



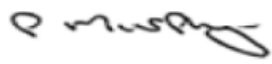
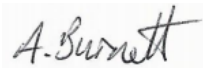
Inspection and Survey of Sheet Pile Wall and Marina Piles at An Daingean FHC, Dingle, Co. Kerry



Guaranteed Safety Reliability and Professionalism

Submitted: April. 2025

Inspection Company	Client
Dive and Marine Contractors Bonnettstown Co. Kilkenny Tel: 056 780 1288 Email: info@diveandmarine.com Web: www.diveandmarine.com	An Roinn Talmhaíochta, Bia agus Mara Department of Agriculture, Food and the Marine Pointe Uí Rinn, Cathair Uí Mhóráin, Trá Lí, Co. Chiarraí Reen Point, Blennerville, Tralee, Co. Kerry Tel: +353 (0)66 7149340 Email: Seamus.Cleary@agriculture.gov.ie Web: www.agriculture.gov.ie

	Name	Signed	Date
Prepared by	Philip Murphy		10/04/2025
Checked by	Alan Burnett		10/04/2025

Contents

Introduction	4
Description of Structure	4
Methodology	4
Inspection Findings	5
Conclusion and Recommendations	8
APPENDIX A: Site Plan	9
APPENDIX B: Photographs	10
APPENDIX F: Condition Assessment Ratings	42

Introduction

This report contains the findings of an underwater inspection carried out at Dingle Harbour Fisheries Centre between 20th and 22nd March 2025.

Dive and Marine Contractors (DMC) was engaged to locate, inspect and remove debris along the Main Pier and the Town Pier with the assistance of Dingle Fishery Harbour Centre (DFHC) plant operators. Photographs of debris recovered are provided in Appendix B: Photographs.

In addition to this DMC was also tasked with carrying out visual inspections, cathodic protection (CP) meter surveys and Ultra Sonic (UT) thickness measurement readings along the east face of the main pier and to the guide piles on the four marina structures in the harbour.

This report is based on the results of these inspections and surveys.

Description of Structure

The main pier extends north to south and is approximately 180m long. The west face is of masonry construction, the east face is of sheet pile construction. These sheet piles and their cathodic protection system were part of this inspection/survey. In addition to the east face of the pier there are five independent marina systems located around the harbour. Four of these marinas were included in this project. One on the east side and three on the west side (Appendix A: Site Plan) The main guide piles on these marinas were inspected, UT readings were recorded and their CP systems surveyed as part of this inspection project.

Methodology

A five-person dive team conducted the inspection in accordance with the company operating procedures in line with relevant health and safety legislation to ensure safe diving operations.

Access and Egress was via ladders, steps, slipway and client's pontoon.

For the purpose of this report the chainage was marked out at 5.00m intervals from north to south along the edge of the main pier. Chainage 0.00m (Ch 0) Was taken as the interface between the slipway and the tarmac surface to ensure it was a readily identifiable location to allow easy replication at a future date, this resulted in a total chainage of 210.00m being marked up due to the slipway extending inshore approximately 30.00m. The diver started at Ch. 0 and worked methodically along the sheet piling to the nose of the pier. The diver confirmed the presence of anodes at each in-pan and took CP meter readings at every ten-metre interval, these were taken at upto 3 locations, near the surface, midwater and above the channel bottom. Any reading over 0.9v is considered sufficient, any readings above 1.3v could indicate over protection which can cause 'hydrogen embrittlement'. UT readings were also taken at every ten-metres, 9 readings were taken at each 10.00m section of the sheet pile wall at the in-pan, side-pan and out-pan at the splash zone, intertidal zone and above the channel bottom. Three readings were also taken at each candidate round pile. The candidate round piles were selected by the Harbourmaster on site; these were taken at the splash

zone, intertidal and above the channel bottom. For the purpose of this inspection the piles were numbered from 1 to 47.

Piles 1 to 20 were situated at Marina A, adjacent to the Town Pier, Piles 21 to 23 were located at Marina B, Piles 24 to 40 were located at Marina C and finally, Piles 41 to 47 were located at Marina D.

The fifth Marina was located between the slipway east of the main pier and the Town Pier, as it is a relatively new structure it was excluded from this scope of works.

Please refer to Appendix A: Site Plan for each location.

Inspection Findings

4.1 East Pier

Overall, we gave the East Pier a condition rating of **5 - Satisfactory**, please refer to Appendix F: Condition Assessment Ratings table.

