

1. INSPECTION, MONITORING AND TRIGGER LEVEL ACTIONS

- 1.1. THE CONTRACTOR SHALL MONITOR AND CONTROL GROUND MOVEMENTS CAUSED BY THE CONTRACTOR'S WORKS. THIS SECTION OUTLINES THE MINIMUM PERFORMANCE EXPECTED FROM MONITORING TO BE INCORPORATED INTO A MONITORING PLAN TO BE DEVELOPED BY THE CONTRACTOR AGREED WITH NR.
- 1.2. THE CONTRACTOR SHALL ESTABLISH THE PROTOCOL AND METHODOLOGY FOR REPORTING AND IMPLEMENTATION OF ACTIONS REQUIRED IN THE EVENT OF EXCEEDANCE OF MOVEMENT TRIGGER LEVELS. THE CONTRACTOR SHALL ENSURE THAT KEY PERSONNEL OUTLINED IN THE EXISTING SEA WALL MONITORING PLAN ARE IN PLACE PRIOR TO WORKS COMMENCING.
- 1.3. THE EXISTING SEA WALL SHALL BE SUBJECT TO REGULAR INSPECTION THROUGHOUT THEIR DESIGN LIFE BY A COMPETENT INDIVIDUAL APPOINTED BY THE PRINCIPAL CONTRACTOR, AS WELL AS AFTER ANY REINSTATEMENT OR ANY WORKS WHICH MAY HAVE MODIFIED IT. ANY DAMAGED AREAS SHALL BE REINSTATED.
- 1.4. FOLLOWING EACH INSPECTION OF THE EXISTING SEA WALL, A RECORD INSPECTION LOG SHALL BE COMPLETED AND SIGNED BY THE PRINCIPAL CONTRACTOR, AND ANY AMENDMENTS TO OR DAMAGE NOTED TO THE ABUTMENT SHALL BE ISSUED TO THE DESIGNER. EXAMINATIONS SHALL BE CARRIED OUT IN ACCORDANCE WITH NRL3/CIV/006/1B HANDBOOK FOR THE EXAMINATION OF STRUCTURES AND NRL3/CIV/006/5A WITH A MARKED ELEVATION (LOG) OF EACH OF THE ASSETS OF SIGNIFICANT DEFECTS INCLUDING SLIDING, ROTATION, DISPLACEMENT OF ONE PART OF THE RETAINING WALL RELATIVE TO ANOTHER, PERCOLATION, TEARS OR SPLITS IN ELEMENTS, ACCIDENTAL DAMAGE, BULGING OR OUT OF PLUMB ELEMENTS
- 1.5. THE LOG SHALL CONTAIN DETAILS OF ANY ALTERATIONS, REPAIRS OR MODIFICATION, MAINTENANCE AND, IF NECESSARY, A REVISED DRAWING. THE LOG SHALL INCLUDE THE NATURE, NUMBER LOCATION AND EXTENT AND SEVERITY OF THE DEFECTS. THE LOG SHALL RECORD ANY SIGNIFICANT CHANGE IN THE DEFECTS RECORDED SINCE THE LAST EXAMINATION.
- 1.6. VISUAL EXAMINATIONS (IN ACCORDANCE WITH NRL3/CIV/006/1B & 5A) SHOULD INITIALLY BE UNDERTAKEN AT THE START AND END OF EACH SHIFT DURING ALL OF THE PROPOSED SHEET PILES, GROUND ANCHORS AND WALING BEAM. THIS REGIME (TWICE DAILY INSPECTIONS) WILL BE REQUIRED DURING ANY PAUSE PERIOD BETWEEN STAGES AND GROUND ANCHORS. MOVEMENT OF THE RETAINING WALL ASSETS RECORDED BY REMOTE MONITORING SHALL ALSO BE RECORDED AT A CORRESPONDING FREQUENCY WITH ACTION TRIGGER LEVELS AS SET OUT IN TABLE 2
- 1.7. SURVEY WORKS ARE TO COMPLY WITH NRL2/TRK/3100 ISSUE 5 AND BE OF SUFFICIENT ACCURACY TO RECORD MOVEMENT ACCORDING TO TRIGGER LEVELS INDICATED IN TABLE 2.
- 1.8. SURVEYOR TO DETERMINE MOVEMENTS FROM CURRENT AND PREVIOUS READINGS OF TARGETS WITH DATA FORWARDED TO THE MAIN CONTRACTOR. CONTRACTOR TO DETERMINE SUITABLE SURVEYING TECHNIQUES.

