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Our Ref: 2185/L/002 Rev 1

14th May 2015

For the attention of Neil Herbert

Natural Resources Wales

Maes Newydd, Llandarsi

Castell-Nedd

Port Talbot

SA10 6JQ

Dear Neil,

WITHYHEDGE LANDFILL SITE

NRW Response to CQA plan submission for the construction of the valley cells (N1,N2,N3 and S1)

I have addressed in turn (refer to type in italics) each point you raised in your letter dated 14th April 2015, using your references. This letter of response has also been updated with the relevant agreements reached during a site meeting held 29th April 2015.

Cell 1 & 2 North temporary cap

1. The temporary cap currently in place was installed without CQA supervision. As part of the enforcement response we instructed the operator that a careful (independent) inspection would be required to confirm that the construction of the cap had not damaged the basal containment system (i.e. around the area of the tie-in). It was agreed that the work could be undertaken when the temporary cap was lifted and we would therefore expect that this CQA plan includes the provision for this work (e.g. procedure, record keeping and mitigation required).

An appropriate section has been added to the CQA plan (section 4.1 (vii) to cover for the inspection for damage to the permanent sidewall liner.

Valley cell overflow

2. The design, albeit amended, still includes an overflow system for leachate from the valley cell into the western cells (Cells 1& 2 North & South). We have serious misgivings about the incorporation of any overflow system which is reliant on these western cells. Leachate management has been problematic in these cells and once the temporary cap (currently in place) is removed it is envisaged that this problem is likely to re-occur during the valley cell operational life. Therefore we believe that any reliance on the Cell 1 & 2 cells should be minimised and the use of the overflow avoided. It should be noted that the side slopes in these western cells (Cells 1& 2 North and South) have no drainage provision, contrary to the detail in the drawings (please

amend) you have submitted. This in turn would seriously impair the effectiveness of any overflow system. There was also extensive perching in these cells and provisions should be made to ensure that uncontrolled leachate breakouts are managed when working in proximity to these cells.

With reference to our letter dated 10th March 2015 relating to Pre-Operational Measure Reference 3 – leachate management system, I confirm that the results of our calculations indicate that when ignoring a significant storm event occurrence, there will be a minimal head of leachate standing within the valley cells during the period of time prior to being capped. We looked at two worst-case scenarios linked to a storm event. The calculations indicated that it would be unlikely that leachate levels within the valley cells would over-top into the adjacent Cells 1 & 2 as long as leachate levels within the valley cells were maintained at compliant levels and that the recently installed eductor pump leachate removal system were operating.

The overflow system has been deleted from the specification and Drawing 2185/2/008 has been withdrawn from the final submission. .

Cell 15

3. The original design for cell 15 had no contingency for failure in the leachate extraction system (i.e. there is only one extraction point which doubles as a monitoring point). Since the variation (for the valley cell) was determined, leachate management in cell 15 has been problematic and as such, prior to any additional loading being placed onto this system we believe the current system requires enhancement. This requires further discussion.

It was agreed at the 29th April 2015 meeting that RML UK will install a secondary leachate extraction chamber within Cell 15 at its northern boundary. The details for this are yet to be developed but the chamber will be installed on the liner cell base by excavation of waste and the installation of 2nr 1m height perforated concrete rings on a mass pour concrete base. Clean, fines free brick hardcore will be placed around the chamber. Non perforated concrete rings will be used to establish penetration through cap and cover soils. The waste shall be reinstated around the non-perforated section of chamber and hardcore brick surround. The cap and cover soils shall then be reinstated.

Cell 13.

4. The original design required, in addition to a geocomposite drainage layer, the installation of a target pad for cell 13. This needs to be included into this plan.

Drawing 2185/2/009 has been included into the specification document and a section has been added to the specification text and QAP to cover the expected works to establish a second chamber within the south west area to Cell 13.

Valley Cell – Leachate Drainage

5. You propose a 300mm thick leachate aggregate drainage blanket, this is not acceptable and needs to be increased to 500mm. Alternatively a 300mm thick blanket can be proposed provided that it is supplement with an acceptable pipework system (see

guidance on requirements). However any design incorporating a pipework system will need upslope risers (as per original design).

The thickness of the proposed leachate drainage layer has been increased to 500mm and sidewall riser pipes have been included to supplement the leachate chambers at Cell N1 and Cell S1.

6. The use of 10/20 aggregate for the basal drainage layer at this facility will not be accepted, we will only accept 20/40 graded aggregate (see previous discussions with RML/SITA on this point). Please remove all references from the submission for 10/20

The basal drainage layer will now comprise a 500mm thick layer of 20/40 graded aggregate incorporating upslope risers at Cell N1 and Cell S1.

Target Pad S1

7. We believe the target pad at this location should be installed at the base of the cell to allow leachate levels to be adequately controlled. However based on the above comment you may consider incorporating upslope risers (as part of a revised drainage arrangement), in which case this point is less critical.

The design detail for the target pads has been revised to enable the extraction and or monitoring of leachate levels at liner level. Refer to Drawing 2185/2/006 Rev A.