With one exception, CP readings were consistent throughout the structure between Ch 50 to Ch 210, ranging from 0.857v to 1.035v. However, readings as low as 0.270v were recorded between Ch 30 and Ch 50. This is where the sheet piles begin. It is relatively shallow in comparison to the main section of the quay wall and as a result shorter anodes (0.7m) have been installed. The shorter anodes generally will result in lower voltage readings, any reading lower than 0.5v is typical of what is expected on an unprotected structure, so it appears that this initial section of sheet pile wall is significantly under protected. Larger anodes (1.40m) were present throughout the structure from Ch 57 and were secured at both top and bottom brackets. Anodes showed typical depletion of about 10%.

As stated above, one reading in the mid water range at Ch 150 yielded a low reading of 0.580v. This immediate area was checked several times, but it failed to yield a higher reading. This may be due to a local anomaly such as fouling on the surface which prevented continuity with the CP meter. Both readings above and below this area yielded suitable results.

Ultra-Sonic Thickness (UT) readings were recorded at ten-metre intervals from Ch 40 to Ch 200. Minor variations were noted throughout the structures; however, these variations range from minor to moderate (upto 2.5mm). See Appendix C: UT Measurements to review the UT readings.

Refer to Appendix B: Photograph 9 for an illustration of a typical anode.

Five voids were noted throughout the sheet pile wall structure between Ch 167 and Ch 198, these voids were relatively consistent in both size and elevation. They were between 50mm wide x 80mm high and 120mm wide x 330mm high and were up to in excess of 1.00m in penetration. They were all located between 4.40m and 5.50m below the deck level. Clean angular stone was noted behind the piles where visible. Considerable suction was noted to each void at the time of the inspection, see photographs 10 to 14.

The bottom 1.00m appeared to be missing from the fender situated at Ch. 87. The rubbing strip extended down beyond the timber section, see photograph 15.

Section loss was noted to the bottom 1.50m of the fender at Ch. 106, see photograph 16.

The bottom rubbing strip was loose and extended down past the timber section by 0.45m at Ch. 125, see photograph 17.

Upto 1.50m of timber was missing from the bottom of the fender at Ch. 129, see photograph 18.

The bottom 1.70m of fender material appears to be missing on the fender at Ch. 133, see photograph 19.

The bottom fender strip at Ch. 137 appears to be loose.

The bottom 1.80m of the fender at Ch. 141 seems to be missing, see photograph 20 and the bottom 1.80m of the fender at Ch. 148 appears to be damaged and exhibits exposed steel bolts, see photograph 21.

The bottom 1.20m of the fender at Ch. 160 appears to have upto 60% section loss, see photograph 22.

Damaged or missing timber was noted to the bottom 1.20m of the fender at Ch. 163, see photograph 23.

The bottom cross member of the fender at Ch. 167 exhibited upto 40% section loss, see photograph 24.

Upto 40% section loss was also noted to the bottom fender cross member at Ch. 175.

The bottom 1.20m was missing from behind the rubbing strip on the fender at Ch. 185 and 1.80m was missing from the bottom of the fender at Ch. 193.

The construction of the pier changed to a concrete facade at Ch. 203, see photograph 25. No significant defects were noted to the remainder of the structure.

4.2 Marina A

We have rated the condition of Marina A to be **5 - Satisfactory**.

All 20 piles have anodes attached, 11 of these have 2 anodes each. The depletion of these anodes was noted to be typically 10% on each pile. CP meter readings were carried out on all piles and all readings fell within expected ranges of 0.930v and 1.057v. UT meter readings were also recorded for candidate piles.

Whilst we did not have access to the original pile thicknesses to allow accurate comparisons, the values observed fell between expected values, there was no visible indication of significant deterioration. This UT survey can now be used as the base line survey for these piles.

See Appendix A: Site Plan for Marina A and pile locations and Appendix B: Photographs (photograph 3) for a general view. See Appendix C: UT Measurements to review the UT readings.

4.3 Marina B:

We have rated the condition of Marina B to be **5 - Satisfactory**.

All 3 Piles have 1 anode attached. the depletion of these anodes was noted to be 10%.

CP meter readings were carried out on all 3 piles and all readings fell within expected ranges of 0.930v and 1.015v. No UT measurements were taken at Marina B.

