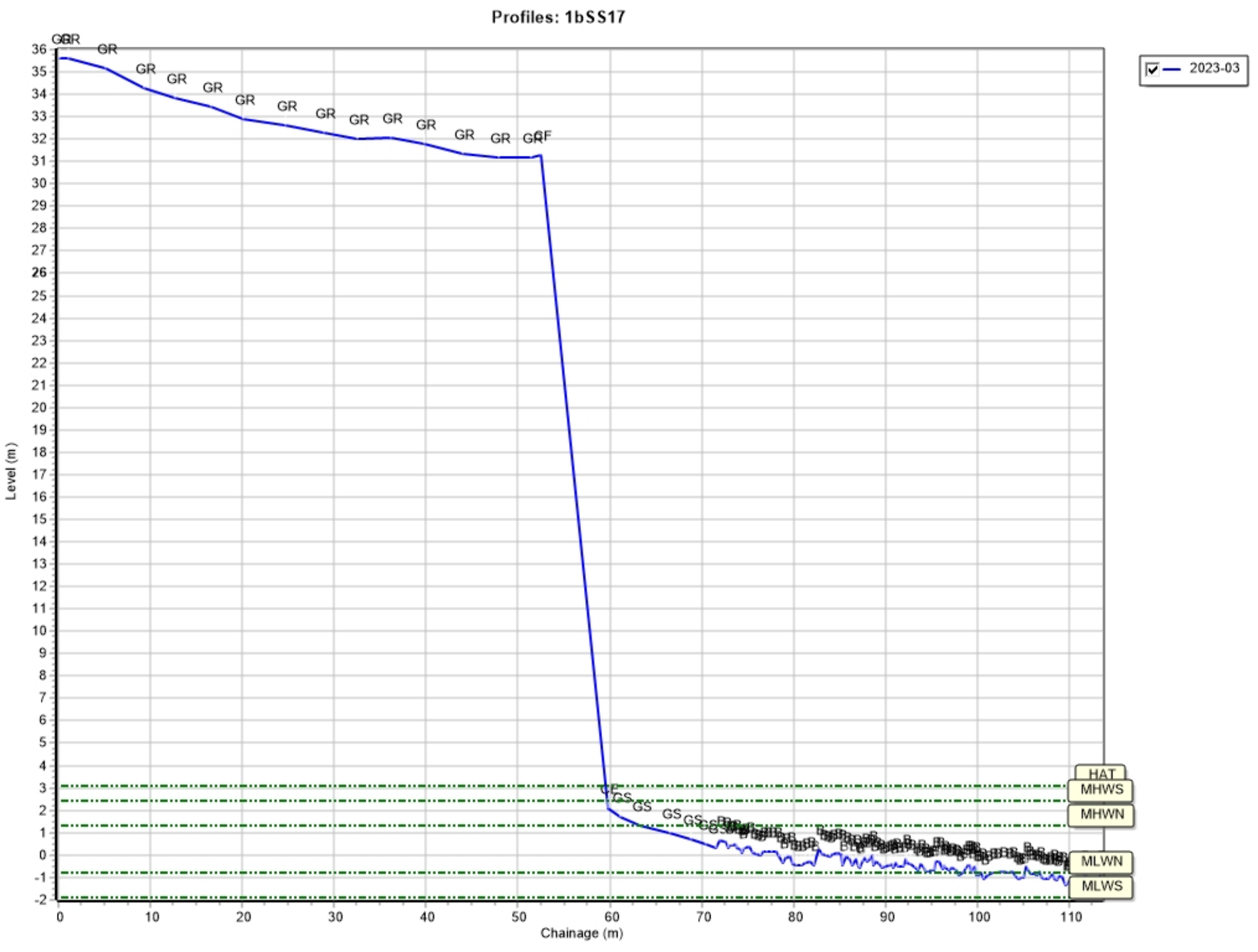
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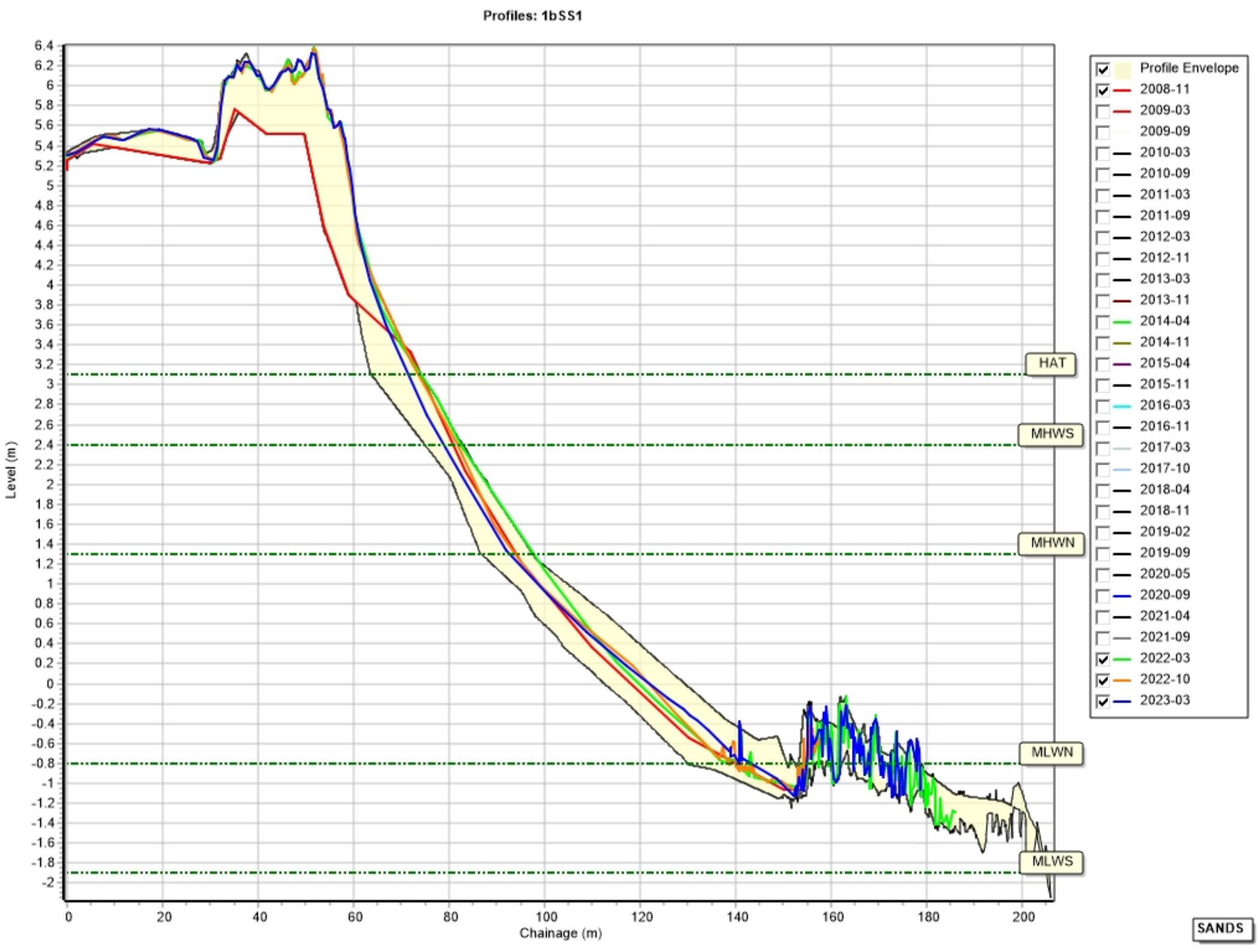
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2022-10
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