2. ENVISAGED CONSTRUCTION SEQUENCE

- 2.1 MOBILISE TO SITE.
- 2.2 CARRY OUT BURIED SERVICES SCAN AND MARK OUT LOCATIONS OF BURIED SERVICES. THIS WILL NEED TO BE UNDERTAKEN FOR THE LENGTH OF THE SHEET PILED WALL.
- 2.3 CARRY OUT DILAPIDATION SURVEY OF THE EXISTING SEA WALL.
- 2.4 MARK ALL SETTING OUT POINTS (SOP'S) FOR THE SHEET PILED WALL AND ANCHORS.
- 2.5 BRING NECESSARY TEMPORARY WORKS TO SITE. TEMPORARY WORKS TO BE SUBJECT TO A FORM C DESIGN.
- 2.6 MOBILISATION OF PILING RIG TO SITE.
- 2.7 PRE-AUGURING TO BE UNDERTAKEN PRIOR TO SHEET PILE INSTALLATION.
- 2.8 INSTALL SHEET PILES TO DESIGN TOE DEPTH.
- 2.9 INSTALL ANCHORS AND WALING BEAM AS PER SPECIFICATION.
- 2.10 INSTALL CAPPING BEAM AS PER SPECIFICATION.
- 2.11 INSTALL SUITABLE FORMWORK AT ENDS OF SHEET PILE EXTENT.
- 2.12 PUMP GROUT INTO VOIDS WITHIN EXISTING SEA WALL
- 2.13 DEMOBILISATION FROM SITE

3. TRIGGER LEVELS AND ACTION PLAN

TABLE 1 – SUMMARY OF MONITORING TRIGGER LEVEL MOVEMENT IN RETAINING WALL.				
NOTE: SEA WALL TRIGGER LEVELS, ACTIONS AND RESPONSIBILITIES ARE OUTLINED SEPARATELY IN THE TRACK MONITORING PLAN. ACTIONS AND RESPONSIBILITIES FOR MOVEMENT DETECTED IN RETAINING WALL ASSETS OUTLINED IN THE ASSET MONITORING PLAN TO BE DEVELOPED BY THE CONTRACTOR.				
TRIGGER LEVEL	GREEN	AMBER	RED	BLACK
RECORDED HORIZONTAL MOVEMENT	MOVEMENT < 20mm CUMULATIVE	20mm-30mm CUMULATIVE	30mm-40mm CUMULATIVE	>40mm CUMULATIVE
ACTIONS FOR SHEET PILE RETAINING WALL	CONTINUE TO INSPECT AND SURVEY IN ACCORDANCE WITH THE MONITORING PLAN	SURVEYOR TO NOTIFY MAIN CONTRACTOR. CONTRACTOR TO INSPECT WALL IN ACCORDANCE WITH THE MONITORING PLAN TO DETERMINE RATE OF ANY ON-GOING MOVEMENT & REVIEW MONITORING REGIME.	SURVEYOR TO NOTIFY NETWORK RAIL AND MAIN CONTRACTOR IN ACCORDANCE WITH THE MONITORING PLAN. CEASE WORK AND ASCERTAIN CAUSE OF MOVEMENT. CONTRACTOR TO INSPECT WALL IMMEDIATELY. INCREASE MONITORING OF WALL AND PLAN TO BACKFILL IN FRONT OF THE WALL AND RESTRICT PLANT MOVEMENT IN ACCORDANCE WITH THE ASSET.	WORK TO TEMPORARILY CEASE. WORK PERSONNEL TO BE EXCLUDED FROM EXCAVATIONS, BACK FILL IN FRONT OF THE WALL AND RESTRICT PLANT MOVEMENT.

