**GUIDANCE NOTE**

**For Standard Bidding Document (SPD) for Works and Operation Services**

**Design, Build and Operation (DBO) of**

**Water and Wastewater Treatment Plants**



**July 2023**

Preface

This Guidance Note has been prepared as a companion to the World Bank Standard Procurement Document (SPD) entitled *Request for Proposals, Works and Operation Service, Design, Build and Operation of Water Treatment Plant (WTP) and Wastewater Treatment Plant (WWTP) and SPD entitled Initial Selection Document, Works and Operation Services, Design, Build and Operation of Water Treatment Plant (WTP) and Wastewater Treatment Plant (WWTP)* – hereinafter “the DBO SPDs” applicable to the procurement of Works and Operation Service on IBRD or IDA-financed projects whose Legal Agreement makes reference to the World Bank’s Procurement Regulations for IPF Borrowers (“Procurement Regulations”), July, 2016 as amended from time to time

The DBO SPDs are designed to be used on water treatment plant and wastewater treatment plant projects. They could also be used, with some adaptation, on projects including distribution networks and/ or sewerage networks.

The DBO SPDs use a two-stage proposal process with initial selection which is similar to that used on the Bank’s SPD for Works, Design and Build. The two stage approach gives the opportunity for the technical solutions provided by bidders to be examined, discussed and modified as needed before a priced proposal is submitted. This is considered to provide value for money and lead to an acceptable solution. The tradeoff is it may take a longer time and requires capacity to manage the process at the end of the first stage. To be used depending on the recommendations of the Project Procurement Strategy for Development (PPSD), a single-stage version of the DBO procurement documents has also been developed for cases where the circumstances may be more suited for single stage approach.

The DBO SPD Request for Proposals is based on the FIDIC Gold Book (Conditions of Contract for Design Build and Operate Contracts). A number of important provisions have been introduced consistent with Bank’s requirements and to make it relevant to the water and wastewater sector. Among the many notable differences, the Bank SPD is designed for use in both greenfield (new asset) and brownfield (rehabilitation and operation of existing asset) scenarios, whereas the Gold Book is designed only for use in greenfield situations.

This Guidance Note is primarily intended to assist World Bank Borrowers who are planning to develop water or wastewater treatment infrastructure and World Bank staff working on these projects. Its purpose is to help users decide whether a DBO would be the right contract model for them and to provide guidance on how to use, adapt, and further develop the DBO SPDs to fit the particularities of each project.

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Introduction

1.1 Background

The DBO SPD has been developed to assist Borrowers and Bank staff working on these projects to ensure a more streamlined process. The document is the same for water and wastewater treatment plants other than the outline for the Employer Requirements where a separate outline has been prepared for each and can be found at Annexes B and C of these Guidelines respectively.

1.2 The FIDIC Gold Book

The SPD is based on FIDIC Gold Book General Conditions 1st Edition. The Particular Conditions have been adapted, as appropriate.

Employers will need to make reference to the FIDIC Gold Book and must purchase a copy of the document from FIDIC in order to apply it.

1.3 What this set of SPD is covering and is not covering

The SPD can be used for water and wastewater treatment plants and ancillary facilities. With some adaptation it could be used for distribution and sewerage networks.

It is recommended that the subject DBO contracts have a minimum Operation Service Period of 10 years.

1.4 Procurement process

Depending on the Project Procurement Strategy for Development (PPSD) recommendations, either a single stage or two stage RFP processes may be adopted.

Design Build Operate Contracts – What they are and when they are
used - and how they are different from other procurement approaches

2.1 Core features of a DBO Contract

In a Design-Build-Operate (DBO) Project a private contractor is engaged to design, build and operate the facility on a single responsibility basis. The public sector finances the new facility and owns the resulting assets. By procuring the design, build and operation as a single contract, the Employer can reduce interface risks and improve the incentives for innovation, cost efficiency, and performance delivery.

The DBO model is an output-based contract. In other words, the contract makes the Contractor accountable for meeting the contract outputs, for instance in relation to required potable water quality or treated effluent quality. It is the Contractor’s responsibility to select the most efficient treatment process and to ensure that the resulting plant is fit for purpose. Within certain limits (discussed later) the Contractor should be given the maximum amount of freedom to design, build and operate the plant in the most efficient way possible.

DBO contracts are typically medium to long term contracts with operation service periods of 15 -20 years. Shorter term contracts can be considered but these may result in a distortion or weakening of contract incentives which will need to be addressed in the design of the contract. This issue is discussed in more detail in Section 4 of this Guidance Note.

During the Operation Service Period the Contractor is responsible for operating and maintaining the works and meeting the contractual performance standards. The Contractor must replace assets if they fail or when they reach the end of their useful service lives. A key feature of the DBO-SBD is the Asset Replacement Fund which provides funding for the replacement of assets with > 5 year asset life in accordance with the Asset Replacement Schedule submitted as part of the Contractor’s proposal.

2.2 Why choose a DBO contract model?

A DBO may be appropriate where public finance is available to pay for investment in the facility.

There are three basic procurement alternatives that can be considered when planning any new publicly-funded treatment facility, namely; Separate contracts for design and build (Design-Bid-Build or D/B/B) a Design-Build contract (DB), and Design-Build-Operate contract (DBO). The advantages and disadvantages of each of these options is discussed below and summarised in Table 2.1.

* **Bid Build (D/B/B)**: This is the traditional procurement method in which the Employer engages an engineering consultancy firm to undertake design and site supervision, and a construction company to build the works. The public sector is subsequently responsible for operating and maintaining the plant. The D/B/B approach provides the Employer with a large degree of control over the design process but provides few incentives for innovation and cost efficiency. It requires the Employer to develop detailed designs and specifications prior to bidding and is particularly prone to interface problems between the engineer and contractor which can be expensive for the Employer to resolve and can cause delays. Often too, cash-strapped public sector Employers have been unable to effectively maintain the facilities as the assets have aged. Care needs to be taken to give clear instructions to the design engineer to take operating efficiencies as well as the cost of construction into account when optimizing the design.
* **Design-Build (DB):** In a DB contract a contractor undertakes both the design and construction of the works. By having a single entity design and build the works on a single responsibility basis the Employer overcomes some of the designer/contractor interface issues associated with the traditional separate contracts approach. Other key potential advantages of the design-build approach may be a) quicker implementation, b) stronger incentives to innovate, and c) lower front-end capital costs. The downside is that the same incentives that drive lower initial capital costs may result in the use of poorer quality materials and equipment. The contractor is not involved in the operation of the Works, so there are few incentives to encourage the contractor to deliver a plant which is reliable, durable and efficient to operate and maintain in the long term. Thus the Employer must take care to ensure that process selection and detailed design take account of operating efficiencies as well as construction costs. As with D/B/B contracts, the contractor is not required to bring operations expertise and there is no provision for undertaking essential asset replacement as the works begin to age. DB contracts are also sometimes referred to as Engineering Procurement Construction (EPC) or Turnkey contracts.
* **Design-Build-Operate (DBO)**: Relative to the design-build approach, having a single organization responsible for the design, build and operation of the works brings a number of potential cost and performance advantages. Cost efficiencies are gained because the contract is awarded on the basis of the lowest combined capital and operating costs. The contractor has an interest in making sure that the plant is durable, reliable and efficient to operate. So the model rewards innovation in design, construction and operations. The DBO model will usually ensure improved works performance relative to public operation in part because the consequences of a breach of contract standards is more severe, for instance involving the imposition of penalties. As noted in section 4.1.2, however, if the duration of operations is less than 10 years then incentives to ensure efficiency in operation reduce and so additional incentives in respect of energy and chemical efficiency will need to be included in the contract.

The DBO can also provide for skills transfer to the Employer’s staff if this is specified in the contract, through training and even on the job training of Employer staff in the latter years of the operation period can be included.

Unlike the D/B/B and DB models, the DBO contract model includes provisions to ensure replacement of assets that have failed or have reached the end of their useful service lives.

2.3 Privately funded alternatives to the DBO model

Where an Employer is seeking to raise private finance then a Build, Operate and Transfer (BOT) approach would be more appropriate. Neither the DBO SPD nor the Gold Book has been designed for a BOT structure and Borrowers should consult a transaction advisor or contact the PPP Group of the World Bank if it is seeking to attract private investment into its project. Where private finance is to be combined with IPF under IBRD or IDA finance, then the Procurement Framework will apply and bidding documents will need to be developed that are tailored for the project. Please consult the task team leader for more information. For more information on the various forms of private financed contracts, visit the World Bank’s PPP in Infrastructure Resource Center at [www.worldbank.org/pppirc](http://www.worldbank.org/pppirc).

**Table 2.1: Comparing three different forms of procurement**

|  | **Design/Bid/Build** (public sector operates) | **Design-Build**(public sector operates) | **Design-Build-Operate** (private sector operates) |
| --- | --- | --- | --- |
| **Preparation requirements** | **Onerous:** Employer’s prepares feasibility and detailed designs prior to bid. | **Medium:** Employer undertakes feasibility and prepares output specification. | **Medium:** Employer undertakes feasibility and prepares output specification. |
| **Evaluation of bids** | **Simple:** all bids submitted on the same technology basis.  | **Complex:** bidders may submit bids based on different technologies. | **Complex:** bidders may submit bids with different technologies and opex/capex trade offs |
| **Interface risks for Employer** | **High:** opportunities for interface problems and blame culture between designer, contractor and employer  | **Medium:** Single responsibility for the design-build phase. Potential for blame between contractor and public operator.  | **Lowest:** A single entity is responsible for all stages. The contractor must manage all interface issues. |
| **Employer’s ability to control design solution** | **Strong:** Employer controls design. | **Medium:** Less Employer control (but Employer may specify allowable technology options). | **Medium:** Less Employer control (but Employer may specify allowable technology options). |
| **Incentives for long term cost efficiency** | **Weak:** Limited incentives to select most efficient design solution, or make it easily buildable or easy to maintain.  | **Medium**: Incentives will deliver a plant with a low initial Capex cost. But the resulting plant may be expensive to operate and maintain. | **Strong:** Contract is awarded on the basis of lowest combined capex and opex costs over the life of the contract.  |
| **Incentives for innovation** | **Weak**: Arrangements do not reward engineering innovation. Designers tend to favor conservative solutions which may not be the most cost effective for the Employer. | **Medium**: Good for design innovations that reduce the initial cost and buildability. Poor for innovations to improve long term operability.  | **Best:** Incentives encourage and reward innovations in all areas (process design, buildability and operations).  |
| **Incentives to build durable and reliable assets** | **Medium:** This form of approach can result in durable structures and the use of good quality materials and equipment. However, designs may ignore ease of maintenance issues and employers are often unable to plan or fund asset replacement effectively.  | **Poor:** The contractor has limited interest in the long term performance of the plant. The contractor may increase its profits by using poorer quality materials/ equipment. Also suffers from same ease of maintenance and asset replacement issues as the D/B/B model.  | **Good:** The contractor has an interest in making sure the plant is reliable and durable for the period of the operation service. An asset replacement fund ensures that assets are replaced when they reach the end of their service lives. |
| **O&M expertise** | **Weak:** Training provided only. | **Weak**: Training provided only. | **Strong:** Contractor brings technical and managerial O&M expertise. |
| **Accountability for breach of standards** | **Weak:** limitedconsequences in event of a breach of output standards after retention period. Engineer and contractor may blame each other. | **Generally weak:** limited consequences in event of breach of output standards outside the retention period. | **Strong:** penalties/ contract enforcement measures apply for breach of output standards. |
| **Skills Transfer**  | **Weak:** Limited opportunity for skills transfer. Treatment plants often end up being operated below capacity or not functional because Employer is unfamiliar with technology. | **Weak:** Limited skills transfer after hand-over. Treatment plants often end up being operated below capacity or not functional because Employer is unfamiliar with technology. | **Strong:** Long term capacity building of local operations staff. Employer’s staff training can be provided during contract and upon handover at the end of the contract.  |

2.4 Key issues that a Borrower should consider

There are number of key issues that Borrowers should consider before making a decision to choose a DBO model:

1. A DBO requires a long term commitment on the part of the Employer to pay the fees for the operation service. It needs to be clear that this is affordable. Typically, the IBRD or IDA loan will cover fees for design and build services + some years of fees for operation services. If the operation period continues beyond the end of the IPF disbursement period, which is likely as an operation period of 10 years or more for DBOs is recommended, the Employer will need to identify alternative arrangements for funding operation fees for the later years. Such funding may come from revenues but if there is a risk that revenues are not sufficient to cover these funding obligations then the bidders/Contractor may require government support for Employer payment obligations, whether through setting funds aside in a special account or a guarantee mechanism. International Finance Institutions such as World Bank and its sister the Multilateral Investment Guarantee Agency (MIGA) can also provide risk mitigation instruments and guarantees. For more information on these go to World Bank Guarantees webpage at [www.worldbank.org/en/programs/guarantees-program](http://www.worldbank.org/en/programs/guarantees-program) and MIGA at [www.miga.org](http://www.miga.org).
2. Where an Employer uses a consultant to look at the feasibility of the project, such feasibility should look at the financial, economic, legal and environmental feasibility of the project as well as the technical feasibility. Where appropriate, the consultant should identify technologies that may or may not be appropriate. A sample terms of reference is attached as Appendix 1 as a guide on activities that should be undertaken in project preparation.
3. The Employer develops inputs and output specifications in the Employer Requirements rather than a detailed design. It is rarely appropriate to adapt very long and detailed specifications that have been previously prepared for traditional works contracts as these can limit the contractor’s ability to innovate and find efficiencies. Relevant issues could include a desire for energy efficiency or even energy generation, reuse of treated wastewater, land constraints.
4. The focus will be on whole life costing of the facility, not just what is the cheapest facility to build but which represents the best value for money over the duration of the contract. This may take energy and other efficiency issues into account. In wastewater treatment in particular, different technical solutions result in very different outcomes in terms of operating costs. It will also need to consider whether the facility should be phased, in cases where full capacity may not be needed initially but may be required going forward.
5. The Employer should seek to understand who the likely bidders will be for such a project, taking into account the size of the project, the country and utility risk and other issues. It may be worth carrying out an initial market sounding to understand this at an early juncture as this can influence the criteria for initial selection (in terms of technical and financial standing).
6. The Employer will be responsible for the accuracy of the information it provides to the contractor in the Employer’s Requirements and elsewhere. The Contractor could make a claim if the information provided by the Employer is inaccurate provided that it has undertaken its due diligence in a timely manner.
7. Consideration needs to be given as to how to ensure that the Contractor remains committed to the project and is incentivised to design and build the facility and equipment so that it is durable and reliable (for instance through qualification of bidders, performance securities, joint venture provisions, or parent company guarantees).
8. The Contractor will be entitled to be paid its operating fee once the facility is tested and commissioned. The Employer therefore needs to ensure that the influent is available and able to be delivered to the treatment facility. If the Employer is constructing sewers or water transmission lines under a separate contract from the DBO, then it will need to coordinate projects to ensure that the pipes and connection points are ready.
9. During the Operation Service Period, the Contractor will be wholly accountable for meeting the performance standards for the plant. The Contractor should be given freedom to recruit personnel, to set staff terms and conditions, and undertake training and development as they see fit (subject to any minimum requirements specified in the Employer’s Requirements). It is not normally appropriate to require the Contractor to take on members of the Employer’s operations staff but it may be appropriate to require during the latter years of the operations period that the Employer’s staff be given on the job training and be seconded to the Contractor for that purpose.
10. The DBO-SPD includes provisions for routine replacement of assets when assets reach the end of their working lifespan. For example, in a reverse osmosis water treatment plant, membranes will require replacement after (approximately) 5 to 7 years. The Employer will need to make provision in its budgets to pay for necessary asset replacement in accordance with the Contractor’s asset replacement schedule. This asset replacement fund is to be funded by the Employer and payments from it will be as per the costed asset replacement schedule which part of the Contractor’s bid. The Employer is required to set out in the Financial Memorandum how this will operate. For more on the Asset Replacement Fund, see 4.7 below.
11. At the end of the contract, the facility will be handed back to the Employer. The Employer will need to consider its requirements for hand-over including, in particular, the Contractor’s obligations for training and knowledge transfer to its follow-on operations staff, whether a supply of spare parts and consumables for a certain period will need to be left behind, and the mechanism for jointly inspecting the facilities (well in advance of the end date of the contract), identifying items to be fixed and a timeframe for fixing.
12. For wastewater, the Employer will need to consider whether the Contractor is to be responsible for disposal for sludge and other solids and whether this is to be disposed in a facility to be made available by the Employer. It may include a provision allowing the Contractor to sell by-products from the sludge, subject to having the correct permits.

Preparation activities

3.1 The Employer’s team

The Employer will need to perform front-end preparatory tasks to enable it to:

1. develop a realistic understanding of the contract’s scope and budget;
2. establish the contract on a sound legal foundation;
3. analyze the affordability and value for money of the project: and
4. provide bidders with information that they can reasonably rely upon to develop their design proposals, establish prices and understand the contract risk allocation.

To achieve these objectives, the Employer will need to build a team with the necessary skills. These may include engineers, environmental specialists, process specialists, procurement advisors (preferably familiar with DBO contracts), financial specialists and legal advisors. In most cases these skills will not be available in-house and will need to be procured through consultancy arrangements.

A sample Terms of Reference for a consultant to assist the Employer in scoping and preparing the DBO (technical and commercial) is attached as Annex A. Such consultant would coordinate with any environmental and safeguards consultant engaged for the project.

3.2 Site acquisition, planning permissions, land issues

The Employer should identify the site for the treatment plant as early as possible. Depending on local laws, there may be long lead times associated with consultation, acquisition and consent particularly if the site is located in a congested urban area. Ideally the land purchases should be made and planning/building permissions should have been obtained before the start of the bidding process.

If space is at a premium (for instance if the works is to be located in a high density urban environment), it may be appropriate to introduce incentives to encourage the most efficient use of the space available. One way of doing this, would be to use a form of land pricing in the bid evaluation whereby bidders are asked to indicate how much land they require and then this would be priced based on a predefined price per unit of land and added into the bid price for evaluation purposes. A high unit price of land would encourage bidders to propose process technologies with a smaller footprint and to use the available space as efficiently as possible.

3.3 Hydrological, Sub-Surface, and Climatic Site Data

The more information that the Employer can give to bidders, the better the quality of the bids is likely to be. It is recommended that the Employer should provide the following data and studies:

1. ***Hydrological study***: For water treatment plant the Employer should undertake hydrological or hydrogeological studies which should provide test results and analysis on flows and quality in sufficient detail to support decision making on safe yield and process design. If the water source is likely to be affected by seasonal issues, these need to be quantified and supported with as much historical data as possible. For wastewater treatment plants, the bidders will need to know details of the characteristics of the wastewater influent and the dry weather average and peak flows.
2. ***Sub-surface investigations***: Sub-surface investigations should be undertaken as necessary to enable the bidders to plan and design the Works. They may comprise of geological studies, soil analyses, and the examination of underground services.

The data from the hydrological studies will also be the basis of the Influent Baseline Characteristics schedule included in the Employer’s Requirements. This baseline may later be used during the Operation Service Period for determining whether there has been a long term deterioration in the quality of water/wastewater influent which would merit a change in price.

Under GC 4.10 the Employer is required to provide copies of all the above studies and site data to the bidders.

3.4 Environmental and Social Management Requirements

The environmental and social aspects are carried out in accordance with applicable requirements.

