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11-All the reports and plans and studies and any similar matters that shall be required to be prepared or submitted in accordance to the environment impact assessment study or remarks and requirements of this permit shall be prepared by an experienced environment consultant who shall have previous experience in similar matters.

12- **With regard to the laws related to the project/permit**

12-1 Total commitment with the entire related national policies and legislations applied (directly or indirectly) with the protection of environment and safety and health related to the working sites among which law no 30 for the year 2002 and executive chart thereof etc.. and those indicated in the environment impact assessment study and the correspondent issued by the Ministry of Environment and in case of contradiction in the text or value or limits then the harsher text and value and limit shall be applied.

12-2 Any thins that shall not be national applied environment laws nor the conventions and international regional and mutual treaties ratified by the state then what shall be needed from laws and specifications and limits and standards and technical proofs or guides for investigation and collection and analysis and assessment etc that shall be necessary to the implementation of the project and the requirements and conditions stated in this permit among which what shall be related to the studies/ reports/plans that shall be prepared and submitted to the Ministry of Environment shall be set provided that the name and number of the law/report/plan that shall be prepared and submitted to the Ministry of Environment provided that the





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name and number of the law/specification/guide shall be defined accurately with mentioning of the issuing party or approval and the year.

12-3 In case of contradiction in the text or value or limits stated in the what was mentioned in the above clauses then the harder text and value and limits that shall be harder in all the stages of the project (construction and cases of operation) and in the preparation of studies /reports /plans within the entire cores (analysis and assessment and conclusions etc).

13- **With regard to soil and ground water**

13-1 In case of any indications that there are pollution to the soil or ground water then the employer shall stop all the work and activities of the project and submit a detailed report on the investigation of environment for the pollution of soil and ground water to the Ministry of Environment for review including set and detailed action on the mechanism of dealing with this pollution wherever existing and according to the requirements of the preparation of these reports. Moreover, no work or activities shall be proceeded in these sites except after the Ministry of Environment shall approve the report submitted and issue an environment permit thereof.

13-2 Total commitment with the indicated requirements and conditions and mentioned in this permit and those described in appendix (1) with regard to the implementation of environment and technical investigation of the soil and ground water (geotechnical for soil and groundwater) and include the results of this investigation with the above mentioned report.

13-3 The accurate technical investigation for the underground cavities phenomena in the area within the mentioned study above on the soil through





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making necessary field survey to define the existence of this phenomena in the project location and the extent of its impact on the project and specific detailed description to the engineering and technical necessary action to remove this impact if any.

- 13-4** Commitment to the implementation of the long term monitoring and control for the quality of the ground water in the suggested facility location for the environment impact assessment study by using five control wells in the site (five control wells) and submit periodical reports for the monitoring and control results through the construction and operation stages as shall be indicated below and for the entire used polluters in the environment impact assessment study:

13-4-1 Monthly report during the first six months of the construction period then quarter yearly report for the next periods until the end of the construction works provided that these reports shall be submitted as part of the periodical follow up reports submitted to meet the requirements of the construction environment management plan (CEMP) and the Ministry of Environment shall be entitled to amend the extension the submitting of the reports according to the developments.

13-4-2 Quarter yearly report during the operation stage works provided that these reports shall be submitted as part of the periodical follow up reports submitted to meet the requirements of the operation environment management plan (OEMP) and the Ministry of





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Environment shall be entitled to amend the extension the submitting of the reports according to the developments.

14- **With regard to the sand leveling and reclamation:**

- 14-1 No sweeping of soil or bushes shall be permitted in the project site or any of its sites.
- 14-2 The usable reminder of the excavation and leveling and reclamation (mud/sand etc) that shall be transported to the certified collection discharge locations in cooperation with the Reservations and Wild Life Department and the Environment Protection Department at the Ministry of Environment or be used in the state projects after coordination with these two parties and the Private Engineering Office (reservations sector) and the competent municipality and the Public Works Authority.
- 14-3 The un- usable reminder of the excavation and leveling and reclamation (mud/sand etc) that shall be transported to the certified collection discharge locations in cooperation with the Reservations and Wild Life Department and the Environment Protection Department at the Ministry of Environment and after coordination with the competent municipality and the Public Works Authority.
- 14-4 In case of need to materials for the reclamation or sand leveling then coordination shall be made with the competent municipality to be provided from the certified sites and who shall be permitted environmentally by the Ministry of Environment and with the same technical characteristics of the soil existing in the site of the project.





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15-Trees or wild bushes in the project site or any of its sites shall not be removed except after obtaining the written approval of the Reservations and Wild Life Department and according to an official request by the project owner to them and according to the following requirements and procedures and through the direct liaison with the two mentioned parties and under their direct supervision:

15-1- The removal and transport according to the mechanism and terms and requirements approved by the agricultural production and supply at the agriculture department at the Ministry of Environment.

15-2- Removal and planting to the allocated places approved by the Reservations and Wild Life department at the Ministry of Environment.

15-3- The project owners shall implement all the works related to the removal and transport and planting among which that deal with excavation and planting and the preparation of the allocated locations to remove trees and bushes according to the mechanisms and conditions and requirements above mentioned.

16- **With regard to archeology and heritage:**

16-1- Approval of the competent authority's projection of archeology and heritage shall be obtained before starting any works or activities in any of the project's sites.

16-2- The project owners shall stop all works in the site in case of indications that there are any heritage or social or archeological values and the competent parties shall be notified among which Qatar Museum Authority and shall abide to their instructions and recommendations in this regard.





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17- **With regard to noise:**

- 17-1- All the precautionary action mentioned in the guides of the related environment practices of the environment protection during the construction stage including what is related to maximum limits of noise and vibrations and intense lights that must be used at night and places of installation.
- 17-2- Apply the best environment practices in order to avoid not increasing the noise level over the maximum stated in the approve laws among which what is related to protection of life in the marine environment.
- 17-3- A plan shall be put to avoid causing harm to the marine creatures (fish, turtles etc...) during mating season during the construction operation and include it within the environment management construction operations.
- 17-4- Marine mammals shall be watches during the peak period to decrease any passive impact expected on the coastal marine mammals provided that this shall be done through Marine Mammal Observer MMO who shall be an expert and with previous experience.
- 17-5- Total commitment with the limits and standards of noise stated in the applied environment laws among which those stated in the appendix no (2) herein and this with regard to the surrounding environment with working according to the requirements indicated within the clause no (12) of the environment permit.





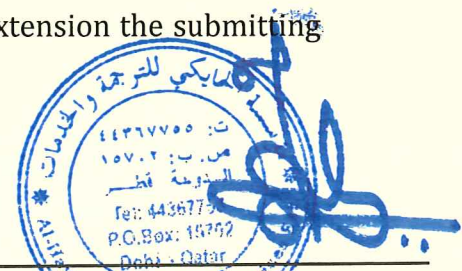
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17-6- With regard to the requirements of ventilation within the public environment (closed and semi closes areas) commitment shall be made to the requirements that must be followed (at minimum rate) in the applied environment laws among which those indicated in appendix no (4) herein with working according t the requirements indicated in the clause no (12) of the environment permit.

17-7- Commitment with implementing monitoring program for noise generated from the facility units and not less than five locations that shall be suggested and given with maps and justifications to the Ministry of Environment for review and approval provided that periodical reports shall be submitted for the results of the monitoring during the construction and operation stages and as clarified below:

17-7-1 Quarter yearly report during the construction stage provided that it shall be submitted as part of the periodical follow up reports submitted to meet the requirements of the construction environment management plan (CEMP) and the Ministry of Environment shall be entitled to amend the extension the submitting of the reports according to the developments.

17-7-2 Quarter yearly report during the operation stage works provided that these reports shall be submitted as part of the periodical follow up reports submitted to meet the requirements of the operation environment management plan (OEMP) and the Ministry of Environment shall be entitled to amend the extension the submitting of the reports according to the developments.





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**18- With regard to the environment aerobic axis (quality of air and emitted air polluters:**

- 18-1- The generated emissions from all the units and components of the project during the construction and operation stages shall not exceed the limits and standards applied as part of the policies of lowering the emissions that are indicated in the laws and systems applied and those stated in the environment impact assessment study and the correspondence issued by the Ministry of Environment. In case of contradictions in the text or value or limits then the harder text and value and limit shall be applied.
- 18-2- The maximum limit for the concentration of Nitrogen dioxide (NO<sub>x</sub>) allowed to be emitted from the facility units shall be (9ppm (20 mg/Nm<sup>3</sup>) at 0° C, 1 atm & 15% O<sub>2</sub>) which shall be applied on all cases and positions of facility's operation and for each unit of the units separately.
- 18-3- Emissions shall be monitored (collect data and analyze them) according to the approve specifications in order to ensure not exceeding the set limits and standards that are mentioned and their source in this permit.
- 18-4- CEMSs continuous control devices shall be installed to monitor the gas emissions (NO<sub>x</sub>, SO<sub>2</sub> & PM) emitted from the chimneys in addition to the characteristics of the emissions (temperature, velocity, O<sub>2</sub>, etc) provided that the registered readings from this system shall be instantly and directly and shall be transmitted directly and immediately (direct link) to the monitoring system and registration at the Ministry of Environment.