4. ON SITE PULL-OUT TESTS

TO BE TESTED ACCORDING TO BS 8081:2015 OR BS EN 1537

- 4.1. SITE SELECTION: TO BE DISCUSSED BETWEEN DESIGNER AND CONTRACTOR:
- 4.2. EQUIPMENT TEST:
- PULLING PIPE COUPLERS (OR SIMILAR) PLUS DYWIDAG BARS (OR SIMILAR);
 - LOAD CELL;
 - SPACER FOR THE COLLAR OF THE HOLE;
 - LEVELLING WEDGES;
 - ANTI-ROTATION DEVICE;
 - DISPLACEMENT MEASURE DEVICE.
- 4.3.PROCEDURE TEST:
- HOLES MUST BE PUMPED OR BLOWN DRY;
 - LOAD-DISPLACEMENT TESTING;
 - PULLING FORCE SHALL BE RECORDED AT EACH LOADING STEP AT 1, 5 AND 15 MINUTES;
 - DEFORMATION INDUCED BY THE PULLING SYSTEM MUST BE SUBTRACTED FROM THE ANCHOR DISPLACEMENT;
 - RECORD DISPLACEMENT AFTER FAILURE OR TARGET VALUE IS ACHIEVED;
 - UCS CEMENT GROUT/RESIN FOR ANCHORS MUST BE TESTED.
- 4.4. SUITABILITY PULL-OUT TESTS
- 1 NO. ADDITIONAL ANCHORS SHALL BE INSTALLED FOR SUITABILITY PULL-OUT TESTS PURPOSES.
 - SUITABILITY TESTS SHALL COMPLETE 2NO. CYCLES TO 150%TW (TW: DESIGN ANCHOR CAPACITY) PLUS 1NO ADDITIONAL CYCLE TO REACH THE ANCHOR ELASTIC FAILURE;
 - SPECIFIC DESIGN ANCHOR CAPACITIES ARE SHOWN IN THIS DRAWING (SUITABILITY PULL-OUT TEST SPECIFICATIONS AND ANCHOR CAPACITIES)
 - LOADING STEPS OF EACH CYCLE AND MEASURING TIME SHALL BE CONDUCTED ACCORDING TO THE TABLE SHOWN IN THIS DRAWING (SUITABILITY PULL-OUT TEST PROCEDURE)
- 4.5 RESULTS
- A REPORT MUST BE PRODUCED, INCLUDING:
- INFORMATION ON LOCATION, SOIL TYPE AND GROUT TYPE;
 - INFORMATION ON ANCHOR DIAMETER, DRILL DIAMETER AND ANCHOR LENGTH;
 - INFORMATION ON LOADING STEPS AND MEASURING TIME. TOGETHER WITH THE RECORDED DISPLACEMENT AT EACH LOADING STEP AT DIFFERENT MEASURING TIME (TEST PROCEDURE);
 - INFORMATION ON THE TYPE OF FAILURE MECHANISM.
- 4.6 SUITABILITY PULL-OUT TESTS:
- IF 150% TW (TW: DESIGN ANCHOR CAPACITY) IS NOT ACHIEVED PRIOR TO REACHING FAILURE, THE CONTRACTOR IN CONSULTATION WITH THE DESIGNER ENGINEER SHALL INVESTIGATE THE CAUSE OF FAILURE. THE CONTRACTOR IN CONSULTATION WITH THE DESIGNER ENGINEER SHALL PROVIDE DETAILS OF THE COURSE OF ACTIONS THAT THEY PROPOSE TO ADOPT AND ANY MODIFICATION THEY CONSIDER ARE REQUIRED.