3.5 Sizing the treatment plant

One of the early tasks of the engineering consultant will be to prepare demand forecasts which will provide the basis for decision making on plant capacity. The forecasts provided by the consultant should consider low, mid and high growth scenarios.

It is always the Employer’s responsibility to specify the size of the treatment plant (this cannot be left for the bidders to propose). In a mature urban environment in which growth is reasonably predictable, it would be common to use a 25 year design horizon. In developing countries, the rates of growth are often much higher and there may be substantial uncertainties relating to the future population, the take-up of new connections, and the type of urban development. In such circumstances it might be inefficient to use a long term (e.g. 25 year) design horizon as this may result in a plant with significant unused capacity for much of its service life. Shorter design horizons should be considered.

Ideally, the treatment plant would be sized to meet at least the predicted demand at the end of the DBO contract. This may not always be possible so strategies may be needed which allow for the plant to be expanded during the DBO period, for instance:

1. If the technology allows a modular approach (e.g. a reverse osmosis plant), the inlets, outfalls, pipelines and main structures can be specified to meet a long term demand horizon. The treatment process plant would be specified to meet a shorter term demand horizon and new treatment modules would be added (at the Employer’s expense) as necessary to meet demand. The changes could be undertaken using the standard variation procedures within the DBO contract.
2. An alternative approach would be to design the DBO bidding documents to accommodate phased development. The contract could, for instance, be awarded to the bidder offering the lowest combined cost of the initial works and subsequent expansion works. This type of approach would be appropriate if the expansion works are likely to be needed quite quickly – say, within the first five years of the contract period (since, even with price indexation, it would be unreasonable to expect the bidders to make a price commitment with no time limit).
3. If the expansion works are likely to be more than five years away and the plant is not amenable to a modular approach, then the Employer could procure the necessary expansion works under a separate contract. This may be done through negotiation with the existing contractor or on the basis of a competitive tender. If the latter, the DBO contract would ideally need to address i) whether the incumbent contractor would, or would not, be permitted to bid for the expansion works and ii) whether the Contractor would or would not be obliged to operate and maintain the expanded sections of the works.

From the above, it is clear that having a DBO contract need not limit the employer’s flexibility to expand the works to meet changes in demand. It should also be borne in mind that if the demand growth turns out to be significantly greater than initially expected, the Employer has the right to terminate the DBO early for convenience. It can then arrange follow-on contract arrangements as it sees fit.

3.6 Outline Design and Employer’s Requirements

The role of the Employer’s engineering consultant should be:

1. Confirm the technical feasibility of the project
2. Prepare demand forecasts and specify plant capacity
3. Determine key output standards for the treatment plant
4. Identify key technical constraints (e.g. relating to space, noise, sludge disposal etc.)
5. Identify acceptable/non acceptable technology options
6. Complete the Employer’s Requirements

The Employer does not need to prepare detailed drawings and specifications. It would, however, be useful to include site plans and conceptual drawings and/or outline design to help explain the general concept of the Employer’s needs.

The selection and award process

4.1 Initial selection (similar to pre-qualification)

4.1.1 Why initial selection?

The DBO SBD uses initial selection (i.e. prequalification) followed by a two stage bidding process. Initial selection is recommended because the technical and financial capacity of contractors in long term DBO projects may be critical to the success and sustainability of the project. It allows the Employer to weed out unqualified bidders at an early stage and provides it with an understanding of the level of interest in the project and of the type of organisation that may be interested in bidding. This understanding can be used to refine the bid documents, for instance when deciding on a suitable technical and financial scoring approach for bid evaluation.

Bidder’s also gain from initial selection because it allows them to make a more informed judgement as to whether they will participate in the bidding process.

An Initiation Selection Document (ISD) document for the DBO SPD can be found in the Bank’s website.

The Employer specifies the following key information in the Initial Selection document: i) minimum qualification criteria (financial & experience), ii) minimum (x) and maximum (y) thresholds for the number of applicants to be qualified iii) a series of rated criteria which will be evaluated and scored. The procedure for evaluating the applications is then as follows:

1. A long list of applicants meeting the minimum qualification requirements is prepared. Applicants that do not meet the minimum qualification requirements are rejected.
2. If the number of applicants on the long list is equal to or less than the minimum threshold for the number of applicants (x) all long listed applicants will be qualified.
3. If the number of applicants on the longlist is more than “x” then the Applicants are ranked on the basis of an evaluation of the rated criteria. Applicants are then “Initially Selected” in sequence from the ranked list. The Employer has discretion to determine the number of applicants to be Initially Selected provided that the number of Initially Selected Applicants is not less than “x” and no more than “y”.

In addition to greater flexibility, this approach makes it easier for the Employer to set qualification criteria that are aligned to what the market can offer.

4.1.2 Who can bid?

An applicant may be a private entity, state-owned entity or any combination of them. State-owned entities must satisfy the conditions for eligibility set out in the Instructions to Applicants.

Where the applicant may be JV all joint venture (JV) members are jointly and severally liable. The SPDs includes a lock-in period for JV members before they can assign their interests. This should be at least 2 years post-commissioning of the plant. It will normally be appropriate for the Employer to lock JV member providing the operations expertise into the project for whole period. Lock in of a JV member is different from assignment of rights and obligations of the contract, which is dealt with under General Condition 1.8.

As the DBO is likely to be for a long period then a consortium of bidders may prefer to establish a special purpose vehicle and Employers may consider offering this option. The ISD and the SPD provide wording under which the Employer to allow for this. It is important in this circumstance to ensure that the special purpose company is established in the country where the project is to take place, that it is sufficiently capitalised (that the issued and paid for capital is significant enough to make it financially stable) and that there are provisions for sell down of the shares by the various consortium members, with lock-in periods where appropriate.

4.1.3 Factors to consider when setting qualification thresholds

There is often considerable debate during the preparation period on how to set suitable qualification criteria for applicants.

The qualification criteria often need to reconcile competing objectives. On the one hand, Employers (and funding agencies) want to encourage maximum competition and lower barriers to entry into the market. On the other hand, most Employers do not want to take unnecessary risks by engaging an inexperienced contractor which may not be able to deliver and operate a plant with the required performance. It is often difficult to find the right balance between these two objectives. Each project will need to develop criteria to suit the size and scope of the project and the nature of the private sector market. There is no single right answer.

Before specifying the qualification requirements, it is worthwhile considering the nature of the private sector market and what experience is realistically available. For example:

1. How much capacity and experience is there in the local private sector?
2. If the local private sector does not have the necessary expertise, is there likely to be international interest?
3. What types of local and international company are likely to be interested in bidding for the contract?
4. What core experience/expertise must be provided by the bidder/ joint venture and what expertise can be provided by subcontractors?

If an assessment of the market leads to a view that the interest from international companies is likely to be limited, then the qualification criteria will need to be adjusted accordingly.

4.2 One-stage or two-stage bidding process?

As noted in the Preface, the DBO SPDs use either a single or two stage bidding process in accordance with the Procurement Framework.

When applying the two stage, the Employer requests selected firms (i.e. the firms that have qualified through initial selection) to submit unpriced technical proposals. The Employer reviews these proposals to determine which aspects are consistent with its requirements and which aspects do not conform or are missing. The Employer may hold meetings with proposers to discuss each proposal and identify appropriate changes to the technical and commercial terms.

The proposers that have offered a sufficiently responsive first stage proposal are requested to submit a second-stage proposal. The second stage proposal comprises a technical and financial proposal.

The potential advantages of the two stage process are:

* It allows the Employer to make use of the expertise of proposers to help it develop and improve its technical requirements;
* It allows bidders to gain a better understanding of the Employer’s priorities and technical requirements;
* Implementation risks are reduced because of the improved dialogue between bidders and Employer;
* It reduces the need for the evaluation team to make difficult technical choices, such as the situation when the evaluation team needs to compare one proposal offering a proven technology solution with weaknesses in other areas, and another proposal which is a less proven process solution that has an otherwise stronger proposal.

The disadvantages of the two stage process include:

* The two stage process requires additional time for discussions with proposers, and for two stages of evaluation, review and approval;
* There may be a lack of familiarity with the approach amongst Employers and government procurement committees which could lead to difficulties in following the required process;
* For relatively simple projects the added value to be gained from the two stage process may be quite limited.

4.3 Evaluation of Bids

4.3.1 Technical evaluation

The purpose of technical evaluation is to determine whether the technical solution proposed by a bidder is feasible, deliverable and robust, that it is based on reliable technologies, and that it meets requirements of the bidding documents.

In the two-stage bidding process, there are two stages of technical evaluation. The evaluation of the first stage proposals comprises an evaluation of responsiveness, a technical evaluation, and an evaluation of compliance with the initial qualification criteria. The Employer may conduct meetings with individual bidders in order to review the suitability of the proposed solutions and discuss any issues raised in the first stage evaluation. The outcome from the first stage evaluation will be a series of proposer-specific memoranda (entitled “Changes Required Pursuant to First Stage Evaluation”) listing the required changes and elaborations that each proposer is required to make in their second stage proposals.

The second stage technical evaluation framework includes a scored evaluation. The evaluation team must allocate scores based on the criteria which the Employer specifies in SPD Section II (the Proposal Data Sheet) and SPD Section III (Evaluation and Qualification Criteria).

The technical evaluation process depends on having individuals with sufficient knowledge and expertise to critically review potentially complex technical proposals and apply fair minded judgements. If the Employer does not have such expertise available in its staff, it will need to engage outside consultants to assist during the Stage 1 clarification meetings and help it prepare the various changes memoranda and evaluation reports.

The arrangements for technical scoring should seek to minimize the effects of subjectivity in individual evaluators. This may be achieved by having multiple evaluators (scores can be averaged, and outlier scores can be challenged) and by ensuring that there is a healthy process of debate and challenge within the evaluation team. Outside probity auditors can be engaged to provide additional objectivity and transparency.

4.3.2 Financial evaluation

The evaluated bid price is the sum of the evaluated design-build price and the evaluated operation service price.

The procedures for evaluation of the financial proposal (correction for non-conformities, arithmetic correction, conversion to a single currency, and adjustment for margin of local preference) are specified in the Instructions for Proposers and Proposal Data Sheet.

Many Employers chose to discount the Operation Service fees over the operation service period. The aim of the Net Present Value (NPV) calculation is to adjust the operation service price to account for the time value of money. The assumption being that a dollar today is worth more than a dollar tomorrow. This is true even after the effects of inflation have been taken into account.

There is some debate as to whether Net Present Value approaches are appropriate in a DBO context. The following factors should be considered before adopting an NPV approach for the evaluation:

* The perfect financial evaluation would select the bidder offering a plant with the lowest life-cycle cost. But this is rarely possible with DBOs because DBO contract periods are usually considerably less than the intended life-span of the plant (a full life cycle analysis would need to consider operating costs over a 30 to 40 year time period). Therefore, the operations cost component of the DBO price bid will automatically carry less weight in the evaluation than would be needed to identify the bid offering the lowest life cycle cost. The result will be to encourage bidders to propose solutions with low initial capex costs but higher long term Opex costs than would be ideal. A decision not to use NPVs in the evaluation would help to counter this intrinsic bias against low Opex solutions.
* The use of an NPV approach would imply that the Employer expects the Contractor’s operating fees to become progressively more affordable in future years. This may not necessarily be the case in environments where future water or wastewater tariffs may be subject to uncertain political dynamics.

If NPVs are to be used, the main decisions for the Employer are the choice of discount factor, and the base date for the present value calculation.

1. **Discount factor:** The choice of discount factor is often an afterthought. However, a few percentage points difference in the factor can make a big impact on the evaluated bid price and may affect the process and equipment choices of bidders. In most DBOs the Operation Service fees are indexed. So a “real discount rate” should be used (i.e. a discount rate which has had the effects of inflation stripped out). Real discount rates should be selected in line with local market conditions. Values of 3% to 5% are typical.
2. **Base Date:** The most common approach is to discount the Operation Service cash flows to the year preceding the start of the Operation Service Period. A strict application of NPV philosophy would involve discounting both design-build and operation service cash flows back to the contract commencement date. However, such approaches create significant extra complexity in the evaluation process and offer little, or no, added value.

The Employer should provide the above information in the Proposal Data Sheet. It is good practice to also include a NPV calculation table, as per the example shown below, so that there can be no room for doubt on how the NPV provisions would be applied.

**Table 4.1 – Example of NPV Calculation Table**

|  |  |  |
| --- | --- | --- |
| **Item** |  | **Years of Operation Service Period** |
| **Units** | **1** | **2** | **3** | **4** | **5** | **etc** |
| 1 | Bidder’s annual amount\* (operation service + asset replacement) | Currency |  |  |  |  |  |  |
| 2 | NPV Factor with discount rate of [3%] | nr | 0.97 | 0.94 | 0.92 | 0.89 | 0.86 | etc. |
| 3 | Present value(row 1 x row 2) | Currency |  |  |  |  |  |  |
| 4 | Net Present Value | Currency | *[sum all PV value in row 3 for Operation Service Period]* |

\* from price schedule, as corrected in accordance with the ITP.

4.3.3 Determination of the most advantageous proposal

The contract is awarded to the bidder offering the “Most Advantageous Proposal” which, is the Proposal of the Proposer that meets the Qualification Criteria, has been determined to be substantially responsive to the RFP, and is the highest scoring Proposal in the combined technical and financial evaluation.

Key contract issues

5.1 Contract duration – how long should a DBO be?

5.1.1 Design-Build Duration

The DBO contract is divided into a Design-Build Period and an Operation Service Period.

The Design-Build Period is the period during which the Works is designed, built and commissioned. The Design-Build Period starts on the Commencement Date as defined in Sub-Clause 8.1 of the Conditions of Contract. In the SBD, the standard Gold Book provisions are replaced by Particular Conditions PCC 8.1 which set out a series of conditions precedent that must be fulfilled prior to commencement.

When determining the time for completion of the Design-Build the Employer should ensure it allows a realistic amount of time for the Contractor to obtain all the necessary permits and licenses and to undertake any preparatory work specified in the Employer’s Requirements. Employers should also bear in mind that setting over-ambitious timelines could be counter-productive as it may affect the final quality of the design and build.

5.1.2 Operation Service Period duration

The Operation Service Period is the period during which the Contractor must operate and maintain the Works. The Operation Service Period starts on the date specified in PCC 10.2 (usually seven days after the issue of the Commissioning Certificate) and ends on date specified in the Contract Data (subject to fulfilment of the necessary pre-conditions set out in GC 10.8).

The selection of an appropriate Operation Service Period will play a major part in the success of the project. Longer term DBOs offer superior incentives for durability, resilience, innovation and cost efficiency relative to a short term DBO (see Table 4.1 below). For this reason, it is recommended that the Operation Service Period should be at least ten years and if possible 15 to 20 years.

Longer term DBOs are not always feasible, for instance when:

* there are time limitations on the funding for the Operation Service Period, with no alternative funding source having been identified, or
* the commercial, regulatory and political risks are such that potential bidders may be unwilling to make a long term commitment, or would expect unacceptably high margins to compensate for such risks;
* the Employer wishes to retain flexibility as to how the works will be operated or developed in the medium term.

If shorter Operation Service Periods are to be used, the Employer should ensure that the specifications, Performance Standards and Performance Damages are designed to compensate for the weakening of the intrinsic incentives of the DBO model. For example, a shorter DBO may need to include additional provisions to encourage efficient use of energy and chemicals, and to ensure the reliability and durability of the assets.

**Table 5.1: The effect of contract duration on incentives**

|  |  |  |  |
| --- | --- | --- | --- |
| **Incentive** | **Short Duration DBO****(e.g. 3-7 Years)** | **Medium Duration DBO****(e.g. 10 - 12 years)** | **Long duration DBO****(e.g. 15 -20 years)** |
| Building reliable and durable civil works | Weak | Medium | Strong |
| Specifying/using high quality plant and equipment | Weak | Medium | Strong |
| Innovation and efficiency of operation and maintenance | Weak | Medium | Strong |
| Lowest combined capital and operating cost over lifetime of the asset (whole life costing) | Weak(favours low capex, high opex solutions) | Medium | Strong |

5.2 Process technology selection

One of the areas in which a contractor can add value is in the selection of a suitable process technology. So, as a general principle, bidders should be given the maximum degree of freedom to propose different process solutions.

There may however be situations where the Employer will need to limit the choice of process solutions, for example if the Employer:

1. wishes to standardize its infrastructure using a particular technology;
2. does not have access to qualified and experienced process specialists who would be able to compare and evaluate bids which propose different process technologies;
3. has identified a shortlist of technologies that it considers to be suitable for use in the local environment and which it is prepared to accept;
4. wishes to avoid advanced proprietary technology processes because it does not want to be dependent on a single technology provider, or because it considers that its own staff might be unable to operate the plant when it is eventually handed back at the end of the Operation Service Period;
5. has land constraints and so needs to keep with compact technologies;
6. has specific requirements on energy generation or water re-use.

If the Employer intends to restrict the choice of technology solutions it should make this clear in the Employer’s Requirements.

5.3 Operation of pre-existing facilities

The DBO SPD includes provisions in PCC Sub Clause 4.27 which allow the Contractor to take over and operate existing facilities during the Design-Build Period. The Employer must describe the facilities to be taken over and the obligations for rehabilitation, extension, or eventual demolition in the Employer’s Requirements. If it is an operational facility, the Employer will need to specify the required standards of performance during the design-build phase, and whether it will provide free power or materials.

The Contractor is required to take over the existing facilities in the condition that it finds them. In many cases, operational facilities may be in poor condition or unfit for purpose. The DBO SPD recognises that prospective bidders may be reluctant to accept risks and liabilities associated with such assets. The contract therefore sets lower thresholds for Contractor accountability by providing that the Contractor uses its “best endeavours” to meet the required standards of performance and by limiting the Contractor’s liabilities.

An alternative approach (which would require PCC Sub Clause 4.27 to be amended) would be to pass the technical and performance risks associated with existing facilities to the Contractor. This would be a feasible approach in situations where the existing facilities are in good condition, are capable of meeting the required standards, and there is good knowledge of the asset (for instance, there are good records of condition and past performance, and the asset is accessible for inspection and survey by bidders).

5.4 Performance Standards and Performance Damages

The arrangements for defining and enforcing performance standards during the Operation Service Period have been significantly modified relative to the FIDIC Gold Book. The main changes relative to the Gold Book are:

1. The introduction of “Performance Standards” as a defined term,
2. the addition of a Schedule of Performance Standards as an Appendix to the Contract Agreement which summarises the key outputs from the treatment plant,
3. the addition of a Schedule of Performance Damages as an Appendix to the Contract Agreement,
4. Clarification in relation to the application of damages in the case of a failure to meet the performance standards.

Provisions relating to production continuity and reliability continue to be dealt with in PCC Sub-Clause 10.6. Other standards relating to quality, efficiency, environmental performance are addressed in PCC Sub-Clause 10.7 (renamed as “Failure to Meet Performance Standards”).

The Employer shall note that both the Schedule of Performance Standards and the Schedule of Performance Damages are Appendices to the Contract Agreement and therefore will take precedence over other contract documents.

5.4.1 Schedule of Performance Standards

The DBO contract is an output based contract. So the contract should focus on desired outcomes rather than providing a detailed specification of inputs as would be required in a traditional procurement approach. The Schedule of Performance Standards defines the key minimum output requirements for the plant and will govern how the plant is designed, commissioned, operated and monitored. It is therefore a critical document for the contract.