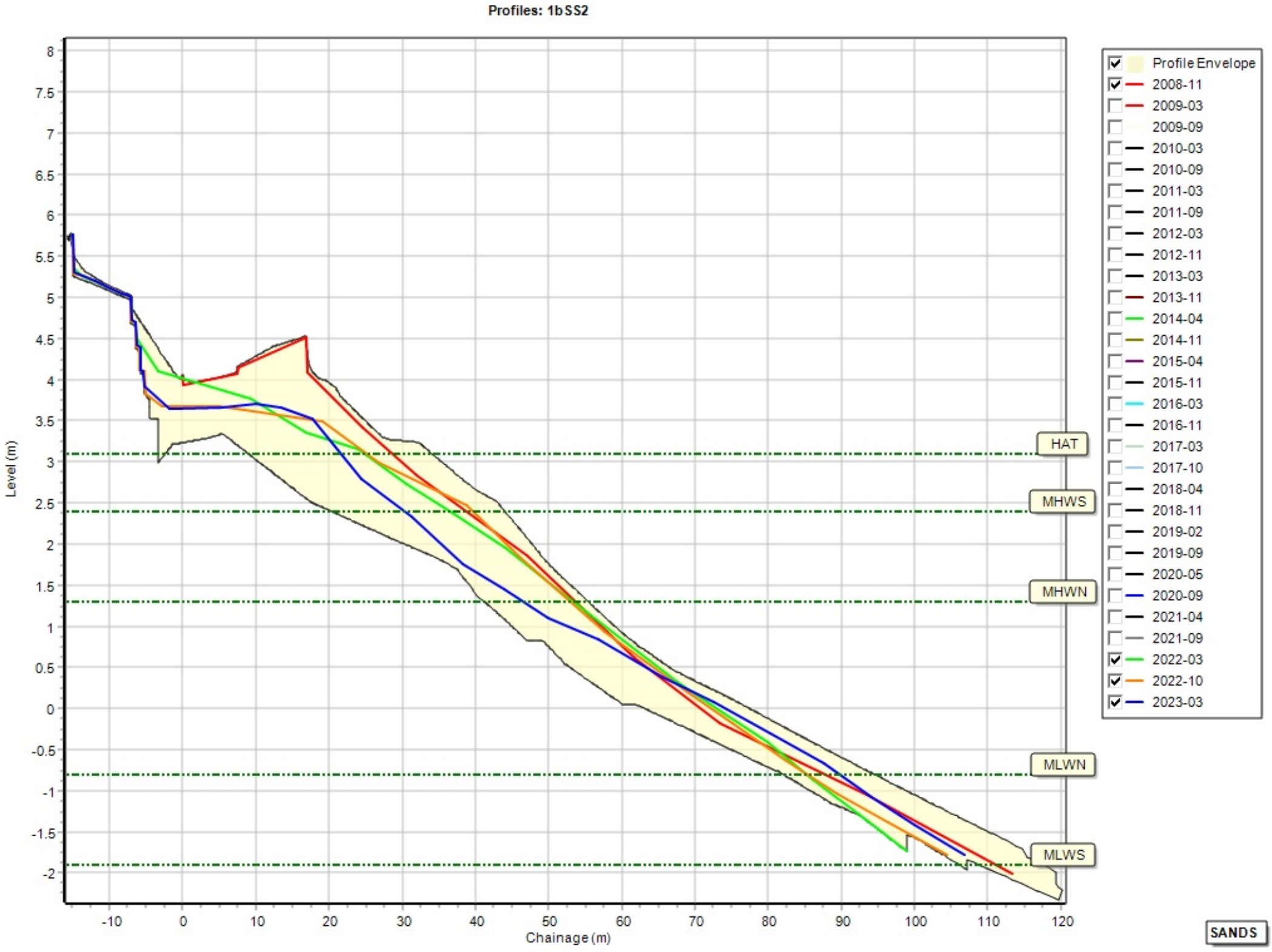
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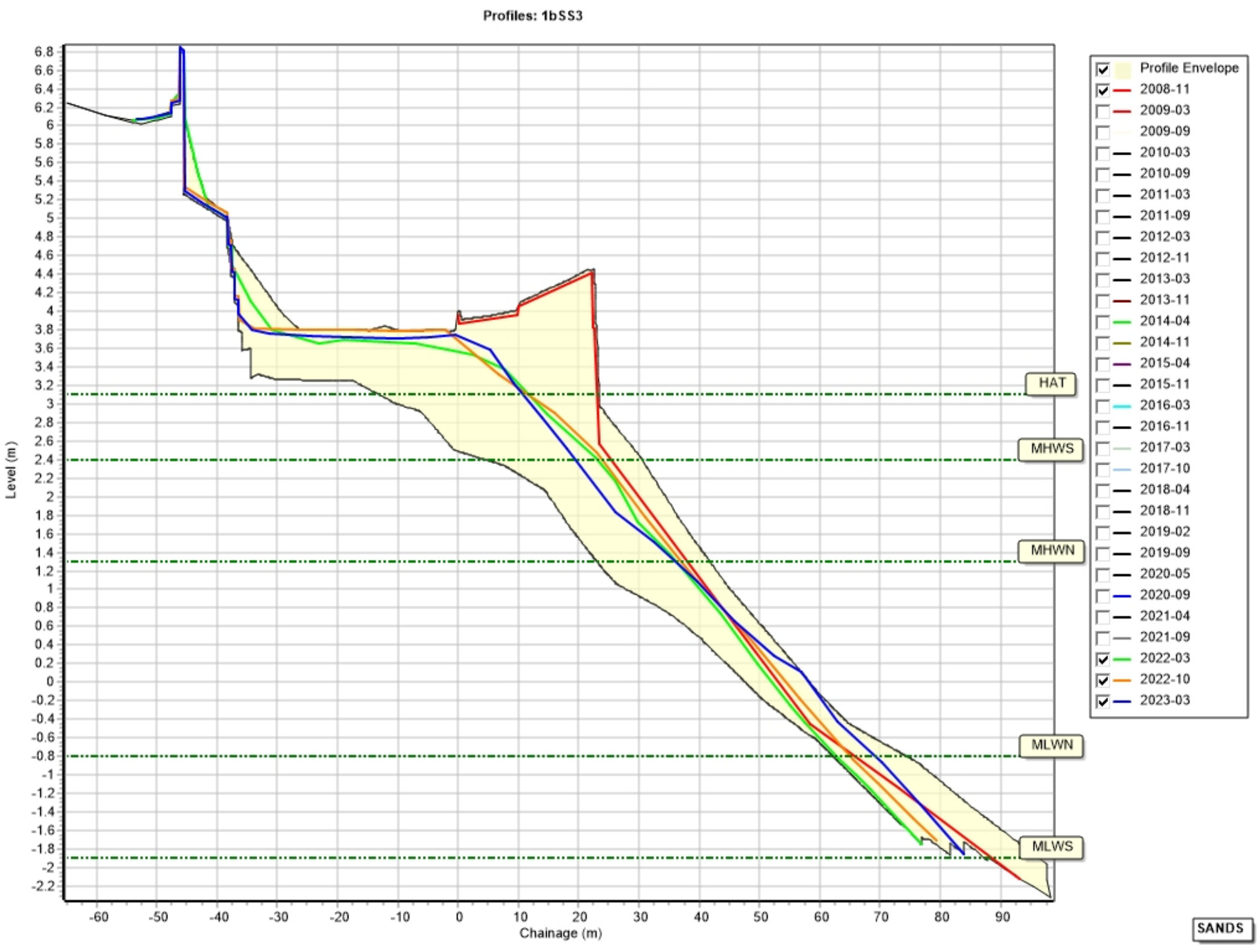
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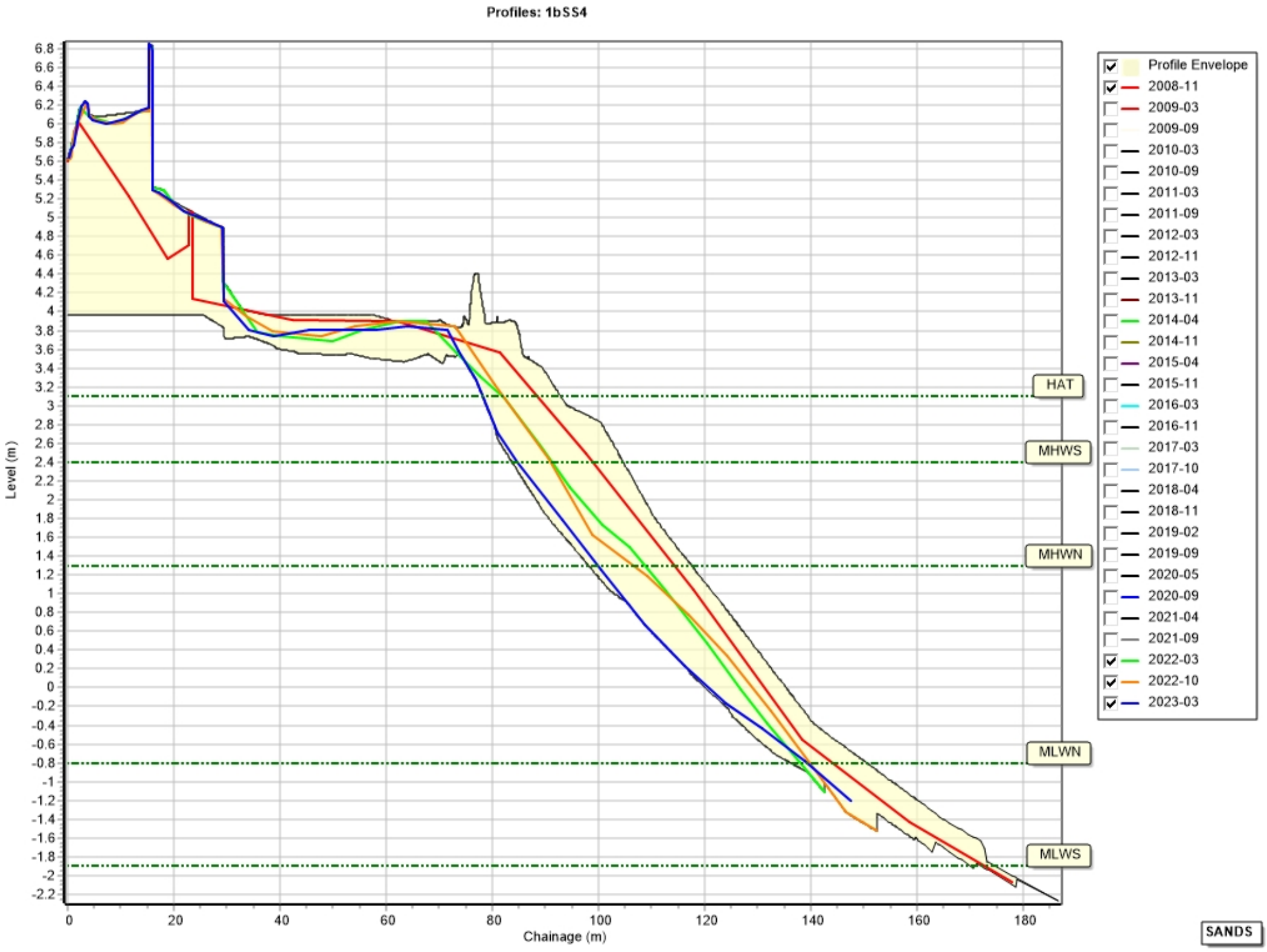