Target Pad N3

8. We believe a target pad should be provided for the deepest sub cell (N3) as part of the design.

A target pad has been included within Cell N3 – refer to Drawing 2185/2/003.

CQA Plan

9. (2.1.8) Please change this to reflect the wording in the permit condition 2.6.3 for consistency.

The QA Plan has been revised to reflect the wording in the permit condition 2.6.3 for consistency.

10. (2.1.17) The CQA plan would have to be approved first by NRW before decommissioning can commence and this should be made clear in the statement.

The revised QA Plan includes for a section for the decommissioning of the boreholes. Refer to paragraph 2.1.17. The specification includes relevant text at section 3.8 of the Specification – Appendix A of the QAP.

11. (4.2 (vi)) include target pads in the items to be surveyed, see later comment. If you intend to incorporate leachate pipework then this will also need to be surveyed.

Matter agreed; appropriate changes have been made to the QA Plan – section 2.4.2 of the specification includes for the surveys and text at paragraph 4.1(vi) has been included .

12. (5.1 iii)) you do not require NRW approval of the source evaluation report to proceed, although one should be submitted.

Matter agreed; appropriate changes have been made to the QA Plan – paragraph 5.1(iii) has been included.

13. (6.2) There needs to be written approval (ideally on a specific template) prior to FML placement. (Appendix C “GCL 5 – GCL Covering” and section 5.7.6 of the specification should be updated to reflect the above comment).

Matter agreed; appropriate changes have been made to the QA Plan and specification – refer to the revision tables at the front of the respective documents .

14. (13) CQA Validation report. The list should be expanded to also include the following:

- i. Description of non-conformances and the subsequent remediation (Including photographs of all repairs made to geomembrane & GCL system)
- ii. Test (laboratory & field) reports (The results of all field and laboratory testing to include any failed tests, details of remedial action taken and re-test.
- iii. Appendix C CQA Validation Report Drawings: the list needs to include drawing 3, 6 and 16. An Isopachyte of the clay liner thickness and leachate drainage layer. To avoid ambiguity please also include a reference that as-built drawings will include; Title of Project, contract, element of works; Drawing version number, with details of revision history; Scale (Scale at size to be printed, eg 1:500 at A1); Details of the Survey Grid; Locations of control stations/levels, benchmarks, etc. (permanent and temporary); North arrow; Grid intersections; Distinguish between surveys done on different times and dates.

Matter agreed; appropriate changes have been made to the QA Plan and specification – refer to the revision tables at the front of the respective documents .

Specification

15. (3.2.2) It is understood that asbestos contaminated material has been placed onto the site haul road forming the base of the valley cell and although at levels below hazardous waste thresholds, any excavated materials requiring disposal should ideally be landfilled within the main landfill body. The handling of the material may also require certain precautions (see also later point on properties of haul road (32)).

The Client will undertake the excavation and backfill preparatory works for the Valley Cell and any excavated materials requiring disposal will be disposed of within the main landfill body with due precautions given to the handling of the material. Appropriate changes have been made to the specification – refer to the revision tables at the front of the document .

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16. (4.1.4) I believe drawing reference 008 should be included in the drawings referenced in this section?

This drawing has been removed / deleted.

17. (4.5.5) On completion of field trial a field trial report shall be submitted to Natural Resources Wales.

All references to the Environment Agency have been revised to read Natural Resources Wales. Apologies.

18. (4.7.2) The principle groundwater receptor for the site is the adjacent river which has been designated as a SAC, I would therefore expect the pass/fail criteria used to be the more stringent limit applicable to major aquifers.

The pass/fail criteria shall be lifted to be a minimum of 95% of test results shall indicate $\leq 5\%$ air voids, in accordance with the more stringent pass/fail criteria applicable to major aquifers. Matter agreed; appropriate changes have been made to the specification – refer to the revision tables at the front of the document .

19. Appendix C Clay Liner Testing 5- permeability for this project is $<1 \times 10^{-8}$ not 1×10^{-9} .

Appropriate changes have been made to the QAP and Specification.

20. Appendix C Clay Liner Testing 5- Interval should be “prior to the installation of the GCL”

The appropriate change has been made to the Specification.

21. Table 6.5 of the specification requires a 300hrs stress crack test. NRW has agreed with EA and industry at the Landfill Engineering Sub Group due to landfill failures from increased use of additives in the USA that for HDPE the stress crack test will be increased to a 500hrs test that should be applied as of April 01st unless the specification has already been agreed with NRW or incorporated into a contract. Similarly the asperity height was increased from 10 to 16mils (0.25 to 0.40mm). It was agreed that GM13 (here Appendix B) would be amended to incorporate these changes. For discussion.

The updated GRI GM 13 and GM19 standards have been included at Appendix B.

22. Section 9.6 As noted previously we have concerns over this aspect of the design and this requires further discussions.

A target pad has been added to Cell N3. Refer to Drawings 2185/2/003 and 006.

23. Section 10 GDL -Drawing 008 indicates that the GDL will not extend up the entire flank of the existing waste. Can this be clarified as we expect all historical wastes in cell 13 or the adjacent unlined cell, to be covered in GDL.