The standards should be realistic and achievable and should take account of the difficulty and cost of meeting them. For a water or wastewater treatment plant, the standards will need to cover minimum capacity, water/wastewater standards, water/wastewater testing, sludge treatment and disposal, and environmental matters such as noise and smell. In wastewater plants there may also need to be standards linked to biogas generation and beneficial re-use of sludge.

World Bank funded projects shall comply with the applicable Bank’s Environmental and Social requirements.

In longer term DBOs, there are intrinsic incentives for the Contractor to design, build and operate the treatment plant as efficiently as possible. In shorter and medium term contracts it will be necessary to include performance standards relating to plant efficiency. For example, standards may be specified in relation to energy efficiency and chemicals use.

If necessary, the performance standards should take account of likely temporal variations in the influent quality and quantity. For example, on a water treatment plant, different efficiency standards might apply during periods of high influent turbidity than during low turbidity. Alternatively, lower standards of efficiency may be specified during periods of low flow when plant performance is likely to be suboptimal.

The water and wastewater quality testing provisions are sometimes overlooked but are particularly important in a DBO contract for holding the Contractor to account. This is one case where the contract should be detailed and prescriptive. Collectively, the Performance Standards Appendix and Employer’s Requirements should be clear on:

1. In-line monitoring requirements
2. Site laboratory requirements
3. Sampling and testing methodology
4. Sampling and testing frequencies
5. Quality control
6. External validation of results, and
7. Record keeping

5.4.2 Schedule of Performance Damages

The Schedule of Performance Damages should list the amount of damages that are payable in the event of an interruption or delay (PCC Sub-Clause 10.6) and in the event of a failure to meet one or more performance standard (PCC Sub-Clause 10.7).

Many legal systems, particularly those following a common law tradition, do not permit the application of punitive damages. So, the amount of performance damages in the schedule should represent a reasonable pre-estimate of the actual loss that will be suffered by the Employer in the event of a breach or performance failure attributable to the Contractor.

In the case of a water treatment plant the damages could be linked, for example, to an estimate of lost water revenues, or the cost of bringing alternative production facilities on stream or tankering water to customers.

In a wastewater treatment plant, damages associated with a breach of effluent standards might, for example, be linked to an estimate of the full daily cost of running the plant including operations and maintenance costs, depreciation and cost of capital (on the grounds that the full daily cost represents the financial value that the Employer places on creating a better environment).

Damages are an important part of the contract framework because they ensure the Contractor is made properly accountable for meeting the performance standards. However, for some standards, occasional infringements may be tolerable or it may be unrealistic to expect the Contractor to achieve 100% compliance. If this is the case, the Schedule of Performance Damages can be drafted so that minor or occasional infringements do not automatically result in the payment of damages. For example, the schedule could specify that damages only become payable if there was more than one infringement per calendar Month, or if the compliance rate falls below a pre-defined percentage.

It is good practice to keep a record of how damages have been calculated in case of legal challenge at a later date.

5.5 Risk allocation

5.5.1 Risks in the Design-Build Period

The Employer’s risks and liabilities for the design build are as set out in the contract. The Employer shall note in particular that it may be responsible for additional costs arising from:

* Errors, faults, and omissions in the Employer’s Requirements (GC 1.10, 4.7, 5.1, 17.1) provided that the Contractor has undertaken its due diligence in a timely manner.
* Unforeseeable physical conditions (GC 4.12)
* Delays by the authorities (GC 9.4)
* Changes in legislation, (GC 13.6)
* Exceptional risks and forces of nature (GC 17.1, 18)

5.5.2 Risks in the Operation Service Period

The Employer’s risks in the operation service are as set out in the contract. The Employer shall note in particular that it may be responsible for additional costs arising from:

1. Influent flows exceeding or falling short of the installed capacity (in a wastewater plant)
2. Long term deterioration in raw water quality (water treatment plant) or wastewater influent quality (wastewater treatment plant) leading to failure of the performance standards
3. Pollution incidents (water and wastewater)
4. Changes in legislation (e.g. quality and environmental standards, taxes and duties)
5. Exceptional risks and forces of nature (GC 17.1, 18)

The Employer also has the option of allowing a change in price in the case of a long term change in raw water quality (water treatment plant) or wastewater influent quality (wastewater treatment plant) leading to increased operations costs (see PCC / Contract Data 13.9).

The impacts of changes in raw water quality (water treatment plant), and wastewater influent quality (wastewater treatment plant) are dealt with in PCC 13.9. and 18.1. In order for PCC Sub Clause 13.9 to work, the Employer must include the “Influent Baseline” appendix in the Employer’s Requirements.

The “Influent Baseline” appendix describes the required design operating range for the plant. The Employer (or its design consultant) must specify the mean, minimum and maximum values for each quality parameter.

5.6 Performance Security

Performance securities are necessary for all works‐related contracts but have a particular relevance in a DBO. The effectiveness of the DBO model relies on the Contractor being bound into the contract for the full duration of the contract. If the Contractor calculates that it can abandon the project during the operations period if things get difficult, then long term accountability is lost and the rationale for the DBO contract is undermined. One of the best ways of ensuring the continued commitment of the Contractor is through the provision of an appropriately sized performance security.

Performance securities also have a cost (typically between 0.5% and 5% of the guaranteed value) so there is a balance to be struck between cost and risk. The DBO SPDs allow the Employer to specify progressive reductions in the amount of the performance security during the contract. The first reduction occurs at the end of the retention period, and the second occurs after five years of successful operations - conditional on full achievement of the performance standards.

The amount of the initial performance security for the design-build should follow normal industry practice in the project country (typically 10% of the design-build value).

A very large guarantee amount can be a problem for bidders as they may be constrained by limitations on their overall liabilities imposed by the issuing bank.

5.7 The Asset Replacement Fund

The Asset Replacement Fund provides the funding to support routine replacement of items of plant when they reach the end of their useful working lives. It only applies to replacement of items of plant with a life expectancy of five or more years.

The rules for managing the Asset Replacement Fund are set out in GCC 14.5 and 14.18. The key features of the asset replacement arrangement are:

1. Only items listed on the contractor’s Asset Replacement Schedule (included in its proposal) are eligible for replacement through the asset replacement fund.
2. If an asset that is listed on the contractor’s Asset Replacement Schedule requires earlier replacement, the funds for replacement will only be released on the scheduled date of replacement.
3. The Contractor and Employer may mutually agree that an item listed on the Asset Replacement Schedule does not require replacement. Any unused funds at the end of the contract are then to be shared equally between the contractor and employer.
4. The Contractor must bear the costs of replacing assets that are not included on the Asset Replacement Schedule.

The DBO-SPD is not prescriptive as to how the Employer manages the Asset Replacement Fund. It may be appropriate for the Employer to establish a ring-fenced account into which it makes regular contributions so that there are always sufficient funds available to pay the Contractor. Alternatively, the Employer will need to ensure that the necessary provisions for replacement are included in its annual budgets.

5.8 Assignment of the DBO following commissioning

It is sometimes the case that a central ministry or state entity will be responsible for funding and implementing the design-build of a facility, and a municipal organisation will be responsible under law for operating the facility. Who should be the Employer under these circumstances?

The answer will depend to a degree on the financial and technical capacity available in the municipality. If the municipality has the resources to pay the Contractor and oversee the contract, then responsibility for the DBO contract can be transferred to the municipality following commissioning of the Works. The particular conditions Sub-Clause 1.8 *(Assignment)* provides a mechanism for such a transfer provided that the municipality has the capacity to pay. An alternative approach would be to establish the Contract Agreement as a tripartite agreement in which the roles of the ministry and municipality are clearly set out.

If the municipality does not have the necessary capacity to pay the Contractor’s fees and oversee the contract, then it is recommended that the ministry or state entity should remain as the Employer through the full term of the contract. In such circumstances the contract may set out a role for the municipality that is consistent with its capacity.

5.9 Operating License, Title to Land and Rights of Way

The SPD assumes that land and right of way will be provided by the Employer. If the Employer does not have title to the land, then it will need to (a) acquire such title in good time, (b) obtain a license over the land to permit it to construct and operate the facilities from the entity that has title and authority to operate the treatment plant or (c) procure an operating license from such entity to the contract. This should be resolved before issuing the letter of acceptance so that the access to the land can be granted on the Effective Date of the contract. Any delay in making land available to the Contractor could result in delays and extensions of time and damages.

The purpose of the operating license is to give the Contractor unhindered legal access to the site and the legal right to operate the facility during the operation service period. If an operating license is required from a third party, a copy of a draft operating license should be included in the request for proposals. The operating license should be issued to the Contractor at the time of issuing the letter of acceptance although it will not come into effect until the issue of the commissioning certificate

5.10 Payment basis

5.10.1 Payment for the Design-Build

Payment for the design-build of the works follows the standard FIDIC Yellow Book approach.

The Employer should provide details of the payment procedures including a schedule of stage payments in the Schedule of Payments attached to the Contract Agreement. If payment for any part of the Works is to be made on the basis of re-measurement, this must be defined in the Contract, and additional provisions relating to re-measurement will need to be added into the Particular Conditions

5.10.2 Payment during the Operation Service Period

#### Principles for designing the OS payment formula

There are a large number of different payment approaches that can be adopted during the Operation Service Period. When developing a suitable price formula, the following general principles should be applied:

1. **Risk allocation**: The Contractor should not be expected to carry significant risks over which it has no control (i.e. “casino risks”). So it is generally not appropriate to require the Contractor to take significant risks associated with future demand, raw water quality (for water treatment plants) or wastewater influent quality (for wastewater treatment plants).
2. **Economic efficiency**: In so far as is practical, the Contractor’s monthly revenues should increase or decrease in line with the Contractor’s costs. The Contractor’s costs are comprised of fixed costs (e.g. labour and overheads) and variable costs (e.g. power and chemicals). Variable costs may be a function of volumetric demand, of influent quality, or both.
3. **Ease of administration**: In so far as possible, the pricing formula should be as easy as possible to administer. Simple pricing formulae are more transparent and easier to manage. Complex formulae, such as those that depend on wastewater effluent quality test results which may have a margin of statistical variability and may be difficult to validate, are less transparent and much harder to administer.
4. **Indexation:** The design of the pricing formulae and the indexation formulae need to be considered together. The indexation arrangements can be made more efficient if the operation service fees are divided into components that broadly reflect available indexes. For example, the fixed component may be linked to consumer price inflation indices and the variable fee may be indexed to changes in electricity prices.
5. **Currency and exchange rates**: the payment formulae and indexation arrangements will need to take account of any limitations relating to the currencies of payment of the operation service fees[[1]](#footnote-1) and the extent to which Contractor will be protected from currency exchange risks.

Some examples of different payment formulae are shown in Table 5.1 below.

#### Should electricity be provided free of charge?

As noted in Table 5.1, electricity can either be included within a volume-related fee, or can be provided free of charge to the Contractor.

The advantage of providing electricity free of charge is that the Contractor carries reduced demand or influent quality risks. The disadvantage is that the Contractor has little incentive to use energy and chemicals efficiently so long as it meets the minimum energy efficiency standard specified in the Performance Standards (if any).

For technical reasons, it can sometimes be better to have the Employer pay the electricity bill rather than the Contractor (e.g. in some countries, a public sector Employer would be entitled to lower tariffs than a private company). However, this does not affect the decision on whether to provide free electricity as the electricity cost risks may be transferred to the Contractor with appropriately designed pass-through arrangements.

If the employer intends to provide free energy and/or chemicals, then the costs will still need to be incorporated into the bid price. One way of achieving this is to allow bidders to propose the guaranteed minimum efficiency values in their bids[[2]](#footnote-2). The bid price is then calculated using the guaranteed values multiplied by forecast volumes.

**Table 5.2: Examples of different charging approaches on DBOs**

| **Charging Basis** | **Issues** |
| --- | --- |
| **Fixed monthly charge with free supply of electricity and chemicals** | * Common approach and simple to administer.
* Contractor is insulated against the risks of higher or lower energy/chemicals consumption associated with changes in demand and variations in raw water quality/wastewater influent quality.
* Contractor would normally be required to meet minimum guaranteed energy and chemical use efficiency standards, but otherwise the incentives to optimise energy and chemical use are quite weak (the Contractor does not share any efficiency gains above the minimum guaranteed efficiency level)
 |
| **Fixed monthly charge + volume related charge** | * Common approach on both water and wastewater treatment plant.
* Flows are easy to measure so this option is relatively simple to administer. Check meters can be installed to verify accuracy of metered volumes.
* Contractor is insulated from demand risks but would not be protected if there were changes to the characteristics of the influent (for example if the source water quality (WTP) or wastewater influent quality (WWTP) deteriorated). However, the Employer can cap these risks by allowing for a price adjustment in the event of material changes in the influent quality (see PCC 13.9).
* The formula provides good incentives for the Contractor to optimise energy efficiency.
* Indexation formulae will protect Contractor from inflation effects and changes in energy prices
 |
| **Fixed monthly charge + pollution load charge (e.g. related to COD/ BOD load, or NH4-N,) (wastewater only)** | * This approach is only suitable for wastewater treatment plant.
* The Contractor is insulated against cost changes caused by changes in the total influent pollution load (e.g. tonnes of COD per year).
* Pollution load values may be difficult to measure accurately and consistently so this option is harder to administer.
* The approach would be suitable where the wastewater quality is likely to remain the consistent over the lifetime of the contract. The Contractor is not protected if the wastewater becomes more dilute than expected (for instance as a result of high sewer infiltration) which would result in higher pumping costs. (although the Employer can cap these risks by allowing for a price adjustment in the event of material changes in the influent quality (see PCC 13.9).
 |
| **Fixed monthly charge + volume related charge+ pollution load charge (e.g. related to suspended solids/ COD/ BOD load, or NH4-N)** | * In a surface water treatment plant the payment formula may insulate the Contractor from cost variations associated with changes in demand and seasonal changes in sediment loads. In a wastewater treatment plant the formula may insulate the Contractor from cost variations linked to changes in influent volume and quality.
* The formula requires accurate and consistent measurement of flows and pollution loads. Consequently, this option would be the most difficult to administer and the most prone to dispute.
 |

#### Standby electricity price adjustments

Standby generation is likely to be a requirement of most projects. The unit costs of running standby generators may be more than standard electricity tariffs (particularly if the power from the grid is subsidised). Therefore, it may be necessary to insulate the Contractor from these power reliability risks over which it has no control.

Various approaches can be considered, for example:

* The Employer may reimburse, at cost, the Contractor’s fuel costs involved in generating power during power cuts (subject to meeting pre-specified standards for generation efficiency) less any amounts that would have been paid for electricity from the grid.
* The Employer may pay the Contractor a “standby generation supplement” during power cut periods. The supplement would then need to be included within the Operation Service fee bid forms and included as part of the financial evaluation.

Arrangements would need to be made for measuring and recording grid power and standby generation to ensure that the arrangements are administered fairly and transparently and can be audited by third parties.

5.10.3 Indexation

#### Indexation in the design-build period

The purpose of indexation is to insulate the Contractor from the impacts of inflation over which it has no control.

Design-build indexation may not be necessary in very stable low inflation environments and relatively short duration contracts. In most cases, however, it would be good practice to allow indexation of the design-build costs. The alternative would be to pass the inflation risk to the Contractor. The Contractor would then include an allowance for inflation in its prices, along with a premium to cover its additional risk. Some Bidders may even decide not to bid if they judge that the inflation risks are too great (for instance, in volatile economic environments). So, by including an indexation provision the Employer gains from lower prices as a result of a lower Contractor’s risk premium and improved competition.

The indexation provisions applicable during the design-build period closely follow the FIDIC Yellow Book approach. The standard indexation formulae require bidders to specify, within their proposals, the indexes to be used and the relative price weightings applicable to each index.

#### Indexation during the Operation Service Period

The FIDIC Gold Book allows the Employer to choose whether or not to provide indexation during the Operation Service Period. In reality, however indexation of the Operation Service fees is likely to be necessary for all DBOs carried out by the Bank given the extended implementation period.

Separate indexation arrangements will be required for each component of the Operation Service Fee and for the Asset Replacement Fund.

5.11 Insurances

The amount of the insurances to be provided by the Contractor should take account of local legal context. It is recommended that the Employer obtains professional advice from a local insurance provider to assist it prepare the insurance sections of the Contract Data.

With respect to the insurances to be provided in the operation service period, the Employer should bear in mind that the DBO is a long term contract. Any numerical values included in the contract data will be eroded over time by inflation. It may be preferable therefore to link minimum insurance requirements to replacement values (where appropriate).

5.12 Handback requirements

At the end of the DBO Contract the facility will be handed back to the Employer.

The DBO SPD sets out arrangements for joint inspection of the Works at least two years before the end of the contract. The Contractor then prepares a program for corrective works to make good any damage or defects to the Works.

The Employer will need to specify any additional handback requirements in the Employer’s Requirements section. Handback issues may include training requirements for the Employer’s follow-on staff, and the required minimum stocks of consumables and spare parts to be provided at the end of the contract.

Contract oversight

6.1 The Employer’s Representative

The Employer’s Representative is appointed by the Employer and is named in the Contract Data. The Gold Book is not prescriptive as regards who can act as the Employer’s Representative. It could be a senior member of the Employer’s organisation, or it could be firm of consulting engineers. Whoever is chosen, they should have the necessary professional skills and experience to enable them to fulfil the role effectively.

The role of the Employer’s Representative to is act for the Employer, and in the best interests of the Employer. At the same time, the Employer’s Representative must act with fairness and integrity when making determinations.

If the Employer intends to appoint different Employer’s Representatives for the Design-Build and for the Operation Service, then each of these persons must be clearly named and identified in the Contract Data.

6.2 The Auditing Body

The Auditing Body is an impartial body whose role is to monitor the performance of both Contractor and Employer during the Operation Service Period. To fulfil this role, it will need to undertake audits and investigations to confirm contract compliance, to identify any shortcomings, and to advise on possible improvements. Unlike the Employer’s Representative it has no power to make determinations or instruct the Contractor.

The Auditing Body can be a person, or persons, or an organisation. The Auditing Body must be in place six months before the start of the operation service period. There should an Auditing Body in place throughout the operation service period, although the persons or organisation appointed to the role may be substituted.

The Auditing Body is “jointly appointed” by the parties, and paid for out of a provisional sum identified for the purpose. The Employer’s Requirements should set out in detail how the joint appointment process will work in order that both parties can be confident that the Auditing Body will be able to act independently and retain the confidence of both parties.

This is dealt with in the Employer’s Requirements templates annexed hereto that have been prepared for use with the SPDs.

6.3 The Dispute Adjudication Board

The role of the Dispute Adjudication Board is to resolve disputes between the parties and fulfil the duties set out for it in Clause 20 of the General Conditions of Contract and the associated “General Conditions of Dispute Adjudication”.

Each member of the DAB must be suitably qualified and independent of the parties. Normal practice would be to have a three-member DAB during the design-build period, and a sole adjudicator for operation services period.

The contract also allows for arbitration for final settlement of disputes in the case that either party is dissatisfied with the decision of the DAB.

Annex A: Sample Terms of Reference for Consultant for WWTP

***[can be adapted to a WTP]***

The following Terms of Reference (“TOR”) outline the responsibilities of a consultant (“the Consultant”)for preparation of the proposed design build and operate (“DBO”) project for a WWTP (“the Project”) on behalf of [ ] (the “Employer”).