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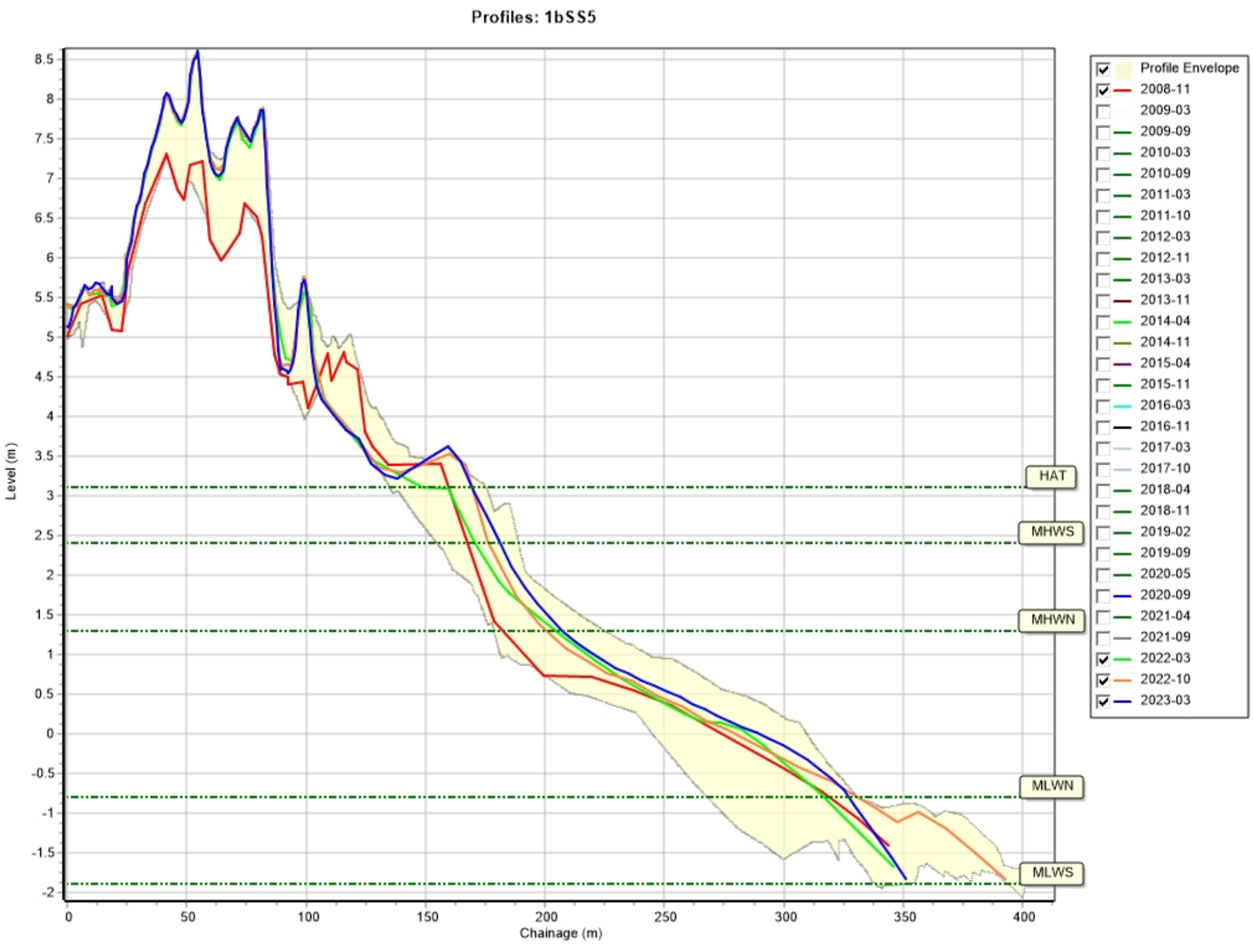
2023-03
SANDS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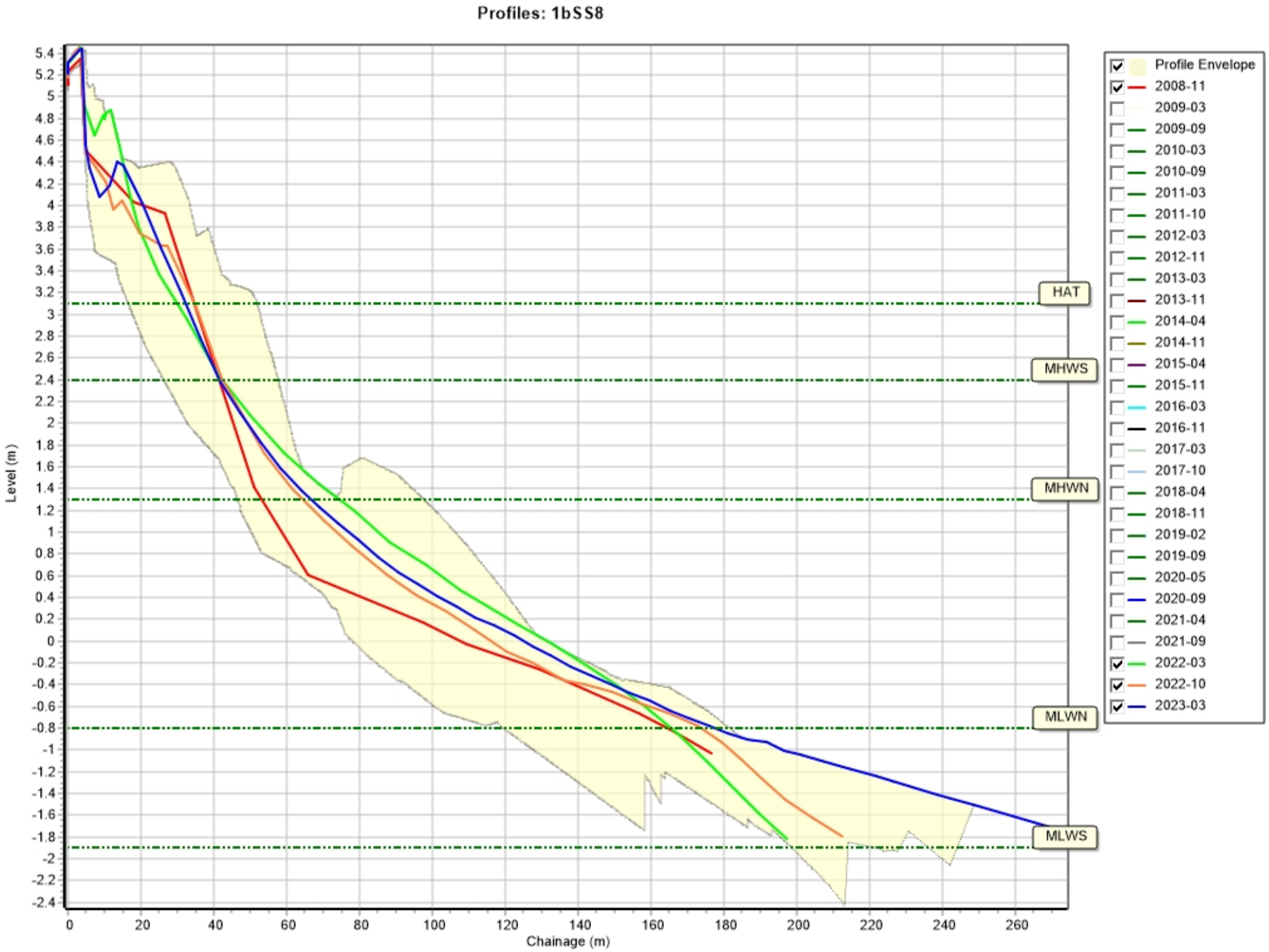