See Appendix A: Site Plan for Marina B and pile locations and Appendix B: Photographs (photograph 4) for a general view.

4.4 Marina C:

We have rated the condition of Marina C to be **5 – Satisfactory**.

All 17 Piles have 1 anode each attached. The depletion of these anodes was noted to be 10% on all 17 piles. CP meter readings were carried out on all piles and all readings fell within acceptable ranges of 0.95v and 1.036v.

Whilst we did not have access to the original pile thicknesses to allow accurate comparisons, the values observed fell between expected values, there was no visible indication of significant deterioration. This UT survey can now be used as the base line survey for these piles.

See Appendix A: Site Plan for Marina A and pile locations and Appendix B: Photographs (photograph 5) for a general view. See Appendix C: UT Measurements to review the UT readings.

4.5 Marina D:

We have rated the condition of Marina D to be **5 – Satisfactory**.

All 7 Piles have 1 anode each attached. The depletion of these anodes was noted to be 10%. CP meter readings were carried out on all piles and all readings fell within acceptable ranges of 1.032v and 1.040v.

The piles showed evidence of having been treated with a protective coating since the last inspection.

Whilst we did not have access to the original pile thicknesses to allow accurate comparisons, the values observed fell between expected values, there was no visible indication of significant deterioration. This UT survey can now be used as the base line survey for these piles.

See Appendix A: Site Plan for Marina A and pile locations and Appendix B: Photographs (photograph 6) for a general view. See Appendix C: UT Measurements to review the UT readings.

Conclusion and Recommendations

Overall, the structures were found to be in a satisfactory condition.

Consideration should be given to addressing issues raised with the fenders on the east pier.

Remediation works appear to have been carried out since the last inspection to Marina D.

Some moderately low readings were noted along the sheet pile and marina piles, but the variation was not more than 2.5mm. However, we did not access to the original as built thickness of the piles to accurately calculate total diminish of the piles. We recommend that a regular inspection regime is maintained to ensure continued serviceability is maintained across the whole facility. This regime would ideally include CP and UT meter readings to all steel sections, Visual inspections to all elements including concrete and masonry elements should also be included.

Although outside the scope of this inspection we also recommend that Bathymetric surveys be carried out a regular interval.

Based on this report we would recommend that CP, UT and visual inspections are carried out at intervals not exceeding 5 years.