1. Background

*[Include Project description]*

1. Objectives of the Assignment

## The Consultant is to assist the Employer in carrying out technical, legal, financial and economic due diligence for the Project and in preparing the bidding documents for the Project. The Project shall be procured in accordance with the World Bank Procurement Regulations using the applicable Standard Procurement Document for DBO for WWTP found at <http://www.worldbank.org/en/projects-operations/products-and-services/brief/procurement-new-framework#framework> and associated initial selection document, following the guidance note for the DBO found there also. The assignment will be divided into two main phases:

1. Due diligence, scoping of the Project and feasibility study
2. Preparation of bidding documents and support of the Employer throughout the procurement process.
3. Scope of Services

The Consultant will carry out the following activities:

## 3.1 Due diligence report

The Consultant will carry out due diligence on the proposed project and prepare a due diligence report. This due diligence will fall into three categories: technical, legal, financial and economic. The Consultant will also coordinate with the environmental and safeguards consultant assigned by the Employer to the Project.

### 3.1.1 Technical

The Consultant will undertake:

1. **data collection of basic planning data**. Data assumed to be available includes master planning documents, demographic and land use studies, maps and topographic information, facility design documentation, water resource and quality information, etc. The Consultant will include in its review existing and planned waste water treatment plants for the area considered. A project library will be established. Documents will be provided both in hard copies and digital format.
2. Drawing from the data collection, **a summary of land use and demand for wastewater treatment capacity** for the …-year planning period in the service area. The Consultant will determine the economic drainage/service area for the WWTP, based on street elevations. This drainage/service area will be developed in draft form for review by all stakeholders. Once the limits of the economic service area have been agreed, the Consultant will prepare the estimated service area population, based on land use and population density estimates.
3. **Description of future service area** including:
* Map of existing service area
* Criteria for future service area
* Map of future service area
* Explanation of boundaries shown on map
* The service area’s topographical and other features that are relevant to the planning process will be prepared and presented in summary form. Specific factors that could affect the future service area may include natural or man-made barriers.
* Define and summarize growth projections within the service area. This data will in turn be used to define future demand projections for wastewater treatment capacity. Key components in defining future growth are land use and population forecasts.

##### **Service Area Policies** - In-place or planned water policies which may affect the utilities growth and development will be discussed. Policies which deal specifically with wastewater collection and treatment and have a direct impact on utility development within its future service area will be identified. The purpose is to identify and assess pertinent policies that impact sewer collection system growth. Additionally, required service levels for the proposed PPP mechanism and solicitation will be clearly identified (e.g. populations served, reliability indices, etc.).

##### **Future Growth/ Land Use** -Existing land use patterns will be summarized. Zoning policies, documented growth trends, and adopted land use plans should be assessed in developing future land use patterns for the utility’s future service area. Future land use patterns should be summarized for incremental periods (e.g. ten years, twenty years) and/or ultimate capacity. The following parameters of land use will be considered:

Type of Development – Demand for sewer collection varies with type of development. It is therefore important to distinguish between residential, commercial, industrial, and other categories of development within the future service area.

Amount of Development – Population density or extent of development must be known to accurately project future water use.

Location of Development – Sizing and routing of facilities depends upon the location of future development.

Timing of Development – When growth will occur is a crucial dimension of land use that affects both the design and scheduling of water system improvements.

###### **Population** - Population forecasts for the service area.

#### **Future Demand for Collection of Wastewater** - Demand for collection of wastewater is a function of projection of future water demand. Water demand projections produced based on a review of the following data:

* Assessment of existing water consumption,
* categories of existing use,
* average day and peak flows,
* system water losses, any water
* conservation measures currently in effect or being proposed
* future demand projections
1. **Assessment of Required Treatment Levels -** Describe and evaluate the proposed discharge point(s) for treated effluent for the Project and assess the potential impact on the receiving water body/aquifer. Document relevant standards required to meet health and environmental standards and regulations. Identify and address potential future water quality problems that may arise as a consequence of effluent and/or sludge disposal resulting from the Project.
2. Identification of any completed water resource studies or plans that address the Project’s **receiving water(s) or aquifer**. Identify regulations which will govern standards for discharges to receiving surface waters and / or groundwater(s).
3. **identification of sources of potential contamination** - Identify contaminants of concern, entry into the water supply and impact on water quality. Discuss levels of degradation which may require treatment or development of alternate discharge points for both the treatment plant effluent and disposal of process sludge.
4. Summary of available wastewater data which would be applicable to estimating the **characteristics of raw wastewater** which is likely to be delivered as influent to the Project.
5. Summary of any **receiving water standards for quality**. Summarize chemical, physical, and bacteriological data for each aquifer.
6. **Description of** **current wastewater discharge standards and requirements** taking into account discharge points, ambient quality and planned quality improvements, if any, of the receiving water and/or any planned reuse of the treated effluent.
7. **Description of potential treatment technologies** to meet wastewater treatment needs for the defined service area through the …-year planning period taking into account any existing wastewater treatment facilities and justify the alternative recommended through a cost/benefit or any other recognized economic analysis technique, e.g. life-cycle costing.

### 3.1.2 Legal

The Consultant will:

1. Identify key legal issues, including statutory, institutional and other issues, associated with preparation, procurement and implementation of the Project on a DBO basis and confirm the legal basis for the transaction;
2. Make recommendations on any legal or regulatory changes, as necessary (in coordination with the Employer);
3. Building on the analysis undertaken under 3.1.2, identify all relevant environmental, pollution, water and wastewater standards and discharge standards that the Project will need to meet, together with any approvals that will be required to prepare, procure and implement the Project
4. Make recommendations on the development of the procurement strategy and timetable for the Project, identifying key milestones, deliverables and approvals and estimate of duration of design build phase of the Project.

### 3.1.3 Financial and Economic Analysis

The Consultant will:

1. prepare cost estimates for the Project, based on the recommended technology including:
* construction of the Project and associated facilities, and distinguish where possible foreign component of costs, comparing different possible technologies and solutions where relevant.
* Operating and maintenance costs for the Project. O&M costs will be estimated based on existing, similar faculties. For operating costs, a distinction should be made between fixed and variable costs and provide a breakdown of energy, chemicals, labor and other costs, comparing different possible technologies and solutions where relevant.
1. Develop a public sector cost estimate to compare the overall costs of the Project if it was wholly implemented as a public sector project versus implementing the Project via a DBO contract approach. Data will include costs for comparable publicly procured wastewater treatment plants, indicating initial budget and completion time estimates, actual investment costs and completion times, total life cycle investment costs including maintenance (when such information is available), operating costs, and evolution of quality standards over time.
2. Carry out an affordability analysis looking at the financial impact of the Project and likely costs over the duration of the contract, whether the Employer will be able to afford the payment obligations during the Operation Service period once the World Bank loan has been disbursed, taking into account present and likely future revenues, obligations and potential alternative funding sources, and likely impact on tariff. Develop suggested options for managing affordability risk.
3. Carry out an analysis of the economic benefits of the Project.

The Consultant will prepare a draft due diligence report setting out the above issues and present it at a workshop of government stakeholders to be organized by the Employer. It will finalise the draft due diligence report including feedback from the workshop and in writing from the Employer.

## 3.2 Preliminary Conceptual Design of the Wastewater Treatment Plant (WWTP) and associated facilities

The Consultant is to prepare a conceptual design of the WWTP and associated facilities required for the service area, taking into account any existing wastewater treatment facilities. The Consultant will provide the conceptual design for the wastewater treatment plant(s), justifying the technical solution selected through a cost/benefit analysis and robustness of the preferred process. The Consultant will evaluate various options *[including extension of the existing wastewater treatment facilities and/or the construction of new facilities]*. This analysis will include economic evaluation of sludge management options required for each alternative evaluated and take into account the whole life costing of the WWTP.

For Project facilities, the Consultant will identify both the infrastructure proposed for construction and/or operation under the DBO contract, but also the basic system standards and criteria needed for a bidder to evaluate and price its proposal. This will include, but not limited to, treatment standards, service levels, environmental impacts of the various alternatives, and other operational or service criteria.

The Consultant will also draft a term sheet of key terms of the DBO contract including the duration, payment terms, scope of contract. It will prepare a list of potential bidders and questionnaire for potential bidders to be asked through the market sounding exercise.

The Consultant will present the preliminary design, term sheet and procurement strategy in draft form at a workshop of stakeholders to be organized by the Employer. Any comments and feedback from the workshop and the Employer will then be incorporated into the design.

## 3.3 Market Sounding

The Consultant will identify and assess potential private bidders, whether local or international, in terms of potential interest, capability and capacity and carry out a market sounding of such potential bidders. This market sounding will be conducted through a written questionnaire to be prepared by the Consultant and agreed by the Employer and followed up by telephone and email. Feedback from the market sounding will be factored into the term sheet and the bidding documents.

## 3.4 Preparation of Bidding Documents and Bid Process

The Consultant will prepare a draft set of bidding documents based on the term sheet and the World Bank standard procurement document (SPD) for DBO in WTP/ WWTP and the standard initial selection document (ISD) for DBO for WTP/ WWTP found on the World Bank Procurement page. The Consultant will follow the guidance set out in the Guidance Note prepared for the SPD for DBO in WTP/WWTP and the template for Employer Requirements annexed thereto.

The Consultant will prepare:

1. The ISD, advising the Employer on appropriate selection criteria for candidates
2. The Employer’s Requirements, including design criteria and service level requirements, performance specifications, bid evaluation criteria and other parts of the procurement documents that need to be completed.

The Consultant will provide support to the Employer in conducting the procurement process and evaluation of bids, including preparing responses to pre-bid meeting questions and requests for clarifications.

1. Deliverables

|  |  |  |
| --- | --- | --- |
| **Deliverable Number** | **Description** | **Due Date- Estimated** |
| 1 | Inception report  | 3 weeks after contract signing |
| 2 | Draft due diligence report | *[4]* months after contract signing |
| 3 | Workshop on due diligence report | *[4]* months after contract signing |
| 4 | Final due diligence report. | 1 months after workshop |
| 5 | Draft conceptual design and term sheet | *[7]* months after contract signing |
| 6 | Workshop on conceptual design and term sheet | *[7]* months after contract signing |
| 7 | Market sounding | *[8]* months after contract signing |
| 8 | Final conceptual design and term sheet | *[9]* months after contract signing |
| 9 | Draft bidding documents | *[12]* months after contract signing |

**The dates in the table above are indicative and may be amended, the overall process is expected to be completed within 18 months, therefore the Consultant should make allowance for such.**

The feasibility study report will compile the deliverables documented in tasks 3.1 into a single document. An executive summary, including principal findings, conclusions and recommendations will be included in the final draft.

Reports will be drafted in English and the Consultant will provide drafts in soft copy and for final reports, 5 hard copies and one soft copy.

1. Administration and Qualifications

5.1 Team composition and Qualification Requirements for Key Experts

The Consultant must be a single legal entity with all other necessary expertise secured via subcontract, or joint venture arrangement. The Employer will enter into a single contract for the delivery of the work set out in these terms of reference. Foreign firms must familiarize themselves with local conditions and laws, and take them into account in preparing their proposals. Reports will be written in English and consultants will be expected to have a strong command of written English. The skills and experience required of the Consultant should include inter alia, experience with respect to:

* wastewater treatment plant and wastewater sewerage line design, construction and operation;
* contract preparation and structuring using international best practices, including advisory or feasibility studies;
* Demand forecasting and modelling of infrastructure projects in the **last three** years;
* Financial and economic analysis experience;
* Experience with projects in the water sector in emerging markets;
* Familiarity with relevant national policies, regulations and laws for similar projects.

It is expected that the project team will comprise the following competencies:

1. Registered Civil and Structural Engineer with at least 10 years of experience in developing countries in design and construction of wastewater treatment projects of a similar nature. Knowledge of preparing employer specifications for PPP or DBO projects would be desirable.
2. Economist holding a masters degree or equivalent with at least 10 years of experience in developing countries and experienced in undertaking economic analysis and modeling infrastructure projects. Understanding of projects in the water sector would be desirable
3. Financial Specialist holding a masters degree or equivalent with at least 8 years of experience of developing the financial and economic analysis for infrastructure projects. Knowledge of the water sector would be desirable.
4. Local legal expert qualified in the local jurisdiction with at least 10 years of experience with experience in structuring long term infrastructure contracts.
5. Project duration

The Project duration will be 18 months with a possible extension to 24 months.

1. Contract Management

The Consultant will have a lead nominated representative who will report directly to the Employer’s nominated representative.

The Employer will provide to and collaborate with the Consultant in making available all data, maps and reports relevant to the project subject to the extent of availability of such information.

The Employer will also facilitate the Consultant’s access to government and local authorities.

The assignment will be developed in the Consultant’s base of operations and in *[location]*. While working in the *[location]*, the experts based outside of *[location]* will use facilities of their local partner.

1. Remuneration

The total remuneration for this assignment will be [ ] and paid against milestones as set out in [ ].

Annex B: Template for Employer’s Requirements (Water Treatment Plant)

Section VII: Employer’s Requirements

Template for
Water Treatment Plant
DBO Contracts

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1. Summary of Employer’s Requirements

1.1 The Project

*[The Employer shall provide an overview of the project in this section setting out the objectives for the project and key elements of the Works and Operation Service]*

1.2 The Schedule of Performance Standards

The Contractor shall plan, design, construct, operate and maintain the Works as necessary to meet the standards specified in the Schedule of Performance Standards.

In the case of any conflict between the standards specified in these Employer’s Requirements and those specified in the Schedule of Performance Standards, the requirements of the Schedule of Performance Standards will take precedence.

*Optional provision: “The Employer may, subject to any conditions that (in its sole discretion) it may deem appropriate, agree to a temporary and limited relaxation of such standards to undertake planned maintenance during the Operation Service Period.”*

1.3 Limitations on process selection and design

*[The Employer shall state here whether there are any limitations on the choice of treatment process or other design elements. For instance the Employer may wish to exclude certain process technologies which it regards as unsuitable, or it may want to have all bidders submit bids on the basis of the same process technology which may make bid evaluation less subjective]*

1.4 Nominated Sub-contractors and co-operation with other contractors

*[The Employer shall provide details of:*

* *nominated Subcontractors which the Contractor is required to engage as required under GCC 4.5 (if any);*
* *any other contractors working on the Site as required in GCC 4.6]*

2. The Site

2.1 Site Map / Service area map

*[The Employer shall include a scaled map showing the following information:*

* *The Site and its boundaries;*
* *Points, lines and levels of reference to be used for setting out purposes (as required in GCC 4.7;*
* *Site access;*
* *The intake;*
* *The* ***precise*** *physical points where the Contractor’s responsibilities start and end;*
* *The Existing Facility (if any)*
* *Infrastructure to be demolished;*
* *Infrastructure to be retained and/or refurbished.*
* *Location of electrical power offtake*
* *Location of existing utility services (if known)*
* *Any other information required by bidders to prepare a priced proposal]*

2.2 Right of Access to the Site

*[The Employer shall indicate the time and manner in which it will give the Contractor possession of the Site and any foundation, structure, plant or means of access to the Site as required in GCC 2.1. The Employer should ensure consistency with the Contract Data]*

3. WTP Technical Requirements

*[The key output standards for the plant will be specified in the Schedule of Performance Standards. To minimise the risks of inconsistencies in the documents, it is preferable to refer to the Schedule of Performance Standards rather than duplicating the performance criteria that are already included in the schedule]*

3.1 Water source

3.1.1 Description of source

*[Employer shall provide relevant details, including:*

* *Yield and reliability*
* *Water quality*
* *Seasonal variations in quality and quantity]*

3.1.2 Source water design conditions

*[The Employer shall include a source water baseline in Appendix 2.*

*The contract will need to address the risks associated with changes in source water composition. This may be achieved through a combination of approaches, such as:*

*i) selecting an Operation Service payment arrangement which insulates the Contractor from changes in influent quality; and/or*

*ii) providing for an adjustment in price in the event of a long term change in influent baseline characteristics (see PCC 13.9).*

*The Employer will also need to decide whether to make the Contractor responsible for assessing a suitable design range for key parameters, or whether to specify the design range in Appendix 2. If the Contractor is made responsible the Employer will need to satisfy itself that the winning bidder’s/ Contractor’s design has made sufficient allowance for variability in the influent composition.*

*Whichever approach is chosen the Employer should provide the Contractor/Bidders with as much information as possible about the nature and variability of the source water.*

3.2 Demand and capacity

3.2.1. Employer’s water demand projections

3.2.2 Installed treatment capacity requirements

3.2.3. On-site water storage requirements

3.2.4 Pumping and transmission requirements

3.2.5 Min and max pressure requirements (if any)

3.2.6 Plant continuity requirements

*[the Employer shall specify the permitted number of, and duration of, plant outages for planned maintenance]*

3.3. Water treatment requirements

*[Employer to specify:*

* *Applicable WQ standards*
* *Remineralisation requirements (if applicable)*
* *Disinfection requirements ]*

3.4. Efficiency requirements

*[For short and medium duration DBO contracts it will be necessary to specify minimum standards for efficiency, e.g. in relation to energy efficiency and chemicals use.*

*In locations where there are seasonal variations in the quality of the source water, it may be appropriate to link the efficiency standards to the source water quality (e.g. suspended solids concentrations]*

3.5. Treatment residuals

3.5.1. Wastewater discharges

3.5.2. Sludge treatment and disposal

3.6 Other environmental requirements

*[Noise can be an important consideration if the WTP is to be developed in a built-up area]*

3.7. Materials requirements

*[The Employer shall specify its minimum requirements for materials, e.g. acceptable pipe materials, grades of stainless steel, concrete cover, etc.]*

3.8. Electricity and Power

3.8.1. Available electrical supply to the WTP

3.8.2. Standby generation requirements

*[State how much standby generation capacity is required – if any]*

3.9. Monitoring, sampling and testing equipment

3.9.1. Flow parameters

Flow measurement devices shall be installed to measure the following:

1. Volume and rate of flow of raw water abstracted
2. Volume and rate of flow of treated water produced and delivered
3. Volume of water used in process
4. *[Employer to add additional requirements]*

All meters and other flow measurement devices shall be sited to avoid interference from flow turbulence and shall be accurate to within the following tolerances:

* *[Employer to state accuracy range requirements for flow meters].*

3.9.2. Water quality sampling and testing equipment

*[The Employer shall specify its minimum requirements for the type, location and minimum sensitivity of sampling and testing equipment, covering for instance:*

* *In-line testing parameters / requirements*
* *Flow proportional sampling / time proportional sampling/spot sampling]*

3.9.3. Site laboratory and equipment

*[The Employer shall indicate whether it requires the Contractor to provide an on-site laboratory, and if so what testing equipment shall be supplied]*

3.10. Other design-build requirements

3.10.1 Site Access

3.10.2 Arrangements for water tankers

3.10.3 Instrumentation, SCADA and telemetry

3.10.4 Administration buildings, stores, workshops

3.10.5 Security and boundary fencing

3.10.6 Utilities, drainage, firefighting

3.10.7 Landscaping and parking

4. Planning, design, approvals and documents

4.1. General

With respect to the planning and design of the Works, the Contractor shall:

1. ensure that the Works is designed to comply with the specifications included in these Employer’s Requirements and the standards of performance included in the Schedule of Performance Standards.
2. ensure that its designs are in accordance with the design codes and standards specified in [Section 11] of the Employer’s Requirements or where not so specified, in accordance with good engineering practice;
3. design the Works to minimise adverse environmental impacts;
4. meet all the obligations under the prevailing environmental regulations and the Environmental Management Plan;

Unless otherwise agreed with, or directed by, the Employer’s Representative the Contractor’s Design shall be consistent with the Contractor’s Technical Proposal.