Drawing 2185/2/004 now shows the GDL extent to the crest of the Cell 13 slope.

24. There are several references to Environment Agency please replace with NRW, unless referring to Agency published guidance.

All references to the Environment Agency have been revised to read Natural Resources Wales, unless referring to published guidance.

25. Gas tight end caps for all infrastructure should be fitted and specified (e.g. leachate wells).

The appropriate change has been made to the Specification.

26. Drawing 2185/1/006 identifies only leachate well S1 with double visqueen wrap to limit down drag. Item 58, page 159 identifies that no surcharge load has been applied as double wrapped visqueen is applied to the chimney (not chimneys). Can the consultant confirm which leachate wells benefit from double wrapped visqueen?

The reference to a Visqueen wrap has been added to the other section details shown on Drawing 2185/2/006.

27. CQA details for the leachate extraction and transmission system for valley cell is not included (e.g. pumps and transmission pipework). This needs to be included or alternatively submitted as a separate document.

It was agreed at the meeting that a separate letter or document would be submitted to provide this information.

28. Can you attach the pro-formas that will be used in the CQA plan.

Refer to Appendix G of the revised QAP.

29. I was also unable to locate anything in relation to the construction of the two rain flaps that you propose. The removal of these flaps will also need independent CQA and subject to a CQA plan this should be made clear in this document (you can include the method for removal in this plan or submit a separate plan in due course).

The 'temporary' chambers have now been made 'permanent', a target pad has been added to Cell N3.

30. When submitting an updated CQA plan please provide a summary of all items that have been changed.

Please refer to the document revision control sheets located at the front of the revised QAP and specification.

SRA

31. We require some further clarification in relation to groundwater levels. The SRA (page 154, point 33) identifies groundwater levels between 0.6 to 2.6m bgl or 39.66 to 40.3m AOD. The site boundary is said to be at ~36m AOD to the north in point 11 (page 151). We also note that there is reference to maintaining the unsaturated zone to 1m bgl. This is confusing and appears to suggest that groundwater could be at or very near the surface to the North in the insitu ground (silty clay with sand lenses). This needs to be clarified as the permit requires a 1m thick unsaturated zone beneath the cell.

The formation level as shown on Drawing No 2185/2/004 is between 46 and 47 m OD. There is therefore an unsaturated zone of at least 5m down to the groundwater level of 40.3m OD.

32. It is noted the formation in southern half ie cells N3 and S1, is said to be a mixture of insitu ground and existing site road. The site road is likely to have compressed more than the natural ground. Whilst this is likely to lead to a small and tolerable strain on the lining system, I think if possible it would be advantageous to try and ensure that the leachate well foundations (concrete base pads) of the deeper leachate wells in N3 (~16m) and S1 (~19m) are situated either wholly on or wholly off the haul road. Alternatively the strain accommodated in a calculation.

The location of the existing site road shall be overlain with the cell layout and the site infrastructure shall be set out on site to accommodate this request. However, without doing the settlement calculations, we would not expect unacceptable differential settlement given the use of reinforced concrete bases.

33. In Table 2 the parameters are explained, however the Naue communication or Geospec lab test that are referenced for HDPE DR v GCL could not be located. Item 49 of page 158 identifies that these parameters are assumed. I note however in 2.5.1 of the specification that interface tests will be undertaken by the contractor on all interfaces and the instruction is that each interface will satisfy the following equation
- $$24.9 \alpha'_{\text{Lab}} + 96.4 \tan(\delta'_{\text{lab}}) \geq 180 \text{ kNm}^{-2}$$

Could the consultant explain the derivation of the numbers, so one can appreciate how it relates the SRA?

Thank you for pointing this out as this part of the specification was included in error.

As stated in Item 49 of the SRA (page 9)

"The HDPE (rough) v GCL interface shear strength parameters have been assumed, conservatively, for the interface between the waste and the geosynthetic drain".

The parameters assumed for the design values ie $c' = 0$ and $\phi' = 24.8^\circ$ gave an ODF = 1.44 ie safe. To reduce the ODF to 0 ie just stable would require the design parameters to reduce to $c' = 0$ and $\phi' = 17.8^\circ$. This is an extremely low value for this interface which would never be realised in practice. There is nothing to be gained in carrying out interface shear box tests on this interface.

Pre-Operational Conditions

Table 1.4B ref 4 Odour Method Statement

I couldn't locate anything in the submission addressing the requirement of this pre-operational condition.

An appropriate method statement will be prepared and submitted separately for review.

Table 1.4B ref 3 Review of existing leachate system in Phase 1&2 North

A submission has been made and a separate response to deal with pre-operational conditions will be made in due course.

Table 1.4B ref 7 Decommissioning of groundwater wells

Operator will be submitting these separately.

Refer to section 3.7 of the specification.

We hope you find the above satisfactory. Please do not hesitate to get in touch if you have any questions or comments relating to this response.

Yours sincerely
for and on behalf of TerraConsult Ltd

J Waterworth

Jim Waterworth
Director