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- 18-5- Install devices to monitor the gases (O<sub>2</sub>, CO, CO<sub>2</sub>) emitted from the gas turbines in the Combustion control system in order to ensure efficiency in keeping the emissions within the applied limits and standards.
- 18-6- The project owners shall submit periodical reports (quarter yearly) on the concentrations of the emitted air pollutants from the facility units (NO<sub>x</sub>, SO<sub>2</sub>, CO, VOC<sub>s</sub>, PM & Hg) and the periodical half yearly reports on measured pollutants shall be done with the use of continuous control devices (CEMSs).
- 18-7- Apply the best technological practices used to control the emissions of Nitrogen oxides and conform to the maximum limits mentioned in the above clauses.
- 18-8- Install and operate the control and monitoring devices according to the specifications and regulations and recommendations of the factory and the Ministry of Environment and those approved by the specifications.
- 18-9- the natural gas used in operating the turbine units and the entire facility units shall conform to the approved specifications by the specifications and metrics authority and metrics authority and shall be free from sulfur and mercury.
- 18-10- Install and operate and maintain two terminals to monitor and control the surrounding air quality through momentary monitoring (instantly) and direct to the concentration of all the polluters in the surrounding air environment and Meteorological elements in accordance with the suggestion of the project owner in the environment impact assessment study. Provided that a detailed document shall be submitted for these two terminals including measured components and polluters in details and the suggested location and the





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technical justifications in details to the Ministry of Environment for review and approval before supply and installation. These two terminals shall be directly linked with the control and registration at the Ministry of Environment which shall ensure transmitting registered data directly and momentarily.

18-11- In case of amendments shall be done on the control and monitoring system on the emitted air polluters and from this amendment resulted on emissions or generated or discharge of polluters in any form then the environment impact assessment study of the project and for the all related parts and sections shall be amended through making quantitative analysis and assessment and modeling of these polluters then amend the outcome and recommendations of the study and the precautionary actions and other matters accordingly provided that as first phase the terms of reference and scope of work document shall be submitted for the amendment on the study before starting any works related to this study.

**19- With regard to the marine environment**

19-1- Due to the environment harm resulting from the project in all phases on the sensitive marine environments that are mentioned in the study then the project owner shall submit a written a detailed and comprehensive compensation plan to the Ministry of Environment which shall contain the application of "similar to similar and location to location mechanism in order to create a balanced ecological environment and the entire harmed environments (coral, sea - grass, oysters , beds, alga etc) in the similar size and quality that shall ensure similar compensation according to the laws and systems and applied procedures.





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- 19-2- Due to the harm resulting from losing the public beach (as mentioned in the environment impact assessment study section 10,4,5) the project shall submit detailed and comprehensive compensation plan to the Ministry of Environment that shall ensure similar compensation according to the laws and systems and procedures applied and in coordination with the competent authorities.
- 19-3- The limits of discharging the salty water to the marine environment shall not exceed (265,000) cubic meters per day.
- 19-4- All used reclamation materials on the construction of the marine environment shall be subject to testing and analysis before use ensures that it is free from any polluters.
- 19-5- It shall be strictly prohibited to discharge the outcome of the marine excavation to the marine environment and shall be transmitted to the approved locations by the Ministry or Environment.
- 19-6- Difference in temperature of the discharged cooling water compared with the referral point (in ordinary and non ordinary cases) shall not exceed 3 centigrade (3C) in the mixing and end area.
- 19-7- Set a quantitative program to measure the number and length of marine plants and other ecological marine types per one square meter and include it in the CEMP construction environment management plan.
- 19-8- Precautionary and necessary measures shall be taken to prevent marine organism from slipping inside the withdrawing water tube.





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- 19-9- Pulsed doses of chlorine shall be used instead of the continuous doses to limit the total volume of used poisons in the Bio-control system.
- 19-10- Control in the concentration of chlorine and copper in salt water so as not to exceed the permitted limit in law.
- 19-11- Take into consideration the use of additional pumps during the experimental stage in the RO units to limit the concentration of salt in the water for the purpose of the station entering the stage of complete operation.
- 19-12- Cut on the chemical uses in the desalination operation in order to cut the environment impact of the discharged salty water.
- 19-13- Control and monitor within the operation stage (following plans and programs shall be set in details and comprehensively and submit it to the Ministry of Environment for review and approval including all the axis and required details (measurement location, number of measuring times, etc) so as to prepare the requirements of implementation as part of the operation environment management plan (OEMP) for the purpose of continuous long term monitoring within the operation stage):
- 19-13-1- Monitor and control the marine environment water quality in the operation stage (referral points (not less than three locations), and affected environment locations) as well as monitoring the discharged water from the discharge pipes at the beginning middle and end of the mixing area for all the elements indicated in the





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environment permit and the environment impact assessment study and the executive chart of the environment protection law.

19-13-2- Program to monitor the rate of clash, damage and killing the marine creatures and include it in the operation environment management plan (OEMP).

19-13-3- Detailed monitoring plan for the Levels of plankton in the marine environment.

19-13-4- Detailed monitoring plan to marine mammals and turtles.

20- **With regard to the marine excavation works**

20-1- The marine excavation work for the withdrawing tunnel shall be defined between point (1,6 km) and (2,75 km) from the coastal line only.

20-2- The best practices shall be applied in the marine excavation that shall conform to the Sediment and turbidity standards applied according to the requirements indicated in the clause (12) of the permit.

20-3- Daily monitoring to the marine organisms and commitment to stop all work once these organisms exist within 500 meters and work according to the requirements indicated in the clause 13.4 of the permit with regard to MMO).

20-4- Marine excavation shall be strictly prohibited in case of high waves and strong winds provided that the height of waves and strength of marine tide and winds at which all work shall be stopped shall be set within the construction environment management plan (CEMP) and shall work in accordance with the requirements stated in clause (12) of the permit.





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20-5- The marine environment water quality shall be monitored during the construction periodically in order to ensure that it conforms to the standards and limits indicated in the law. The monitoring points and measured pollutants shall be set and the measurement period and submit reports within the construction environment management plan (CEMP) and work according to the clause (12) of the permit.

20-6- Silt curtains barriers shall be fixed around the entire working area in the marine environment.

21- With regard to the internal work environment

21-1- With regard to noise, temperature and humidity and lighting that must be provided and the maximum limits for the concentration of physical and chemical pollutants in the internal working environment, commitment must be made to the limits and standards stated in the applied laws among which those in the appendix no (3) of this permit with working according to the requirements stated in the clause no (12) of the permit.

21-2- With regard to ventilation in the internal working environment, commitment must be made with the limits and standards stated in the applied environment laws among which those stated in the appendix no (4) of this permit with working according to the requirements stated in the clause no (12) of the environmental permit.

22- With regard to the green spaces that are planned within the site:

22-1- Total commitment shall be made with the entire requirements and conditions of the competent parties in the state and particularly the types of plants and thickness and mechanism of planning it and irrigation with





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stressing on the not using alien plants on the bio environment system in the country.

- 22-2- Use of the treated discharged water to irrigate the green areas and trees and bushes and the Physical, chemical and biological properties of these water (treated sewage) shall be within the maximum limits stated in the applied environment laws among which those stated in the appendix no (5).
- 23- It shall be strictly prohibited to dewater ground water in the project site and its sites except after applying to request environment permit from the Ministry of Environment with which a detailed plan shall be attached on the implementation mechanism including certain solutions with regard to the transport and collection and discharge actions (with the engineering diagrams) and obtain an environment permit before starting any main or secondary works or activities in this matter in the site or outside it and according to the administrative and technical approve procedures.
- 24- It shall be strictly prohibited to dig any wells in the project site or Ministry of Environment and competent authorities.
- 25- With regard to the treatment station of generated sewage from the facility's units: due to the shortage and negligence that were found in the draft of the environment impact assessment study of the project with regard to this axis and in the entire sections of the study related to (analysis, assessment , conclusions and actions and procedures of monitoring and control etc) then this study must be amended as per what was send in remarks and requirements of the Ministry of Environment in this regard and those are as follows:





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- 25-1- Study the (analysis, assessment and procedures etc) of the impact of polluters in the discharged treated water and the load generated from it on the marine environment and in details and quantitatively.
- 25-2- Study the (analysis, assessment and procedures etc) of the impact of sludge generated from the treatment operation on the environment with regard to the concentration of polluters on the sludge and its nature and degree of harm and the storage mechanism and dealing and transport and discharge off.
- 25-3- Detailed plan for the monitoring and control of discharged water from the treatment units (on exit from the treatment system and before entering the transport network) and the generated sludge and all polluters and submit a comprehensive and detailed plan to the Ministry of Environment for review and approval including all axis and the required details (measurement location number of measuring times etc).
- 26- All the waste and garbage generated from the works included in this permit shall be discharged of according to the applied laws and the approved action in the certified allocated places after coordination with the competent parties in the country (municipality etc).
- 27- All laboratories and environment services practitioners (investigator site works, sampling, testing, laboratory testing etc) that assisted or shall assist must meet the requirements of the applied laws and those indicted in the permit (any stage may be) and must be registered and accredited at the competent parties (Ministry of Environment/ Laboratories and standardization secto etc..).







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- 28- It shall be strictly prohibited to make or install or put or operate any service or production auxiliary or main units (offices, prefabricated concrete unit, asphalt producing unit, maintenance workshops machines parks etc) or make basins or discharge of waste or garbage of all types to the surrounding environment in the project site or its sites except after obtaining an environment permit from the Environment Assessment Department / Ministry of Environment after filling the application to get the environment permit and meet the requirements and submit it to the Environment Assessment Department through the competent parties for review and decision taking according to the applied procedures in addition to obtaining all the administrative and technical approvals from competent parties and authorities.
- 29- It shall be strictly prohibited to start any construction or preliminary works in the site whether main or secondary or direct or indirect in the project site or its sites except after preparing a construction environment management plan (CEMP) and submit it to the Ministry of Environment for review and approval and based on the general requirements indicated in the appendix (6) below.
- 30- The preparation of an environmental management system and operational processes for the facility must be done through an environment consultant and submit it to the Ministry of Environment as appendix to request operation permit for the facility before starting any operations whether main or secondary provided that it shall include the axis shown below for example and not limited to:
- 30-1- Safety and health and environment management plan for the operations and define the in charge to activate it.
- 30-2- Emergency plan and define the in charge to activate it.





