

الدقم Duqm

هيئة المنطقة الاقتصادية الخاصة
Special Economic Zone Authority

Sultanate of Oman سلطنة عُمان



URGENT

Ref.: DA/2-4/2015/T22/15-7

Date: November 08, 2015

Circular No. (6)

Reference: SEZAD Tender No. (22-2015) "Construction of Jurf and Saay Flood Protection Dams in Duqm"

Date of Collection of Tender Documents: Submission date: 03/11/2015

02/09/2015

New extended Submission Date: 17/11/2015

Subject: Reply to Queries

Reference to the bidder's clarification on the above subject.

Please see the attached reply to queries for your kind action and record.

NOTES:

- All Bidders are to endorse this Circular and attach it as part of their tender submission.
- Bidders are advised that **SEZAD shall not accept** any further queries as tender shall be submitted on **Tuesday November 17, 2015 at 12h00, Muscat Time.**

Kind regards


SEZAD, Tenders & Contracts.



Tender No. 22/2015 Construction of Jurf and Saay Dams in Duqm

Replies to queries received from bidders

1. Our understanding of the compaction specification for the clay core is 98% of British Standard density that is roughly equivalent to the modified Proctor test. At the same time the Contractor is required to compact wet of the optimum moisture content. In our view, this narrows the range of achievable density-moisture relationship to a point rather than a range, which is essentially not achievable

Reply: We provide a comparison of the various common compaction tests available as clarification below. Please note we require the Standard BS according to Clause 3.3 for the core material, it can be seen that it is similar to the tests done by Proctor and slightly modified to bring it to SI units.

Similarly for the coarser alluvium material we require compaction to Clause 3.5 which is similar to the Modified AASHTO test.

Consequently the specified compaction and moisture content ranges specified remain unaltered.

Table 8.4 Comparison of compaction tests

| Test | Soil type | No. of layers | Blows/ layer | Height of drop | | Weight of rammer | | Volume of mould | |
|---------------------------------------|--|---------------|--------------------|----------------|-----------|------------------|----------|--------------------|---------|
| | | | | (in) | (mm) | (lb) | (kg) | (ft ³) | (cc) |
| Proctor | | 3 | 25 | 12 | 305 | 5.5 | 2.5 | 1/30 | 944 |
| Modified AASHTO BS 1377: part 4: 1990 | | 5 | 25 | 18 | 457 | 10 | 4.55 | 1/30 | 944 |
| Clause 3.3 | Particles up to medium-gravel size | 3 | 27 | | 300 | | 2.5 | | 1000 |
| Clause 3.4 | Soils with some coarse gravel-size particles | 3 | 62 | | 300 | | 2.5 | CBR mould | c. 2300 |
| Clause 3.5 | Particles up to medium-gravel size | 5 | 27 | | 450 | | 4.5 | | 1000 |
| Clause 3.6 | Soils with some coarse gravel-size particles | 5 | 62 | | 450 | | 4.5 | CBR mould | c. 2300 |
| Clause 3.7 | | 3 | Vibratory 25-45 Hz | | Vibratory | | c. 30—40 | CBR mould | c. 2300 |



2. The Oryx Sanctuary Boundary Delineation fence must be relocated after construction but the exact location is not yet known. This is measured under Item 6.17 of Jurf dam as a Lump Sum. Can this be changed to linear metre with an estimated quantity

Reply: We enclose herewith copies of Revision 2 of the Bills of Quantities of the two dams with this measurement unit revised in Excel and pdf formats

3. The Bill of Quantities provided with Addendum 1 did not include the Grand Summary Page. Please provide this page

Reply: We enclose herewith copies of Revision 2 of the Bills of Quantities of the two dams with the Grand Summary Page included in Excel and pdf formats

4. The Bottom Outlet Pipes and PVC drainage pipes are not separately measured and paid for in the BoQ of Saay dam. Please provide separate items for these items.

Reply: We enclose herewith copies of Revision 2 of the Bills of Quantities of the two dams with the Grand Summary Page included in Excel and pdf formats

5. Please advise on spoil areas at Jurf Dam.

Reply: We attach drawings indicating the proposed spoil area at Jurf dam as well as proposed Contractor's Camp area. Please note this indicates the General location similar to the diversion Type drawing. The Contractor has to consider his camp requirements and design his diversion works taking cognisance of the pre-loading requirements. Consequently the exact locations of the spoil areas, camp location and diversion works are interconnected. Since protection of the Permanent Works during construction is the responsibility of the Contractor we do not prescribe these locations but indicate probable areas that can be used.

6. Please provide layout drawings of the grout curtain and consolidation grouting at Saay dam similar to those provided at Jurf Dam

Reply: We attach drawings indicating the requested grouting layouts

7. Please provide Specifications for the quality of treated water that can be discharged from site.

Reply: The quality of water discharged from site must conform to the Technical Specifications and the laws and regulations of the Sultanate of Oman.