4.2. The Environmental Management Plan

*[The Employer should specify the scope of the Contractor’s responsibilities for preparing and implementing the EMP. If the EMP has already been prepared it should be included in the Employer’s Requirements as an appendix.]*

4.3. Permits and approvals (requirements)

*[The Employer shall, as required by GCC 1.14:*

* *Describe the permissions, licences, and approvals that have been obtained, or will be obtained by the Employer before construction commences;*
* *Specify the permissions, licenses, approvals or notices that must be obtained or given by the Contractor;*
* *Specify the fees, taxes, and duties required to be paid by the Contractor in respect of any licenses or other permissions]*

4.4. Initial site investigations and studies

*[It is the Employer’s responsibility to provide sufficient accurate and reliable information to enable bidders to design and price the Works. The Employer shall state in this section what surveys it requires the Contractor to undertake to verify or supplement the data provided by the Employer after the contract has been awarded]*

4.5. Durability of the Works

The Contractor shall design the Works to meet or exceed the minimum asset lives shown in the asset life table below.

|  |  |
| --- | --- |
| **Description** | **Design life (years)** |
| Water and wastewater pipelines  | [……] |
| Civil and structural works  | [……] |
| Building works (administration, ablution, laboratory, workshop, store) | [……] |
| Roads and infrastructure works | [……] |
| Steelwork | [……] |
| Pumps and mechanical equipment | [……] |
| Equipment for chemical precipitation and polymer preparation | [……] |
| Membranes (if applicable) | [……] |
| Cartridge filters (if applicable) | [……] |
| Switchgear, transformers, internal cabling, heavy electrical equipment | [……] |
| Instrumentation and control | [……] |
| Emergency generator | [……] |

The Contractor shall develop and submit to the Employer’s Representative for approval, a durability plan (The Durability Plan) which will demonstrate how its design will meet the specified asset lives. The Durability Plan shall include:

1. An analysis of the nature of the Works environment and the main durability issues to be addressed;
2. Specifications for concrete and reinforced concrete structures including proposed concrete specifications, crack width limits, concrete cover provisions, use of epoxy coated or stainless steel reinforcement bars, and use of proprietary concrete surface coatings and treatments;
3. Specifications for steel and stainless steel used in civil and building structures and specifications relating the use of galvanised or other coatings;
4. Specifications for ancillary structures such as walkways, handrails, and stairways;
5. Specifications for critical mechanical and electrical plant and equipment;
6. Specifications relating to buildings and architectural features.

4.6. Contractors Documents (Design Build) and progress reports

4.6.1. Submission and approval of Contractor’s Documents (Design-build)

The Contractor shall prepare the following Contractor’s Documents for the Design-Build for review only, review and approval, or review and consent by the Employer’s Representative.

If no submission date is specified, the submission dates shall be in accordance with the Contractor’s time programme, prepared pursuant to GC 8.3.

**Contractor’s Documents (design-build)** *- example*

| ***Report/deliverable*** | ***Deadline for Submission*** | ***ER review only, ER review and approval, or ER review and consent1*** | ***Nr of copies to be supplied******(see GC 1.9)*** |
| --- | --- | --- | --- |
| Contractor’s Programme(see GC 8.3) | As GC 8.3 | Review & approval | *[state]* |
| *Initial site surveys*  | *[insert date]* | *[state]* | *[state]* |
| *Quality Assurance Plan (Design Build)* |  |  |  |
| *Health and safety plan (Design-Build)* |  |  |  |
| *Durability Plan*  |  |  |  |
| *Design Report*  |  |  |  |
| *Preliminary design drawings* |  |  |  |
| *Construction drawings* |  |  |  |
| As-built drawings | As GCC 5.5 | As GCC 5.5 | *[state]* |
| *Plan for the Tests on Completion of Design Build Etc.* |  |  |  |
| O&M Manuals | As GCC 5.6 | As GCC 5.6 | *[state]* |

*[Notes:*

*1. The Employer shall note that GCC 5.2 distinguishes between documents requiring “consent” and documents requiring “approval”*

*2. The list of Contractor’s Documents is an example only and shall be developed by the Employer]*

The Contractor shall keep a copy of the above Contractor’s Documents on Site throughout the term of the Contract.

4.6.2. Design-Build Publications to be kept on Site

The Contractor shall keep the following publications on Site:

*[Employer to specify publications to be kept on Site as required under
GC 1.9]*

4.6.3. Progress Reports during the Design-Build

*[The Employer shall describe contents of the DB progress reports and numbers of copies required, if different from GCC 4.21. Alternatively state “As GCC 4.21” if the Employer considers GCC 4.21 to be sufficient for its needs]*

5. Existing Facilities

*[If the Contractor is required to operate existing infrastructure during the Design Build Period, then this section shall describe the rehabilitation and O&M services to be provided and the performance standards to be achieved in the DB Period.*

*The text may need substantial modification depending, for instance, on the type of facilities to be operated, the condition of the facilities, whether the facilities are to be incorporated in the permanent works or later demolished, and the availability of free electricity and other supplies.*

*If there are no Existing Facilities to be operated by the Contractor then the Employer shall state “Not Used” or “Not Applicable “in each sub-section]*

5.1. Description of the Existing Facilities

*[The Employer shall describe the Existing Facilities to be operated by the Contractor during the DB Period.]*

5.2. Contractor’s Responsibilities for rehabilitation of the Existing Facilities

*[The Employer shall provide details of any rehabilitation and/or replacement works and identify how such works will be paid for (e.g. using a provisional sum identified for the purpose in the price schedules)]*

5.3. Contractor’s Responsibilities for operating the Existing Facilities

Commencing [ …] days following the Commencement Date and ending on the Operation Service Commencement Date the Contractor shall carry out all operations and maintenance of the Existing Facilities including,

1. operating and maintaining the assets and equipment forming the Existing Facilities;
2. providing labour, plant, power and electricity, chemicals, lubricants, spare parts and overheads necessary for operation and maintenance of the Existing Facilities;
3. providing the following insurances […*Employer to specify*…………..]
4. sequencing the construction of the Works to minimise disruption to the operation of the Existing Facilities;
5. undertaking all monitoring required by the Applicable Law;
6. providing monthly reports of performance of the Existing Facilities to the Employer.

5.4. Employer’s Equipment and free issue materials for Existing Facilities

*[The Employer shall list here the Employer’s Equipment, raw materials, fuels, electricity, consumables and other items to be made available by the Employer for the use of the Contractor during the Design-Build Period as required for GCC 1.1.33, 4.19, 4.20 and PCC 4.27]*

5.5. Incorporation of Existing Facilities into the Works

*[The Employer shall describe what will happen to the Existing Facilities at the Operation Service Commencement Date. For instance, whether the Existing Facilities will be deemed to form part of the Works as indicated in GCC 4.27, or whether they will be decommissioned or demolished etc.]*

6. Demolition, earthworks, construction and commissioning

6.1. General obligations

The Contractor shall:

1. provide all of the demolition, excavation, building, co-ordination, repair, review, inspection, testing, quality assurance and control, monitoring, scheduling, clean-up and other construction work and services required for the modification of the Site and the building of the Works.
2. undertake all demolition, excavation, and building work in accordance with the Contractor’s Documents specified in these Employer’s Requirements, as approved by the Employer’s Representative where applicable.
3. be solely responsible for the construction means, methods, techniques, sequences, and procedures and for co-ordinating the various parts of the design-build under the Contract.

6.2. Facilities for the Employer’s Personnel during the Design-Build period

*[The Employer shall specify any facilities that will be required for the Employer’s Personnel as required under GCC 6.6.]*

6.3. Contractor’s site access and facilities

*[Generally, the Contractor should be free to organise its site access, site accommodation and site storage facilities as it wishes. However, if the Employer intends to provide facilities for use by the Contractor, or to impose any conditions on site access or the Contractor’s facilities they shall be included here as required under GCC 6.6 (Facilities for Staff and Labour.]*

6.4. Electricity, Water and Gas during the Design-Build

*[The Employer shall provide details of the electricity, water, gas and other services that are available on Site and shall indicate whether any of these utilities and services will be made available free of charge to the Contractor – see GCC 4.19]*

6.5. Employer’s Equipment and free issue items (Design-Build)

*[The Employer shall list here the apparatus, machinery and vehicles, and materials (if any) to be made available by the Employer for the use of the Contractor during the Design-Build Period pursuant to GCC 1.1.33. and GCC 4.20]*

6.6. Demolition

The conditions for demolition shall be as detailed in GCC 4.26.

The Contractor may retain demolished building materials for his work. All unwanted demolished materials shall be removed from the Site to disposal sites agreed by the Employer’s Representative.

*[The Employer shall describe any additional conditions relating to ownership, sale or return of demolished materials]*

6.7. Samples and testing

*[The Employer shall describe here its requirements with respect to the provision of materials samples as required under GCC 7.2, and with respect to the testing of Plant, Materials and workmanship as required under GCC 7.4]*

6.8. Payment of Royalties

*[The Employer shall describe here its requirements with respect to the payment of royalties, rents and other payments for natural materials obtained outside the Site and the disposal of surplus materials, as required in GCC 7.8]*

6.9. Tests on Completion of the Design-Build

*[The Employer shall describe here its requirements with respect to the Tests on Completion of the Design-Build. The Employer should note the provisions of GC 11.1 [Testing of the Works] and in particular the sequence of tests from “pre-commissioning tests” “commissioning tests” and “trial operation”]*

7. Operation Management Requirements

7.1. General Requirements

7.1.1. Overall description of the Operation Service

The Contractor shall,

1. operate and maintain the Works;
2. abstract raw water from the designated source(s);
3. treat the raw water to the standards
4. supply treated water to the Employer in the quantity requested by the Employer, (provided that the requested volume does not exceed the specified capacity of the Works);
5. treat, store and safely dispose of sludge and other screenings materials as further specified in these Employer’s Requirements;
6. carry out monitoring, sampling, testing and reporting in accordance with the approved [Water Quality Testing Plan];
7. undertake all preventive and routine maintenance, including repainting of buildings and other structures in accordance with the Contractor’s maintenance management program;
8. plan and carry out all necessary asset replacement whether funded through the Asset Replacement Fund or otherwise;
9. procure at its own expense all things necessary to operate and maintain the Works including labour, plant, equipment, electricity, stand-by power, chemicals, materials, and spare parts;
10. fence and secure the Works and prevent unauthorized access;
11. maintain the site in tidy condition and take measures to control potential environmental nuisance, including but not limited to, odours, litter, pests, insects, rodents and birds;
12. develop and manage programs to train and advance the skills of the Contractor’s Personnel;
13. provide familiarity training to nominated staff of the Employer and Employer’s Representative;
14. carry out all management, financial and administrative responsibilities relating to the Works,
15. manage complaints from the public;
16. provide periodic reports on the operation and performance of the Works.

7.1.2. Performance during the Operation Service Period

1. The Contractor shall ensure that the Works complies at all times with:
2. The conditions of any license or consent issued by the regulatory authorities; and
3. The minimum standards specified in the Schedule of Performance Standards; and
4. Any additional requirements set out in these Employer’s Requirements.
5. The Contractor shall at all times operate and maintain the Works in accordance with the approved Environmental Management Plan and approved Contractor’s Documents including:
6. the Operating and Maintenance Manuals
7. the Emergency Response Plan
8. the Water Quality Testing Plan
9. the Health and Safety Manual
10. the Quality Assurance Manual
11. Where no specific performance standard exists in the Contract the Contractor shall at all times operate and maintain the Works in accordance with good international water utility practice;
12. Except as may be authorised by the Employer’s Representative during periods of planned maintenance, the Contractor shall ensure that the specified design capacity is made available at all times during Operation Service Period.

7.1.3. Employer’s Equipment and free issue materials (Operation Service)

*[The Employer shall list here the Employer’s Equipment, raw materials, fuels, electricity, consumables and other items to be made available by the Employer for the use of the Contractor during the Operation Service Period pursuant to GCC 1.1.33, 4.19, 4.20, and 10.4]*

7.2. Contractor’s Documents (Operation Service)

7.2.1. General Requirements for Contractors Documents (Operation Service)

With respect to each of the Contractor’s Documents listed in this section the Contractor shall meet the following requirements:

1. The Contractor shall submit each of the Contractor’s Documents to the Employer’s Representative for its review only, review and consent, or review and approval in accordance with the schedule in Section 7.2.2 below and GCC Sub-Clause 5.2;
2. The Contractor shall begin the implementation of the Contractor’s Documents upon receiving consent or approval from the Employer’s Representative;
3. The Contractor’s Documents shall be implemented by the Contractor at the Contractor’s expense;
4. The Contractor shall review and update the Contractor’s Documents in accordance with the schedule in Section 7.2.2 below. However, routine updates to the Operating and Maintenance Manuals shall not be subject to approval by the Employer’s Representative. Updates to other plans and manuals shall require approval or consent as indicated in GCC 7.2.2.
5. A physical copy of all plans and manuals shall be retained at the Site at all times and available for inspection by the Employer’s Representative.

7.2.2. Submission and approval of Contractor’s Documents (Operation Service)

The Operation Service plans and manuals shall be submitted in accordance with the following timetable:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Initial submission date** | **Update frequency** | **ER review only, review and approval, or review and consent required?1** | **Number of copies to be supplied (see GC 1.9)** |
| Operating and Maintenance Manuals | *[insert deadline date consistent with GCC 9.12]* | *Continuously following modification of assets and/or procedures* | Review and approval (as GCC 9.12). Updates do not require approval. | *[state]* |
| Emergency Response Plan | *[insert deadline date ]* | *[insert revision frequency]* | *[state]* |  |
| Water Quality Testing Plan | *[insert deadline date ]* | *[insert revision frequency]* |  |  |
| Health and Safety Manual (Operation Service) | *[insert deadline date ]* | *[insert revision frequency]* |  |  |
| Quality Assurance Manual | *[insert deadline date ]* | *[insert revision frequency]* |  |  |
| *Add additional documents as needed.* |  |  |  |  |

*[Notes:*

*1. The Employer shall note that GCC 5.2 distinguishes between documents requiring “consent” and documents requiring “approval”.*

*2. The list of Contractor’s Documents shall be further developed by the Employer]*

The Contractor shall keep a copy of the above Contractor’s Documents on Site throughout the term of the Contract.

7.2.3. Operation Service Publications to be kept on Site

The Contractor shall keep the following publications on Site:

*[Employer to specify Operation Service publications to be kept on Site as required under GC 1.9]*

7.2.4. Operating and Maintenance Manuals

Operation and Maintenance Manuals shall include sufficient detail to operate, maintain, dismantle, reassemble, adjust and repair the Plant and Works and shall include, as appropriate:

1. a description and schematic of the Works showing the individual process stages forming the Works. The schematic shall indicate the sequence of the treatment units and show all chemical feed points;
2. facility design criteria and capacities, including the dimensions and rated capacity of all equipment;
3. step-by-step operating instructions for all major components and unit processes used at the plant. The section shall also cover all the operating conditions routinely or periodically encountered, including start-up procedures, shut down procedures, and emergency operating procedures;
4. chemical management procedures, including step-by-step instructions to be used to store, handle, and feed each chemical used at the facility;
5. Maintenance procedures, including, preventative maintenance schedules, calibration schedules, lubrication schedule, step-by-step maintenance instructions whenever possible, parts inventory and manufacturer/parts supplier/vendor details;
6. Instrument calibration procedures and schedules;
7. Record keeping requirements (daily logs, maintenance records, routine reports, engineering drawings, equipment specifications, warrantees, instruction manuals, training records, etc.).

7.2.5. Emergency Response Plan

The Contractor shall prepare an emergency response plan (the “Emergency Response Plan”) to manage emergencies covering,

1. major plant failures;
2. chemical spills;
3. contamination of the water source;
4. pollution of the environment;
5. extreme weather conditions;
6. natural disasters;
7. accidents
8. other similar emergencies

The Contractor shall include in the Emergency Response Plan:

1. contingency plans for all identified emergencies;
2. the identities of key Contractor and Employer emergency response coordination staff, together with emergency contact details;
3. procedures to provide immediate notification to the Employer’s Representative upon the occurrence of any emergency;
4. the location of emergency equipment and other resources;
5. training programs for the Contractor’s staff; and
6. an annual program for emergency response exercises.

7.2.6. Water Quality Testing Plan

The Contractor shall develop a water quality testing plan (the “Water Quality Testing Plan”). The Water Quality Testing Plan shall include:

1. details of the laboratory and testing equipment and instruments used at the plant;
2. location of monitoring and sampling points;
3. methods, procedures, schedules and frequencies of sampling and analysis of raw water and treated water, including procedures for validation of test results if an initial test indicates that a specified standard has been breached;
4. methods, procedures, schedules and frequencies of sampling and analysis of sludge and other screening materials;
5. step-by-step instructions for each laboratory test the plant conducts;
6. a plan to monitor noise and other local environmental impacts;
7. a program to monitor whether the Works is complying with Environmental Management Plan;
8. a detailed protocol for immediately notifying the Employer and any relevant regulatory authority of any failure to meet the specified standards;
9. a protocol for addressing any non-compliance of the Works
10. methods for testing the accuracy of instruments; and
11. calibration schedules, with frequencies and methods for calibration of the different instruments.
12. procedures for audit and validation of test results;
13. protocols for documentation of sampling and analysis results;

The methods and frequencies of sampling and testing in the Water Quality Testing Plan shall comply with the requirements of the regulatory authorities, and with the methods and frequencies specified in these Employer’s Requirements.

7.2.7. Health and Safety Manual (Operation Service)

The Contractor shall develop written health and safety procedures (the “Health and Safety Manual”) covering all aspects of the operation and maintenance of the Works, including (but limited to):

1. Health and safety hazard analysis;
2. Health and safety precautions;
3. Personal protective clothing and equipment and safety gear;
4. Procedures for dealing with a health and safety incident;
5. Health and safety staff responsibilities;
6. Use of, storage of, safety arrangements, and evacuation procedures in connection with chemical facilities;
7. Confined space entry procedures;
8. Safety measures to manage risks from the build-up of methane and other noxious gases;
9. Fire equipment inspection procedures.

7.2.8. Quality Assurance Manual

The Contractor shall develop a quality assurance manual (the “Quality Assurance Manual”) in accordance with the requirements of GCC 4.9 and EN ISO 9001. The quality assurance system shall be ISO approved and certified.

7.3. Staff organisation and training

7.3.1. Staff organisation

No later than 21 days before the date of commencement of the Operation Service the Contractor shall submit to the Employer’s Representative, for approval, a staffing plan showing:

1. the Contractor’s proposed organization for carrying out the Operation Service.
2. the names, qualifications and experience of all operation and maintenance personnel.

The Contractor shall promptly inform the Employer’s Representative in writing of any changes to its staffing or organisational arrangements.

The Contractor shall ensure that its staff has expertise and experience consistent with the requirements specified in Section 8 of these ER.

7.3.2. Training of Contractor’s Personnel

The Contractor shall prepare and implement a staff training plan (the “Staff Training Plan”) for the training of the Contractor’s operations and maintenance staff. The Staff Training Plan shall be submitted to the Employer’s Representative for comment but shall not require the approval of the Employer’s Representative.

The quality and effectiveness of the Contractor’s training programmes shall form part of the audit of the Contractor’s performance undertaken by the Auditing Body under GCC 10.3.

