



SPECIFICATION DOCUMENT

Project: 21529B – CERD Development – Old Colwyn

Location: Colwyn Bay North, OS Grid Reference 287343, 378698

Mileage and ELR: CNH3 217m 69ch to 218m 19ch

Client: Amco Giffen

Scope of this Document: Topographical Survey & Ground Investigation Requirements

CW Document Reference No: 21529B-SPE-001

Address:

Crouch Waterfall, The Barn, Elms Farm, Hobb Lane, Warrington, WA4 5LS

Design Brief:

Works for this scheme include remediation works to the sea wall at Old Colwyn, as part of the CERD development.

Methodology:

- *The survey shall be carried out to an accuracy of Band 3 +/- 25mm as per Network Rail standard NR/L2/TRK/3100 issue 5, using a Drone UAV survey.*
- *National Grid Coordinates supplied for those points as well as the local grid xyz values.*
- *Surveyed heights (levels) shall be orthometric and quoted in metres above the national height datum published by the national mapping agency.*
- *The surveyor shall provide permanent survey control markers not more than 50m apart – all control points shall be inter visible by two other control points and part of the continuous survey control to demonstrate accuracy and residual redundancy.*
- *The surveyor shall locate permanent markers for survey control as required for the survey at the surveyor's discretion.*
- *The surveyor shall use his/her discretion to select the most appropriate marker type for all survey control points.*

Provisions:

- *3D Topographic Survey Drawing in AutoCAD .dwg or Microstation.dgn format.*
- *3D Point cloud data in .pod format suitable for use in Microstation or .rcs format suitable for use in AutoCAD/Revit and WebPointCloud (online point cloud viewer).*
- *Site wide 2D Orthophotos as jpeg images and .jgw files suitable for viewing as raster images backgrounds in AutoCAD and Microstation.*

General Information / Topographical survey Requirements:

- *Boundary wall routes, plus boundary fencing as required.*
- *Bases and other infrastructure in place.*
- *Any significant or irregular undulations to be surveyed where possible.*
- *Extents of rock faces / wall / cuttings, including rock armour levels*
- *Details of any channels /ditches / weep holes.*
- *Average water levels (Where possible)*

Survey Extents:



Figure 1 – Survey Extents

Figure 1 shows the chainage extents provided from the CRT documents, covering an approximate 700m length chainage. The survey required shall cover this area. The adjacent rail track does not require capturing, however top of embankment levels and distance to track is required. Confirmation of easements for undertaking drone surveys to be confirmed around the track, possible possessions required.

Ground Investigation Requirements:

INTRODUCTION

The following document provides a ground investigation specification for works to be carried out at Old Colwyn Sea Wall in the context of the renovation requirements set out by NR and detailed within CRT document reference NR-IP-EN-2155-A01.

The existing sea defence at Old Colwyn has been identified by Network Rail for renovation, as it was assessed in 2016 and significant number of defects was recorded that is directly attributable to the wave action, weather conditions, and coastal processes.

The sea defence structure is located adjacent to the CNH3 railway line, to the east of Colwyn Bay Station. The sea defence runs parallel to the coastline, protecting the railway line and the A55 road behind it from flooding and coastal erosion.



The structure comprises two main sections of vertical stone wall backed by a recurve wall and fronted by a rock armour protection. The first section (Section A from the Coastal Asset Condition Survey Report from Annex 1) has significantly larger rock armour protection than the second section (Section B from the Coastal Asset Condition Survey Report). On the west end the sea wall ends at CNH3 218m 041yds including the access ramp where it ties into Conwy Council's Colwyn Bay Promenade. On the east end the wall starts at CNH3 217m 1518yds where it ties into Conwy Council's rock revetment and shingle beach. A short section of the rock revetment on the east end lies within Network Rail boundary.

An option selection report (5191937-ATK-REP-CIV-RP-C-00004) has been undertaken which evaluates a number of possible solutions. The option selection report recommends Option 2 which is outside the scope of planned works. Therefore, it has been agreed by the RAM and the Project Team to develop Option 1. The key outputs for the chosen option are:

- Repair defects to the existing sea wall including:
 - Local concrete repairs;
 - Repairing concrete cover to walkway;
- Replenish / replace rock armour where low or deficient;
- Replace flap valve; and
- Address any outstanding defects scored 12 or above in the Coastal Asset Condition Report or the latest Detailed Examination referenced in Annex 1 of CRT documentation.