8. Please advise whether salt water may be used as construction water for the moisture conditioning of the earth embankments to bring it to specified moisture content.

Reply: The groundwater at Jurf dam has high salt concentrations and no bituminous membranes are included in the structure, consequently we do not have any objection to using seawater to moisture condition the fill materials before compaction for Jurf Dam. Please note repeated wetting and drying will not be allowed since the salt concentrations can then build up to unacceptable levels. Approval of extraction points must be obtained from the relevant authorities.

However, the groundwater at Saay dam did not show similar salt concentrations and consequently salt water cannot be used for moisture conditioning at Saay dam.

9. The bottom outlet drawings indicate 200 mm PVC pipes at the outlet and HDPE at the inlet. Is the PVC a misprint?



Reply: Yes the 1000mm diameter outlet pipes are HDPE throughout. Revision 1 of Drawing 1333-SAAY-CWK-063 is included herewith.

10. Please provide drawings indicating the locations to be pre-loaded at both dams.

Reply: We enclose drawings indicating the locations of the areas to be pre-loaded at both dams. Please note that the exact extent of the Shale at Jurf dam is not known and is assessed from borehole information. The extents of the pre-loaded area will therefore only be determined after foundation excavation and mapping of the foundation has been completed.

The pre-loaded area for Saay is indicated as required.

11. Please advise where the cost of the surcharge area at Jurf dam will be measured.

Reply: Similar to the OHDM we considered the cost for temporary embankment construction to be included in the excavation rates. However, several bidders requested separate measurement for this temporary embankment construction. Consequently we enclose herewith copies of Revision 2 of the Bills of Quantities in Excel and pdf formats where the pre-loaded area for Jurf dam is measured separately. The rate shall include all costs for placing compaction, monitoring and removal of the material as specified. Excavation of the material will still be measured under Items 2.04 and 2.05

12. Please advise how the 600mm sacrificial layer of material on the pre-loaded area of Saay dam will be measured.

Reply: The cost of provision and removal of the sacrificial layer is considered to be included in the rates for embankment construction.

13. Please provide specifications for the plastic concrete plinth at Jurf Dam.

Reply: This is a specialised operation and trials on site will determine the constituents of the final product. The Engineer has considerable experience with this material and will advise as required.

Trial mixes shall be performed on the plastic concrete before approval for use in the Permanent Works. The plastic concrete shall have a slump between 200 and 250 mm, a uniaxial strength after 10 days > 1.25 Mpa and less than 7 MPa, Young's Modulus E of between 200 MPa and 800 MPa and permeability after 10 days of $k < 10^{-8}$ m/s. Strain at rupture to exceed 3%.

The bentonite shall have a plasticity index greater than 400. The bentonite suspension in water shall contain no particle larger than 0.080 mm

The bentonite shall be free of any particles which might be prejudicial to the normal hardening of the cement

For bentonite used for slurry without cement, the bentonite supplier shall guarantee a figure (expressed in grams per litre of water) corresponding to the maximum mass of bentonite that shall be added to one litre of water to give a slurry with a 40 seconds Marsh viscosity value. This figure is referred to as the dosage.

The concrete shall comprise a mixture of cement, bentonite, sand and aggregates of maximum size 20 mm. The mix shall flow easily and be self compacting, to give a dense concrete when placed in position.



Design of the plastic concrete mix shall include several trial mix batch productions to establish the consistency and flow characteristics of the plastic concrete in its fresh condition as well as the strength and permeability characteristics when hardened.

The optimum method of mixing, for example, mixing all dry the ingredients together or mix only cement and aggregates dry and then add hydrated bentonite or variations will be established.

The consistency of the plastic concrete over the entire period of the panel concreting and suitability for use in the proposed placing procedures must be established. Care must be exercised to ensure the correct proportions of the various materials are used to obtain the required rheology while ensuring the curing rate is such that early age cracking is minimised.

The Contractor shall undertake mix design tests to determine the optimum proportions of water, SRC cement, and bentonite. Fresh mix characteristics (decantation, hardening time, viscosity), and concrete characteristics (R_c , modulus, plasticity, permeability...) will be checked and shall exceed the minimum requirements. Special attention must be given to the local extremely hot and dry conditions during mixing transportation and placing of the plastic concrete.

A minimum of 8 mix design tests shall be undertaken to demonstrate the sensitivity of the mix properties to changes in constituent proportions. The final mix proportions to be adopted will be selected by the Engineer. The design tests shall be undertaken at Contractor's expense.

The plastic concrete plant shall include all equipment for mixing plastic concrete, transporting to the desired location and placing the plastic concrete. The plant shall have a capacity adequate for the required rate for the maximum panel size with a substantial safety margin to allow for potential breakdowns or other delays.

The proposed initial trial mix is provided as a suitable starting point and has been used successfully at other locations. Variations to the proportions will demonstrate changes in workability and final properties.

The grain size distribution of the aggregate should vary from 0 mm to 12 mm with an even grading. All the materials used in the production of plastic concrete shall comply with the specifications.