7.3.3. Training of Employer’s Personnel

The Contractor shall provide familiarity training on an as-needed basis to nominated members of the Employer’s and Employer’s Representative’s supervisory staff covering the design, operation and maintenance of the Works and the Contractor’s procedures for reporting and quality control.

*[The Employer shall add/substitute additional training if required, and shall specify its requirements for specialist training staff, and training materials as required under GCC 10.5]*

7.4. Health and safety

The Contractor shall:

1. Ensure that its operating and maintenance procedures follow good health and safety practice;
2. Ensure that the Works is maintained at all times in a safe condition.
3. Train all its staff on health and safety issues in accordance with the Health and Safety Manual and the Staff Training Plan;
4. Provide for all staff and visitors the necessary protective and safety equipment and clothing.
5. Provide all necessary safety and first aid equipment.

The Contractor’s staff shall include an Accident Prevention Officer who shall be responsible for safety at the Works. The Accident Prevention Officer shall be properly qualified and experienced in water treatment safety matters. The Contractor shall notify the Employer of the identity of the Accident Prevention Officer.

The responsibilities of the Accident Prevention Officer shall include:

1. safety training
2. safety inspections, and
3. promoting good safety practice
4. investigation of accidents and health and safety breaches.
5. the inspection and maintenance of fixed and portable fire protection equipment

7.5. Treatment and disposal of wastes from treatment operations

*[The Employer shall describe here:*

* *Requirements for storage of sludge on site and transport of sludge for disposal;*
* *Acceptable and non-acceptable methods of sludge disposal;*
* *The location of approved disposal sites (e.g. landfill, incineration etc);*
* *The Contractor’s obligations to obtain approval from the Employer’s Representative for any changes to the disposal site or method;*
* *The Contractor’s responsibilities for payment of amounts due for the disposal of wastes;*
* *Ownership of any revenues from the beneficial sale of sludge.]*

7.6. Maintenance requirements

7.6.1. General maintenance provisions

The Contractor shall carry out maintenance of all Plant and equipment in accordance with the manufacturers’ recommendations and the Operation and Maintenance manuals. The specification of spare parts, in terms of the materials used and the quality of manufacture shall be in accordance with the recommendations of the original manufacturer.

The Contractor shall ensure that buildings and ancillary structures are kept clean and continuously maintained in a proper and orderly fashion. The Contractor shall maintain, repair, paint, and replace all structures, building elements (including fittings and services), and office furniture as necessary to maintain the appearance and functionality of the Works.

The Contractor shall maintain outside spaces in a tidy condition and undertake maintenance of paved areas, lawn areas, plants, shrubs, bushes and trees.

7.6.2. Maintenance management system and inventory control

The Contractor shall develop and implement a computerised maintenance and inventory control system which shall include, but not be limited to:

* a system for planning and scheduling preventative maintenance works;
* a system for spare part inventory control;
* a system for recording all preventative and reactive maintenance undertaken by the Contractor.

7.7. Measurement and testing during the Operation Service Period

7.7.1. General

The Contractor shall undertake all monitoring, sampling and testing in accordance with:

* The minimum frequencies and sampling methods specified in these Employer’s Requirements;
* The approved Water Quality Testing Plan;
* The Environmental Management Plan;
* Any additional requirements specified by the applicable regulatory authorities.

7.7.2. Flow measurement

The Contractor shall monitor and report on:

* The volume and rates of flow of raw water abstracted
* The volume and rates of flow of treated water delivered
* The volume of water used in process.

Meters and flow measurement devices shall be checked and recalibrated every two years, or in accordance with the manufacturer’s recommendations if more frequent testing is recommended.

7.7.3. Sampling methods and frequencies

*[The Employer shall include a schedule showing the type of sampling and the minimum testing frequencies for each chemical, radiochemical and biological parameter covered by the water quality standards. Indicative example below]*

|  |  |  |
| --- | --- | --- |
| ***Parameter*** | ***Type of sampling*** | ***Frequency of testing*** |
| *Turbidity* | *In-line* | *continuous* |
| *Coliforms* | *Etc* | *Etc* |
| *Etc* | *Etc* | *Etc* |
|  |  |  |
|  |  |  |
|  |  |  |

7.7.4. Measurement of noise

*[The Employer shall describe the requirements for measuring and reporting on noise]*

7.7.5. Third party validation of results

In order to check and validate the Contractor’s laboratory results, the Employer’s Representative may at any time:

1. authorise third parties to take samples and undertake independent testing on its behalf; and
2. require the Contractor to take samples on its behalf and to have such samples tested at an independent laboratory.

7.8. Asset Replacement

When an asset is to be replaced pursuant to GCC Sub Clause 14.5 (Asset Replacement Schedule) and GCC 14.18 (Asset Replacement Fund) the specification of the replacement asset shall be on the basis of “equal or better” and the design life of the replacement asset shall be in accordance with the asset life table in Section 4.5 of these Employer’s Requirements.

7.9. requirements during the Operation Service Period

7.9.1. Information to be notified immediately

The Contractor shall immediately notify the Employer’s Representative in the event of the following:

1. A major breakdown of the Works;
2. A major accident or pollution incident;
3. A breach of water standards that creates risks to public health.

7.9.2. Monthly progress report

Within 7 days of the end of each calendar Month, the Contractor shall submit a monthly report to the Employer’s Representative summarising the technical performance, staffing and operation and maintenance of the Works. The layout of the reports and other general requirements shall be discussed and agreed with the Employer’s Representative.

The Monthly report shall include:

1. Water production statistics (volumes abstracted, used in process, and supplied);
2. Water quality test results;
3. Details of quantities and quality of sludge and other waste materials and records of delivery to disposal site;
4. Plant and Works outages;
5. A summary of compliance with the Performance Standards;
6. Records of consumption of electricity and chemicals;
7. A summary of Plant and equipment repair, overhaul, and replacement activities undertaken in the Month;
8. asset replacement undertaken under the Asset Replacement Fund;
9. a report on exceptional events, emergency operations, and accident statistics during the Month;
10. a summary of complaints received from the public;
11. a programme for major Plant maintenance and asset replacement for the following three Months;
12. any other data reasonably requested by the Employer’s Representative.

The Monthly report shall be submitted in electronic form only.

7.9.3. Annual report

The Contractor shall, each year, prepare and submit an Annual report summarising the Contractor’s performance of the Operation Service in the previous year. The format and scope of the Annual report shall be discussed and agreed in advance with the Employer’s Representative. The reports shall summarise the data provided in the Monthly reports.

The timing of annual reports (for instance, whether they should be aligned to Calendar years or Contract year) shall be as specified by the Employer’s Representative. The Annual report shall be submitted no later than 28 days following the end of the reporting year.

7.9.4. Documents to be held on site during the Operation Service Period

The Contractor shall at all times hold the following documentation on Site during the Operation Service Period:

1. Contractor’s Documents (Design-Build) listed in Section 4.6 of these Employer’s Requirements;
2. Contractor’s Documents (Operation Service) listed in Section 7.21 of these Employer’s Requirements;
3. Environmental Management Plan;
4. Commissioning testing records and Commissioning Certificate;
5. SCADA records, sampling and testing records, calibration records, incidence and failure records, and safety records;
6. The following publications: *[the Employer shall list publications as required in GCC 1.9]*

8. Contractor’s Staff and Expertise

8.1. General

The Contractor’s Personnel shall have qualifications and experience consistent with the requirements specified in Table 9.1 and 9.2.

The Contractor is encouraged to use local labour that has the necessary skills.

All supervisory personnel employed at the Site shall be able to read, write and converse in the ruling language of the Contract specified in PCC 1.4.

*[The Employer shall provide details here of any requirements for the engagement of staff if different from GCC 6.1 (Engagement of Staff and Labour)].*

**Table 9.1 Qualifications and Experience – Design Build**

*[Note: The list of Key Staff is a sample only, and will be revised for each project.]*

| ***Position*** | ***Qualifications required*** | ***Experience required*** |
| --- | --- | --- |
| *Design Manager* |  |  |
| *Process designer* |  |  |
| *Construction Manager* |  |  |
| *Accident Prevention Officer (Construction)* |  |  |
| *Quality Assurance Manager* |  |  |

**Table 9.2: Qualifications and Experience – Operation Service**

*[Note: The list of Key Staff is a sample only, and will be revised for each project.]*

| ***Position*** | ***Qualifications required*** | ***Experience required*** |
| --- | --- | --- |
| *WWTP Manager* |  |  |
| *Accident prevention officer (operations)* |  |  |
| *Process control engineer* |  |  |
| *etc* |  |  |

9. Hand-Back Requirements

9.1. General requirements

At the Contract Completion Date, the Works shall be:

1. in a reasonable condition of repair, cleanliness and appearance taking into account its age and allowing for reasonable wear and tear; and
2. capable of meeting the standards specified in the Schedule of Performance Standards.

The procedures for testing, inspection and remedying of defects prior to handback shall be as detailed in the GCC 10.8.

9.2. Hand-back inventories

At the Contract Completion Date the Contractor shall hand-over the following stocks of consumables, spare parts and special tools:

1. Spare parts sufficient for [*insert number*] Months operation of the Works based on manufacturer’s recommendations;
2. Chemicals sufficient for [*insert number*] Months operations;
3. Fuel stock for the emergency generators sufficient for [*insert number*] weeks of continuous operation;
4. Other consumable supplies (e.g. lubricants etc.) sufficient for [*insert number*] Months of the operations;
5. All special tools as are necessary to carry out maintenance in accordance with the manufacturers recommendations.
6. *[The Employer to add additional requirements]*

No less than six months prior to the Contract Completion Date, the Employer and the Contractor shall meet and agree on a detailed inventory of spare parts, special tools, and consumables to satisfy the requirements indicated above.

For the avoidance of doubt, the above inventories shall be provided at the Contractor’s expense.

*[If the treatment plant uses a membrane process the Employer should also specify its requirements for replacement of the membranes before the end of the contract]*

9.3. Training of Employer’s follow-on O&M personnel

No less than eight months prior to the Contract Completion Date, the Contractor shall prepare and deliver to the Employer for its approval a training plan for the Employer’s follow-on O&M personnel (or personnel designated by the Employer). The aim of the training plan shall be to equip the follow-on O&M personnel with the knowledge and skills necessary to operate and maintain the Works.

Following approval of the training plan the Contractor shall provide formal and on-the-job training for up to *[insert number]* personnel in accordance with GCC 10.5.

The training shall cover at least the following:

1. managing, operating, controlling, monitoring and maintaining the Works, the individual treatment processes and all associated plant and equipment;
2. data filing and processing and reporting;
3. assembly, dismantling and maintenance of equipment and plant;
4. fault diagnosis and rectification
5. the Operation and Maintenance Manuals,
6. the Health and Safety Manual
7. the Emergency Response Plan
8. the Water Quality Testing Plan
9. Quality Assurance Plan

All training shall be completed by the end of the Operation Service Period.

The Contractor shall bear the cost of planning the training program and providing trainers, training materials and training venues. The Employer shall be responsible for all wages, travel and subsistence associated with the participation its nominated personnel in the approved training program.

10. Terms of appointment for the Auditing Body

10.1. General

The Contractor shall engage and pay for the Auditing Body specified in GCC Clause 10.3 using the provisional sum amount included in the Contract Price for the Operating Service.

The terms of the agreement between the Auditing Body and the Contractor shall be subject to the approval of the Employer.

10.2. The procedure for appointment of the Auditing Body

The procedure for the appointment of the Auditing Body shall be as follows:

1. The Contractor shall propose a shortlist of a minimum of *[Employer to provide number]* candidates for the approval of the Employer.
2. If the Employer requires the removal of a candidate from the shortlist in (a) above, then the Contractor shall remove such candidate and shall propose a substitute candidate for the approval by the Employer.
3. Following approval of the Contractor’s shortlist, the Contractor shall undertake a competitive procurement of the Auditing Body from the agreed shortlist.
4. The procedures for procurement, evaluation and selection, and the terms of appointment, of the Auditing Body shall all be subject to the approval of the Employer.

If the Parties cannot agree on the appointment of the Auditing Body the matter shall be referred to the DAB for resolution.

The appointment of the Auditing Body shall be for a period of three years unless otherwise agreed by the Parties.

10.3 Reappointment procedure

The Auditing Body’s appointment may be renewed subject to the agreement of both parties. If either party objects to the renewal of the Auditing Body, then the Parties shall appoint an alternative Auditing Body following the same procedure as above.

10.4. Scope of services of the Auditing Body

The Auditing Body shall audit and monitor the performance of the Contractor, the Employer and Employer’s Representative. Notwithstanding that the Auditing Body is engaged by the Contractor, the Auditing Body shall act independently and impartially.

The scope of services of the Auditing Body shall include the following:

1. To assess the overall performance of the Contractor;
2. To review the quality and comprehensiveness of the Contractor’s Documents (Operation Service) described in Section 7 of these Employer’s Requirements;
3. To review the Contractor’s procedures for testing, reporting and quality control;
4. To undertake sample audits of the data provided in the Monthly and Annual progress reports submitted by the Contractor and to comment on the accuracy and comprehensiveness of such reports;
5. To comment on the quality of the Contractor’s records and audit trails;
6. To assess the Contractor’s compliance with the Performance Standards and the Environmental Management Plan;
7. To comment on the reliability of the Plant and adequacy of the Contractor’s maintenance procedures;
8. To review the adequacy of the training plans of the Contractor and to identify where additional training is needed;
9. To review any complaints received from the public in respect of the operation of the treatment facility;
10. To review financial management practices of the Employer and the Employer’s Representative;
11. To make recommendations for improvements in the Contractor’s management or operation of the Operation Service;
12. To make recommendations for improvements in the Employer’s management and oversight of the Contract;
13. To prepare a draft annual performance report for discussion with the Parties;
14. To prepare a final annual performance audit report.

The draft and final annual performance reports shall be submitted simultaneously to the Contractor and Employer’s Representative.

11. Standards and codes

The following is a list of acceptable standards and codes which shall be adopted by the Contractor in the design, execution and operation of the Works. The Employer may accept other comparable codes and standards provided that they are widely accepted internationally.

*[The Employer shall include a schedule of standards and codes, as required under GCC 5.4, covering for instance:*

* *Civil and Building*
* *Earthworks*
* *Concrete*
* *Liquid retaining structures*
* *Mechanical and Electrical*
* *Protective coatings]*

Appendix 1: Environmental Management Plan

***[****Insert relevant EMP provisions****]***

Appendix 2: Influent Baseline Appendix

*The Employer shall note that the information in this table will be the basis for the bidder’s/Contractor’s design and may be used for assessing adjustments in price in the event of long term changes in influent conditions under PCC 13.9.*

**Influent Quality Baseline**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Mean Annual Value** | **Design Range\*** |
| **Min** | **Max** |
| *e.g. Suspended Solids* | Mg/l |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

*\* If the Employer intends to specify the design range, it should specify range values for critical parameters (e.g. salinity in the case of a sea water RO plant). It is not normally necessary to specify ranges for all parameters.*

*The alternative approach would be to make the Contractor responsible for assessing a suitable design range, in which case the last two columns may be removed.*

Appendix 3: Financial Memorandum

*[The Employer shall attach here the Financial Memorandum which details the Employer's financial arrangements as required under GCC 1.1.43.]*

Annex C: Template for Employer’s Requirements
(Wastewater Treatment Plant)

Section VII: Employer’s Requirements

Template for
Wastewater Treatment Plant
DBO Contracts

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1. Summary of Employer’s Requirements

1.1. The Project

*[The Employer shall provide an overview of the project in this section setting out the objectives for the project and key elements of the Works and Operation Service]*

1.2. The Schedule of Performance Standards

The Contractor shall plan, design, construct, operate and maintain the Works as necessary to meet the standards specified in the Schedule of Performance Standards. In the case of any conflict between the standards specified in these Employer’s Requirements and those specified in the Schedule of Performance Standards, the requirements of the Schedule of Performance Standards will take precedence.

*Optional provision: “The Employer may, subject to any conditions that (in its sole discretion) it may deem appropriate, agree to a temporary and limited relaxation of such standards to undertake planned maintenance during the Operation Service Period.”*

1.3. Limitations on process selection and design

*[The Employer shall state here whether there are any limitations on the choice of treatment process or other design elements. For instance the Employer may wish to exclude certain process technologies which it regards as unsuitable, or it may want to have all bidders submit bids on the basis of the same process technology which may make bid evaluation less subjective]*

1.4. Nominated Sub-contractors and co-operation with other contractors

*[the Employer shall provide details of:*

* *nominated Subcontractors which the Contractor is required to engage as required under GCC 4.5 (if any);*
* *any other contractors working on the Site as required in GCC 4.6]*

2. The Site

2.1. Site Map / Service area map

*[The Employer shall include a scaled map showing the following information:*

* *The Site and its boundaries;*
* *Points, lines and levels of reference to be used for setting out purposes (as required in GCC 4.7;*
* *Site access;*
* *The influent sewer;*
* *The WWTP outfall;*
* *The* ***precise*** *physical points at which the Contractor’s responsibilities start and end;*
* *The Existing Facility (if any)*
* *Infrastructure to be demolished;*
* *Infrastructure to be retained and/or refurbished.*
* *Location of electrical power offtake*
* *Location of existing utility services (if known)*
* *Any other information required by bidders to prepare a priced proposal]*

2.2. Right of Access to the Site

*[The Employer shall indicate the time and manner in which it will give the Contractor possession of the Site and any foundation, structure, plant or means of access to the Site as required in GCC 2.1. Ensure consistency with the Contract Data]*

3. WWTP Technical Requirements

*[The key output standards for the plant will be specified in the Schedule of Performance Standards. To minimise the risks of inconsistencies in the documents, it is preferable to refer to the Schedule of Performance Standards rather than duplicating the performance criteria that are already included in the schedule]*

3.1. Description of Catchment

3.1.1. Geographic area served by the WWTP

3.1.2. Residential / commercial / industrial profile

3.1.3. Future development plans

3.2. WWTP flows and capacity requirements

3.2.1. Installed capacity

The Contractor shall design and build the Works to meet the minimum capacity requirements specified in the Schedule of Performance Standards, and shall ensure that such capacity is available throughout the Operation Service Period.

*[The Employer shall specify the minimum design capacity of the Works, including Dry Weather Flow (DWF) capacity & peak hourly and daily flows]*

3.2.2. Current and Future WWTP Influent Flows

*The Employer’s wastewater flow projections (dry weather / average etc.) shall be included here or in Appendix 2.*

3.3. Wastewater composition

3.3.1. Base data on wastewater influent characteristics

*[The Employer’s assessment of wastewater influent characteristics shall be described here and reference made to Appendix 2.*

*The contract will need to address the risks associated with changes in Wastewater composition. This may be achieved through a combination of approaches, such as:*

* 1. *selecting an Operation Service payment arrangement which insulates the Contractor from changes in influent quality; and/or*
	2. *providing for an adjustment in price in the event of a long term change in wastewater characteristics (see PCC 13.9).*

*The Employer will also need to decide whether to make the Contractor responsible for assessing a suitable design range for key parameters, or whether to specify the design range in Appendix 2. If the Contractor is made responsible the Employer will need to satisfy itself that the winning bidder’s/ Contractor’s design has made sufficient allowance for variability in the influent composition.*

*Whichever approach is chosen the Employer should provide the Contractor/Bidders with as much information as possible about the nature and variability of the wastewater influent.*

3.4. Effluent discharge requirements

Treated effluent discharged from the Works shall at all times comply with the discharge standards specified in the Schedule of Performance Standards.

