Update and CEE Compliance Report: Rothera Wharf Reconstruction and Coastal Stabilisation Project

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**An information paper submitted by the United Kingdom**

***Summary***

The final Comprehensive Environmental Evaluation (CEE) for the Rothera Wharf reconstruction and coastal stabilisation project was prepared by British Antarctic Survey (BAS), circulated to Parties in September 2018, and the activity permitted by the UK competent authority.

The dismantling and construction activities that took place during the first (2018/19) season were documented in IP 029 submitted to CEP XXII. The second season construction activities ran from November 2019 to May 2020. Minor activities (snagging works) took place during a third season, from December 2020 to March 2021. This third season was originally unplanned but was required as a result of the Covid-19 pandemic shortening the 2019/20 construction season.

This paper updates the CEP on progress with the Rothera Wharf reconstruction and coastal stabilization, confirming this project is largely complete with the wharf now operational. It notes a small number of items were taken out of scope and some monitoring deferred, and explains how compliance with the CEE was ensured.

The paper concludes that this construction project has been successful, compliance with the CEE has been good, the CEE was effective in predicting the likely environmental impacts, and the mitigation measures described have been effective. The project was rated ‘excellent’ on the Civil Engineering Environmental Quality (CEEQUAL) sustainability appraisal tool.

***CEE handling and permitting***

Following the presentation of the Draft CEE at the CEP XXI, the final CEE for the Rothera Wharf project was prepared taking into account feedback from Parties and the ICG review process. It was circulated to Parties in September 2018, and is available on the BAS website: <https://www.bas.ac.uk/wp-content/uploads/2018/09/Final-CEE-Rothera-Wharf-Reconstruction-Coastal-Stabilisation-05.09.18.pdf>

As the UK competent authority, the UK Foreign & Commonwealth Office (FCO, now the Foreign Commonwealth and Development Office (FCDO)) gave BAS the authorisation to proceed in September 2018. This authorisation stipulated that “the CEE, including all mitigation measures, must be followed during the course of the construction works. Any substantive deviation from the plans set out in the CEE must be reported to the permitting authority for consideration before the changes take place”.

***Description of activities during 2018/19 season***

The activities that took place during the 2018/19 season were as described in IP 029 submitted to CEP XXII.

***Description of activities during 2019/20 season***

The arrival of the construction team (approximately 50) personnel to Rothera was staggered over November and December 2019 to enable snow clearance and the dewinterisation of plant. Start-up of the fitter's workshop also enabled all plant, equipment and materials to be serviced.

The team re-established the temporary boating facility in South Cove to allow marine science operations to continue safely away from the construction works. Once boating operations had transitioned back to the temporary jetty then the existing boat shed was converted back to a mess facility for the construction crew.

The remaining four rear frames were assembled in the assembly yard before being moved to the wharf and lowered into position. The final rear frame was in position at the wharf by the end of December 2019. Once positioned, the drilling team drilled and grouted the final rear frame anchors as well as grouting the remaining mid-wall foundations. Once complete, the rear frames were backfilled to allow the front frames to be installed.

The two assembly jigs were raised and used to assemble the taller front frames which provide the internal structure of the new wharf. Once assembled, they were moved to the wharf using the construction crane and lowered into position within the wharf. Once installed, tension anchors were drilled and grouted within each frame leg to anchor the front frame into the rock. The last front frame was fixed into position by the end of February 2020.

The deeper bathymetry discovered towards the ice cliffs meant that the east side wall required extending. The west wall extension structure was no longer required as the cove revetment works were taking place and so this structure was used to extend the east side wall. Modifications to the steelwork were carried out using surplus materials on site and quality approved using field weld test equipment. The modified structure was then assembled at the wharf.

The sheet pile retaining wall was prefabricated in sections. Once frames were anchored into the rock then each prefabricated section was transported to the wharf, lifted into position and fixed to the frame. Sheet piles along the side walls were also fixed to the side wall frames. Once complete, the front half of the wharf could then be backfilled.

Following issue of permits 07/2018 and 12/2019-20, a maximum of 105,000 tonnes of rock could be extracted from the temporary quarry. The team carried out an additional two main blasts this season, bringing the total quantity of extracted rock to 104,768 tonnes. It is noted that 80,366 tonnes were extracted from the temporary quarry during 2018/19 and 24,402 tonnes this season. The total quantity of explosives consumed came to just over 16 tonnes.