The initial trial mix uses a slurry of water some of the bentonite and cement to prevent clods forming in the mixer. Dry mixing of the constituent materials will be allowed if it can be demonstrated that uniform dispersion of the bentonite and cement is achieved.

The slurry shall be produced by mixing the constituent materials in a high velocity mixer in the following ratio:

900 L of water
40 Kg of bentonite
200 Kg of cement
1140 Kg and about 1000l



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The resulting suspension shall have a marsh funnel viscosity, t_m of 30 seconds to 40 seconds and a density of approximately 1150 kg/m³. The bentonite has to be compatible with the cement.

The slurry shall then be mixed in a conventional concrete mixer in the following ratio:

| | | |
|------|----|--------------------------|
| 333 | L | of slurry (380 kg) |
| 1680 | Kg | of aggregate (0 – 12 mm) |
| 20 | Kg | of bentonite |
| 50 | Kg | of Cement |

Should the specified characteristics not met with the material properties given, the cement content shall be varied in the slurry mix. The trial mixes must demonstrate suitability of the produced plastic concrete direct placement above formation.

If the bentonite can be mixed in dry form without forming clods the dry mix proportions to be used are as follows for a 1m³ mix. However, the suitability of dry mixing must be demonstrated before production on site.

| | |
|-----------|-----------------|
| Water | 300l |
| Cement | 115 to 150 kg |
| Bentonite | 33 to 40 kg |
| Aggregate | 1610 to 1700 kg |

14. Two levels for the depth of the grout curtain at Jurf are indicated namely 30 m and 40m, please clarify

Reply: *The grout curtain at Jurf is nominally 30m deep form foundation but will be deepened locally depending on site conditions. Consequently Bidders must allow for grouting to greater depth than 30m.*

15. There is confusion in the nomenclature used for riprap and riprap transition or riprap bedding layer. Please clarify

Reply: *The words will govern with riprap referring to the outer most rock layer of the dam to be provided for as specified. Riprap bedding or transition or Zone 2B material refers to the material between the riprap layer and the earth embankment. Based on the grading of the material tested during the site investigations this bedding/transition layer is required. The thickness of this transition/bedding layer is taken nominally as 300mm but will be optimised during site trials.*

16. The land required for the Contract camp is subject to rents. Please advise on the rental costs

Reply: *Please refer to <http://www.duqm.gov.om/invest/land-lease-rates> to get required information.*

17. Please advise whether rental of borrow areas is required and the rental fee, if required.





Reply Please refer to <http://www.duqm.gov.om/invest/land-lease-rates> to get required information.

18. What is the maximum depth of quarries and borrow pits.

Reply: The depth of the borrow areas and quarries is governed by the depth of suitable material as well as the requirements to allow natural drainage as specified. In addition the laws and safety requirements will determine the excavation means and methods.

19. May TSE or brackish water be used as construction water?

Reply: Brackish water may be used but must be monitored, especially at Saay dam. We cannot give a blanket statement on the use of Treated sewage since this depends entirely on the water quality after treatment, consequently we can only state that it depends on the treatment process and quality of the water.

20. Please advise where groundwater from dewatering operations must be disposed of:

Reply: The groundwater must be discharged downstream of the site at a location where it does not pose re-circulation problems.

21. Will site batching of concrete be permitted?

Reply: The specifications allow for site batching or obtaining concrete from commercial sources.

22. Please provide treatment procedures and specifications for Sabkha construction and removal.

Reply: Sabkha cannot be used for construction purposes in the Permanent Works.

23. Please provide information and locations near the site for water, power telecommunications and sanitation facilities for construction.

Reply: Bidders to make their own assessment and arrangement for these services

24. Please provide cycle time for the approval of detail shop drawings

Reply: The specifications allow 14 days for approval of drawings and details by the Engineer

25. Please advise on the maximum mobilisation period

Reply: 75 Days. Please refer to Bid Documents

26. Please advise whether the Apostille for Constitution of Companies and other legal documents are sufficient.



Reply: The bidders are required to follow Tender Board Oman regulations in this regard.

27. Please provide a drawing indicating the site boundaries

Reply: We enclose drawings indicating the tentative site boundaries.

28. The Prime Document requires Bidders to provide a breakdown of Rates but no template is provided. Please clarify if the breakdown of Lump Sum Rates is required and if so please provide a template.

Reply: Bidders to provide their own cost breakdown structure

29. Please advise whether all equipment must be explosion proof since Hydrogen sulphide gas was encountered at some boreholes

Reply: Bidders are responsible for the safety of the site and consequently must assess for themselves what safety precautions are required for all activities including dealing with hydrogen sulphide during construction

30. Please confirm the 4months period for the removal of the temporary embankment at Jurf is the maximum period and that this may be reduced if the pore pressure measurements indicate the groundwater movement has stabilised.

Reply: Yes the four months is a maximum period and the Engineer will be the sole arbiter of whether the groundwater stabilisation is sufficient to allow removal.