Further details on the defects present at this structure can be found in the most recent examinations reports, the Coastal Asset Condition Survey Report (JBA 2016), or the GRIP 3 Option Selection Report 5191937-ATK-REP-CIV-RP-C-00004.

To enable the design of the above works, it is required that investigations are carried out to ascertain the makeup of the existing sea wall and founding strata and design the appropriate renovation measures to the structure.

The Specification shall be the UK Specification for Ground Investigation, Second Edition, as published by ICE Publishing in 2012.

NAME OF CONTRACT

CERD Development

NAME OF INVESTIGATION SUPERVISOR

To be confirmed by AMCO GIFFEN.

Site Description

The sea defence structure is located adjacent to the CNH3 railway line, to the east of Colwyn Bay Station. The sea defence runs parallel to the coastline, protecting the railway line and the A55 road behind it from flooding and coastal erosion. Structure is located between ELR CNH3 217m 70ch and 218m and 19ch. Structure reference is W217518. OS grid reference for the site is SH87647872 and nearest postcode is LL29 9BB.



Main Works Proposed and Purpose of Contract

The purpose of the Contract and investigation is to gather geotechnical information which shall be used to inform the design of renovation measures for the existing sea wall structure and associated rock armour.

Scope of the Investigation

The scope of the ground investigation is as follows:

- 5no Windowless Samples to a minimum of 6 m in depth, at 100m centres along the length of the sea wall. These shall be carried out on the walkway immediately above the rock armour sections. All Windowless sample positions are to be commenced with a hand dug inspection pit for service clearance to a depth of no less than 1.2m.
 - Undisturbed samples are to be taken at the top of every change in strata;
 - SPT testing at every 1.5m and change in strata;
- 22no cores through the existing wall, spaced at 50 m centres along the length of the wall. Cores are to be carried out in pairs, one mid height of wall (horizontal core) and another at the base of the wall with a 45 deg inclination.
- Laboratory testing of selected samples;
- Logging and reporting to BS EN 1997-1 and BS5930-2015.
- Only a factual report is required.

Working hours and access arrangements are to be confirmed by AMCO GIFFEN.

Geology and Ground Conditions

The BGS online viewer, shows historical ground investigation information is available, primarily located along the A55, south of the defences. Available historical ground information within a 100 m radius of Old Colwyn Sea Wall includes;

- 2 No. 0-10 m exploratory holes
- 16 No. 10-30 m exploratory holes
- 2 No. 30 m + exploratory holes.



There have been two ground investigations undertaken in the Old Colwyn area, as listed in the table below. There are also several confidential boreholes in the surrounding area (Appendix D.1 in the 5191937-ATK-REP-GEO-RP-C-000004).

Approximate Depth	Summary of historical ground information	
		Description
0-2 m bgl		Made ground. Consists of topsoil, tarmac when located close to the A55, and coal fragments at the western end of the defences. Primarily comprises brown silty clay with gravel sized stones.
2-15 m bgl		Beach deposits. Located along the coastline, comprising of moderately loose, light brown coarse sand with rounded to sub-rounded fine, medium and coarse gravel, cobbles and occasional boulders. Firm to stiff, brown silty clay with occasional gravel-sized sub-angular to sub-rounded stones and pockets of red brown, fine sand. Occasional cobble to boulder-sized stones are observed at increasing depth.
15 m bgl +		Stiff brown, silty clay with occasional gravel-sized stones and fine sand becomes fissured and occasionally poorly laminated at depth. Fissuring has been noted as shallow as 10 m bgl.
25 m bgl +		Progression into coarser sand with increased gravel- and cobble-sized limestone stones.

Mining and Mineral Extraction

The Coal Authority indicates a mine entry at Raynes Jetty, approximately 1100 m east of the defences. No mining activity has been noted within 1 km of the defences. Historical ground investigation states that Made Ground comprising of coal fragments has been identified close to the eastern end of Old Colwyn Sea Wall. Raynes Quarry is a disused limestone quarry located on Tan Penmaen Head.

Hydrogeology

The western half of the site is underlain by a low productivity, secondary aquifer of medium groundwater vulnerability. The eastern half of the site is underlain by a moderately productive, secondary aquifer of medium groundwater vulnerability. Tan Penmaen Head, located adjacently to the east of the site, is identified as a principal aquifer.

