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18/07/23

Dear Sir/Madam,

**PIBLINELL CARBON DEUOCSID HYNET ARFAETHEDIG / PROPOSED HYNET
CARBON DIOXIDE PIPELINE**

RE: NATURAL RESOURCES WALES' DEADLINE 6 SUBMISSION

This letter comprises Natural Resources Wales (NRW)'s response to the following documents, which were submitted into the examination by the applicant at Deadline 5:

- i. Hydrogeological Impact Appraisal of Open Cut crossing, Alltami Brook [REP5-014] – see Annex A;
- ii. Applicant's Comments on Submissions Received at Deadline 4 [REP5-015] – see Annex B, and
- iii. Responses to Examining Authority's Second Written Questions (ExQ2) [REP5-025] – see Annex B.

The Applicant has also submitted its Water Framework Directive Derogation Case for the Alltami Brook Crossing [REP5-016] at Deadline 5. It should be noted that NRW has provided clear advice to the Applicant as to the requirements under WFD in particular making clear that Article 4(7) would need to be considered. It is a matter of regret that this advice was not acceded by the Applicant until a late stage in the examination. A 'without prejudice' derogation report in support of the Applicant's preferred option has now been submitted. The information in the derogation report is significant and requires detailed consideration. NRW will review as a priority and will provide its advice to the Examining Authority as soon as possible. Pending this review, NRW is not in a position to provide further substantive advice at this deadline.

Our comments are made without prejudice to any further comments NRW may wish to make in relation to this application and examination whether in relation to the ES, provisions of the draft DCO and its Requirements, SoCG or other evidence and documents provided by

Liverpool Bay CCS Ltd. and their consultants ('the Applicant'), the Examining Authority or other interested parties.

In addition to being an interested party under the Planning Act 2008, NRW exercises functions under legislation as detailed in the cover letter of NRW's Deadline 1 Written Representations [REP1-071].

Please do not hesitate to contact Chris Jones should you require further advice or information regarding these representations.

Yours sincerely,

Chris Jones
Uwch Gynghorydd – Cynllunio Datblygu / Senior Advisor – Development Planning
Cyfoeth Naturiol Cymru / Natural Resources Wales

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ANNEX A: Hydrogeological Impact Appraisal of Open Cut crossing, Alltami Brook [REP5-014]

- 1.1 NRW has reviewed the Applicant's Hydrogeological Impact Appraisal (HIA) of Open Cut crossing, Alltami Brook [REP5-014] submitted at Deadline 5 of the HyNet CO2 Pipeline NSIP examination and our advice to the Examining Authority is as follows.
- 1.2 NRW notes that the HIA concludes that: "*There is not considered to be a mechanism present which would allow a discernible loss of flow from the Alltami Brook to the underlying bedrock aquifer*" and "*...the DCO Proposed Development is not considered to be a risk to impacting the WFD status of the Wepre Brook surface water body*".
- 1.3 An Article 4(7) WFD derogation report [REP5-016], which refers to and relies upon the conclusions of the HIA, has been prepared by the Applicant and submitted at Deadline 5 for this NSIP examination. NRW is currently reviewing this document and will provide its advice to the Examining Authority as soon as possible.
- 1.4 In summary, NRW acknowledges that the Applicant has developed a conceptual model (a simplified representation of a complex geological and hydrogeological setting) for the site of the Alltami Brook crossing. The Applicant affords significant weight to this model within their WFD Article 4(7) derogation case. However, there is evidence to suggest that the actual geological site conditions are far more complex than indicated by the conceptual model. In our view, this creates uncertainty in the level of reliance that can be afforded to the conceptual model as a predictive tool. Due to the reliance placed on the conceptual model to determine whether or not there may be a deterioration in Water Body status, NRW does not have confidence in the Applicant's conclusions for the reasons set out below.
- 1.5 Table 2.2 of the HIA presents information from four boreholes located along the A55 in proximity to the proposed Alltami Brook crossing point. NRW's review of the British Geological Survey's (BGS) GeolIndex shows the presence of other boreholes in the vicinity and their respective borehole logs which have not been considered in the HIA. These boreholes are shown on Figure 1 below, which also includes the approximate distance from the A55 to the proposed Alltami Brook crossing point. The information from the full complement of boreholes reveals that groundwater may not be present, and where it is found to be present the depths to which it is encountered vary. The information from the boreholes presented in the HIA is therefore not considered to be comparable or to provide a sense of continuity in the hydrogeological regime in the locale of the Alltami Brook crossing point. In addition, the boreholes presented in the HIA are installed within different geological units in comparison to the geological units within which the proposed pipeline would be installed, *i.e.*, an 'isolated younger outcrop of Pennine Lower Coal Measures mudstone, siltstone and sandstone surrounded by the older Gwespyr sandstone (see Figure 3 below).