2023-03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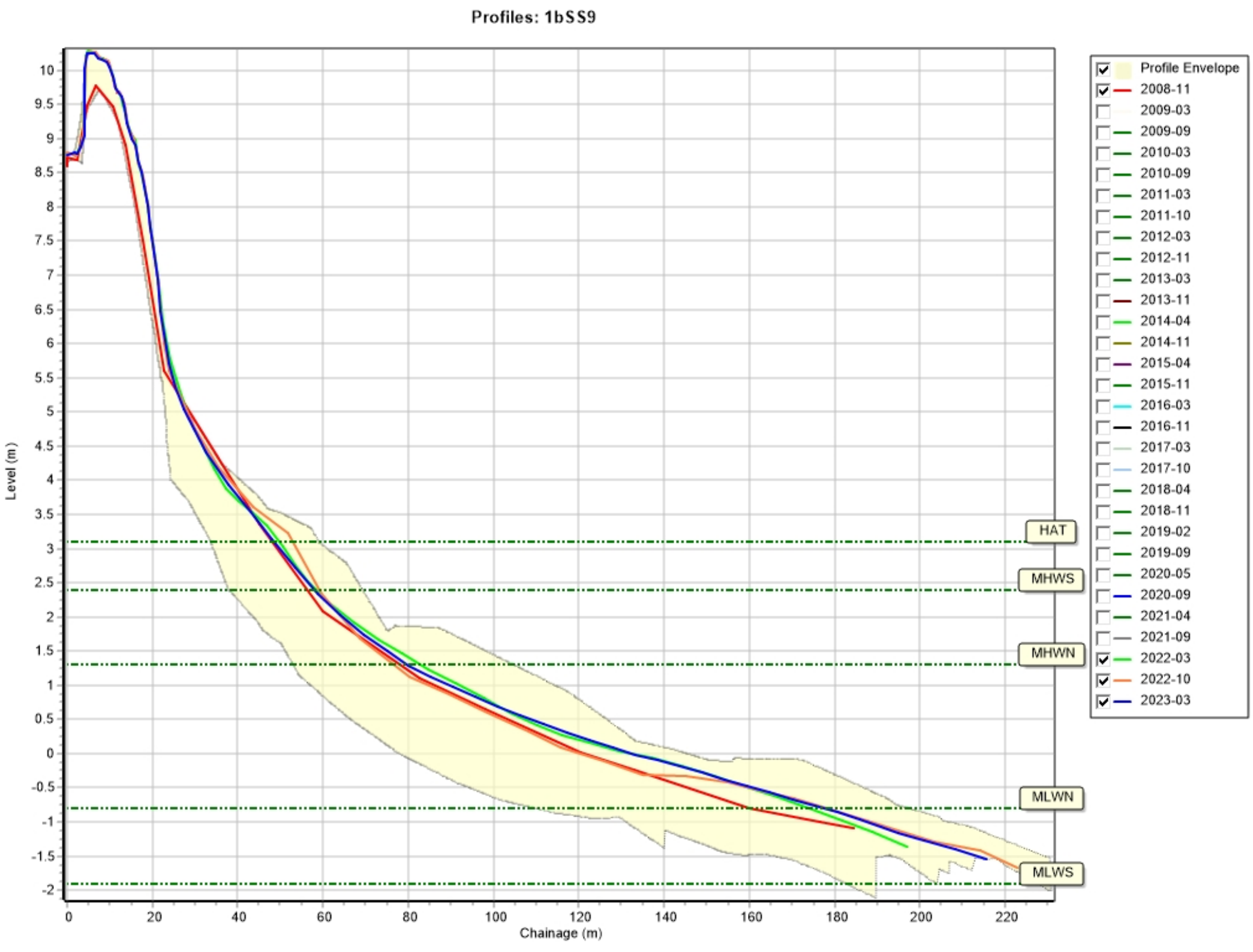
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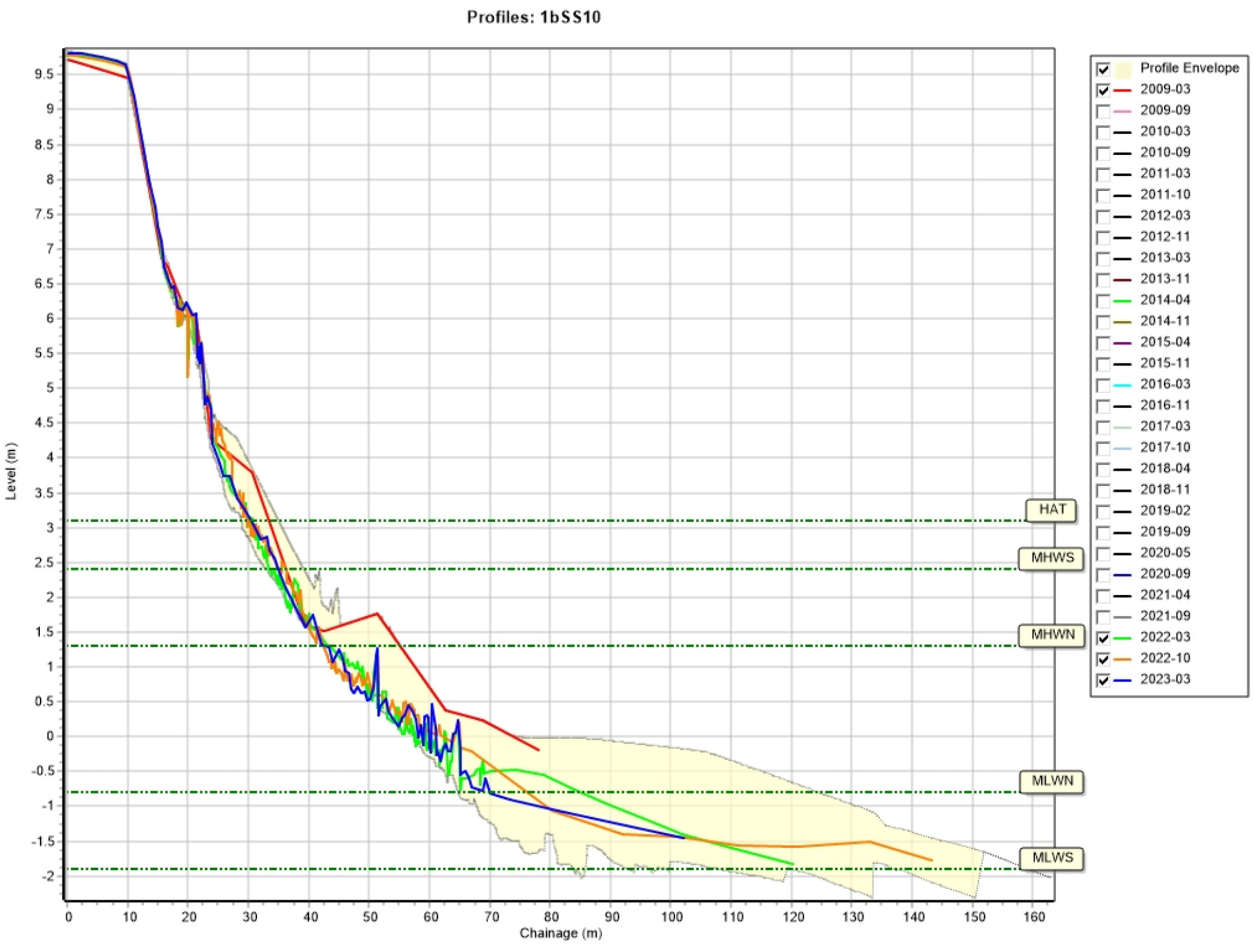
2023-03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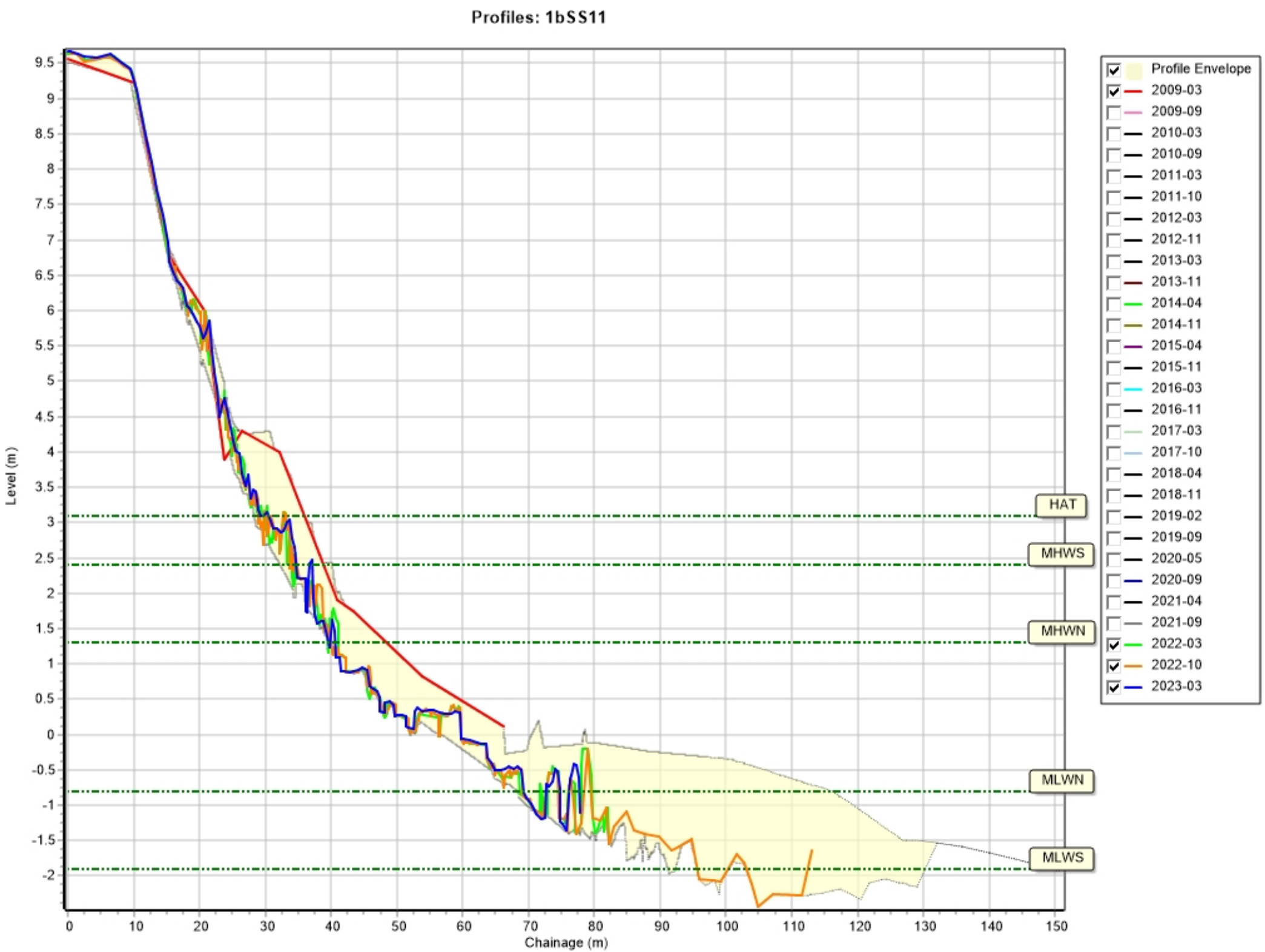