Hydrology

The hydrology of Old Colwyn is significantly affected by the Irish Sea. Old Colwyn has experienced historic flooding, despite the construction of sea defences to protect the town and railway line. Three outfalls have historically been identified along the defence. Nant-y-Ffynnon, the largest of the three streams, was diverted beneath the A55 towards the coast to outfall at the western extent of the defences. Two additional smaller streams historically appeared to perpendicularly cross Station Road but no longer appear to reach the sea, cut off by the A55.

Underground Drainage and Seepage

No evidence of seepage through the existing defences has been identified.



Flooding

Old Colwyn has experienced past coastal flooding resultant from storm surges, with a significant flooding event occurring in 2013, despite the presence of sea defences to protect the town. Natural Resources Wales online long-term flood maps have identified areas of coastal flood warning and flood alert along the coast of Old Colwyn shown in the images below. Areas of low, medium and high risk of surface water flood risk have been identified to the south of the A55 and along most roads in Old Colwyn. Areas of low, medium and high risk of flooding from rivers and seas are located parallel to the coast, adjacent to the defences, and at Splash Point along the path of Nant-y-Ffynnon.

Unexploded bomb risk

An unexploded bomb (UXO) risk map indicates that the area is of low UXO risk, having 15 bombs per 1000 acres or less.

General Requirements

CDM (2015) regulations apply to the Contract.

The Contractor shall carry out all work to ISO 9001 or a similarly approved quality management system.

The level of staffing provided by the Contractor shall be commensurate with the works being carried out. An experienced ground engineer shall be present on site full-time for the duration of the site-works; this engineer will be responsible for the supervision of all site activities, logging of exploratory holes, taking samples and photographs and the provision of daily records and preliminary logs.

Appropriate hygiene and welfare facilities shall be provided on site by the Contractor; the Contractor shall not use available public facilities. The Contractor shall detail any assumptions or requirements (e.g. availability of on-site power, space required for facilities) in their return.

Dates for mobilisation to site and commencement of the site-works are to be confirmed with AMCO GIFFEN.

Working hours are to be confirmed with AMCO GIFFEN.

Access arrangements and permits to work to be confirmed by AMCO GIFFEN.

Although it is not expected that Sentinel requirements or Network Rail safe systems of work are necessary, it is for the Contractor to ascertain these requirements and provide appropriately qualified staff members to carry out the works.

Suitable safe systems of work are to be agreed with the Client to allow safe access to the work site and adjacent to open water.

The Contractor is responsible for the security of site during the works, and their work sites will need to be fenced off. No exploratory holes are to be left open overnight. Any plant left on site overnight shall be appropriately secured to deny access to the public.

Contamination is not known to be present on site. However, as the site is located adjacent to an active railway, the possibility of contamination being present cannot be discounted. The Contractor shall take appropriate measures to safeguard their plant and employees, surrounding personnel and the environment from the spread of any contamination as a result of drilling activities. The Contractor shall decontaminate all drilling equipment on completion of each exploratory hole and on completion of the site works.

No services information has been provided to the Designer. All exploratory hole positions shall be scanned using appropriate detection equipment prior to the commencement of drilling and at 300mm intervals while excavating.

The maximum period for chiselling / slow boring / excavation through hard strata shall be 30 minutes, following which the Investigation Supervisor shall be contacted for instruction.

All unavoidable damage shall be reinstated by the Contractor.



The Contractor is responsible for the disposal of all waste (including contaminated arisings and groundwater) generated as a result of the works, including the sampling and testing of all waste materials.

The Contractor is responsible for reinstating the site to its previous condition following the completion of site-works.

All exploratory hole positions are to be surveyed in by the Contractor to a vertical and horizontal accuracy of 0.05m. Position and levelling information are to be provided to National Grid and Ordnance Datum respectively.

Sufficient photos to show the condition of the whole of the site prior to the start of the site-works and an analogous set on completion of the investigation are to be provided.

Percussion Boring / Dynamic Sampling

Provisionally the percussion boring will be carried out using a dynamic sampling rig. **The Contractor is free to determine the drilling methodology and the starting diameter for the borehole such that drilling, sampling and testing can be carried out to the scheduled depth while suitable sampling and testing is undertaken.**

Water shall not be added during drilling except where required to facilitate drilling in granular strata. The maximum period of chiselling / slow boring shall be 30 minutes. Following this period, instruction from the Investigation Supervisor shall be sought.

Sampling and Monitoring during Intrusive Investigation

Sampling shall be undertaken as follows within percussive boreholes:

- Open-tube samples (U70 or U100) shall be taken in suitable cohesive material where encountered, at every change in strata. Undisturbed sampling shall be undertaken at alternating depths to SPT tests.