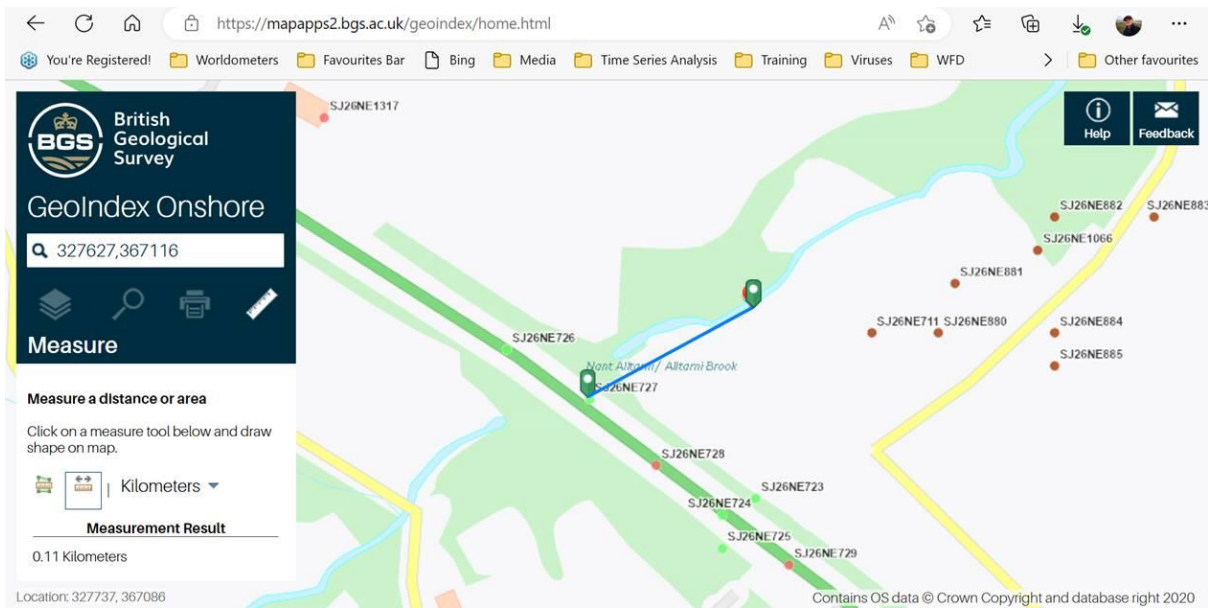


Figure 1: Additional boreholes at the Alltami Brook crossing location

1.6 The BGS 1:10,000 map excerpt (Figure 2 below) shows the disc-like boundary outline (outlier) of the Lower Coal Measures Unit (md) with the Gwespyr sandstone (Gwp) to the east and a NE to SW trending fault to the west, demarcating the outlier within which the pipeline is proposed to be installed. Figure 2 (below) shows a number of faults, one of which is located between the crossing point and the particular boreholes on the A55 that have been presented within Table 2.2 of the HIA. Therefore, in the absence of any site-specific ground investigation data, it is not considered possible to be certain that there is groundwater connectivity between the groundwater encountered in the boreholes along the A55 and the proposed crossing point. Rather, the fault could function as a hydraulic barrier to flow and the particular outcrop of the lower Coal Measures and Gwespyr sandstone at the crossing point could be unsaturated bedrock. It is possible that any groundwater contribution to the Alltami Brook in the crossing-point locale is inconsistent in its nature, *i.e.*, in some locations there may be contribution and in other locations it may be completely absent. Any groundwater contribution will largely be controlled by the presence of transmissive fractures, if present, the influence of faults in terms of helping or hindering groundwater flow and lithological control.