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- 30-3- Management plan for (treatment and control) for air polluters and liquid and solid waste etc that are generated from the operations.
- 30-4- Management plan for waste resulting from the operation (solid, liquid, sludge etc)
- 30-5- Management of hazardous and chemical materials
- 30-6- List / records of control and environment inspection and maintenance.
- 30-7- Training program for safety and health and occupational health for workers.
- 31- The Health and Safety and Environment Department at the KAHRAMAA committeemen with the follow up and inspection and checking the project site and its sites and all that shall be needed to ensure the implementation of the project according to the conditions stated in the environment permit and to the Environmental management and operational plan of construction operations approved for the project. In case of any violations or offences then the Health and Safety and Environment Department shall take all the necessary action to remove and stop the offence and harm and inform the Environment Assessment Department at the Ministry of Environment with a detailed report.
- 32- The Ministry of Environment shall be entitled to withdraw the permit or cancel it if it shall appear that the employer or the contractor or assigned persons to implement any works have committed offences for any of the terms stated in this permit or to the provisions of the applied laws.





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**Appendix No (1)**

**Conditions and Requirements to be Applied When Implementing Geotechnical Investigation Works and Geophysics Surveys for Soil and Ground Water**

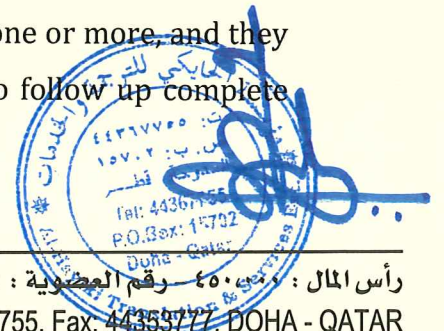
- 1- It is strictly prohibited to make any withdrawal or injecting of water from or to the ground reservoir.
- 2- The following documents must be submitted to the Ministry of Environment:
  - a) Paper typed copy and electronic CD of the coordinates of the investigation locations.
  - b) Submit a final report including all the results and measurements for these investigations to be added within the data base of the Ministry. with the completion of the investigation and measurements work.
- 3- The depth of the investigation wells for ground water must not exceed the Upper Medra shale and not to go over it and otherwise, the owner must apply to obtain an environment permit from the Ministry of Environment including all the administrative documents and information and technical plans and detailed procedures to protect the environment and obtain this environment permit before commencing any main or secondary, direct or indirect works in this concern.
- 4- Must implement all the precautionary measures stated in the related environment practice of the environment protection, health and occupational safety.
- 5- All devises and equipments used in implementing works must conform to the specifications accredited as per the applied laws.
- 6- Must be committed not to pollute groundwater through excavation and collection of samples and use investigation wells and all needed from excavation equipments or





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- excavation liquids or used materials in making investigation wells, and for that reason the best adopted practices and technical proofs related to the protection of environment.
- 7- The investigation sites must be monitored and managed so as not to be a source for underground water reservoir pollution.
  - 8- The investigation work must be made in a technical way so as not to permit the transfer of ground water between the shallow ground layers and the deep ones and according to the best approved related practices and technical proofs .
  - 9- The permit owners /project shall be fully responsible for any problems occurring or that may occur on the balance and stability of the facilities near the investigation wells.
  - 10- Owners/ contractor must prepare an evaluation for environment risks that might be generated on all works related to this permit on elements and sensitive environment that may be affected with these works. Among that the precautionary action and machinery of avoiding the damage or cut it to the level stated in the applied laws or the best adopted practices. In this regard, the contractor shall bear civil and criminal responsibility on any damage that shall occur directly at present or on the long run. Moreover, the contractor shall incur the expenses of removing this damage and rehabilitate the environment to the condition it was on.
  - 11- The contractor shall prepare and implement a special plan for environment and health and safety for operations that shall be done in the site. Hence, the contractor shall appoint efficient environment, safety and health officer ,one or more, and they shall be in the site continuously while implementing works to follow up complete





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implementation and meeting the requirements of the issued environment permit and all applied environment laws specially those on safety and health at the working sites.

12-The contractor shall be fully responsible for providing safety requirements for implementing work to preserve health and safety of workers and equipments during implementing work who are in the site and surrounding area. This shall be according to the provisions stated in the applied laws and the best adopted practices and technical proofs related to this work.

13-The contractor shall prepare Quality Management System (QMS) and use it for all works which is necessary to ensure accuracy of results, analysis and assessment and conclusion and recommendations. Also it must be attached to be used as Annex in the final report of these works.

14-All environment services providers (laboratories etc) to any main or secondary works related to this permit must be certified by the Ministry of Environment and competent parties in the country in this field and must submit certificates proving this as an appendix in the final report of these works.

15-All equipments and devices must have measures according to the time table for it and by specialized parties in this field and accredited by the Ministry of Environment and competent parties in the state.

16-Any watching wells used for investigation , duplicate of its locks must be given to the Water Department at the Ministry of Environment after competing its use in the project in order to study the extent of using it in the future in monitoring of ground water in Qatar.





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**Annex No (2): Parameters and Measurement of Noise**

Areas	Limit of maximum noise at the boundary of building average of 10 minutes	
	In the day	At night
Residential and institutions	55	45
Commercial	65	55
Industrial	75	75

**With regard to above table the following must be met**

- Use of noise parameter prepared for the protection of residents from physiological weakness resulting from excessive noise rate and include limit of exposure to environmental noise for public protection and provision of guidance for the use of lands.
- The rate of noise should be measure in order to obtain environmental authorization by using Octave band Analyzer type no.1.
- Parameter of night times shall start at 10 p.m. to 4 a.m.
- Residential area: is that area in which residential buildings constitute more than 50% , schools hospitals and mosques.
- Commercial area: s that area in which shops , offices, garages and commercial buildings constitute more than 50%.
- Industrial area: s that area in which industrial facilities constitute more than 50%.





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**Annex No (3): Permissible Parameters in Closed Environment**

**1. Noise**

- It is not permissible to be exposed for noise of more than 115 Decibel (A) unless the exposed is equipped with a year bud of type Almaf.
- The limit of noise is 85 Decibel for 8 hours time.
- In case of exposure for different rates of noise during working hours that exceed 85 Decibel (A) for interrupted periods the following equation set forth in annexure (3/ sixth) from executive regulations of environment protection law No.30 of 2002 shall be used:
- The limit of exposure for noise rate in case of heavy hammers is 140 Decibel and it should not be exceeded.
- In case of duty exposure to noise of more than 85 Decibel (A) may be permissible provided that the time of exposure as indicate against each case is to be observed:

Rate of Noise	Time of Exposure in Hours
85	8
90	4
95	2
100	1
105	0.5
110	0.25
115	0.125

**2. Temperature and Humidity**

2/1. Facility proprietor is obliged to take necessary actions to preserve temperature and humidity within the workplace at no excess of the maximum and minimum permissible and in case of necessity of work outside these limits he shall provide suitable protection means to labors such as special clothing and other means.





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### 2/2. Classification of grades of hardness of labor

- Work is deemed to be light if the energy spent is equal to 200kilo calorie/hour.
- Work is deemed medium if the energy spent is equal 200 – 350 kilocalorie / hour.
- Work is deemed hard if the energy spent is more than 350 kilocalorie / hour.
- Humidity rate should not exceed 80% in the workplace.

### The maximum indicator of humid temperature with Globe as per work system and hardness (5m)

Work and rest system	Light work (percent)	Medium work(percent)	Hard work(percent)
Continuous work	30	26.7	25.0
75% work +	30.6	28	25.9
50% work +	31.2	29.4	27.9
25% work +	32.2	31.1	30

### 2/3. Means of prevention and protection in case of necessary work off-limits of temperature and humidity:

- Labor shall be accustomed to the work conditions before start of work.
- Organization of work time and rest time to decrease the physiological load on laborer and to have sufficient time of rest during the work times.
- Distribution of total work time evenly on the day.
- Scheduling hard work hours to be at the least temperature in the day.
- Short rest intervals at once per hour for drinking water and salt and at least one liter of water and 0.1% of salt for each laborer (not giving salt tablets). The water should not be more than 60 meters from the laborer.
- Provision of suitable clothing and other preventive means.







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g. Take all precautions, engineering design, control and engineering performance to lower the temperature.

**3. Lighting:**

a) The standard indicated against each operation in the table below is the minimum required. Anything not provided in this table shall be subject to in annexure (3/ sixth) from executive regulations of environment protection law No.30 of 2002.

b) Lighting in the workplace should be measured on horizontal level 1 meter high from the ground level.

Serial	Operation	Lighting in Luxes
1.	Works that involve walking in corridor with load of material	50
2.	Works that involve distinction of some material and large products	200
3.	Works that involve assembling of small products and work on typewriters accounting and office work	500
4.	Works that involve total accuracy such as watches , jewelry, tailoring and turning	1000

**4. Limits of the concentration of harmful chemicals**

According to contents of (3/ sixth) from executive regulations of environment protection law No.30 of 2002 , if the table does not contain the item, then the licensee must check with Ministry of Environment to know and comply with limits and standards specified by the Ministry of Environment in this respect.

**5. Standards and levels of dust allowed in the work environment.**

According to contents of (3/ sixth) from executive regulations of environment protection law No.30 of 2002





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**Annex No (4): General Requirements to be applied as minimum quantity of the air necessary for ventilating the closed or semi-closed places.**

S.N.	Quantity of external air	Type of site and activity
1	280-140	High-roof- Bank- lecture room - worship place- large public place- theatre - no smoking room
2	240-280	Flat - barbershop - beauty saloon- hotel room or room for limited smoking
3	560-420	Cafeteria - place with a small restaurant - public workplace - hospital room - restaurant or room for medium smoking
4	850-560	Private workplace- office or clinic or room for limitless smoking
5	1700-850	Conference room or crowded room with large smoking

With regard to the table, the following shall be met.

- Space per person not less than 4.25 cubic meter
- Floor per person not less than 1.4 square meter
- Dangerous closed places shall be provided with mechanical ventilation system capable of providing air change in the rate of 12 times per hour inside the place.
- Natural ventilation shall be secured in the dangerous wholly or partially open places capable of securing change of air in the rate of 12 times every hour for 95% of the time. This system may be supported if required by mechanical ventilators to reach rate of ventilation equal to the standard of dangerous closed places.