APPENDIX B: Photographs



Photograph 1: East face of the Main Pier



Photograph 2: Town Pier



Photograph 3: Marina A viewed from the Main Pier



Photograph 4: Marina B viewed from the west shore



Photograph 5: Marina C viewed from the Main Pier



Photograph 6: Marina D viewed from its west end looking east



Photograph 7: Typical pile above water



Photograph 8: Ch 0 at the slipway/tarmac interface



Photograph 9: Typical anode



Photograph 10: Void at Ch 67



Photograph 11: Void at Ch 178



Photograph 12: Void at Ch 187



Photograph 13: Void at Ch 190



Photograph 14: Void at Ch 198



Photograph 15: Defect to fender at Ch 87



Photograph 16: Defect to fender at Ch 106



Photograph 17: Defect to fender at Ch 125



Photograph 18: Defect to fender at Ch 129



Photograph 19: Defect to fender at Ch 133



Photograph 20: Defect to fender at Ch 141



Photograph 21: Defect to fender at Ch 148



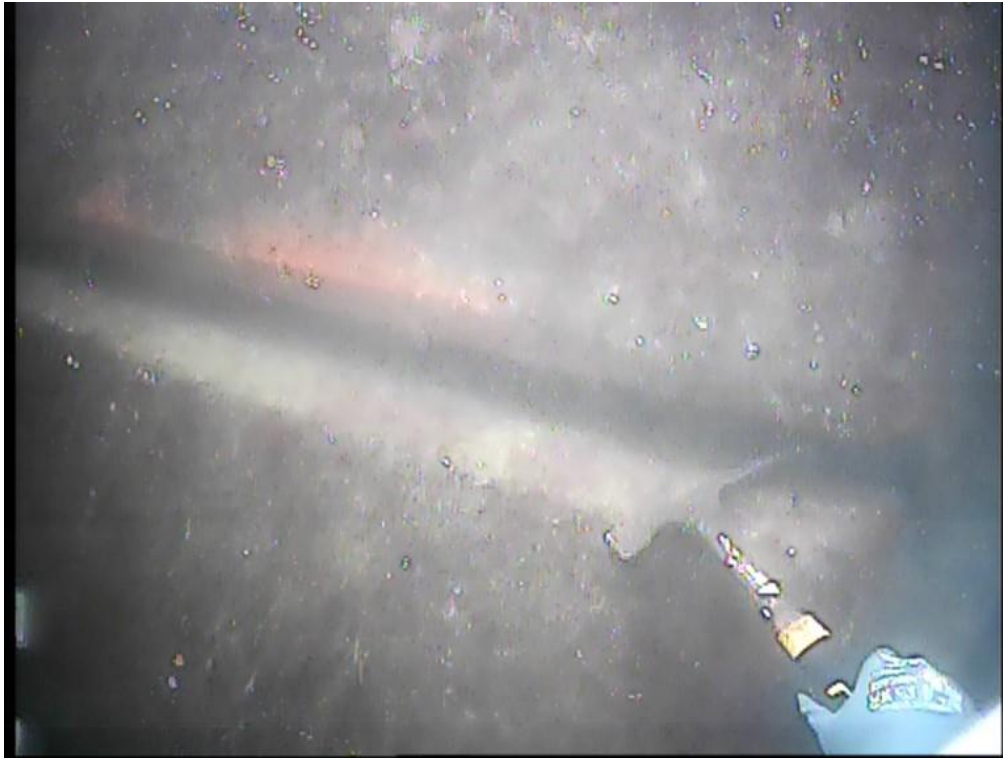
Photograph 22: Defect to fender at Ch 160



Photograph 23: Defect to fender at Ch 163



Photograph 24: Defect to the fender cross member at Ch 167



Photograph 25: Change in construction at Ch 203



Photograph 26: Debris recovered from the east pier



Photograph 27: Debris recovered from the east pier



Photograph 28: Debris recovered from the west pier



Photograph 29: Debris recovered from the west pier



Photograph 30: Debris recovered from the west pier



Photograph 31: Debris recovered from the Town Pier



Photograph 32: Debris recovered from the Town Pier



Photograph 33: Debris recovered from the Town Pier

APPENDIX C: UT Measurements

Marina Piles

Pile No. 1

Location:	Value:
Splash Zone	19.8
Inter Tidal	20.6
Above Channel Bottom	20.4

Pile No. 7

Location:	Value:
Splash Zone	19.0
Inter Tidal	18.9
Above Channel Bottom	19.1

Pile No. 10

Location:	Value:
Splash Zone	16.0
Inter Tidal	16.4
Above Channel Bottom	15.8

Pile No. 13

Location:	Value:
Splash Zone	16.2
Inter Tidal	15.5
Above Channel Bottom	*

Pile No. 16

Location:	Value:
Splash Zone	15.7
Inter Tidal	15.6
Above Channel Bottom	15.2

Pile No. 20

Location:	Value:
Splash Zone	18.8
Inter Tidal	18.8
Above Channel Bottom	19.0

Pile No. 24

Location:	Value:
Splash Zone	16.4
Inter Tidal	15.5
Above Channel Bottom	*

Pile No. 28

Location:	Value:
Splash Zone	16.3
Inter Tidal	15.9
Above Channel Bottom	15.8

Pile No. 32

Location:	Value:
Splash Zone	16.2
Inter Tidal	15.6
Above Channel Bottom	15.7

Pile No. 35

Location:	Value:
Splash Zone	15.9
Inter Tidal	14.5
Above Channel Bottom	14.6

Pile No. 41

Location:	Value:
Splash Zone	22.4
Inter Tidal	22.0
Above Channel Bottom	*

Pile No. 44

Location:	Value:
Splash Zone	20.4
Inter Tidal	18.7
Above Channel Bottom	18.5

Pile No. 47

Location:	Value:
Splash Zone	20.5
Inter Tidal	20.2
Above Channel Bottom	20.2

Sheet Piles

Ch. 40

Location	In-pan	Side Pan	Out-pan
Splash Zone	11.5	12.1	10.1
Intertidal Zone	11.2	*	12.0
Above Channel Bottom	9.8	10.2	9.7

Ch. 50

Location	In-pan	Side Pan	Out-pan
Splash Zone	12.0	12.2	*
Intertidal Zone	8.3	*	*
Above Channel Bottom	10.0	8.8	9.9