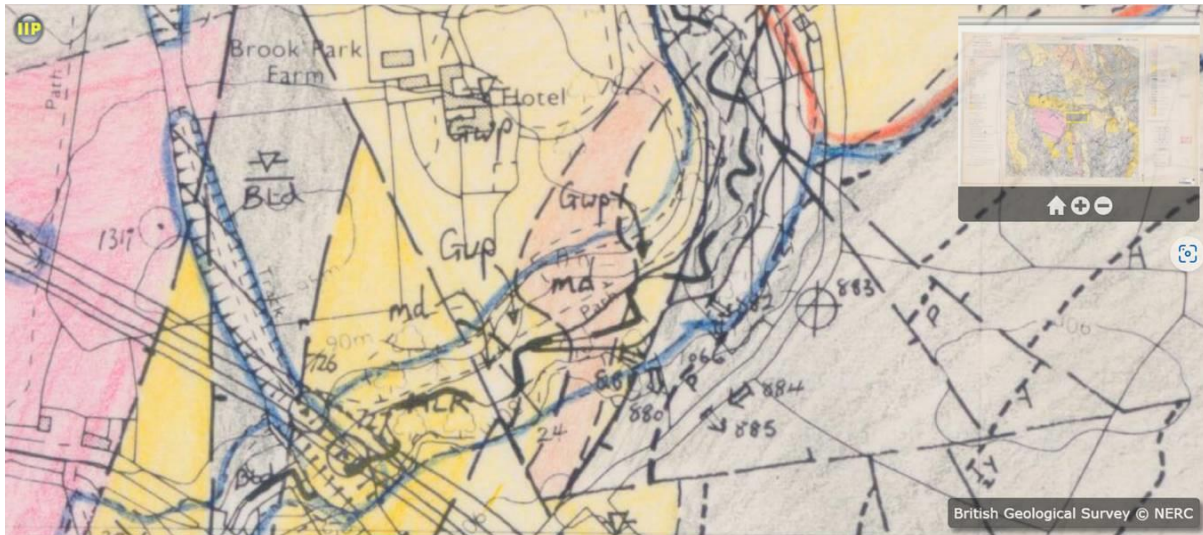


Figure 2: BGS 1:10,000 map excerpt for the proposed Alltami Brook crossing location

- 1.7 Furthermore, Borehole SJ26NE727 presented in Figure 2.2 and Table 2.2 of the HIA states that the well was drilled to 15.1m which yields a borehole base elevation of 64.4m AOD. This is below the proposed Alltami Brook crossing point elevation which is ~73m AOD: as the excavation is approximately 4m deep this gives an excavation elevation of ~69m AOD. The borehole log describes fluid loss at 4.5m depth yet encountering groundwater at 14.3m (i.e., below the level of Alltami Brook), although this rises to +0.3m due to pressure. We also note that there are two largely dry boreholes located along the A55, drilled to a greater depth of 40m (Boreholes SJ26NE728 and SJ26NE729). It is possible that Borehole SJ26NE727 encountered a transmissive fracture at depth whereas Boreholes SJ26NE728 and SJ26NE729 did not. This highlights the lack of consistency in the ground materials and groundwater conditions at the site. In our view, it is therefore not possible to rely upon the information from any one borehole regarding the potential contribution of bedrock groundwater levels to the Alltami Brook, as the information is inconsistent between them. In addition, the geology encountered along the A55 is of a different time period in comparison to the expected geology at the Alltami Brook crossing and is separated from the geology at the crossing point by a fault.
- 1.8 The following excerpt (Figure 3 below) is from the NRW Geospatial Map viewer and shows the relationship of the proposed Alltami Brook crossing point to the seepage reported in the HIA (para. 2.7.9); it has been drafted using coordinates presented by the Applicant. Based on the mapping shown in Figure 3 below the seepage appears to be a contact seepage between the two different coloured units (designated as pink and grey in Figure 3) so may not be a fracture flow contribution, as hypothesised by the Applicant, but rather a manifestation of the permeability difference between where sandstone and mudstone contact each other, for example. This seepage point is approximately 120m downstream from the proposed crossing point and is at a lower elevation. The estimated crossing point elevation is ~73m AOD.
- 1.9 The seepage is therefore not considered reconcilable to the crossing point itself because the fault that is immediately upgradient of the crossing point may hinder groundwater flow in the bedrock. It is unlikely that there is consistent

contribution of bedrock groundwater flow along the reach of Alltami Brook because such contribution would require a consistent network of saturated and transmissive fractures to intersect Alltami Brook. Figure 3.1 of the HIA (Preliminary Hydrogeological Conceptual Model) would suggest that such a consistent and spatially extensive network of saturated and transmissive fractures exists, which is unlikely to be the case as the borehole logs suggest, coupled with the possibility that local faulting hinders the continuity of groundwater flow.