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**Annex No (5): Standard for Treated Wastewater Used for Irrigation**

1.

Parameter	Symbol	Maximum limit allowed (MAL) for agriculture irrigation	Maximum limit allowed (MAL) for Green Terrace	Unit
<b>1- Physical Tests</b>				
Total dissolved Solids	TDS	2000	2000	mg/L
Total Suspended Solids	TSS	50	50	mg/L
pH	pH	6-9	6-9	
Floating Particles		Nil	Nil	
<b>2- Inorganic Matters</b>				
Ammonia as N	NH <sub>4</sub> <sup>+</sup>	15	15	mg/L
Chlorine Residual	Cl <sub>2</sub>	0.1	0.1	mg/L
Cyanide (Total)	CN	Nil	0.2	mg/L
Dissolved Oxygen	DO	>2	>2	mg/L
Fluoride	F	15	15	mg/L
Phosphate as P	PO <sub>4</sub> <sup>-3</sup>	30	30	mg/L
Sulphate	SO <sub>4</sub> <sup>-2</sup>	400	400	mg/L
Sulfide	S <sup>-2</sup>	0.1	0.1	mg/L
Biochemical Oxygen demand	BOD <sub>5</sub>	10	50	mg/L
Total Kjeldahl Nitrogen as N		35	35	mg/L
Chemical Oxygen	COD	150	150	mg/L





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Demand				
<b>3- Trace Metals</b>				
Aluminum	Al	15	15	mg/L
Arsenic	As	0.1	0.1	mg/L
Barium	Ba	2	2	mg/L
Boron	B	1.5	1.5	mg/L
Cadmium	Cd	0.05	0.05	mg/L
Chromium, total	Cr	0.01	0.2	mg/L
Cobalt	Co	0.2	0.2	mg/L
Copper	Cu	0.2	0.5	mg/L
Iron	Fe	1	1	mg/L
Manganese	Mn	0.05	0.05	mg/L
Mercury	Hg	0.001	0.001	mg/L
Nickel	Ni	0.2	0.5	mg/L
Zinc	Zn	0.5	0.5	mg/L
Sodium absorption rate	SAR	10	10	mg/L
<b>4- Organic Matters</b>				
Oil & Grease		10	10	mg/L
Phenols		0.5	0.5	mg/L
Total Organic Carbon	TOC	75	75	mg/L
<b>5- Biological Tests</b>				
Total Coliform		2.2	23	MPN/100ml
Egg parasites		<1	<1	
Worm parasites		Nil	Nil	
Toxicity Evaluation	Each state should be studied separately			





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**Annex No (6)**

**General requirements that must be committed to at minimum when preparing detailed maps for the construction operations management (Comprehensive Construction Environmental Management Plan (CEMP))**

**1- General Themes for preparing maps:**

- 1.1- Conditions and general and special terms included in the environment permit issued for the project.
- 1.2- All correspondence and documents submitted by the owners and the remarks of the Ministry of Environment regarding the permit application and in case of contradiction, the stronger action and description shall be applied.
- 1.3- Laws and environment systems related to the public health and safety in the working sites and which are applied in the state and credited by the competent parties relate directly or indirectly to the project and its impacts.
- 1.4- Indicate all main and secondary works and activities direct or indirect related to the project which will be implemented in the allocated location or its sites.
- 1.5- Tools and method statements for work and activities mentioned in the pervious clause.
- 1.6- The best techniques and environment implementation methods available.

**2- The comprehensive plan (CEMP) must include the following detailed actions and for example and not limited to, and the ministry / competent environment party, shall have the right to amend by addition once it appears the there are certain activities or construction operations that are not shown in advance:**





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2.1- Operation of electricity units (generators) among which what is related to system and control action and monitoring and inspection of air polluters generated thereon and procedures of storing fuel used therein with certain consideration to the following:

2.1.1- Operating of generators shall be limited to gas fuel or diesel (low sulfur) and in all cases, the used fuel must have specifications conforming to that adopted in the state and especially with regard to the content of sulfur which must be at minimum. It shall be strictly prohibited to operate any of these units by using any other fuels other than the one indicated previously.

2.1.2- There must be chimney/s to discharge of polluted air generated from generators and with suitable height.

2.2- Traffic department procedures within the site/s when entering or exiting.

2.3- Procedures of solid and liquid waste management

2.4- Collecting and treatment and disposal of groundwater and surface water generated from operations in the site.

2.5- Procedures of monitoring and control of air polluters generated from operations and activities of the site.

2.6- Procedures of control and decreasing noise and vibrations.

2.7- Procedures of removing and cleaning and rehabilitating elements of environment (soil, groundwater etc) for each cases in the project site or its sites.

2.7.1- Pollution resulting from activity or operation linked with the project.





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- 2.7.2- Pollution generated from a previous period to the receipt of the site (fuel tanks, leakage of swage etc) with the importance of notifying the Ministry of Environment of the pollution officially and submit a detailed report and not commenting any action to remove or clean or rehabilitate or other matter except after obtaining the approval of the Ministry thereon.
- 2.8- Procedures of managing chemicals (transfer, store etc) whereas full commitment shall be made with the texts and procedures and requirements and conditions of making chemicals warehouses and hazardous waste and the method of dealing with them as shown in Environment Protection Law no (30) for the year 2002 and those mentioned in clause not (1,2) above.
- 2.9- Procedures of storing raw materials.
- 2.10- Procedures of removing and collecting and cleaning and disposal of construction units (over and under ground) and others removed from the site.
- 2.11- Procedures of dismantling and removal of all service ad auxiliary units related to the project within the site and its sites.
- 2.12- Procedures of removing pollution and rehabilitation of the project site and its sites from any pollution that may occur from the construction or initial or main or secondary operations linked with the project.
- 2.13- Procedures of safety and security and vocational safety at the work sites.
- 2.14- Procedures of response and control and treatment of accidents and environment and occupational disasters that may occur in the project site or its sites.





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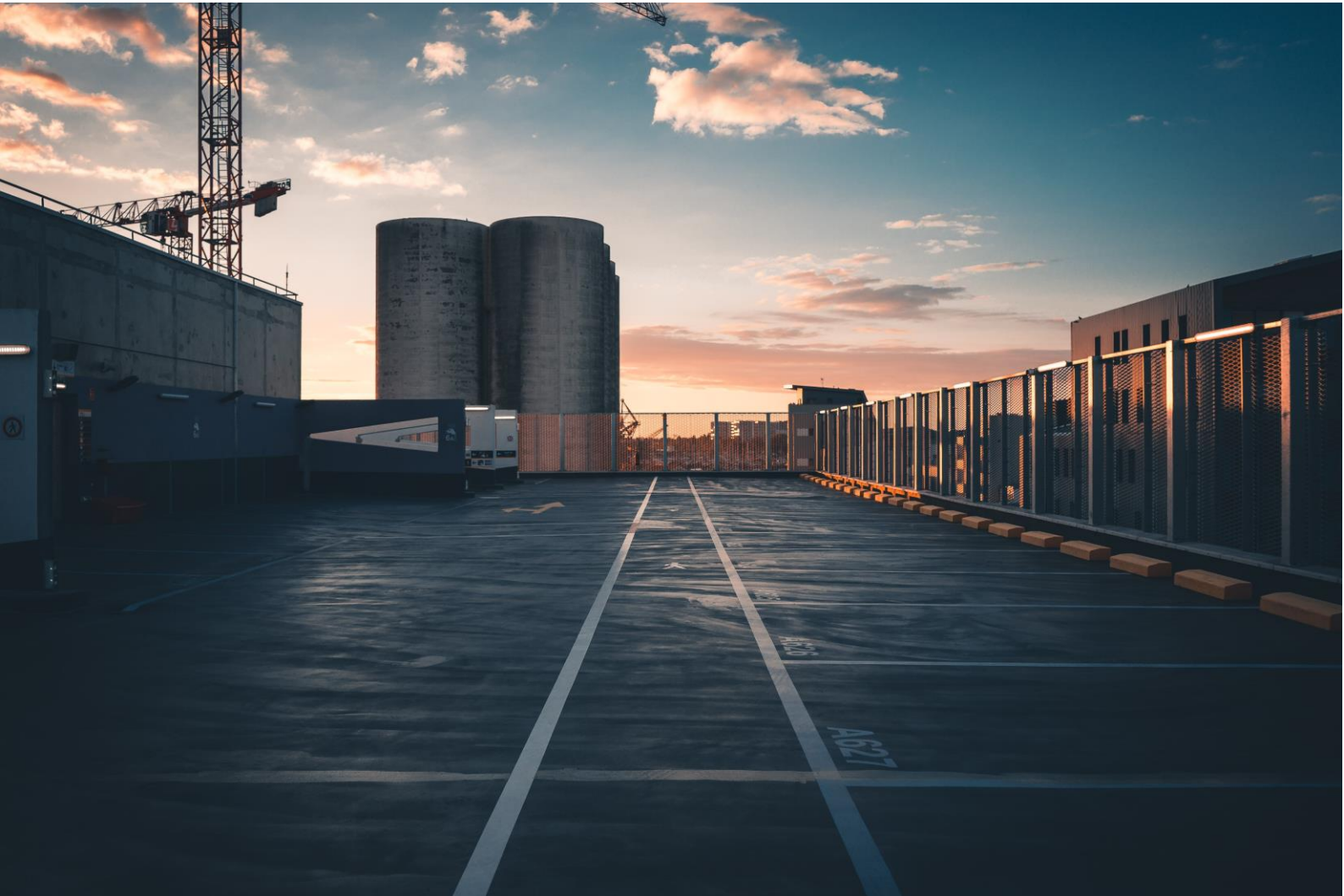
3- Must place announcement plates including details of the project as will be shown below provided that the number and location shall be determined in coordination with the Public Works Authority and the Special Engineering Office (natural reservations sector) and the Protection and Environment Rehabilitation department at the Ministry of Environment:

- 3.1- Name of the project and number of the contract.
- 3.2- Name of the supervising party on the project, address (Office Tel- Fax) and the name of the person in charge his Tel number and mobile.
- 3.3- Project consultant, address (office Tel – Fax) and the name of the person in charge his Tel number and mobile.
- 3.4- Name of contractor, address (office Tel – Fax) and the name of the person in charge his Tel number and mobile.
- 3.5- Number of the Environment Permit issued by the Ministry of Environment and date of issue and expiry.