The treated effluent shall be discharged into *[describe the name and location of the receiving watercourse and detailed requirements for outfalls etc.].*

3.5. Standards for sludge and other wastes

*[The Employer shall specify the output standards applicable to treatment, storage and disposal of wastes, e.g.:*

* *Dry solids / volatile organic compound standards*
* *On-site storage requirements (days)*
* *Sludge disposal requirements (e.g. location of approved landfill sites)*
* *Provisions relating to beneficial re-use of sludge*
* *The amount and nature of charges to be borne by the Contractor in relation to disposal of the Sludge.*

*Additional details may be included in Section 7.5]*

3.6. Efficiency requirements

*[For short and medium duration DBO contracts it will be necessary to specify minimum standards for efficiency, e.g. in relation to energy efficiency and chemicals use.]*

3.7. Other environmental requirements

*[Noise and smell can be important considerations if the WWTP is to be developed in a built-up area]*

3.8. Materials requirements

*[The Employer shall specify its minimum requirements for materials, e.g. acceptable pipe materials, grades of stainless steel, concrete cover, etc.]*

3.9. Electricity and Power

3.9.1. Available electrical supply to the WWTP

3.9.2. Standby generation requirements

*[State how much standby generation capacity is required – if any]*

3.9.3. On-site power generation (if required)

*[State here whether the Contractor is permitted/ required to generate electricity on site from biogas]*

3.10. Monitoring, sampling and testing equipment

3.10.1. Flow parameters

Flow measurement devices shall be installed to measure the following:

1. Volume and flow rate of wastewater influent
2. Volume of septage received at the Works
3. Volume and flow rate of treated wastewater discharged from the Works
4. Volume and flow rate of wastewater bypassed
5. *[Employer to add additional requirements]*

All meters and other flow measurement devices shall be sited to avoid interference from flow turbulence and shall be accurate to within the following tolerances:

* *[Employer to state accuracy range requirements for flow meters].*

3.10.2. Sampling and testing equipment

*[The Employer shall specify its minimum requirements for the type and location of sampling and testing equipment, covering for instance:*

* *In-line testing parameters / requirements (e.g. pH, conductivity, COD etc.)*
* *Flow proportional sampling / time proportional sampling*
* *Spot sampling]*

3.10.3. Site laboratory and equipment

*[The Employer shall indicate whether it requires the Contractor to provide an on-site laboratory, and if so what testing equipment shall be supplied]*

3.11. Other design-build requirements

3.11.1. Site Access

3.11.2. Instrumentation, SCADA and telemetry

3.11.3. Septage receiving point

3.11.4. Administration buildings, stores, workshops

3.11.5. Security and boundary fencing

3.11.6. Utilities, drainage, firefighting

3.11.7. Landscaping and parking

4. Planning, design, approvals and documents

4.1. General

With respect to the planning and design of the Works, the Contractor shall:

1. ensure that the Works is designed to comply with the specifications included in these Employer’s Requirements and the standards of performance included in the Schedule of Performance Standards.
2. ensure that its designs are in accordance with the design codes and standards specified in Section 11 of the Employer’s Requirements or where not so specified, in accordance with good engineering practice;
3. design the Works to minimise adverse environmental impacts;
4. meet all the obligations under the prevailing environmental regulations and the Environmental Management Plan;

Unless otherwise agreed with, or directed by, the Employer’s Representative the Contractor’s Design shall be consistent with the Contractor’s Technical Proposal.

4.2. The Environmental Management Plan

*[The Employer shall specify the scope of the Contractor’s responsibilities for preparing and implementing the EMP. If the EMP has already been prepared it shall be included in the Employer’s Requirements as an appendix.]*

4.3. Permits and approvals (requirements)

*[The Employer shall, as required by GCC 1.14:*

* *Describe the permissions, licences, and approvals that have been obtained, or will be obtained by the Employer before construction commences;*
* *Specify the permissions, licenses, approvals or notices that must be obtained or given by the Contractor;*
* *Specify the fees, taxes, and duties required to be paid by the Contractor in respect of any licenses or other permissions]*

4.4. Initial site investigations and studies

*[It is the Employer’s responsibility to provide sufficient accurate and reliable information to enable bidders to design and price the Works. The Employer shall state in this section what surveys it requires the Contractor to undertake to verify or supplement the data provided by the Employer after the contract has been awarded]*

4.5. Durability of the Works

The Contractor shall design the Works to meet or exceed the minimum asset lives shown in the asset life table below.

|  |  |
| --- | --- |
| **Description** | **Design life (years)** |
| Water and wastewater pipelines  | [……] |
| Civil and structural works  | [……] |
| Building works (administration, ablution, laboratory, workshop, store) | [……] |
| Roads and infrastructure works | [……] |
| Steelwork | [……] |
| Pumps and mechanical equipment | [……] |
| Equipment for chemical precipitation and polymer preparation | [……] |
| Switchgear, transformers, internal cabling, heavy electrical equipment | [……] |
| Instrumentation and control | [……] |
| Emergency generator | [……] |

The Contractor shall develop and submit to the Employer’s Representative for approval, a durability plan (The Durability Plan) which will demonstrate how its design will meet the specified asset lives. The Durability Plan shall include:

1. An analysis of the nature of the Works environment and the main durability issues to be addressed;
2. Specifications for concrete and reinforced concrete structures including proposed concrete specifications, crack width limits, concrete cover provisions, use of epoxy coated or stainless steel reinforcement bars, and use of proprietary concrete surface coatings and treatments;
3. Specifications for steel and stainless steel used in civil and building structures and specifications relating the use of galvanised or other coatings;
4. Specifications for ancillary structures such as walkways, handrails, and stairways;
5. Specifications for critical mechanical and electrical plant and equipment;
6. Specifications relating to buildings and architectural features.

4.6. Contractors Documents (Design Build) and progress reports

4.6.1. Submission and approval of Contractor’s Documents (Design-build)

The Contractor shall prepare the following Contractor’s Documents for the Design-Build for review only, review and approval, or review and consent by the Employer’s Representative.

If no submission date is specified, the submission dates shall be in accordance with the Contractor’s time programme, prepared pursuant to GC 8.3.

**Contractor’s Documents (design-build)** *- example*

| ***Report/deliverable*** | ***Deadline for Submission*** | ***ER review only, ER review and approval, or ER review and consent1*** | ***Nr of copies to be supplied (see GC 1.9)*** |
| --- | --- | --- | --- |
| Contractor’s Programme(see GC 8.3) | As GC 8.3 | Review & approval | *[state]* |
| *Initial site surveys* | *[insert date]* | *[state]* | *[state]* |
| *Quality Assurance Plan (Design Build)* |  |  |  |
| *Health and safety plan (Design-Build)* |  |  |  |
| *Durability Plan* |  |  |  |
| *Design Report* |  |  |  |
| *Preliminary design drawings* |  |  |  |
| *Construction drawings* |  |  |  |
| As-built drawings | As GCC 5.5 | As GCC 5.5 | *[state]* |
| *Plan for the Tests on Completion of Design Build Etc.* |  |  |  |
| O&M Manuals | As GCC 5.6 | As GCC 5.6 | *[state]* |

*[Notes:*

*1. The Employer shall note that GCC 5.2 distinguishes between documents requiring “consent” and documents requiring “approval”*

*2. The list of Contractor’s Documents is an example only and shall be developed by the Employer]*

The Contractor shall keep a copy of the above Contractor’s Documents on Site throughout the term of the Contract.

4.6.2. Design-Build Publications to be kept on Site

The Contractor shall keep the following publications on Site:

*[Employer to specify publications to be kept on Site as required under GC 1.9]*

4.6.3. Progress Reports during the Design-Build

*[The Employer shall describe contents of the DB progress reports and numbers of copies required, if different from GCC 4.21. Alternatively state “As GCC 4.21” if the Employer considers GCC 4.21 to be sufficient for its needs]*

5. Existing Facilities

*[If the Contractor is required to operate existing infrastructure during the Design Build Period, then this section shall describe the rehabilitation and O&M services to be provided and the performance standards to be achieved in the DB Period.*

*The text may need substantial modification depending, for instance, on the type of facilities to be operated, the condition of the facilities, whether the facilities are to be incorporated in the permanent works or later demolished, and the availability of free electricity and other supplies.*

*If there are no Existing Facilities to be operated by the Contractor then the Employer shall state “Not Used” or “Not Applicable “in each sub-section]*

5.1. Description of the Existing Facilities

*[The Employer shall describe the Existing Facilities to be operated by the Contractor during the DB Period.]*

5.2. Contractor’s Responsibilities for rehabilitation of the Existing Facilities

*[The Employer shall provide details of any rehabilitation and replacement works and identify how such works will be paid for (e.g. using a provisional sum identified for the purpose in the price schedules)]*

5.3. Contractor’s Responsibilities for operating the Existing Facilities

Commencing [ …] days following the Commencement Date and ending on the Operation Service Commencement Date the Contractor shall carry out all operations and maintenance of the Existing Facilities including,

1. receiving and treating wastewater at the Existing Facilities;
2. using its best endeavours to meet the discharge standards specified for the Existing Facility, taking into account the condition, serviceability and limitations of the Existing Facilities;
3. operating and maintaining the assets and equipment forming the Existing Facilities;
4. providing labour, plant, power and electricity, chemicals, lubricants, spare parts and overheads necessary for operation and maintenance of the Existing Facilities;
5. providing the following insurances *[Employer to specify]*
6. sequencing the construction of the Works to minimise disruption to the operation of the Existing Facilities;
7. rehabilitating or replacing equipment and assets of the Existing Facility using the provisional sum identified for that purpose in the price schedules.
8. undertaking all monitoring required by the Applicable Law;
9. providing monthly reports of performance of the Existing Facilities to the Employer.

5.4. Employer’s Equipment and free issue materials (Existing Facilities)

*[The Employer shall list here the Employer’s Equipment, raw materials, fuels, electricity, consumables and other items to be made available by the Employer for the use of the Contractor during the Design-Build Period as required for GCC 1.1.33, 4.19, 4.20 and PCC 4.27]*

5.5. Incorporation of Existing Facilities into the Works

*[The Employer shall describe what will happen to the Existing Facilities at the Operation Service Commencement Date. For instance, whether the Existing Facilities will be deemed to form part of the Works as indicated in GCC 4.27, or whether they will be decommissioned or demolished etc.]*

6. Demolition, earthworks, construction and commissioning

6.1. General obligations

The Contractor shall:

1. provide all of the demolition, excavation, building, co-ordination, repair, review, inspection, testing, quality assurance and control, monitoring, scheduling, clean-up and other construction work and services required for the modification of the Site and the building of the Works.
2. undertake all demolition, excavation, and building work in accordance with the Contractor’s Documents specified in these Employer’s Requirements, as approved by the Employer’s Representative where applicable.
3. be solely responsible for the construction means, methods, techniques, sequences, and procedures and for co-ordinating the various parts of the design-build under the Contract.

6.2. Facilities for the Employer’s Personnel during the design build period

*[The Employer shall specify any facilities that will be required for the Employer’s Personnel as required under GCC 6.6.]*

6.3. Contractor’s site access and facilities

*[Generally, the Contractor shall be free to organise its site access, site accommodation and site storage facilities as it wishes. However, if the Employer intends to provide facilities for use by the Contractor, or to impose any conditions on site access or the Contractor’s facilities they shall be included here as required under GCC 6.6 (Facilities for Staff and Labour.]*

6.4. Electricity, Water and Gas during the Design-Build

*[The Employer shall provide details of the electricity, water, gas and other services that are available on Site and shall indicate whether any of these utilities and services will be made available free of charge to the Contractor – see GCC 4.19]*

6.5. Employer’s Equipment and free issue items (Design-Build)

*[The Employer shall list here the apparatus, machinery and vehicles, and materials (if any) to be made available by the Employer for the use of the Contractor during the Design-Build Period pursuant to GCC 1.1.33. and GCC 4.20]*

6.6. Demolition

The conditions for demolition shall be as detailed in GCC 4.26.

The Contractor may retain demolished building materials for his work. All unwanted demolished materials shall be removed from the Site to disposal sites agreed by the Employer’s Representative.

*[The Employer shall describe any additional conditions relating to ownership, sale or return of demolished materials]*

6.7. Samples and testing

*[The Employer shall describe here its requirements with respect to the provision of materials samples as required under GCC 7.2, and with respect to the testing of Plant, Materials and workmanship as required under GCC 7.4]*

6.8. Payment of Royalties

*[The Employer shall describe here its requirements with respect to the payment of royalties, rents and other payments for natural materials obtained outside the Site and the disposal of surplus materials, as required in GCC 7.8]*

6.9. Tests on Completion of the Design-Build

*[The Employer shall describe here its requirements with respect to the Tests on Completion of the Design-Build. The Employer should note the provisions of GC 11.1 [Testing of the Works] and in particular the sequence of tests from “pre-commissioning tests” “commissioning tests” and “trial operation”]*

7. Operation Management Requirements

7.1. General Requirements

7.1.1. Overall description of the Operation Service

The Contractor shall,

1. operate and maintain the Works;
2. receive wastewater influent from the sewer;
3. receive tankered wastewater from septic tanks;
4. treat wastewater, including septic wastes, to meet the specified standards and safely discharge the treated wastewater into the environment *(or at the specified discharge point)*;
5. treat and store sludge and other screenings materials and transport such wastes from the Site for safe disposal, as further specified in these Employer’s Requirements;
6. carry out monitoring, sampling, testing and reporting in accordance with the approved [Wastewater Quality Testing Plan];
7. undertake all preventive and routine maintenance, including repainting of buildings and other structures in accordance with the Contractor’s maintenance management program;
8. plan and carry out all necessary asset replacement whether funded through the Asset Replacement Fund or otherwise;
9. procure at its own expense all things necessary to operate and maintain the Works including labour, plant, equipment, electricity, stand-by power, chemicals, materials, and spare parts;
10. fence and secure the Works and prevent unauthorized access;
11. maintain the site in tidy condition and take measures to control potential environmental nuisance, including but not limited to, odours, litter, pests, insects, rodents and birds;
12. develop and manage programs to train and advance the skills of the Contractor’s Personnel;
13. provide familiarity training to nominated staff of the Employer and Employer’s Representative;
14. carry out all management, financial and administrative responsibilities relating to the Works,
15. manage complaints from the public;
16. provide periodic reports on the operation and performance of the Works.

7.1.2. Performance during the Operation Service Period

1. The Contractor shall ensure that the Works complies at all times with:
2. The conditions of any license or consent issued by the regulatory authorities; and
3. The minimum standards specified in the Schedule of Performance Standards; and
4. Any additional requirements set out in these Employer’s Requirements.
5. The Contractor shall at all times operate and maintain the Works in accordance with the approved Environmental Management Plan and approved Contractor’s Documents including:
6. the Operating and Maintenance Manuals
7. the Emergency Response Plan
8. the Wastewater Quality Testing Plan
9. the Health and Safety Manual
10. the Quality Assurance Manual
11. Where no specific performance standard exists in the Contract the Contractor shall at all times operate and maintain the Works in accordance with good international wastewater utility practice;
12. Except as may be authorised by the Employer’s Representative during periods of planned maintenance, the Contractor shall ensure that the minimum dry weather and peak flow design capacity is made available at all times during Operation Service Period.

7.1.3. Employer’s Equipment and free issue materials (Operation Service)

*[The Employer shall list here the Employer’s Equipment, raw materials, fuels, electricity, consumables and other items to be made available by the Employer for the use of the Contractor during the Operation Service Period pursuant to GCC 1.1.33, 4.19, 4.20, and 10.4]*

7.2. Contractor’s Documents (Operation Service)

7.2.1. General Requirements for Contractors Documents (Operation Service)

With respect to each of the Contractor’s Documents listed in this section the Contractor shall meet the following requirements:

1. The Contractor shall submit each of the Contractor’s Documents to the Employer’s Representative for its review only, review and consent or review and approval in accordance with the schedule in Section 7.2.2 below and GCC Sub-Clause 5.2;
2. The Contractor shall begin the implementation of the Contractor’s Documents upon receiving consent or approval from the Employer’s Representative;
3. The Contractor’s Documents shall be implemented by the Contractor at the Contractor’s expense;
4. The Contractor shall review and update the Contractor’s Documents in accordance with the schedule in Section 7.2.2 below. However, routine updates to the Operating and Maintenance Manuals shall not be subject to approval by the Employer’s Representative. Updates to other plans and manuals shall require approval or consent as indicated in GCC 7.2.2.
5. A physical copy of all plans and manuals shall be retained at the Site at all times and available for inspection by the Employer’s Representative.

7.2.2. Submission and approval of Contractor’s Documents (Operation Service)

The Operation Service plans and manuals shall be submitted in accordance with the following timetable:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Initial submission date** | **Update frequency** | **ER review only, review and approval, or review and consent required?1** | **Number of copies to be supplied(see GC 1.9)** |
| Operating and Maintenance Manuals | *[insert deadline date consistent with GCC 9.12]* | *Continuously following modification of assets and/or procedures* | Review and approval (as GCC 9.12). Updates do not require approval. | *[state]* |
| Emergency Response Plan | *[insert deadline date ]* | *[insert revision frequency]* | *[state]* |  |
| Wastewater Quality Testing Plan | *insert deadline date ]* | *[insert revision frequency]* |  |  |
| Health and Safety Manual (Operation Service) | *insert deadline date ]* | *[insert revision frequency]* |  |  |
| Quality Assurance Manual | *insert deadline date ]* | *[insert revision frequency]* |  |  |
| *Add additional documents as needed.* |  |  |  |  |

*[Notes:*

*1. The Employer shall note that GCC 5.2 distinguishes between documents requiring “consent” and documents requiring “approval”.*

*2. The list of Contractor’s Documents shall be further developed by the Employer]*

The Contractor shall keep a copy of the above Contractor’s Documents on Site throughout the term of the Contract.

7.2.3. Operation Service Publications to be kept on Site

The Contractor shall keep the following publications on Site:

*[Employer to specify Operation Service publications to be kept on Site as required under GC 1.9]*

7.2.4. Operating and Maintenance Manuals

Operation and Maintenance Manuals shall include sufficient detail to operate, maintain, dismantle, reassemble, adjust and repair the Plant and Works and shall include, as appropriate:

1. a description and schematic of the Works showing the individual process stages forming the Works. The schematic shall indicate the sequence of the treatment units and show all chemical feed points;
2. facility design criteria and capacities, including the dimensions and rated capacity of all equipment;
3. step-by-step operating instructions for all major components and unit processes used at the plant. The section shall also cover all the operating conditions routinely or periodically encountered, including start-up procedures, shut down procedures, and emergency operating procedures;
4. chemical management procedures, including step-by-step instructions to be used to store, handle, and feed each chemical used at the facility;
5. Maintenance procedures, including, preventative maintenance schedules, calibration schedules, lubrication schedule, step-by-step maintenance instructions whenever possible, parts inventory and manufacturer/parts supplier/vendor details;
6. Instrument calibration procedures and schedules;
7. Record keeping requirements (daily logs, maintenance records, routine reports, engineering drawings, equipment specifications, warrantees, instruction manuals, training records, etc.).