ACCEPTANCE PULL-OUT TEST. SPECIFICATIONS AND DESIGN CAPACITIES

20% ANCHORS TO BE INSTALLED TO SUITABILITY PULL OUT TEST

INCLINATION	BAR	DRILL	EMBEDMENT	TW (DESIGN CAPACITY)
25° WITH RESPECT TO HORIZONTAL	DYWIDAG R38 / 550 HOLLOW BAR	150mm FOR HOLLOW BAR	13000	65kN

PRESTRESSING TO BE CARRIED OUT FOLLOWING THE ACCEPTANCE TESTING

ACCEPTANCE PULL OUT TEST SPECIFICATIONS AND DESIGN CAPACITIES

1ST CYCLE	LOAD INCREMENT	DISPLACEMENT (mm)		
	(%TW)	AFTER 1 MIN	AFTER 5 MIN	AFTER 15 MIN
	10			
	50			
	100			
	150			
2ND CYCLE	LOAD INCREMENT	DISPLACEMENT (mm)		
	(%TW)	AFTER 1 MIN	AFTER 5 MIN	AFTER 15 MIN
	10			
	50			
	100			
	150			

NOTES:

1. DO NOTE SCALE FROM THESE DRAWINGS
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHER STATED.
3. ALL DIMENSIONS AND LEVELS SHALL BE CHECKED ON SITE PRIOR TO ANY WORKS.
4. ALL WORKS ARE TO BE CONDUCTED IN ACCORDANCE WITH NETWORK RAIL MODEL CLAUSE NRL3/CIV/140 (THE SPECIFICATION).
5. ALL DRAWINGS AREA TO BE READ IN CONJUNCTION WITH NETWORK RAIL COMPANY AND GROUP STANDARDS AND THE NEW CONSTRUCTION IS TO BE IN ACCORDANCE WITH NETWORK RAIL COMPANY AND GROUP STANDARDS.
6. THE HEATH, SAFETY AND ENVIRONMENT RISK ASSESSMENT TABLE SHOULD BE CONSULTED FOR DETAILS OF SIGNIFICANT RESIDUAL RISKS AT THE SITE AND THE ASSOCIATED MITIGATION MEASURES.
7. FOR DESIGNER'S RISK ASSESSMENT REFER TO DOCUMENT: 24088W-RSA-001.
8. ANY DISCREPANCIES BETWEEN THE INFORMATION GIVEN AND WHAT IS OBSERVED ON SITE SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AS SOON AS POSSIBLE.
9. THE CONTRACTOR IS TO ONLY USE SPECIFIED MATERIALS. A CHECK OF THE MATERIALS DELIVERED TO SITE SHALL BE MADE BY A COMPETENT PERSON PRIOR TO USE.
10. EXISTING TOPO MODEL: 68035NGLS_01-02
11. THE CONTRACTOR SHALL IMPLEMENT MEASURES TO CONFIRM THE PRESENCE OF BURIED SERVICES WHERE GROUND DISTURBANCE IS REQUIRED IN ACCORDANCE WITH HSG 47 AND NRL2/INI/CP1030. THIS MAY INCLUDE, BUT IS NOT LIMITED TO ELECTROMAGNETIC LOCATION(EML, E.G. CAT SCANNING), GROUND PENETRATING RADAR (GPR) AND / OR TRIAL HOLES AS APPROPRIATE. ANY BURIED SERVICES IDENTIFIED ARE TO BE MARKED UP, DIVERTED OR PROTECTED AS APPROPRIATE IN ACCORDANCE WITH NRL2/INI/CP1030.
12. SHEET PILES ARE TO BE A MINIMUM STEEL GRADE OF S355.
13. SHEET PILES ARE TO BE INSTALLED WITH APPROPRIATE MACHINERY. PRE-AUGERING IS TO BE EMPLOYED TO ENSURE SHEET PILES GET TO THE TARGET TOE DEPTH TO ENSURE STABILITY OF THE STRUCTURE AS PER THE PERMANENT WORKS DESIGN.
14. THE SHEET PILES HAVE BEEN DESIGNED TO RESIST THE FOLLOWING SCENARIOS:
- ACTIVE EARTH PRESSURE FROM EXISTING SEA WALL AND MATERIAL THIS SEA WALL RETAINS.
 - ACTIVE PRESSURE FROM PEDESTRIAN LOADING AT TOP OF SEA WALL.
 - ACTIVE PRESSURE FROM VEHICLE MOVEMENT BEHIND THE SEA WALL. IF THE CLIENT ENVISAGES THESE LOADING SCENARIOS CHANGING, THE DESIGNER IS TO BE CONTACTED AT THE EARLIEST OPPORTUNITY.
15. ALL SHEET PILES ARE TO BE INSTALLED AS CLUTCHED. FAILURE TO CLUTCH THE SHEETS INCREASES THE RISK OF EXCESSIVE SHEET DEFLECTION.
16. ALL WELDS TO BE S355 6MM FILLET WELDS.