## **Appendix B** – Terms of Reference for Expansion Project and MME Approval to Commence with EIA



# **Umm Al Houl Power**

## Terms of Reference to MME RO Expansion Project

February 2019

*This report: has been prepared by GHD for Umm Al Houl Power and may only be used and relied on by Umm Al Houl Power for the purpose agreed between GHD and the Umm Al Houl Power as set out in section 1.2 of this report.*

*GHD otherwise disclaims responsibility to any person other than Umm Al Houl Power arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.2 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.*

*GHD has prepared this report on the basis of information provided by Umm Al Houl Power and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.*

*The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.*

*Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.*

*Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.*

# List of Abbreviations

Abbreviation	Definition
BTEX	Benzene/Toluene/ethylbenzene/Xylene
CCGT	Combined Cycle Gas Turbines
CEB	Chemical Enhanced Backwash
CIP	Clean In Place
CO	Carbon Monoxide
DAF	Dissolved Air Floatation
dBA	Decibels Adjusted. dBA is used for determining the sound exposure to humans
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Programme
EPAP	Equator Principles Action Plan
EPFI	Equator Principles Financial Institutions
ERD	Energy Recovery Device
ESMS	Environmental and Social Management System
GCC	Gulf Cooperation Council
GHD	GHD Global Pty Ltd
GHG	Greenhouse Gas
IFC	International Finance Corporation
IP	Indigenous People
IWPP	Independent Water and Power Project
m <sup>3</sup>	Cubic Meter
m <sup>3</sup> /h	Cubic Meter per Hour
m <sup>3</sup> /d	Cubic Meter per Day
MDL	Minimum Detection Limits
MIGD	Million Imperial Gallons per Day
mm	Millimetre
MME	Ministry of Municipality and Environment
MW	Mega Watt
NH <sub>3</sub>	Ammonia
NO <sub>2</sub>	Nitrogen Dioxide

Abbreviation	Definition
NOx	Nitrogen Oxides
O <sub>2</sub>	Oxygen
O <sub>3</sub>	Ozone
PAH	Poly Aromatic Hydrocarbons
PS	Performance Standards
QEWC	Qatar Electricity and Water Company
QEZ	Qatar Economic Zone
QMA	Qatar Museum Authority
RO	Reverse Osmosis
SDI	Silt Density Index
SEP	Stakeholder Engagement Plan
SO <sub>2</sub>	Sulphur Dioxide
SoW	Scope of Work
SPL	Sound Pressure Level
ToR	Terms of Reference
TPH	Total Petroleum Hydrocarbons
UF	Ultrafiltration
UHP	Umm Al Houl Power Company
VOC	Volatile Organic Compounds
WWT	Wastewater Treatment

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Appendix C – Process Description
Appendix D – Process Flow Diagram
Appendix E – Potable Water Quality
Appendix F – Magnitude of Impact

# 1. Introduction

## 1.1 Overview

The Umm Al Houl Power Company (UHP), a special purpose company formed between Qatar Electricity and Water Company (QEWC), K1 Energy (a joint venture between Mitsubishi Corporation and JERA JV), Qatar Petroleum and Qatar Foundation, is planning an expansion of the existing Umm Al Houl Independent Water and Power Project (IWPP).

The Umm Al Houl IWPP is located around 2.5 km to the south of Al Wakrah City and 15 km to the south of Doha. The existing Umm Al Houl IWPP was issued an Environmental Permit (Ref: 1-20274-2015) (Appendix A), by the Ministry of Municipality and Environment (MME) in December 2015 following the submission of an Environmental Impact Assessment (EIA) Report prepared by Mott MacDonald. The IWPP consist of the following main components, as per the approved EIA Report:

- 2,520 MW power generation island based on combined cycle gas turbines (CCGT) running on natural gas fuel with no single unit greater than 300 MW
- 136.5 MIGD potable water production block:
  - 60.0 MIGD using reverse osmosis technology
  - 76.5 MIGD using a thermal desalination plant

### 1.1.1 Expansion of IWPP

UHP is proposing the development of an additional desalination block and associated facilities. The proposed Umm Al Houl IWPP Expansion Project (herein referred to as 'the Project') will augment the existing desalination production capacity with an additional 60 MIGD using reverse osmosis (RO) membrane technology.

GHD Global Pty Ltd (GHD) has been engaged by UHP as the Project environmental consultant and has been tasked with undertaking the EIA and preparing documentation to support applications for environmental approval for the proposed Expansion Project from the MME.

This report comprise the Terms of Reference (ToR) report for the EIA and provides a description of the Project, defines the Project's environmental requirements, and specifies the proposed methodology for undertaking the EIA, for review and approval by the MME.

## 1.2 Objective of the ToR

Scoping is an essential first step in the assessment of a proposed project. This ToR is prepared with the following objectives:

- Identify at an early stage what the key receptors are
- Identify the likely zone of impact
- Identify the key issues for the development in terms of potential environmental and social impacts on component receptors based on the Project description and the nature of components and receptors
- Define the methodologies to employ in describing the existing environmental condition and impact assessment and identification



### **1.3 Assumptions**

This ToR was developed based on the following assumptions:

- The proposed scope and methodology have been developed based on an understanding of the proposed Project, the site, the availability of existing data, and the proposed role of other specialist consultants in their provision of information incorporated into the EIA.
- All information provided by UHP and/or the Project consultants for the preparation of this ToR is accurate.
- This ToR was developed prior to the finalisation of the conceptual design of the proposed Project. Any key impact significant to the design would result in a corresponding change to the ToR and EIA.

## 2. Project Description

### 2.1 Project Entities

#### 2.1.1 Project Proponent

Details of the project proponent is provided in Table 2-1.

**Table 2-1: Project proponent details**

Project Proponent / Operator	Umm Al Houl Project Company (UHP)
Address	Business Financial Center C-Ring Road Al Emadi Doha
Contact Information	Mr. Jamal Al Khalaf Chief Executive Officer (CEO) Phone: (+974) 4 485 8526 Fax: (+974) 4 486 1116

#### 2.1.2 Environmental Consultant

UHP have engaged GHD as the environmental consultant for the Project. The ToR was prepared by GHD on behalf of UHP. The contact details for GHD is provided in Table 2-2.

**Table 2-2: Environment Consultant**

Environmental Consultant	GHD Global Pty Ltd (GHD)
Address	PO Box 14352 Level 23 Al Asmakh Tower, West Bay Doha
Contact Information	Sindy Yong Manager – Environment and Infrastructure Phone: (+974) 4 428 9483 Fax: (+974) 4 444 6127 Email: <a href="mailto:sindy.yong@ghd.com">sindy.yong@ghd.com</a>

### 2.2 Need for the Project

Qatar's National Vision 2030 sets the long-term objective for transforming the country into an advanced economy, capable of sustaining its own development and providing high standards of living for all people by 2030 (Mott MacDonald, 2016). The population of Qatar continues to grow annually and it dramatically increased from 1.67 million in 2010 to 2.22 million in 2015 (Qatar Statistics Administration, 2015). With the extensive development plans coupled with hosting the Football World Cup in 2022, potential rapid growth in Qatar is anticipated. In order to support Qatar's development plans, it is important that the country have sufficient supply of water to meet its objectives.

The Project is proposed for the following reasons:

- *Limited supply of potable water.* Qatar is one of the world with lowest levels of rainfall and short supply of renewable water resources, exacerbated by one of the world's highest per capita water use, Qatar relies heavily on desalinated water (Mott MacDonald, 2016). The World Bank estimates that annual per capita natural water resources in Qatar from 2011 to

2015 are now approximately 27 m<sup>3</sup> (from World Bank indicators -Food and Agriculture Organization, AQUASTAT data), far below the water poverty line of 1,000 m<sup>3</sup> (Mott MacDonald, 2016). This puts Qatar in natural water resource deficit and pushes the country towards heavy reliance on sea water desalination (Mott MacDonald, 2016).

- *Increased water consumption.* Qatar's water consumption has increased from 1995 to 2012 (Mott MacDonald, 2016). And as such, a need to produce sufficient supply of water is necessary to meet the increasing water consumption in the country.

### **2.3 Project Location**

The Project is proposed to be located next to the existing IWPP located 3.5 km to the south of Al Wakrah Town Centre and 15 km to the south of Doha (Figure 2-1). The IWPP is situated at the north eastern boundary of Qatar Economic Zone (QEZ) 3 or Umm Al Houl Special Economic Zone (SEZ) (GPS coordinates: 25.115099, 51.613167).

The proposed expansion is located immediately to the east of IWPP (Figure 2-2).



**Figure 2-1: Existing IWPP**



**Figure 2-2: Proposed IWPP Expansion Project**

Source: © 2019 Google, Map data © 2019 Tele Atlas

## 2.4 Project Overview

### 2.4.1 Facility Capacity

The total net product water capacity of the proposed Project will be 60 MIGD (272,760 m<sup>3</sup>/day; Table 2-3). An additional 2,728 m<sup>3</sup>/day is required for the internal water consumption of the plant (i.e. for chemical preparation, clean in place (CIP) for RO membranes and external auxiliary water outside the plant).

**Table 2-3: Capacity requirements for the proposed RO Desalination Plant**

Description	Unit	Value
Total net capacity	m <sup>3</sup> /h	11,365
RO plant net capacity	m <sup>3</sup> /day	272,760
<i>Auxiliary water demand</i>		
RO plant auxiliary	m <sup>3</sup> /day	2,728
<i>Total gross water capacity</i>		
RO plant gross	m <sup>3</sup> /day	275,488

### 2.4.2 Plot Layout

The general layout of the proposed IWPP Expansion Project is provided in Appendix B. As per plot layout provided in Appendix B, the proposed expansion will consist of:

- No. 203 – RO Desalination Plan
- No. 204 – SWGR Building for RO Desalination Plant
- No. 205 – Remineralisation Plant
- No. 206 – SWGR Building for Remineralisation Plant

### 2.4.3 Process Description

The process for the proposed RO plant is summarised below. Detailed process description is provided in Appendix C while the detailed process flow diagram is provided in Appendix D.