The foundations for five of the six mooring bollards were installed. Steel frames for the two mooring bollards along the front wall were connected to the front frames. The two concrete blocks were lifted into position and anchors drilled and grouted into the rock. The eastern mooring point was not installed.

The pre-fabricated steel crane foundations were installed and backfilled for the davit crane on either side of the wharf. Service ducts were buried. These facilitate electric cables that provide backup power to the crane. The hydraulic power unit and davit crane were offloaded but were not installed and commissioned during this season. The pontoon, gangway and supporting frame for the retrieval mechanism were installed along the west face of the wharf. The pontoon was not yet been commissioned. Lifesaving equipment and ladders were also installed along the quay edge.

Runway coastal stabilisation works took place between January and February 2020. Repairs were carried out to revetments at both runway thresholds. The revetted slope around the cove was also stabilised to prevent future erosion. The material for this work was sourced predominantly from the remaining rock extracted from the temporary quarry, as detailed above. Additionally, suitable rock from the existing slopes were reused to limit the amount of rock extracted.

The re-screening of material for the runway resurfacing was not carried out this season. The 0-30mm has been stockpiled within the temporary quarry.

The Covid-19 pandemic resulted in the construction season being three weeks shorter than originally planned. This impacted the crane commissioning and other minor works which were deferred to later seasons.

***Description of activities during 2020/21 season***

The construction team numbered 23, including a geotechnical engineer. There was also a senior site supervision engineer from Ramboll (our Technical Advisors). They quarantined in the UK for 2 weeks prior travelling to Rothera, arriving at the end of December. The team was mobilised predominantly to progress the Rothera Modernisation groundworks, however they were also able to complete the relatively small amount of outstanding works on the Rothera Wharf project. Because of the Covid-19 restrictions the team numbers were kept deliberately small and the season length was constrained to 11 weeks.

The team commissioned the crane and corrected defects on the Wharf by fitting a piece of capping beam and some bollard plates.

The original plan was to install and commission a pontoon and gangway, however these were taken out of scope of the project as the team could not find a configuration to work that provide any enhanced benefit over the ladder access to small boats.

The eastern mooring point (described in Section 3.3 of the CEE) has not been installed as it has not been confirmed as being essential for operations. The final decision on whether it is required will be made taking into account the views of the *RRS Sir David Attenborough* Master once the ship comes into service and has moored at Rothera. Given the time that will have lapsed between the original CEE and potential installation of this mooring point, it will be subject to a separate EIA should it be required.

***Compliance with the CEE findings and impact prediction***

To ensure compliance with the CEE (and therefore Permit requirements), environmental responsibilities were allocated to key project staff (as set out in the CEE), environmental requirements were written into operating procedures, and a strong link with clear reporting requirements maintained between the construction team and BAS Environment Office.

A BAS Environmental Manager was on site during February 2020 whilst the groundworks had commenced on site. She observed that procedures on site were compliant and validated this by conducting a compliance audit with the BAS site team. The audit checked that the procedures and plans (included as Appendices A, B, D, E and F of the CEE) were being adhered to and that no unpredicted environmental impacts were occurring.

Covid-19 restrictions prevented staff from BAS Environment Office visiting the site and auditing construction works during the 2020/2021 season, so this audit role was fulfilled by a Project Engineer who had been briefed by, and followed an audit checklist prepared by, BAS Environment Office.

The audit process confirmed that compliance with the CEE was generally evident and that good environmental practice was being observed, although some improvement actions were noted for follow-up by a subsequent audit/inspection.

To ensure that any deviation from the planned works outlined in the CEE were captured, a ‘Register of Project Variations’ was kept. This recorded events such as unexpected ground conditions resulting in minor design alterations, changes in the locations proposed for storing equipment/containers, retention of scrap metal from the old wharf on site, any new activities required and any environmental incidents that occurred.

In the event of a deviation, the register was submitted to the BAS Environment Office to assess the significance of the event. Each event was communicated to the FCDO and, where appropriate, the agreement to undertake the variance sought. Thirty activities were recorded on the ‘Register of Project Variations’ and none have materially affected the environmental impact of the project.