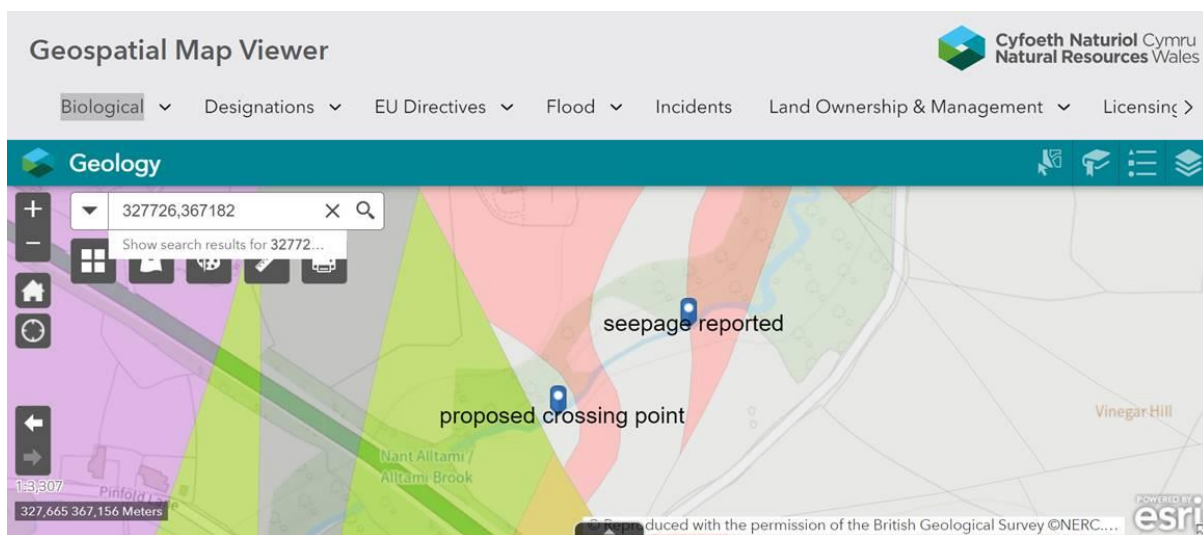


Figure 3: the relationship of the proposed Alltami Brook crossing point to the seepage reported in the HIA (para 2.7.9).

- 1.10 Based on this evidence it is therefore possible that excavation into bedrock at the Alltami Brook crossing point could be within unsaturated fractured bedrock. During the operational phase of the pipeline, if this were to be the case and grout washout of the infilled fractures were to occur, water loss from Alltami Brook could be to unsaturated transmissive fractures. This is in direct contrast to the statement made in the HIA (para. 3.3.4), that:

“The reason (for no loss of Brook flow) is because the conceptual understanding of the area indicates that there is a groundwater baseflow component to the Alltami Brook resulting from an overall upwards hydraulic pressure/flow gradient from bedrock (where fractures allow).”

- 1.11 The above statement suggests that flow from the bedrock is consistent. In our view this is considered to be unlikely, rather that groundwater flow will be limited to some transmissive fractures while other fractures remain largely dry. Based on the evidence presented above, NRW considers that given the geological and hydrogeological complexities at the proposed pipeline crossing point and the inconsistent hydrogeological information revealed by the local boreholes (which are not considered to be reconcilable to the geology and hydrogeological conditions at the crossing point), it cannot be ruled out that the proposed Alltami Brook crossing point could be underlain by unsaturated fractured bedrock. It is equally possible that 50m up or downstream of the crossing point, this is not the case, which demonstrates the inconsistency in fractured rock behaviour. This is particularly pertinent when considering the Applicant’s statement that

“there is an approximately 200 m stretch of the Alltami Brook within which the river crossing could be built within the Newbuild Infrastructure Boundary”.