#### 2.4.3.1 Seawater Intake

Approximately 31,010 m<sup>3</sup>/hour of seawater is required in order to reach the required capacity. The existing seawater intake pipes will be utilised to supply the seawater into the proposed RO plant. Therefore, seawater intake pipes are not proposed for the RO expansion.

#### 2.4.3.2 Pre-treatment

The pre-treatment will primarily consist of:

- Dissolved Air Floatation (DAF) including:
  - pH correction (H<sub>2</sub>SO<sub>4</sub>)
  - Coagulant dosing
  - Dechlorination (sodium metabisulphite dosing)
  - Mixing and flocculation
  - Dissolved Air Flotation

- Intermediate water pumping station
- Filtration stage through disc filters
- Filtration stage through ultrafiltration membrane

Seawater is known to be warm and rich in organic life, presenting red-tide events from time to time. The DAF system will mitigate the issues originating from red tide events as well as remove solids and algae before reaching the disc filters.

The pre-treatment system will produce an RO feed water with a Silt Density Index (SDI)  $\leq 2.5$  75% of the time and SDI  $\leq 3.5$  100% of the time, which are enough for the RO membrane requirements.

The adoption of the DAF system is to improve the removal of light pollutant (mainly dissolved hydrocarbons), algae and micro-organism that are feature of the Gulf waters in normal conditions, and a protection against exceptional conditions of black or red tides.

#### **2.4.3.3 Reverse Osmosis (RO) System**

The RO system treatment will consist of:

- Dechlorination (sodium metabisulphite dosing)
- Antiscalant dosing (1<sup>st</sup> pass)
- Sulphuric acid shock dosing to each RO rack (1<sup>st</sup> pass)
- First pass reverse osmosis, including HP pumping, RO membrane racks and energy recovery system
- Antiscalant dosing (2<sup>nd</sup> pass)
- Second pass reverse osmosis including booster pumps and RO membrane racks
- Cleaning and flushing system

#### **2.4.3.4 Permeate Booster Pump**

The permeate booster pump will provide the outstanding pressure required for delivering potable water to the common filling lines of the potable water tank. Four pumps have been considered and one is an additional standby pump.

#### **2.4.3.5 Effluents and Wastewater Treatment Plant**

Effluents of the RO plant include:

- Backwash water from disc filter and ultrafiltration (UF)
- Floated materials from the DAF system
- Neutralised effluents from UF and RO membranes cleaning

In general, the effluents from the RO plant are discharged to the sea diluted into the brine coming from the MSF and condenser unit. Some of the flows will need treatment prior to discharge, in order to avoid environmental impact.

Backwash water sourced during UF chemical cleaning will be pumped into its own neutralisation tank, prior to being pumped to the seal pit. Provision to connect the UF chemical enhanced backwash-clean in place (CEB-CIB) neutralised flow with the wastewater treatment (WWT) system has been considered if required to be used during the operation of the Plant.

The CIP system for the RO membranes cleaning includes its own neutralisation tank. Floated materials from the DAF units will be pumped into the wastewater treatment plant.

The wastewater treatment plant will consist of the following elements:

- Sludge clarifiers
- Dewatering centrifuges
- Polyelectrolyte dosing

#### 2.4.3.6 Brine Pit Discharge

Brine coming from the energy recovery device (ERD) units will have enough remaining pressure to reach the new brine pit.

#### 2.4.3.7 Outfall Discharge

Drainages, vents, and instrument flows will need to be pumped to reach the seal pit. One duty and one standby pump will be used.

Drainages from the RO plant, will go to the existing seal pit by using the existing RO plant discharge pipe.

### 2.4.4 Design Life

The proposed Project has been designed for a minimum service life of 30 years, under normal and various cycling operating conditions with proper maintenance. The Project will be designed to withstand the prevailing ambient conditions to which it will be exposed and to continue to function normally.

The Project will be designed to operate continuously throughout the year. The pre-treatment package and the RO package will be designed to operate for 8,760 hours per year. As such, sufficient spare capacity will be installed to allow for shutdown due to maintenance or plant failure.

### 2.4.5 Plant Performance Criteria

The proposed Project will be operated, supervised, and maintained in compliance with the plant performance criteria detailed below.

#### 2.4.5.1 Water Quality Criteria

##### Seawater Quality

The proposed Project has been designed so as to achieve the seawater quality specified in Table 2-4.

**Table 2-4: Seawater parameters**

Parameter	Units	Design
Temperature	°C	15–35
Total Dissolved Solids	mg/l	45,900
Ca <sup>+2</sup>	mg/l	532.91
Mg <sup>+2</sup>	mg/l	1,695.61
Na <sup>+</sup>	mg/l	14,068.81
K <sup>+</sup>	mg/l	506.13
Ba <sup>+2</sup>	mg/l	0.01



Parameter	Units	Design
Sr <sup>+2</sup>	mg/l	13.9
CO <sub>3</sub> <sup>-2</sup>	mg/l	5
HCO <sub>3</sub> <sup>-</sup>	mg/l	146
SO <sub>4</sub> <sup>-2</sup>	mg/l	3,530.18
Cl <sup>-</sup>	mg/l	25,295.18
NO <sub>3</sub> <sup>-</sup>	mg/l	0
F <sup>-</sup>	mg/l	1.4
Br <sup>-</sup>	mg/l	94
B	mg/l	5.3
pH		8.21
Total Suspended Solids	mg/l	<30
DAF Inlet Turbidity	NTU	1.2–15
UF Inlet Turbidity	NTU	1.2–5*

\*UF is designed for 5 NTU feed water on a continuous basis, DAF will be operated above this value.

### **Potable Water Quality**

Potable water after remineralisation will comply with the specification of Water Quality Requirements and Conditions for Drinking Water Producer Companies from July 2013 (LNTP Schedule 25) (Appendix E).

#### **2.4.5.2 Noise Criteria**

The proposed Project has been designed with the following noise criteria for sound pressure levels (SPL):

- At 1m distance of each equipment inside the facility: 85 dBA
- At any location within the central control room: 55 dBA

## **2.5 Key Construction Activities and Schedule**

The key dates for the construction of the proposed expansion Project are as follows:

- Anticipated Start Date: 1 February 2019
- Completion of first 30 MIGD: 01 October 2020
- Completion of second 30 MIGD: 01 December 2020

## 2.6 Site Description

### 2.6.1 Nearby Sensitive Receptors

The Project is located in the Al Wakrah Municipality, which has an approximate total population of 299,000 (MPDS Census, 2015). Al Wakrah Town Centre is the nearest sensitive receptor to the Project, which is approximately 3.5 km to the north of the Project site.

There is a public family beach located 1.3 km to the north of the project site. The beach area is used for recreational activities including swimming, quad biking and camping.

Figure 2-3 provides an indicative map of nearby sensitive receptors relative to the Project area and Table 2-5 provides the GPS co-ordinates of sensitive receptors.

**Table 2-5: GPS co-ordinates of sensitive receptors**

Sensitive receptor	Approximate Distance to UHP IWPP	GPS Co-ordinates (WGS84)	
		Latitude (N)	Longitude (E)
Al Wakrah Town Centre	3.5 km	Refer to Figure 2-3	
Al Wakrah Family Beach	1.3 km	25° 7'45.00"	51°37'1.74"
Wakrah Coast Guard Station	0.5 km	25° 7'16.23"	51°37'5.63"
Marine environment	<0.1 km	Immediately east of the Project site (refer to Section 2.6.2.4)	



**Figure 2-3: Key sensitive receptors**

## 2.6.2 Existing Site Conditions

At the time of preparing this ToR, the IWPP is the main facility occupying approximately 100 ha (or 1 km<sup>2</sup>) of land and is currently operational.

The Umm Al Houf SEZ located to the south of the Project Site has an area of 34 km<sup>2</sup>. This area is currently under construction and the plots within the SEZ are yet to be occupied by industrial facilities.

Prior to the development of the existing IWPP, the site was unused with no previous developments having occurred in the area.

Following is a brief description of the previous site assessment (i.e. prior to development of the existing IWPP, undertaken as part of the EIA in 2015) and the existing physical environment based on GHD's site observations and results of the most recent operational monitoring activities undertaken for the existing IWPP (undertaken in the last quarter of 2018 - December 2018).

### 2.6.2.1 Air Quality

#### *Pre-development site condition*

Pre-development ambient air monitoring was undertaken at the Project site and surrounding areas in 2015. Monitoring was undertaken for nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>) and benzene/toluene/ethylbenzene/xylene (BTEX).

Results showed that the average period concentrations of NO<sub>2</sub> are below the Qatari standards at all nine monitoring sites (Mott MacDonald, 2016). Monitoring results for SO<sub>2</sub>, O<sub>3</sub> and BTEX indicate that there are no exceedances of the relevant Qatari ambient standard (Mott MacDonald, 2016).

#### *Current site condition*

Stack emissions monitoring is being undertaken at six operational stacks for nitrogen oxides (NO<sub>x</sub>), sulphur dioxide (SO<sub>2</sub>), carbon monoxide (CO) and oxygen (O<sub>2</sub>). Results were compliant with Project specific guidelines for emissions.

### 2.6.2.2 Noise

#### *Pre-development site condition*

Table 2-6 summarizes the results of the baseline noise survey conducted during the EIA in May 2015. All measurements were found to be compliant with the IFC/World Bank standard.