Ch. 60

Location	In-pan	Side Pan	Out-pan
Splash Zone	11.2	9.8	11.0
Intertidal Zone	11.3	10.8	9.8
Above Channel Bottom	10.1	11.0	10.8

Ch. 70

Location	In-pan	Side Pan	Out-pan
Splash Zone	11.8	10.8	11.2
Intertidal Zone	9.6	11.1	9.8
Above Channel Bottom	10.7	11.7	11.0

Ch. 80

Location	In-pan	Side Pan	Out-pan
Splash Zone	12.7	12.4	11.6
Intertidal Zone	9.8	11.1	10.8
Above Channel Bottom	10.2	10.8	11.2

Ch. 90

Location	In-pan	Side Pan	Out-pan
Splash Zone	11.4	11.4	10.7
Intertidal Zone	10.7	9.8	11.0
Above Channel Bottom	11.9	12.0	11.9

Ch. 100

Location	In-pan	Side Pan	Out-pan
Splash Zone	10.6	10.9	9.9
Intertidal Zone	10.1	10.3	9.9
Above Channel Bottom	11.2	11.3	10.7

Ch. 110

Location	In-pan	Side Pan	Out-pan
Splash Zone	10.7	10.3	11.7
Intertidal Zone	11.0	10.4	10.5
Above Channel Bottom	11.5	11.7	11.4

Ch. 120

Location	In-pan	Side Pan	Out-pan
Splash Zone	11.8	12.1	11.1
Intertidal Zone	11.2	11.9	11.6
Above Channel Bottom	11.5	10.9	11.2

Ch. 130

Location	In-pan	Side Pan	Out-pan
Splash Zone	11.3	11.2	10.8
Intertidal Zone	11.4	10.8	10.1
Above Channel Bottom	10.6	*	10.8

Ch. 140

Location	In-pan	Side Pan	Out-pan
Splash Zone	12.1	12.1	12.4
Intertidal Zone	11.0	10.2	11.5
Above Channel Bottom	11.2	11.4	11.2

Ch. 150

Location	In-pan	Side Pan	Out-pan
Splash Zone	11.9	12.2	12.2
Intertidal Zone	10.6	10.5	9.1
Above Channel Bottom	10.8	10.1	10.6

Ch. 170

Location	In-pan	Side Pan	Out-pan
Splash Zone	12.2	12.2	12.5
Intertidal Zone	10.5	9.3	10.3
Above Channel Bottom	10.8	9.6	10.3

Ch. 180

Location	In-pan	Side Pan	Out-pan
Splash Zone	12.4	12.3	12.2
Intertidal Zone	10.3	10.9	10.8
Above Channel Bottom	11.2	11.4	11.1

Ch. 190

Location	In-pan	Side Pan	Out-pan
Splash Zone	11.7	12.2	12.1
Intertidal Zone	10.1	9.5	9.5
Above Channel Bottom	10.1	9.8	9.6

Ch. 200

Location	In-pan	Side Pan	Out-pan
Splash Zone	12.5	12.4	12.5
Intertidal Zone	12.1	11.6	11.8
Above Channel Bottom	11.6	12.4	11.5

NB: * denotes locations where a stable reading could not be achieved.

APPENDIX D: CP Measurements

Marina Piles

Location	Pile 1	Pile 2	Pile 3	Pile 4	Pile 5
Below Surface	1.038v	1.057v	1.044v	1.030v	1.042v
Above Bed	1.047v	1.057v	1.043v	1.037v	1.042v

Location	Pile 6	Pile 7	Pile 8	Pile 9	Pile 10
Below Surface	1.023v	1.011v	1.040v	1.030v	1.019v
Above Bed	1.023v	1.013v	1.038v	1.023v	1.029v

Location	Pile 11	Pile 12	Pile 13	Pile 14	Pile 15
Below Surface	1.012v	1.020v	1.016v	1.026v	0.986v
Above Bed	1.019v	1.031v	1.028v	1.036v	1.018v

Location	Pile 16	Pile 17	Pile 18	Pile 19	Pile 20
Below Surface	1.018v	1.013v	1.017v	1.020v	1.033v
Above Bed	1.015v	0.971v	1.019v	1.022v	1.034v

Location	Pile 21	Pile 22	Pile 23	Pile 24	Pile 25
Below Surface	0.930v	0.961v	0.961v	0.950v	0.966v
Above Bed	1.004v	1.013v	1.015v	1.020v	1.004v