- 1.12 Therefore, based on the evidence presented, NRW advises that the geology of the Alltami Brook crossing point location is complex. NRW does not agree with the Applicant’s conclusion that there is a consistent bedrock groundwater contribution to the Alltami Brook in all locations (an upwards hydraulic gradient), and in the absence of site-specific ground investigation data, NRW does not have confidence in the Applicant’s conclusions.
- 1.13 Paragraph 3.3.8 of the Applicant’s HIA acknowledges that the exact relationship between surface water in the Alltami Brook and surrounding groundwater is not currently known in detail and proposes ground investigation at detailed design stage to address this and confirm the conceptual understanding. Until such ground investigations have been completed satisfactorily, NRW is unable to accept that the Applicant’s conceptual model is an accurate representation of conditions at the Alltami Brook crossing point, for the reasons explained above.
- 1.14 NRW therefore maintains its position [REP1-071] that there is insufficient evidence provided to date by the Applicant to support its conclusions, and that accordingly there may be deterioration of the Wepre Brook waterbody as a result of the proposed open-cut crossing of Alltami Brook. This is because there is a risk that excavating bedrock for the proposed Alltami Brook open-cut crossing could create a pathway for surface water to be lost to the ground/contaminated mine workings; this could cause water courses to dry up downstream. As a result, the derogation provisions under Article 19 of the Water Environment (WFD) Regulations 2017 must be engaged.
- 1.15 NRW also wishes to provide the following advice regarding the HIA:
- Paragraph 1.7.5: Since the Alltami Brook is an Ordinary Watercourse the *“appropriate consents/permits”* for working in the channel would need to be sought from the Lead Local Flood Authority, not NRW as currently stated.
 - Paragraph 2.8.1: We are unable to locate the permitted discharge activity from the landfill site mentioned, but we advise that there are discharges from quarries in the catchment upstream.
 - Paragraph 3.3.3 explains that *“Inspections will be undertaken following an intense rainfall event or heatwave to monitor any damage and implement appropriate mitigation as necessary.”* NRW advises that clarification is provided about how this would be achieved in practice during/following such events. We also advise that clarity is provided about how any integrity loss underneath the concrete slab would be identified and whether the walls of the excavation (which we understand could be up to 4m deep) would also be grouted in addition to the base.
 - Paragraph 3.3.9: The seasonal variation described would also need to be considered once the ground investigation data become available and the investigations should be planned to ensure that this seasonal variation can be assessed.

Annex B: NRW's responses to the Applicant's Comments on Submissions Received at Deadline 4 [REP5-015] and Responses to Examining Authority's Second Written Questions (ExQ2) [REP5-025] (with regards to NRW's Flood Risk Management assets)

- 1.1 The Applicant's response to NRW's Deadline 4 submission [REP5-015] and its Responses to Examining Authority's Second Written Questions (ExQ2) [REP5-025] did not resolve NRW's concerns regarding securing access to its flood risk management assets. The Applicant suggests that the discussion '*has become somewhat sidetracked into powers of entry and especially the emergency powers*'. The Applicant also suggests that NRW does not adopt 'a credible position.' NRW disagrees. As made clear, NRW has powers to enter land to discharge its functions in respect of flood risk management. These powers may be exercised whether or not there is a physical impediment. NRW's concern therefore is to ensure that, as a matter of project design, there is no physical impediment to its powers of entry so as to avoid potential enforcement action being taken. Put simply, this can be averted by the inclusion of explicit provisions in the DCO requiring NRW's approval as to the siting of the construction compounds. The Applicant has specified that it '*has no construction compounds located so as to prevent access to flood defences*.' Whereas NRW welcomes this confirmation, the design can be subject to change following the grant of the DCO. Nevertheless, given the Applicant's assurances at this stage that there will be no physical impediment to NRW accessing its flood risk assets, its concerns regarding NRW's requests being too onerous or unreasonable, respectfully fall away. Accordingly, NRW maintains its position as set out in its previous submissions that the protective provisions are not suitable and that explicit reference to NRW's consent being required in respect of consenting to the siting of any construction compounds or other structure that may compromise access should be referenced either in the CEMP or by way of a stand-alone DCO requirement.
- 1.2 In order to clearly explain the nature of NRW's concerns regarding access to its flood risk management assets NRW prepared illustrative plans demonstrating the issues in relation to access. These were provided to the Applicant and a meeting was held to discuss the issue on 17/07/23. During the meeting it was confirmed by the Applicant that the northern access track (red line on Figure 1 below) would not be fenced off during the construction period and that this was already secured within the draft DCO. It was also confirmed that there would be no impediment to NRW access along the southern access track during the works (red line on Figure 2 below). At this meeting, the Applicant agreed to confirm this position and amend the draft DCO to guarantee that this is ensured. On that basis, subject to suitable provisions being incorporated into the draft DCO as set out above NRW considers that its concerns regarding access to its flood risk management assets could be satisfactorily resolved.



Figure 1: Compound 30D

The red line above shows the access road that NRW uses to get down to the Northern Embankment. The compound spans the road so it is not clear whether the access point would be fenced off. It needs to be ensured that there is unrestricted access along this road.