**Table 2-6: Ambient noise monitoring results undertaken in 2015**

Station ID	Description	Monitoring results
NS1	Station located at the northern boundary of the site	The recorded noise levels do not exceed the IFC/World Bank L <sub>Aeq T</sub> daytime and night time noise levels
NS2	Station located at the southern boundary of the site	The recorded noise levels do not exceed the IFC/World Bank L <sub>Aeq T</sub> daytime and night time noise levels
NS3	Station located at the western boundary of the site	The recorded noise levels are below the IFC/World Bank L <sub>Aeq</sub> db noise limits

Station ID	Description	Monitoring results
NS4	South of Al Wahran. Station located outside the site boundary and representative of noise sensitive receptor	Baseline noise levels do not exceed the IFC/World Bank noise limits for day and night periods
NS5	Public Beach. Station located outside the site boundary and representative of noise sensitive receptor	Daytime noise level does not exceed the IFC/World Bank noise limits. Night time measurements were not measured.

Source: Mott MacDonald, 2016

### **Current site condition**

Noise measurements are undertaken at the five baseline locations (refer to Table 2-6) on a quarterly basis. The latest quarterly monitoring report (Q4 2018) showed that noise levels at the Project site complied with Qatar Noise Standards for Industrial site limit of 75 dBA (GHD, 2019).

### **2.6.2.3 Soil and Groundwater**

#### **Pre-development site condition**

Prior to development of the existing IWPP, the area was undeveloped. As such, potential contaminating activities are not known to have historically been undertaken at the site (Mott MacDonald, 2016).

A study of soil and groundwater quality was undertaken by Gulf Labs in 2015. Results of the study are summarized below:

- Soil quality (Mott MacDonald, 2016)
  - Very high concentrations of magnesium and low concentrations of heavy metals were noted
  - BTEX and PAHs were not detected in any of the samples above the laboratory minimum detection limits (MDLs)
- Groundwater quality (Mott MacDonald, 2016)
  - Groundwater is relatively neutral (pH between 7.36 and 7.52)
  - Low concentrations of aluminium, boron, iron, molybdenum, phosphorous and zinc were noted in all samples
  - High concentrations of potassium and magnesium were noted, these concentrations are consistent with seawater
  - PAHs, TPH and BTEX were not identified at concentrations above the laboratory MDL
  - Faecal coliform and egg parasites were not recorded

#### **Current site condition**

Five monitoring wells used during baseline assessment (Mott MacDonald, 2016) are being utilised for the ongoing quarterly monitoring program. The December 2018 operational monitoring results showed that all parameters, including BTEX, Petroleum Hydrocarbon, PAHs, and VOCs) were below the MDL with the exception of Arsenic, Boron and Vanadium (GHD, 2019).

## 2.6.2.4 Marine Environment

### Pre-development site condition

A marine environmental baseline survey (MEBS) was conducted prior to the development of the existing IWPP. Five major habitat classifications and different isotopes were recorded and mapped during the survey at the surrounding marine environment (Mott MacDonald, 2016). The five major habitats with their description are provided below:

- Intertidal Sand and Mudflats: The intertidal zone supports and extensive sand flats which are likely to support infauna assemblages which provide foraging opportunities for migrating birds (5OES, 2015).
- Mangroves: An intertidal habitat located to the south of the Project area. The mangrove area is known to support a dense mangrove stand, along with associated fauna (OES, 2015).
- Seagrass: Seagrass beds are dense and extensive within the project area, and are in a relatively pristine condition given the lack of pre-existing development along the stretch of coastline (5OES, 2015).
- Macroalgae: Macroalgae habitats were considered to be well developed and abundant in a number of areas, representative of pristine and intact natural habitats (5OES, 2015).
- Pearl Oysters. Two species of pearl oysters were recorded during the surveys and the concentrations were notable in a number of areas at depths of below 5 m (5OES, 2015).

### Current site condition

MEBS monitoring is being undertaken as part of the operational environmental monitoring for the existing IWPP. The monitoring scope comprises of a full ecological, sensitive habitat, entrainment, seabed temperature, seawater and marine sediment quality assessment. A summary of the most recent monitoring study undertaken at the Project site are provided in Table 2-7.

**Table 2-7: Marine environment monitoring results (December 2018)**

Item	Description	Summary of Results
1	Seagrass coverage around the Project site	Marginal decrease (0.4%) in seagrass coverage was recorded between Q3-2018 and Q4-2018 periods (GHD, 2019)
2	Pearl oyster habitats around the Project site	Marginal decrease (4.2%) in pearl oyster habitats was recorded between Q3-2018 and Q4-2018 periods (GHD, 2019)
3	Compliance of marine sediment quality with adopted marine sediment quality assessment criteria	Compliance was achieved for all monitoring parameters at all stations (GHD, 2018)
4	Compliance of seabed temperature surrounding the Project site, with the seawater quality standards	Temperature differential between Intake and Outfall was below 3°C (GHD, 2019)

Source: GHD, 2019

### **2.6.2.5 Terrestrial Ecology**

#### ***Pre-development site condition***

A terrestrial site assessment was undertaken during EIA in 2015 in order to identify the presence of sensitive habitats at the Project site. Results of the preliminary site visits showed that the site is considered significantly impacted and does not fall within a protected category or have adjacent sensitive terrestrial habitat (Mott MacDonald, 2016). The existing biodiversity value at the site is considered relatively poor on an international level and with respect to its national value (Mott MacDonald, 2016).

#### ***Current site condition***

There are existing construction activities at the Umm Al Houl SEZ Site, which lies south of the existing IWPP. The Project site itself is considered a 'brownfield' area. The proposed expansion project will be constructed in a disturbed and cleared operational work area, adjacent to the existing IWPP, with minimal flora and fauna habitat of significant on the site.

### **2.6.2.6 Cultural Heritage and Archaeology**

#### ***Pre-development site condition***

Two cultural heritage receptors located within the Al Wakrah residential area were identified in the wider area (Mott MacDonald, 2016):

- Al Wakrah Castle
- Sheikh Ghanim Bin Abdulrahman House

Initial site walkovers undertaken over the Project area identified offshore fish traps located in the area of the proposed scheme outfall (Mott MacDonald, 2016).

#### ***Current site condition***

The proposed expansion Project will be located in a highly disturbed environment following extensive works associated with the development of the existing IWPP and the surrounding Umm Al Houl SEZ. Further, no significant cultural heritage or archaeological resources were found during the construction of the existing IWPP.

### 3. Environmental Legislation

The regulatory framework expected to govern the environmental performance of the proposed Project comprises the following:

- Qatar environmental legislation and policy
- Regional conventions and protocols
- International conventions, protocols and guidelines.

This section provides an overview of the key environmental requirements relevant to the Project’s construction and operation activities. It should be noted that these are based on GHD’s understanding and interpretation of current environmental regulatory standards applicable to the Project, and should not be construed as legal opinion.

The summary of the environmental requirements relevant to the Project is provided in Table 3-1.

**Table 3-1: Environmental laws, standards, and guidelines applicable to the Project**

Aspect	Legislation	Project Relevance
<i>Qatar Environmental Laws and Regulations</i>		
EIA study	Technical Guidance for Environmental Impact Study and its Terms of Reference & Scope of Works (ToR & SoW) for the Roads and Infrastructure Projects	Overarching environmental assessment technical guidance document for the preparation of an EIA for an Infrastructure Project.
Overall Project requirement	Qatar Executive by Law for Environmental Protection Law, Law No. 30 for the year 2002.	Overarching Qatari Environmental legislation that results will be compared against (Air, Noise, Seawater and wastewater).
<i>Regional Conventions and Protocols</i>		
Marine environment	Regional Convention for Cooperation on the Protection of the Marine Environment for Pollution	The Project will comply with the provisions in this convention (e.g. no illegal discharge from ships).
Biodiversity	Convention on Conservation of Wildlife and its Natural Resources in the GCC Countries	The Project needs to comply with the provisions of this convention in terms of biodiversity conservation.
<i>International Conventions and Protocols</i>		
Soil and groundwater quality	Dutch Circular on Target Values and Intervention Values for Soil Remediation	This circular will be adopted for the review and assessment soil and groundwater data.



Aspect	Legislation	Project Relevance
Marine environment	Convention on the Prevention of Pollution from Ships (MARPOL)	The Project will comply with the provisions of this convention, which include the preservation of the marine environment by eliminating pollution by oil and other harmful substances and to minimise accidental spillage of such substance.
Marine environment – waste management	Convention on the Prevention of Marine Pollution by Dumping of Waste and other Matter	The Project will prohibit marine dumping (except for possibly acceptable wastes) in compliance with this convention.
	International Convention for the Control and Management of Ships' Ballast Water and Sediments	The Project will comply with the provisions of this convention in preventing, minimising and ultimately eliminating the risks of introduction of harmful aquatic organisms and pathogens through ships entering the ports.
Sediment quality	Australian and New Zealand Guidelines for Fresh and Marine Water (and Sediment) Quality	This guideline will be adopted for the review and assessment of marine sediment.
GHG Assessment	Montreal Protocol on Substances that Deplete the Ozone Layer of 1987 & Montreal Amendments	Ozone depleting substances listed in the Montreal Protocol will not be used during all phases of the Project.
	Kyoto Protocol to the United Nations Framework Convention on Climate Change	The proponent will take into account and consider the targets for the commitment period.
	Vienna Convention for the Protection of the Ozone Layer	The proponent will take into account the mechanisms adopted in this convention. Ozone depleting substances listed in this convention will not be used during the construction and operation of the Project.
Biodiversity	Convention on Biological Diversity	The provisions in this convention will be considered in marine and terrestrial ecology section.

As the Proponent seeks project funding from international lending institutions, the Project needs to comply with the following:

- Equator Principles
- International Finance Corporation (IFC) Performance Standards
- World Bank Group Environment Health and Safety (EHS) Guidelines

International guidelines relevant to the Project is provided in Table 3-2.