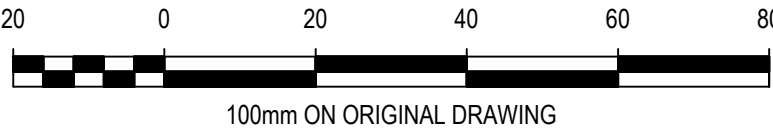
SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
NOTES BELOW ARE ADDITIONAL TO HAZARDS/RISKS NORMALLY ASSOCIATED WITH THIS TYPE OF WORK.

CONSTRUCTION
Ci. UNFORESEEN GROUND AND GROUNDWATER CONDITIONS
Cii. ADVERSE WEATHER
Ciii. SHEET PILE REFUSAL
Civ. ANCHOR REFUSAL
Cv. BURIED SERVICES
Cvi. SEA WALL INSTABILITY
Cvii. VIBRATION
Cviii. SHEET PILE CLASH WITH WALL FOUNDATIONS
Cix. CONTRACTOR NOT FOLLOWING CONSTRUCTION SEQUENCE
Cx. DAMAGE TO EXISTING WALL

OPERATIONS
Oi. CORROSION OF SHEET PILED WALL
Oii. ADVERSE LOADING
Oiii. LOSS OF BEACH MATERIAL
Oiv. WALL DEFLECTIONS
Ov. SEA WALL INSTABILITY
Ovi. INSUFFICIENT SHEET PILE CAPACITY
Ovii. INSUFFICIENT GROUND ANCHOR CAPACITY
Oviii. INSUFFICIENT BOND STRENGTH
Oix. SHIP COLLISION

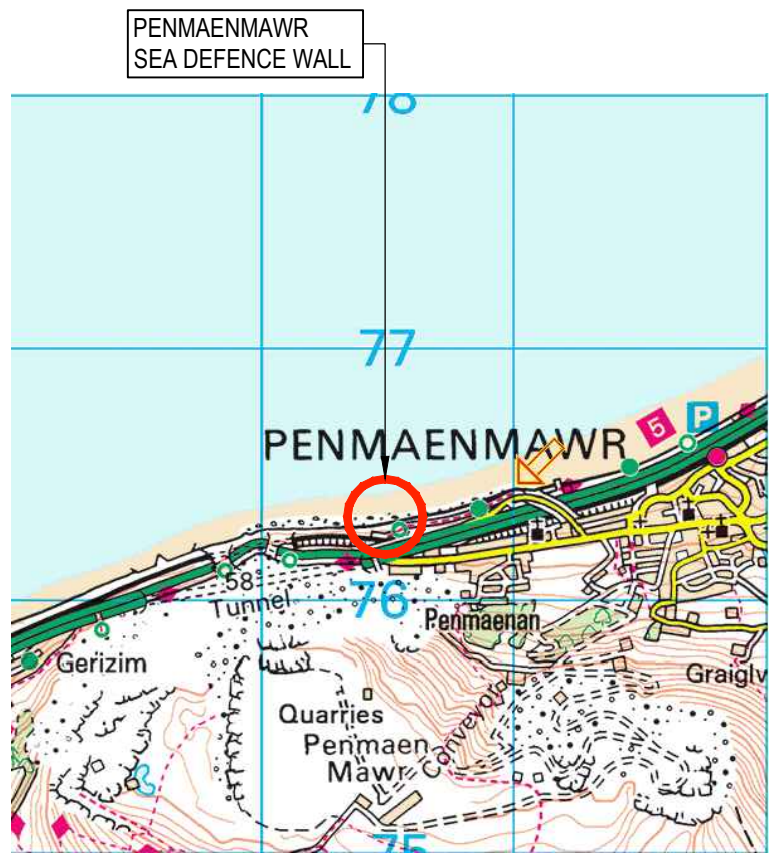
MAINTENANCE
Mi. FALL FROM HEIGHT
Mii. SHIP COLLISION