2023-03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Profile Envelope
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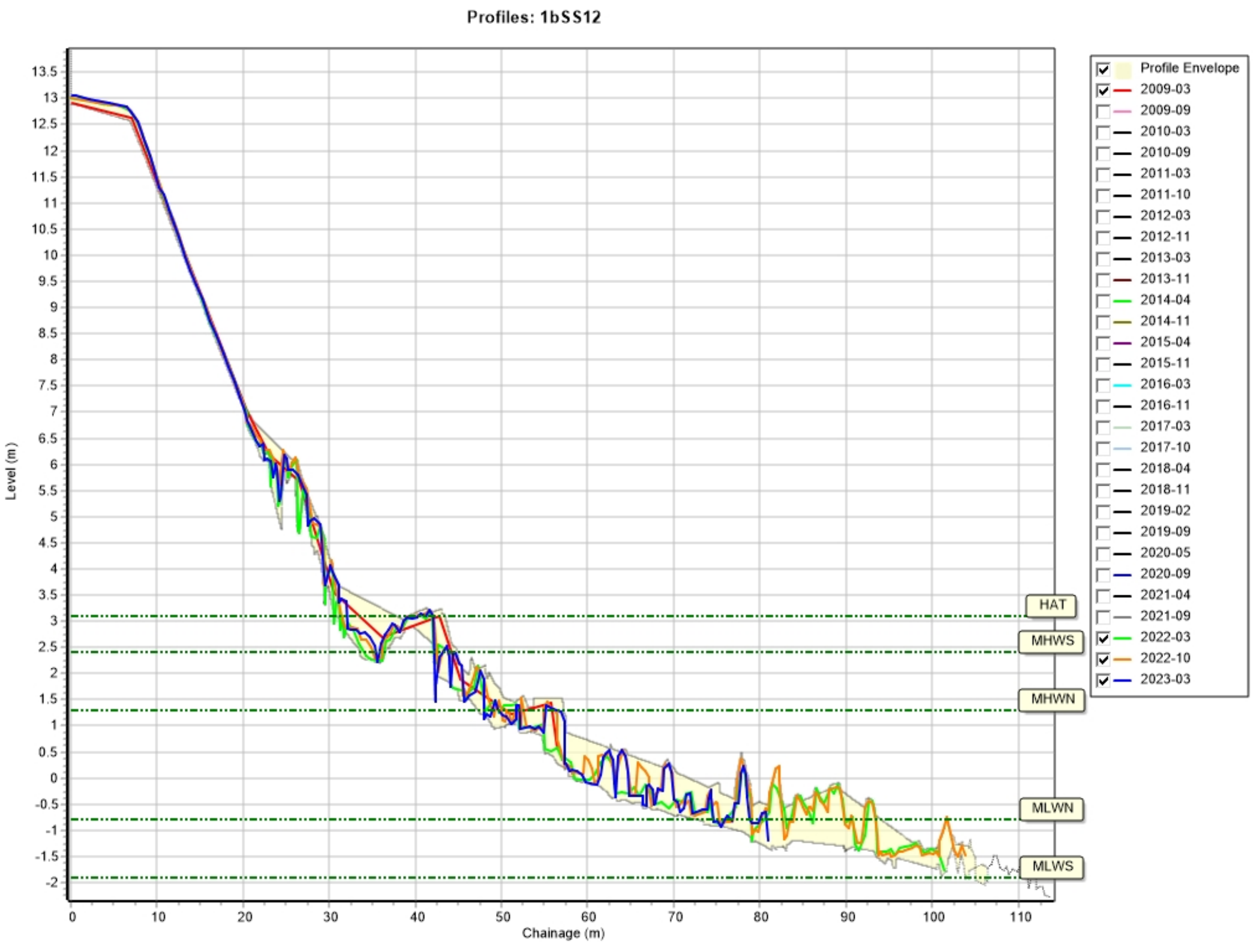
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