A review of the mitigation measures that were described in the CEE has taken place and it has confirmed that they were generally found to be effective.

Some mitigations described in the CEE were not followed through the procurement and preconstruction stages of the project. In particular, the quarrying screening equipment did not feature covers nor dust skirts. Similarly, the D7 drill rig operated a different dust mitigation to that in the CEE. This led to project variations being notified after plant and equipment had been mobilised to site.

The impacts from a controlled detonation of surplus explosives was not identified in the CEE, requiring a Preliminary Environmental Assessment to be prepared and agreed with FCDO prior to the detonation taking place.

All environmental incidents associated with the project were reported on the BAS Incident Reporting System and subsequently investigated by BAS Environment Office. Twenty environmental incidents occurred during the construction period, including for example, minor oil spills and the importation of non-native species on incoming cargo. Most of these incidents had already been identified as potential risks in the CEE and mitigation measures and response strategies were implemented accordingly.

An Environmental Monitoring Plan was agreed and presented in the CEE. Short-term monitoring undertaken throughout the construction period included:

a) Neutralisation of cement contaminated water

b) Wet well seawater turbidity

c) Wildlife displacement

d) Noise from quarrying and construction activities

e) Vibration from quarrying and construction activities

f) Marine noise from construction activities

g) Airborne dust

Where thresholds were exceeded, these were highlighted at the time of the event and were reported to the Rothera Station Leader and Environment Office.

The longer-term monitoring undertaken by BAS personnel, including skua-breeding success on Rothera Point and marine benthic invertebrate communities in the vicinity of the wharf, were due to be reported on at the end of the project. However, the second phase of the benthic invertebrate monitoring, scheduled for the 2020/21 season, was delayed because of the Covid-19 pandemic and is planned for the 2021/22 season.

Taking into account compliance with the CEE, the results of monitoring, environmental incidents that occurred and effectiveness of the mitigation measures adopted, the impacts associated with this project were generally consistent with those predicted in the CEE.

The CEE referred to the BAS policy of applying the CEEQUAL sustainability assessment tool. A CEEQUAL Whole Project Award was applied for, meaning that the entire scope of the project from conception through to construction was subject to assessment. The evidence collection phase has been completed and the evidence assessed by an independent CEEQUAL verifier who has awarded the project an ‘Excellent’ rating.

***Conclusions***

* Rothera Wharf has successfully been rebuilt and is in use. The runway coastal stabilisation works are complete.
* Compliance with the CEE has been good. Nevertheless, some opportunities for improvement were highlighted in the audit reports and some variance events have occurred.
* Some variance from that described in the CEE are inevitable given the refinement of the project design since submitting the CEE, and the uncertainties inherent in a complex construction project.
* The variances have been recorded on a Register of Project Variations and the variances have been discussed with the UK competent authority (and their approval sought, where required) before the activity commenced.
* Some elements of the project have not been completed to date, the most significant is the provision of the eastern mooring bollard which has not been confirmed as operationally essential. A decision on whether this will be required will be made once the *RRS Sir David Attenborough* comes into service. The pontoon and gangway have been removed from the scope of the project.
* The Project Team, Environment Office and the UK competent authority agreed it was helpful to have established how variances would be managed and communicated before they occurred.
* Undertaking compliance audits have been invaluable in checking that the CEE was being adhered to.
* The Environmental Monitoring Plan described in the CEE has been followed.
* Based on the findings of the audits and monitoring undertaken to date, the CEE was effective in predicting the likely environmental impacts, and the mitigation measures described have largely been effective.
* Further monitoring is planned to assess the impact on the benthic environment and to confirm it is as predicted by the CEE.
* The project used the CEEQUAL sustainability assessment tool alongside the EIA process. The project has been assessed by independent CEEQUAL assessors and an ‘excellent’ rating awarded.

***Rothera Wharf reconstruction and coastal stabilisation project – selected photographs***

Imagen que contiene exterior, naturaleza, agua, foto

Descripción generada automáticamente

*Rock quarrying site – post completion*

Un barco en el mar

Descripción generada automáticamente