In hand dug inspection pits, 1no bulk and 1no disturbed sample shall be taken at 0.5m intervals or at any change in strata, whichever is smaller.

In the event of an open-tube sample failing (with failure comprising <75% recovery and / or recovery of granular material only), the hole shall be cleaned out to the base of the test and a SPT test undertaken at this depth.

Groundwater samples shall be taken once groundwater has been encountered and monitored for a period of no less than 20 minutes. Groundwater shall be sampled once encountered in all positions. Cores are to be taken in pairs along the extents of the wall. One set of cores is to be at mid height of the wall and taken horizontally. Second set of cores is to be taken at the base of the wall and to have an inclination of 45 degrees. Reinstatement of cored locations shall be carried out with non-shrink cementitious grout of C40/50 grade.

In-Situ Testing Particular Restrictions/Relaxations

SPT testing is to be carried out in accordance with BS EN ISO 22476-3.

SPT tests are to be undertaken at 1.5m intervals.

The first SPT test shall be undertaken at a depth of 0.5m.

Open-tube samples shall be taken using the sampling equipment and procedures as described in BS EN ISO 22475-1 and BS 5930

Instrumentation Particular Restrictions/Relaxations

Not required.



Instrumentation Monitoring and Sampling Particular Restrictions/Relaxations

Groundwater strikes should be monitored during drilling, allowing for a 20min rise, and measures again at the end of the borehole / end of shift.

Daily Records Particular Restrictions/Relaxations

Raw data comprising drillers logs shall be provided to the Investigation Supervisor within 24 hours of the completion of each shift.

Draft engineering logs shall be provided to the Investigation Supervisor within 3 working days of completion of each position, along with a laboratory testing schedule detailing samples taken and the depth at which they were taken.

Logging and reporting will be in accordance with BS 5930:2015. Descriptions are to include, where relevant:

- Soil name and constituents;
- Colour;
- Structure;
- Strength, consistency and / or relative density;
- Moisture content;
- Soil plasticity, sensitivity and dilatancy;
- Note of any minor constituents / contamination;

Concrete cores are to be 100mm in diameter. Draft core logs shall be provided to the Investigation Supervisor within 3 working days of completion of each position. Cores are to be stored should the need for testing arise.

Geotechnical Laboratory Testing Particular Restrictions/Relaxations

A geotechnical laboratory testing schedule shall be provided to the Investigation Supervisor alongside the draft engineering log.

Geotechnical testing is likely to comprise, but is not limited to the following tests:

- Natural moisture content;
- Atterberg limit tests;
- BRE Digest SD1 : 2005 Concrete Aggressivity Suite – (Suite B)
- Quick Undrained Triaxial Compression
- Uniaxial Compressive Strength (UCS) of rock

All laboratories used shall be UKAS accredited.

Geoenvironmental Laboratory Testing Particular Restrictions/Relaxations

No geoenvironmental testing of soil or rock samples apart from that already noted is required. However, the Contractor should be aware for the potential for contaminated material to be present. If visual, olfactory or other evidence suggests the presence of contamination, suitable environmental samples are to be taken.

The requirements for testing are to be based on anticipated pollutants.



Reporting Particular Restrictions/Relaxations

Only a Ground Investigation Report (Factual Report) is required. A Geotechnical Design Report (GDR) is not required.

Draft engineers/drillers log to be provided to the designer within 3 days of completion of the site-works. (handwritten is fine)

A draft version of the report is to be produced within 10 working days of the completion of site-works. The Contractor shall allow 5 working days for the Investigation Supervisor to review this draft and return comments. Following receipt of comments, the Contractor shall issue the final Ground Investigation Report within 5 working days.

1 No. digital (pdf) copy of the final ground investigation report is to be provided.

The final report is to be accompanied with a complete AGS file (AGS 4.0) containing all exploratory hole, in-situ and laboratory test data.

Key programme dates are as follows:

Activity	Timeframe
Mobilisation period	To be confirmed with AMCO GIFFEN
Site-works period	To be confirmed with AMCO GIFFEN
Submission of Draft Report	2 calendar weeks following completion of site works
Return of comments	1 calendar week following draft submission
Submission of Final Report	1 calendar week following receipt of comments

Schedule of works

Hole No.	Type	Scheduled Depth (m)	Remarks
WS01-WS05	Windowless sample	To refusal (min 12m)	
C01-C22	Wall Cores		