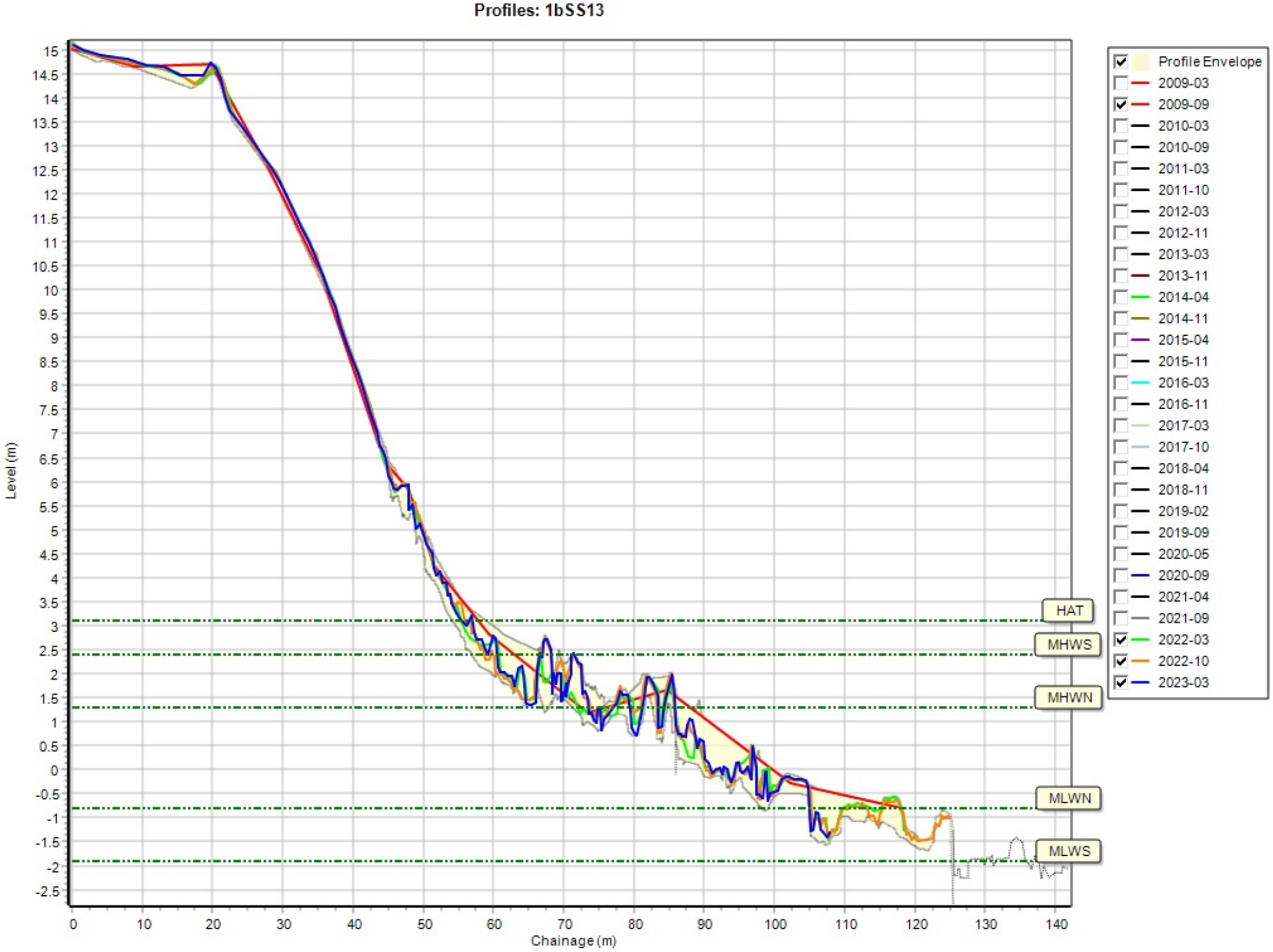
2023-03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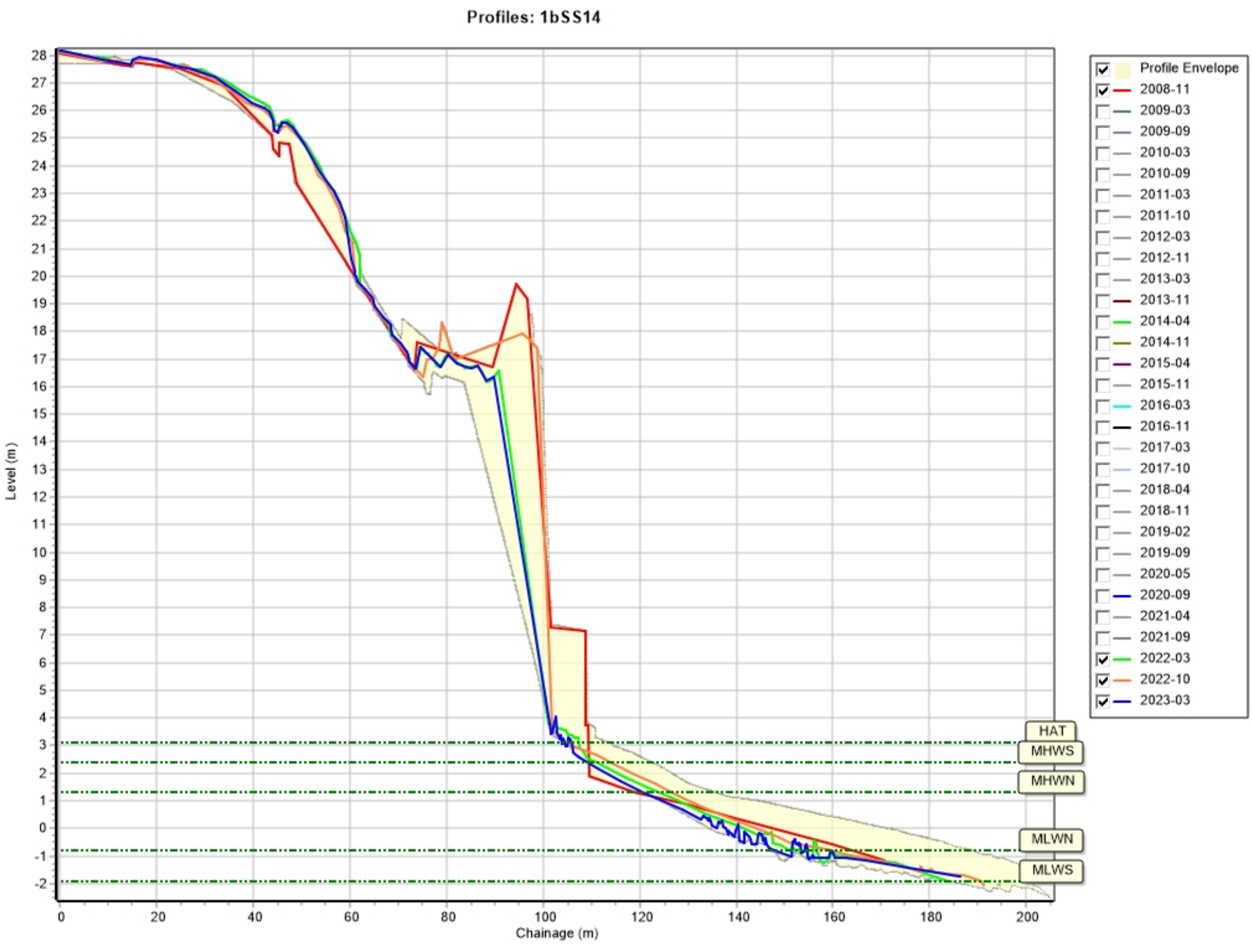
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2023-03