Location	Pile 26	Pile 27	Pile 28	Pile 29	Pile 30
Below Surface	0.983v	0.955v	0.960v	0.980v	1.005v
Above Bed	1.012v	1.015v	1.004v	1.015v	1.035v

Location	Pile 31	Pile 32	Pile 33	Pile 34	Pile 35
Below Surface	0.992v	0.993v	1.014v	0.979v	0.990v
Above Bed	1.026v	1.026v	1.036v	1.021v	1.020v

Location	Pile 36	Pile 37	Pile 38	Pile 39	Pile 40
Below Surface	1.005v	1.009v	0.999v	0.973v	1.001v
Above Bed	1.031v	1.031v	1.022v	1.016v	1.030v

Location	Pile 41	Pile 42	Pile 43	Pile 44	Pile 45
Below Surface	1.043v	1.038v	1.048v	1.032v	1.070v
Above Bed	1.044v	1.042v	1.049v	1.047v	1.069v

Location	Pile 46	Pile 47
Below Surface	1.046v	1.040v
Above Bed	1.048v	1.043v

Sheet Piles

Ch. 40

Location	Value
Below Water level	0.270v
Mid Water	Insufficient depth
Above Channel Bottom	0.275v

Ch. 50

Location	Value
Below Water level	0.670v
Mid Water	Insufficient depth
Above Channel Bottom	0.990v

Ch. 60

Location	Value
Below Water level	1.012v
Mid Water	1.031v
Above Channel Bottom	1.028v

Ch. 70

Location	Value
Below Water level	1.015v
Mid Water	1.033v
Above Channel Bottom	1.020v

Ch. 80

Location	Value
Below Water level	1.015v
Mid Water	1.035v
Above Channel Bottom	1.026v

Ch. 90

Location	Value
Below Water level	1.019v
Mid Water	1.034v
Above Channel Bottom	1.032v

Ch. 100

Location	Value
Below Water level	1.013v
Mid Water	1.028v
Above Channel Bottom	1.029v

Ch. 110

Location	Value
Below Water level	1.007v
Mid Water	1.023v
Above Channel Bottom	1.018v

Ch. 120

Location	Value
Below Water level	0.996v
Mid Water	1.013v
Above Channel Bottom	1.025v

Ch. 130

Location	Value
Below Water level	0.953v
Mid Water	1.008v
Above Channel Bottom	1.027v

Ch. 140

Location	Value
Below Water level	0.991v
Mid Water	1.017v
Above Channel Bottom	1.013v

Ch. 150

Location	Value
Below Water level	0.950v
Mid Water	0.580 (checked x 3)
Above Channel Bottom	1.007v

Ch. 160

Location	Value
Below Water level	0.954v
Mid Water	1.013v
Above Channel Bottom	1.028v

Ch. 170

Location	Value
Below Water level	0.857
Mid Water	1.015
Above Channel Bottom	1.019