The green line shows the section of the compound directly adjacent to Sealand Main Drain (a main river). If the fencing extends to this location, NRW would be unable to track a machine along the bank for maintenance purposes. This work would also be subject to a Flood Risk Activity Permit.

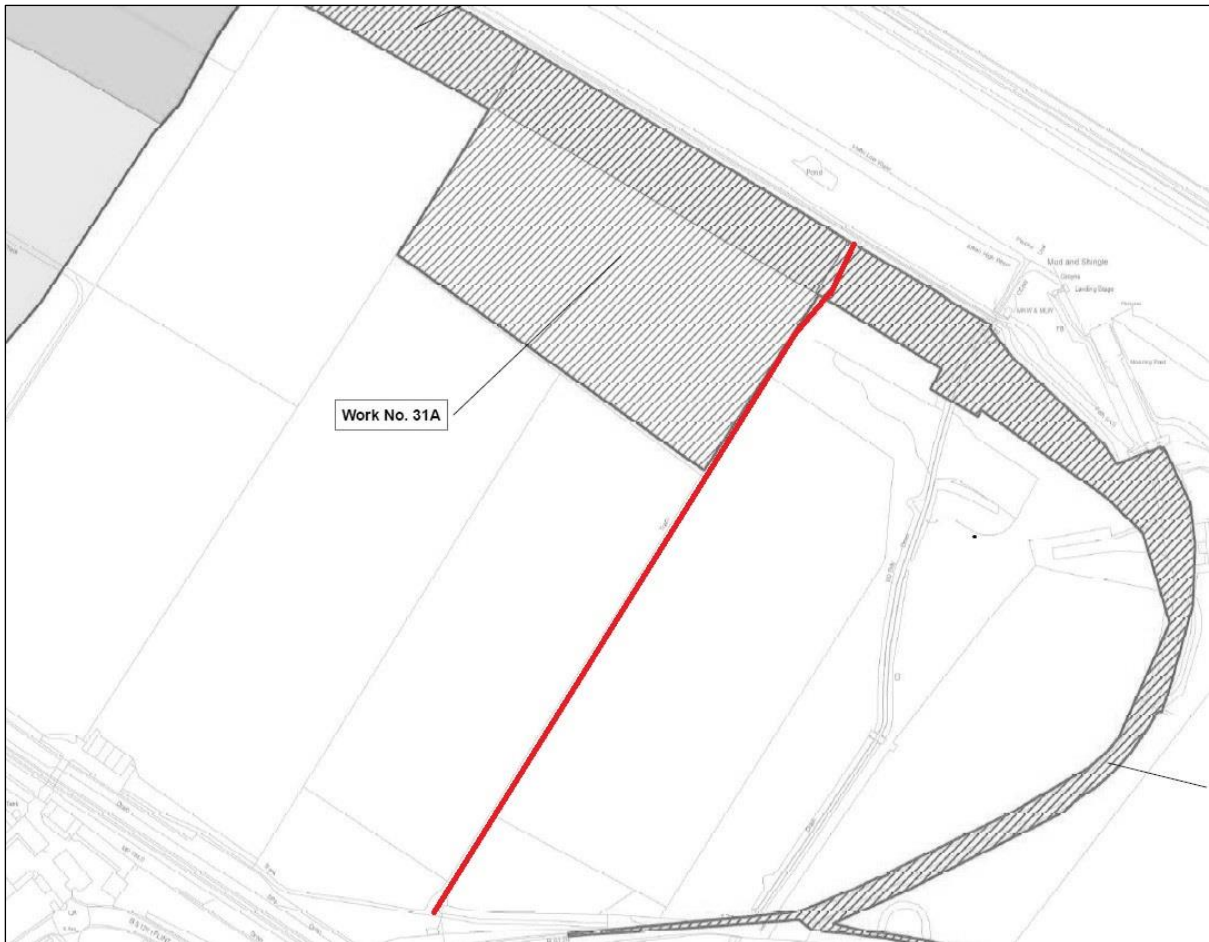


Figure 2: Compound 31A

The red line above shows NRW's only access point to the Hawarden Embankment at this location. It needs to be ensured that there are adequate access provisions for an excavator with flail to get on to the crest of the embankment. There are also key flood risk structures here (Beeches Drain outfall) that can only be accessed at this point.

It needs to be ensured that the compound layout does not prohibit access and any fencing is adequately offset from the access track so that this remains free from any obstructions.