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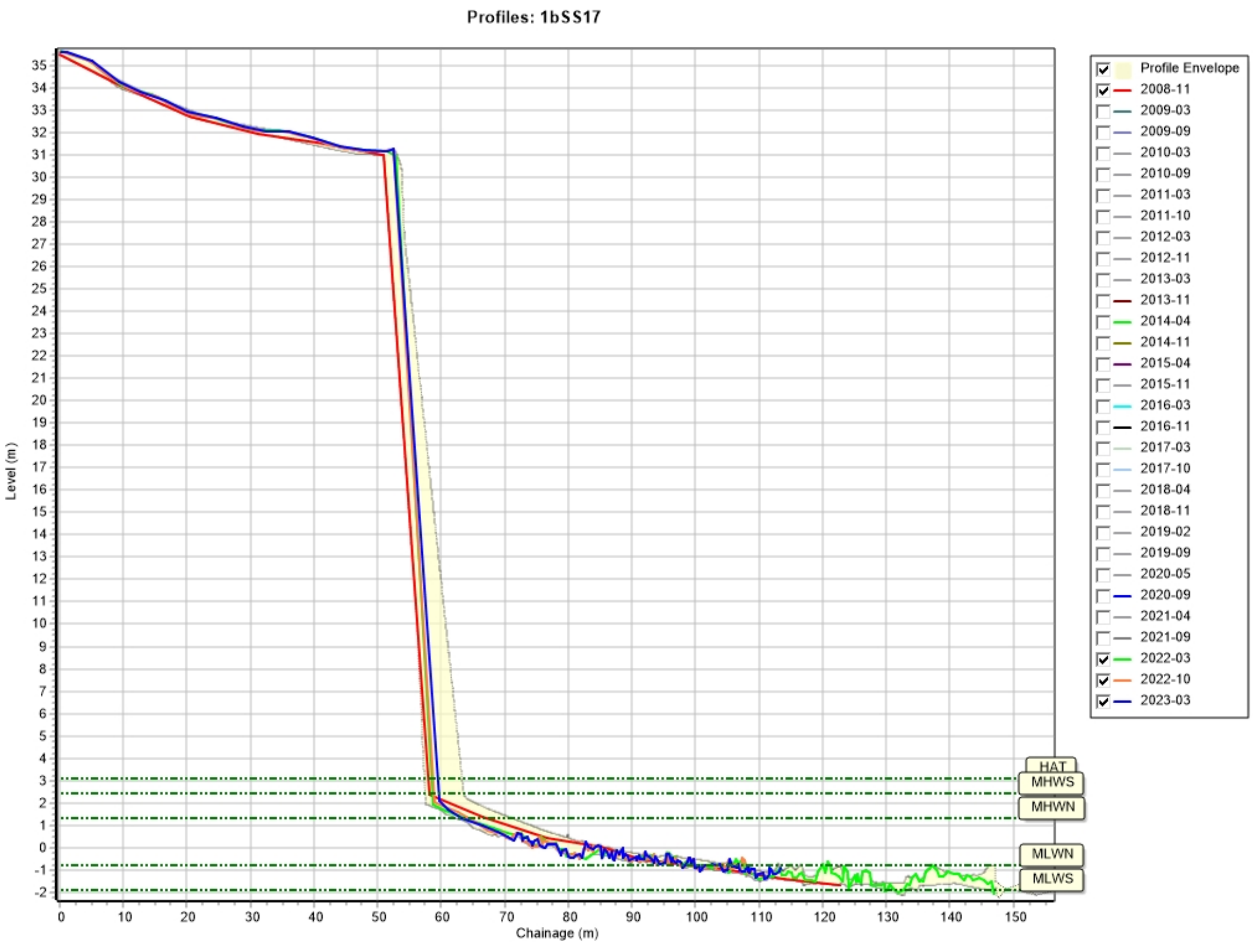
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2021-04
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2022-03
2022-10
2023-03
HAT
MHWS
MHWN
MLWN
MLWS