Ch. 180

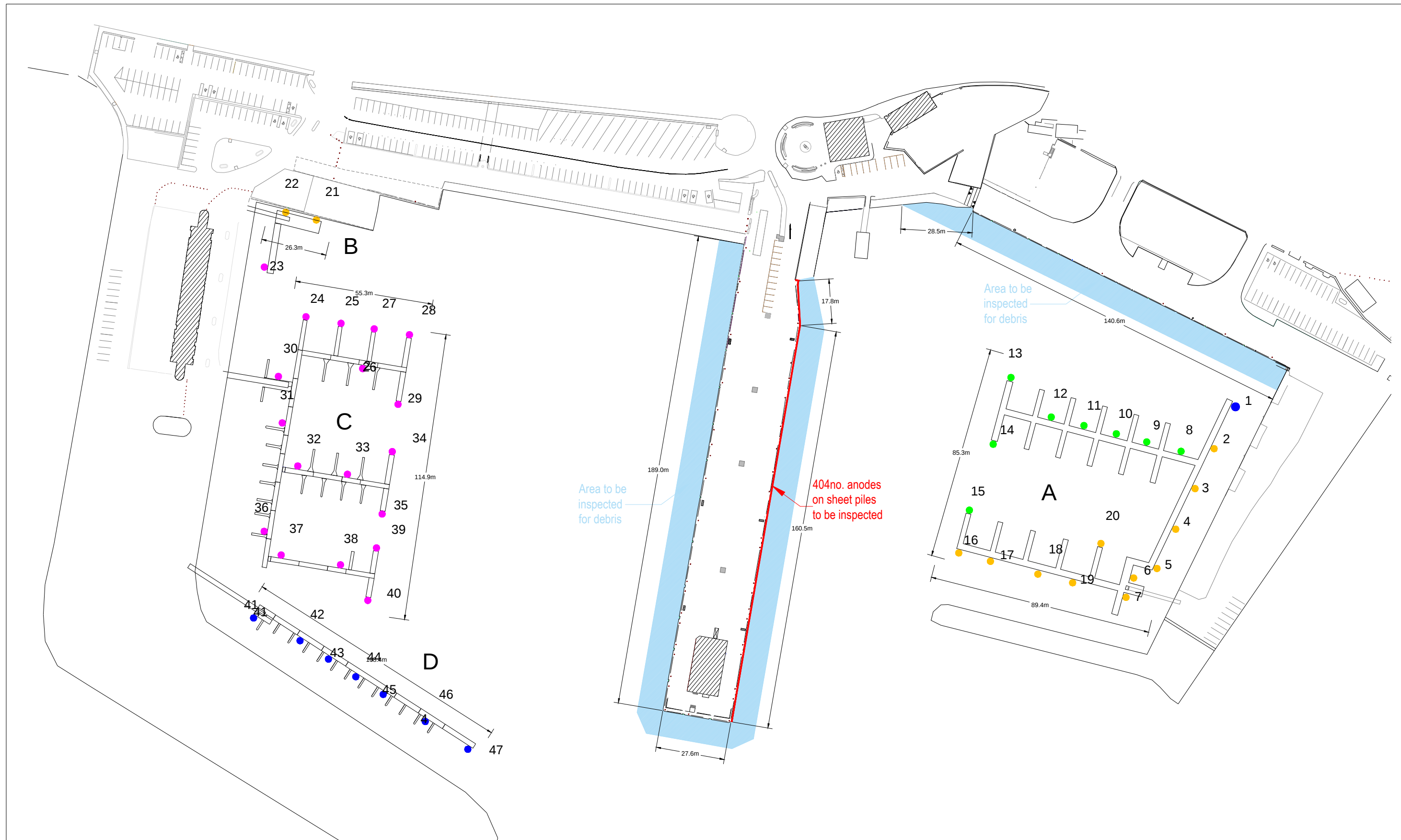
Location	Value
Below Water level	0.985
Mid Water	1.015
Above Channel Bottom	1.026

Ch. 190

Location	Value
Below Water level	0.941v
Mid Water	0.979v
Above Channel Bottom	1.013v

Ch. 200

Location	Value
Below Water level	0.991v
Mid Water	0.959v
Above Channel Bottom	1.016v



Legend

- 13no. 406mm dia. steel piles installed in 2001 (w/ 47kg anodes on 11no. piles in East basin, 70kg anodes on 2no. piles in West basin)
- 8no. 508mm dia. steel piles installed in 2008 (w/ 88kg anodes)
- 18no. 508mm dia. steel piles installed in 2010 (w/ 88kg anodes)
- 8no. 508mm dia. steel piles installed in 2018 (w/ XXkg anodes)

Project	Dingle Fishery Harbour Centre			B 11.07.2019 General Dimensions Added MM GOS GO		
	Title			A 20.06.2019 - MM GOS GO		
	Pile Location Drawing			Rev. Date Description by ch'd app		
 An Roinn Talmhaíochta, Bia agus Mara Department of Agriculture, Food and the Marine Reen Point, Blennerville Tralee, Co Kerry. Tel: 066 7149340, Fax: 066 7128213						
Scale N/A			Drg. No.		KY013 7004	Rev. B
Drawn MM		20.06.2019				
Checked GOS		20.06.2019				

APPENDIX E: Condition Assessment Ratings

The following guiding principles for the condition rating are consistent with industry terminology and have been taken from the 'Underwater Investigations – Standard Practice Manual, ASCE, 2001'.

Underwater Assessment Condition Rating		
Rating		Description
6	Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing is observed
5	Satisfactory	Limited minor to moderate defects or deterioration are observed, but no overstressing observed
4	Fair	All primary structural elements are sound, but minor to moderate defects or deterioration is observed
3	Poor	Advanced deterioration or overstressing is observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity
2	Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of primary structural components
1	Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components