7.2.5. Emergency Response Plan

The Contractor shall prepare an emergency response plan (the “Emergency Response Plan”) to manage emergencies covering,

1. major plant failures;
2. chemical spills;
3. illegal discharges into the upstream sewer network;
4. pollution of the environment;
5. extreme weather conditions;
6. natural disasters;
7. accidents
8. other similar emergencies

The Contractor shall include in the Emergency Response Plan:

1. contingency plans for all identified emergencies;
2. the identities of key Contractor and Employer emergency response coordination staff, together with emergency contact details;
3. procedures to provide immediate notification to the Employer’s Representative upon the occurrence of any emergency;
4. the location of emergency equipment and other resources;
5. training programs for the Contractor’s staff; and
6. an annual program for emergency response exercises.

7.2.6. Wastewater Quality Testing Plan

The Contractor shall develop a wastewater quality testing plan (the “Wastewater Quality Testing Plan”). The Wastewater Quality Testing Plan shall include:

1. details of the laboratory and testing equipment and instruments used at the plant;
2. location of monitoring and sampling points;
3. methods, procedures, schedules and frequencies of sampling and analysis of wastewater influent and effluent quality, including procedures for validation of test results if an initial test indicates that a specified standard has been breached;
4. methods, procedures, schedules and frequencies of sampling and analysis of sludge and other screening materials;
5. step-by-step instructions for each laboratory test the plant conducts;
6. a plan to monitor smell, noise and other local environmental impacts;
7. a program to monitor whether the Works is complying with Environmental Management Plan;
8. a detailed protocol for immediately notifying the Employer and any relevant regulatory authority of any failure to meet the specified standards;
9. a protocol for addressing any non-compliance of the Works
10. methods for testing the accuracy of instruments; and
11. calibration schedules, with frequencies and methods for calibration of the different instruments.
12. procedures for audit and validation of test results;
13. protocols for documentation of sampling and analysis results;

The methods and frequencies of sampling and testing in the Wastewater Quality Testing Plan shall comply with the requirements of the regulatory authorities, and with the methods and frequencies specified in these Employer’s Requirements.

7.2.7. Health and Safety Manual (Operation Service)

The Contractor shall develop written health and safety procedures (the “Health and Safety Manual”) covering all aspects of the operation and maintenance of the Works, including (but limited to):

1. Health and safety hazard analysis;
2. Health and safety precautions;
3. Personal protective clothing and equipment and safety gear;
4. Procedures for dealing with a health and safety incident;
5. Health and safety staff responsibilities;
6. Use of, storage of, safety arrangements, and evacuation procedures in connection with chemical facilities;
7. Confined space entry procedures;
8. Safety measures to manage risks from the build-up of methane and other noxious gases;
9. Fire equipment inspection procedures.

7.2.8. Quality Assurance Manual

The Contractor shall develop a quality assurance manual (the “Quality Assurance Manual”) in accordance with the requirements of GCC 4.9 and EN ISO 9001. The quality assurance system shall be ISO approved and certified.

7.3. Staff organisation and training

7.3.1. Staff organisation

No later than 21 days before the date of commencement of the Operation Service the Contractor shall submit to the Employer’s Representative, for approval, a staffing plan showing:

1. the Contractor’s proposed organization for carrying out the Operation Service.
2. the names, qualifications and experience of all operation and maintenance personnel.

The Contractor shall promptly inform the Employer’s Representative in writing of any changes to its staffing or organisational arrangements.

The Contractor shall ensure that its staff has expertise and experience consistent with the requirements specified in Section 8 of these ER.

7.3.2. Training of Contractor’s Personnel

The Contractor shall prepare and implement a staff training plan (the “Staff Training Plan”) for the training of the Contractor’s operations and maintenance staff. The Staff Training Plan shall be submitted to the Employer’s Representative for comment but shall not require the approval of the Employer’s Representative.

The quality and effectiveness of the Contractor’s training programmes shall form part of the audit of the Contractor’s performance undertaken by the Auditing Body under GCC 10.3.

7.3.3. Training of Employer’s Personnel

The Contractor shall provide familiarity training on an as-needed basis to nominated members of the Employer’s and Employer’s Representative’s supervisory staff covering the design, operation and maintenance of the Works and the Contractor’s procedures for reporting and quality control.

*[the Employer shall add/substitute additional training if required, and shall specify its requirements for specialist training staff, and training materials as required under GCC 10.5]]*

7.4. Health and safety

The Contractor shall:

1. Ensure that its operating and maintenance procedures follow good health and safety practice;
2. Ensure that the Works is maintained at all times in a safe condition.
3. Train all its staff on health and safety issues in accordance with the Health and Safety Manual and the Staff Training Plan;
4. Provide for all staff and visitors the necessary protective and safety equipment and clothing.
5. Provide all necessary safety and first aid equipment.

The Contractor’s staff shall include an Accident Prevention Officer who shall be responsible for safety at the Works. The Accident Prevention Officer shall be properly qualified and experienced in wastewater treatment safety matters. The Contractor shall notify the Employer of the identity of the Accident Prevention Officer.

The responsibilities of the Accident Prevention Officer shall include:

1. safety training
2. safety inspections, and
3. promoting good safety practice
4. investigation of accidents and health and safety breaches.
5. the inspection and maintenance of fixed and portable fire protection equipment

7.5. Treatment and disposal of wastes from treatment operations

*[The Employer shall describe here:*

* *Requirements for storage of sludge on site and transport of sludge for disposal;*
* *Acceptable and non-acceptable methods of sludge disposal;*
* *The location of approved disposal sites (e.g. landfill, incineration etc);*
* *The Contractor’s obligations to obtain approval from the Employer’s Representative for any changes to the disposal site or method;*
* *The Contractor’s responsibilities for payment of amounts due for the disposal of wastes;*
* *Ownership of any revenues from the beneficial sale of sludge.]*

7.6. Maintenance requirements

7.6.1. General maintenance provisions

The Contractor shall carry out maintenance of all Plant and equipment in accordance with the manufacturers’ recommendations and the Operation and Maintenance manuals. The specification of spare parts, in terms of the materials used and the quality of manufacture shall be in accordance with the recommendations of the original manufacturer.

The Contractor shall ensure that buildings and ancillary structures are kept clean and continuously maintained in a proper and orderly fashion. The Contractor shall maintain, repair, paint, and replace all structures, building elements (including fittings and services), and office furniture as necessary to maintain the appearance and functionality of the Works.

The Contractor shall maintain outside spaces in a tidy condition and undertake maintenance of paved areas, lawn areas, plants, shrubs, bushes and trees.

7.6.2. Maintenance management system and inventory control

The Contractor shall develop and implement a computerised maintenance and inventory control system which shall include, but not be limited to:

* a system for planning and scheduling preventative maintenance works;
* a system for spare part inventory control;
* a system for recording all preventative and reactive maintenance carried out by the Contractor.

7.7. Measurement and testing during the Operation Service Period

7.7.1. General

The Contractor shall undertake all monitoring, sampling and testing in accordance with:

* The minimum frequencies and sampling methods specified in these Employer’s Requirements;
* The approved Wastewater Quality Testing Plan;
* The Environmental Management Plan;
* Any additional requirements specified by the applicable regulatory authorities.

7.7.2. Flow measurement

The Contractor shall monitor and report on:

* The volume and rates of flow of wastewater received at the Works
* The volume and rates of flow of treated wastewater discharged from the Works
* The volume and rates of flow of untreated wastewater discharged via overflows or other bypass arrangements.

Meters and flow measurement devices shall be checked and recalibrated every two years, or in accordance with the manufacturer’s recommendations if more frequent testing is recommended.

7.7.3. Sampling methods and frequencies

*[The Employer shall include a schedule showing the type of sampling and the minimum testing frequencies for each chemical and biological parameter for which a discharge standard is specified. Indicative example below]*

|  |  |  |
| --- | --- | --- |
| ***Parameter*** | ***Type of sampling*** | ***Frequency of testing*** |
| *BOD5* | *24 hour flow proportional samples* | *Daily* |
| *Chemical Oxygen Demand* | *24 hour flow proportional samples* | *Weekly* |
| *Total suspended solids* | *24 hour flow proportional samples* | *Daily* |
| *Etc* |  |  |
| Etc |  |  |
|  |  |  |

7.7.4. Measurement of smell and noise

*[The Employer shall describe the requirements for measuring and reporting on smell and noise]*

7.7.5. Third party validation of results

In order to check and validate the Contractor’s laboratory results, the Employer’s Representative may at any time:

1. authorise third parties to take samples and undertake independent testing on its behalf; and
2. require the Contractor to take samples on its behalf and to have such samples tested at an independent laboratory.

7.8. Asset Replacement

When an asset is to be replaced pursuant to GCC Sub Clause 14.5 (Asset Replacement Schedule) and GCC 14.18 (Asset Replacement Fund) the specification of the replacement asset shall be on the basis of “equal or better” and the design life of the replacement asset shall be in accordance with the asset life table in Section 4.5 of these Employer’s Requirements.

7.9. Reporting requirements during the Operation Service Period

7.9.1. Information to be notified immediately

The Contractor shall immediately notify the Employer’s Representative in the event of the following:

1. A variation in the characteristics of wastewater influent which is indicative of an illegal discharge into an upstream sewer;
2. A major breakdown of the Works;
3. A major accident or pollution incident;
4. A failure to meet the treated effluent discharge standards specified in the Schedule of Performance Standards.

7.9.2. Monthly progress report

Within 7 days of the end of each calendar Month, the Contractor shall submit a monthly report to the Employer’s Representative summarising the technical performance, staffing and operation and maintenance of the Works. The layout of the reports and other general requirements shall be discussed and agreed with the Employer’s Representative.

The Monthly report shall include:

1. monthly influent flow rate graphs and tables showing daily maximum, average and minimum inflow values;
2. laboratory average daily, weekly and monthly results tabulated with maximum and minimum values;
3. quantities and quality of sludge and other waste materials and records of delivery to disposal site;
4. a report on Plant and Works outages;
5. a summary of compliance with the Performance Standards;
6. records of consumption of electricity and chemicals;
7. a summary of Plant and equipment repair, overhaul, and replacement activities undertaken in the Month;
8. asset replacements carried out under the Asset Replacement Fund;
9. a report on exceptional events, emergency operations, and accident statistics during the Month;
10. a summary of complaints received from the public;
11. a programme for major Plant maintenance and asset replacement for the following three Months;
12. any other data reasonably requested by the Employer’s Representative

The Monthly report shall be submitted in electronic form only.

7.9.3. Annual report

The Contractor shall, each year, prepare and submit an Annual report summarising the Contractor’s performance of the Operation Service in the previous year. The format and scope of the Annual report shall be discussed and agreed in advance with the Employer’s Representative. The reports shall summarise the data provided in the Monthly reports.

The timing of annual reports (for instance, whether they should be aligned to Calendar years or Contract year) shall be as specified by the Employer’s Representative. The Annual report shall be submitted no later than 28 days following the end of the reporting year.

7.9.4. Documents to be held on site during the Operation Service Period

The Contractor shall at all times hold the following documentation on Site during the Operation Service Period:

1. Contractor’s Documents (Design-Build) listed in Section 4.6
2. Contractor’s Documents (Operation Service) listed in Section 7.21
3. Environmental Management Plan
4. Commissioning testing records and Commissioning Certificate
5. SCADA records, sampling and testing records, calibration records, incidence and failure records, and safety records.
6. The following publications: *[the Employer shall list publications as required in GCC 1.9]*

8. Contractor’s Personnel and expertise

8.1. General

The Contractor’s Personnel shall have qualifications and experience consistent with the requirements specified in Table 9.1 and 9.2.

The Contractor is encouraged to use local labour that has the necessary skills.

All supervisory personnel employed at the Site shall be able to read, write and converse in the ruling language of the Contract specified in PCC 1.4.

*[The Employer shall provide details here of any requirements for the engagement of staff if different from GCC 6.1 (Engagement of Staff and Labour)].*

**Table 9.1 Qualifications and Experience – Design Build**

*[Note: The list of Key Staff is a sample only, and will be revised for each project.]*

| ***Position*** | ***Qualifications required*** | ***Experience required*** |
| --- | --- | --- |
| *Design Manager* |  |  |
| *Process designer* |  |  |
| *Construction Manager* |  |  |
| *Accident Prevention Officer (Construction)* |  |  |
| *Quality Assurance Manager* |  |  |

**Table 9.2: Qualifications and Experience – Operation Service**

*[Note: The list of Key Staff is a sample only, and will be revised for each project.]*

| ***Position*** | ***Qualifications required*** | ***Experience required*** |
| --- | --- | --- |
| *WWTP Manager* |  |  |
| *Accident prevention officer (operations)* |  |  |
| *Process control engineer* |  |  |
| *etc* |  |  |

9. Hand-Back Requirements

9.1. General requirements

At the Contract Completion Date, the Works shall be:

1. in a reasonable condition of repair, cleanliness and appearance taking into account its age and allowing for reasonable wear and tear; and
2. capable of meeting the standards specified in the Schedule of Performance Standards.

The procedures for testing, inspection and remedying of defects prior to handback shall be as detailed in the GCC 10.8.

9.2. Hand-back inventories

At the Contract Completion Date the Contractor shall hand-over the following stocks of consumables, spare parts and special tools:

1. Spare parts sufficient for [*insert number*] Months operation of the Works based on manufacturer’s recommendations;
2. Chemicals sufficient for [*insert number*] Months operations;
3. Fuel stock for the emergency generators sufficient for [*insert number*] weeks of continuous operation;
4. Other consumable supplies (e.g. lubricants etc.) sufficient for [*insert number*] Months of the operations;
5. All special tools as are necessary to carry out maintenance in accordance with the manufacturers recommendations.
6. *[The Employer to add additional requirements]*

No less than six months prior to the Contract Completion Date, the Employer and the Contractor shall meet and agree on a detailed inventory of spare parts, special tools, and consumables to satisfy the requirements indicated above.

For the avoidance of doubt, the above inventories shall be provided at the Contractor’s expense.

*[If the treatment plant uses a membrane process the Employer shall also specify its requirements for replacement of the membranes before the end of the contract]*

9.3. Training of Employer’s follow-on O&M personnel

No less than eight months prior to the Contract Completion Date, the Contractor shall prepare and deliver to the Employer for its approval a training plan for the Employer’s follow-on O&M personnel (or personnel designated by the Employer). The aim of the training plan shall be to equip the follow-on O&M personnel with the knowledge and skills necessary to operate and maintain the Works.

Following approval of the training plan the Contractor shall provide formal and on-the-job training for up to [*insert number*] personnel in accordance with GCC 10.5.

The training shall cover at least the following:

1. managing, operating, controlling, monitoring and maintaining the Works, the individual treatment processes and all associated plant and equipment;
2. data filing and processing and reporting;
3. assembly, dismantling and maintenance of equipment and plant;
4. fault diagnosis and rectification
5. the Operation and Maintenance Manuals,
6. the Health and Safety Manual
7. the Emergency Response Plan
8. the Wastewater Quality Testing Plan
9. Quality Assurance Plan

All training shall be completed by the end of the Operation Service Period.

The Contractor shall bear the cost of planning the training program and providing trainers, training materials and training venues. The Employer shall be responsible for all wages, travel and subsistence associated with the participation its nominated personnel in the approved training program.

10. Terms of appointment for the Auditing Body

10.1. General

The Contractor shall engage and pay for the Auditing Body specified in GCC Clause 10.3 using the provisional sum amount included in the Contract Price for the Operating Service.

The terms of the agreement between the Auditing Body and the Contractor shall be subject to the approval of the Employer.

10.2. The procedure for appointment of the Auditing Body

The procedure for the appointment of the Auditing Body shall be as follows:

1. The Contractor shall propose a shortlist of a minimum of *[Employer to provide number]* candidates for the approval of the Employer.
2. If the Employer requires the removal of a candidate from the shortlist in (a) above, then the Contractor shall remove such candidate and shall propose a substitute candidate for the approval by the Employer.
3. Following approval of the Contractor’s shortlist, the Contractor shall undertake a competitive procurement of the Auditing Body from the agreed shortlist.
4. The procedures for procurement, evaluation and selection, and the terms of appointment, of the Auditing Body shall all be subject to the approval of the Employer.

If the Parties cannot agree on the appointment of the Auditing Body the matter shall be referred to the DAB for resolution.

The appointment of the Auditing Body shall be for a period of three years unless otherwise agreed by the Parties.

10.3. Reappointment procedure

The Auditing Body’s appointment may be renewed subject to the agreement of both parties. If either party objects to the renewal of the Auditing Body, then the Parties shall appoint an alternative Auditing Body following the same procedure as above.

10.4. Scope of services of the Auditing Body

The Auditing Body shall audit and monitor the performance of the Contractor, the Employer and Employer’s Representative. Notwithstanding that the Auditing Body is engaged by the Contractor, the Auditing Body shall act independently and impartially.

The scope of services of the Auditing Body shall include the following:

1. To assess the overall performance of the Contractor;
2. To review the quality and comprehensiveness of the plans and manuals submitted by the Contractor;
3. To review the Contractor’s procedures for testing, reporting and quality control;
4. To undertake sample audits of the data provided in the Monthly and Annual progress reports submitted by the Contractor and to comment on the accuracy and comprehensiveness of such reports;
5. To comment on the quality of the Contractor’s records and audit trails;
6. To assess the Contractor’s compliance with the Performance Standards and the Environmental Management Plan;
7. To comment on the reliability of the Plant and adequacy of the Contractor’s maintenance procedures;
8. To review the adequacy of the training plans of the Contractor and to identify where additional training is needed;
9. To review any complaints received from the public in respect of the operation of the wastewater treatment facility;
10. To review financial management practices of the Employer and the Employer’s Representative;
11. To make recommendations for improvements in the Contractor’s management or operation of the Operation Service;
12. To make recommendations for improvements in the Employer’s management and oversight of the Contract;
13. To prepare a draft annual performance report for discussion with the Parties;
14. To prepare a final annual performance audit report.

The draft and final annual performance reports shall be submitted simultaneously to the Contractor and Employer’s Representative.

11. Standards and codes

The following is a list of acceptable standards and codes which shall be adopted by the Contractor in the design, execution and operation of the Works. The Employer may accept other comparable codes and standards provided that they are widely accepted internationally.

*[The Employer shall include a schedule of standards and codes, as required under GCC 5.4, covering for instance:*

* *Civil and Building*
* *Earthworks*
* *Concrete*
* *Liquid retaining structures*
* *Mechanical and Electrical*
* *Protective coatings]*

Appendix 1: Environmental Management Plan

***[****Insert relevant EMP provisions****]***

Appendix 2: Influent Baseline Appendix

*The Employer shall note that the information in this table will be the basis for the bidder’s/Contractor’s design and may be used for assessing adjustments in price in the event of long term changes in influent conditions under PCC 13.9.*

**Influent Quality Baseline**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Mean Annual Value** | **Design Range\*** |
| **Min** | **Max** |
| *e.g. COD* | Mg/l |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

*\* If the Employer intends to specify the design range, it should specify range values for critical parameters (e.g. COD). It is not normally necessary to specify ranges for all parameters.*

*The alternative approach would be to make the Contractor responsible for assessing a suitable design range, in which case the last two columns may be removed.*

Appendix 3: Financial Memorandum

*[The Employer shall attach here the Financial Memorandum which details the Employer's financial arrangements as required under GCC 1.1.43.]*

1. The contractor’s operating fees may be paid from the Employer’s local currency water and wastewater receipts (not from Bank loans) [↑](#footnote-ref-1)
2. It would be prudent also to specify a “floor” value (i.e. Max Kwhr/ M3) in the bid documents which bidders must improve upon. [↑](#footnote-ref-2)