Appendix B

Topographic Survey

436800 437100 437400

568200 567900 567600

LITTLEHAVEN BEACH

River Drive

Lawe Road

Sea Road

North Marine Park

Haven Point

Fairles Street

0 300 Metres

TOPOGRAPHIC SURVEY (March 2023)

Elevation (mOD)

- -1.7 - -1.5
- -1.4 - -1
- -0.9 - -0.5
- -0.4 - 0
- 0.1 - 0.5
- 0.6 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7

Contours (mOD)*

- 1.0m interval
- 0.25m interval

* Contours only cover sandy beach areas.

Client:	Project:
North East Coastal Group	Cell 1 Regional Coastal Monitoring Programme

Title:

Appendix B - Map 1

LITTLEHAVEN BEACH

South Tyneside Council Frontage

Report:

Update Report
'Partial Measures' Survey 2023

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	27/03/2023	TC	NJC	A3	1:3,000

Co-ordinate system: British National Grid

Royal HaskoningDHV
Enhancing Society Together

North East Coastal Observatory

436800 437100 437400

568200

567900

567600

Difference between topographic surveys
(Oct 2022 to March 2023)
Change in Elevation (mOD)

Gain	>2.0
	1.75 - 2
	1.5 - 1.75
	1.25 - 1.5
	1 - 1.25
	0.75 - 1
	0.5 - 0.75
	0.25 - 0.5
	0.1 - 0.25
Change +/- 0.1m	0 - 0.1
	-0.1 - 0
Loss	-0.25 - -0.1
	-0.5 - -0.25
	-0.75 - -0.5
	-1 - -0.75
	-1.25 - -1
	-1.5 - -1.25
	-1.75 - -1.5
	-2 - -1.75
	<-2

Client: North East Coastal Group

Project: Cell 1 Regional Coastal Monitoring Programme

Title:

Appendix B - Map 2

LITTLEHAVEN BEACH

South Tyneside Council Frontage

Report: Update Report 'Partial Measures' Survey 2023

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	27/03/2023	TC	NJC	A3	1:3,000

Co-ordinate system: British National Grid

Royal HaskoningDHV
Enhancing Society Together

North East Coastal Observatory

Appendix C

Cliff Top Survey

SURVEY LOCATIONS

- Cliff Top Survey Points

Client:	Project:
North East Coastal Group	Cell 1 Regional Coastal Monitoring Programme

Title:

Figure 3 - Map 1

TROW QUARRY

South Tyneside Council Frontage

Report: Survey Report

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	n/a	TC	NJC	A4	1:1,500

Co-ordinate system: British National Grid

Royal HaskoningDHV
Enhancing Society Together

North East Coastal Observatory

Cliff Top Survey

Trow Quarry

Six ground control points have been established at Trow Quarry (Figure C1). The maximum separation between any two points varies along the coast, reflecting the degree of risk from the erosion.

The cliff top surveys at Trow Quarry are undertaken bi-annually. Measurements are taken from a fixed ground control point along a fixed bearing to the edge of the cliff top.

Table C1 provides baseline information about these ground control points and results from the 2011 (baseline) survey showing the position from the ground control point to the edge of the cliff top along the defined bearing. Future reports will show results from subsequent surveys and provide a means of assessing erosion since the baseline survey.

Table C1 – Cliff Top Surveys at Trow Quarry

Ground Control Points				Distance to Cliff Top (m)			Total Erosion (m)		Erosion Rate (m/year)
Ref	Easting	Northing	Bearing	Baseline Survey	Previous Survey	Present Survey	Baseline to Present	Previous to Present	Baseline to Present
			(°)	Sep 2011	Oct 2022	Mar 2023	Sep 2011 - Mar 2023	Oct 2022 – Mar 2023	Sep 2011 - Mar 2023
1	438300.3	566674.7	309	7.00	6.53	6.58	-0.42	0.05	-0.035
2	438338.8	566694.3	312	9.40	9.24	9.19	-0.21	-0.05	-0.018
3	438384.7	566669	33	7.00	6.49	6.48	-0.52	-0.01	-0.043
4	438408.1	566664.8	71	10.50	10.92	10.9	0.4	-0.02	0.033
5	438401.1	566638	120	7.00	7.03	7.03	0.03	0	0.003
6	438392.8	566604.2	110	10.20	9.77	9.83	-0.37	0.06	-0.031