DISMANTLING / DEMOLITION (FUTURE)
Di. FALL FROM HEIGHT
Dii. DAMAGE TO EXISTING WALL



NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS AND LEVELS SHALL BE CHECKED ON SITE PRIOR TO ANY WORKS BEING PUT IN HAND.
4. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE EXISTING STRUCTURE AT ALL TIMES DURING THE WORKS.
5. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONTRACT DRAWINGS AND RELEVANT STRUCTURAL SPECIFICATIONS.
6. ANY DISCREPANCIES BETWEEN THE INFORMATION GIVEN SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AS SOON AS POSSIBLE.
7. ALL MATERIALS USED IN THE WORKS SHALL BE TO BRITISH STANDARDS OR OTHER APPLICABLE SPECIFICATIONS.
8. ALL WORK IS TO BE CARRIED OUT TO B.S. CODES OF PRACTICE AND IN ACCORDANCE WITH GOOD WORKMANSHIP PRACTICE.
9. ALL PROPRIETARY MATERIALS USED IN THE WORKS SHALL BE USED IN COMPLETE ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
10. ALL BURIED, SURFACE AND OVERHEAD SERVICE INFORMATION CONTAINED WITHIN THIS DRAWING IS SHOWN INDICATIVELY. THE SERVICES SHOWN MAY NOT REPRESENT THE ENTIRETY OF ALL SERVICES THAT MAY BE ENCOUNTERED. ALL SOURCE INFORMATION SHOULD BE REFERRED TO PRIOR TO UNDERTAKING WORKS ON SITE. CROUCH WATERFALL ACCEPT NO RESPONSIBILITY FOR OMISSIONS OR ERRORS IN THE POSITIONING OF THE SERVICES PRESENT ON SITE. REFER TO ALL RELATED ENGINEERING DRAWINGS, FORMS AND SPECIFICATIONS FOR FURTHER INFORMATION. REFER TO THE RESIDUALDESIGNERS RISK ASSESSMENT FOR ACTIONS TO MINIMISE AND MITIGATE RISK ASSOCIATED WITH KNOWN AND UNKNOWN SERVICES ON SITE



LOCATION PLAN
O.S. GRID REFERENCE: SH 70 57 62
SCALE : NTS

COMMENT

P01	FOR REVIEW AND COMMENT	HD	BC	VF	23/08/2024
REV	AMENDMENT	DRN	CHK	APP	DATE

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CROUCH
WATERFALL

CLIENT

MPH
CONSTRUCTION

PROJECT TITLE

PENMAENMAWR SEA DEFENCE
WALL

DRAWING TITLE

GENERAL NOTES

DRAWN	CHK	APP	DATE	SCALE
HD	BC	VF	OCT '24	AS SHOWN AT A1
JOB NUMBER		DRAWING NUMBER		REVISION
24088W		001		P01