**Table 3-2: International guidelines relevant to the Project**

Standard	Objectives / Requirements	Project Relevance
<i>Equator Principles (June 213)</i>		
Principle 1 Review and Categorization	Categorizing the project based on the magnitude of its potential environmental and social risks and impacts in accordance with the IFC categorization criteria.	The Expansion Project will be categorized based on the results and findings of the impact assessment. The categories are defined as follows: <ul style="list-style-type: none"> <li>• Category A: Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible and/or unprecedented</li> <li>• Category B: Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures</li> <li>• Category C: Projects with minimal or no adverse environmental and social risks and/or impacts</li> </ul>
Principle 2 Environmental and Social Assessment	The borrower to conduct an assessment process to address the relevant environmental and social risk and impacts of the proposed project (which may include the illustrative list of issues found Exhibit II of the Equator Principle).	The EIA report, which will be prepared upon approval of this ToR, will fulfil this requirement.

Standard	Objectives / Requirements	Project Relevance
Principle 3 Applicable Environmental and Social Standards	The assessment procedure should demonstrate: <ul style="list-style-type: none"> <li>• Compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues</li> <li>• Applicable IFC Performance Standards on Environmental and Social Sustainability</li> <li>• The World Bank Group EHS Guidelines</li> </ul>	The EIA will be undertaken in compliance with Qatar's laws and regulations (refer to Table 3-1), IFC Performance Standards, and World Bank EHS Guidelines (listed below)
Principle 4 Environmental and Social Management System and Equator Principle Action Plan	The borrower is required to develop or maintain an Environmental and Social Management System (ESMS). Where the applicable standards are not met to the Equator Principles Financial Institutions (EPFI) satisfaction, the borrower and the EPFI will agree an Equator Principles Action Plan (EPAP) to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.	An ESMS has been developed for the existing IWPP. As such, the proposed IWPP Expansion Project will be undertaken in line with the existing ESMS.
Principle 5 Stakeholder Engagement	The borrower has to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with affected communities and, where relevant, other stakeholders.	Engagement with relevant stakeholders will be undertaken throughout the Project.
Principle 6 Grievance Mechanism	As part of the ESMS, the borrower has to establish a grievance mechanism designed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance.	A grievance mechanism has been developed as part of the ESMS of the existing IWPP for both, the workforce and for the surrounding neighbourhood. The grievance mechanisms will be implemented for the proposed IWPP Expansion Project.

Standard	Objectives / Requirements	Project Relevance
Principle 7 Independent Review	An Independent Environmental and Social Consultant, not directly associated with the client, should be engaged to carry out an Independent Review of the Assessment Documentation including the Environmental and Social Management Plan, the Environment and Social Management System, and the Stakeholder Engagement process documentation.	GHD was engaged as the environmental consultant to prepare the required environmental studies for the proposed IWPP Expansion Project.
Principle 8 Covenants	<p>The borrower has to provide periodic reports to the EPFI (not less than annually), prepared by in-house staff or third party experts, that:</p> <ul style="list-style-type: none"> <li>• document compliance with the Environmental and Social Management Plans and Equator Principles Action Plan (where applicable)</li> <li>• provide representation of compliance with relevant local, state and host country environmental and social laws, regulations and permits</li> </ul>	Periodic reports to the EPFI will be provided during the construction and operation phases of the Project.
Principle 9 Independent Monitoring and Reporting	The EPFIs will appoint an Independent Environmental and Social Consultant, or require that the borrower retain qualified and experienced external experts to verify its monitoring information, which would be shared with the EPFI.	The Proponent will engage an independent consultant to do periodic environmental monitoring for the Project.
Principle 10 Reporting and Transparency	The borrower will ensure that, at a minimum, a summary of the EIA is accessible and available online.	The EIA will be made accessible and available online.

Standard	Objectives / Requirements	Project Relevance
<i>IFC Performance Standards (PS)</i>		
PS 1 Assessment and Management of Environmental and Social Risks and Impacts	This standard establishes the importance of (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of the project; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of environmental and social performance throughout the life of the project.	The provisions in this performance standard will be considered in assessing the environmental and social impacts of the Project and in recommending the mitigation measures to prevent any adverse impacts associated with the Project.
PS 2 Labour and Working Conditions	This standard recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of the workers.	The requirements in this standard will be taken into consideration in terms of planning for the hiring of workers, providing compensation and benefits, accommodation, and the total health and safety condition of workers. Labour and working condition will be assessed and included in the social impact assessment.
PS 3 Resource Efficiency and Pollution Prevention	This standard encourages more efficient and effective resource use, pollution prevention and mitigation with technologies and practices.	The provisions in this performance standard will be considered in identifying mitigation measures for use of more efficient and effective resources (where applicable).
PS 4 Community Health, Safety and Security	This standard addresses the client's responsibility to avoid or minimize the risks and impacts of project activities, equipment and infrastructure to community health, safety and security.	The provisions in this performance standard will be considered in the assessment of project impacts to the community arising from air emissions, noise generation as well as traffic and security within the Project site.
PS 5 Land Acquisition and Involuntary Resettlement	This standard recognizes that project-related land acquisition and restrictions on land use have adverse impacts on communities and persons that use the land.	Land acquisition and resettlement are not proposed for the Project. The proposed expansion will be located within the existing IWPP Project boundary. As such, this standard is not applicable.

Standard	Objectives / Requirements	Project Relevance
PS 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	This standard recognized the importance of protecting and conserving biodiversity, maintaining ecosystem services and sustainably managing living natural resources in achieving sustainable development.	The provisions set out in this performance standard will be considered in the assessment of marine and terrestrial ecology.
PS 7 Indigenous Peoples	This standard recognized that Indigenous Peoples (IPs) are often among the most marginalized and vulnerable segments of the population. IPs are vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded.	The rights and heritage values associated with IPs are not expected to be impacted as a result of the Project. The proposed expansion will be located within the existing IWPP Project boundary. As such, this standard is not applicable.
PS 8 Cultural Heritage	This standard recognizes the importance of cultural heritage for current and future generations.	Local heritage is not expected to be impacted as a result of the Project since the proposed expansion will be located within the existing IWPP Project boundary. As such, this standard is not applicable. However, this will apply in the event that important cultural and archaeological sites are identified during construction.
<i>World Bank EHS Guidelines</i>		
General EHS Guidelines	This guideline contains information on the performance levels and measures that are generally considered to be achievable in new facilities.	The provisions in this guideline will be used together with the relevant industry-specific sector EHS guidelines in assessing the impacts of the proposed expansion. Mitigation measures will also identified based on the recommendations provided in this guideline.

# 4. EIA Methodology

## 4.1 EIA Objectives

The EIA will be developed to meet the following objectives:

- Conduct the EIA in a manner that is consistent with the regulatory requirements of MME
- Identify potential significant environmental impacts associated with the Project construction and operation and develop corresponding mitigation measures to reduce, offset, and where possible eliminate negative environmental impacts
- Develop an Environmental Management and Monitoring Programme (EMMP) as part of the EIA that provides a framework for environmental management and/or monitoring during both the construction and operation of the Project. This EMMP should be comprehensive enough to cover all the environmental issues and legislative requirements
- Produce an EIA report that provides relevant stakeholders with a thorough understanding of key elements, impacts and mitigation measures of the proposed dredging and disposal activities.

## 4.2 EIA Scope

Given the existing site conditions, project nature and likely environmental impacts of the activities associated with the Project, the environmental aspects that will be considered in the EIA include:

- Air quality
- Noise and vibration
- Soil and groundwater quality
- Marine environment (operation phase)
- Socio-economics / Social Impact Assessment
- Transport and Access
- Waste
- Stakeholder Engagement

Detailed methodology for the above aspects are provided in Section 5.

## 4.3 EIA Process

The key processes of an EIA comprise:

- Liaising with MME
- Literature review
- Review of legislative framework
- Identification of sensitive receptors
- Baseline data assessment
- Impact prediction / assessment and evaluation of findings
- Identification of mitigation measures
- Establishment of an EMMP

A description of how each of the above items will be undertaken is detailed in Sections 4.3.1 to 4.3.10, while further detail on the baseline and impact assessment methodologies for each environmental aspect is provided in Section 5.

Any limitations associated with preparation of this study will be clearly defined within the EIA report. The extent to which study limitations may influence the conclusions of the environmental assessment will also be presented and discussed.

#### **4.3.1 Liaising with MME**

In order to engage MME early on in the project, a technical scoping meeting will be requested between the MME, the project proponent and / or project consultant and the EIA Team. The project proponent and the EIA team will provide an introduction to the proposed project, the proposed EIA methodology and schedule. All submissions to the MME will be made in writing for formal review and acceptance.

#### **4.3.2 Literature Review**

A literature review will be carried out to identify the status of the Project site, its surroundings and the identified environmental sensitive receptors. The literature review will include, but will not be limited to, a review of aerial photography, EIA reports for development projects near the proposed Project site, journals, environmental monitoring results issued by MME, information published by the Ministry of Development Planning and Statistics and theme maps (where available).

#### **4.3.3 Legal Framework**

The EIA will identify and discuss the relevant national and international laws and guidelines expected to govern the environmental performance of the Project, including:

- Qatar national laws
- Relevant international conventions and guidelines

#### **4.3.4 Identification of Sensitive Receptors**

An assessment of the sensitive receptors most at risk of the Project will be included within the EIA, which will be identified via aerial imagery and site visits.

#### **4.3.5 Baseline Data**

Baseline assessments (primary or secondary data) form the backbone of environmental assessments, with data collection required to provide an accurate indication of the condition of environmental systems prior to development. Baseline data will be used to make predictions on the degree of impact associated with the Project, and will help dictate the degree of mitigation and monitoring required to minimise the negative environmental impact of the Project. The existing IWPP is currently operational and has ongoing environmental monitoring undertaken in compliance with its Consent to Operate (CTO) permit. This environmental monitoring data will be utilized to establish the baseline. The utilization of this existing relevant environmental monitoring data will expedite the EIA process and will lead to efficiencies.

#### **4.3.6 Impact Identification**

Potential impacts will be identified through an assessment of planned construction activities associated with the RO plant, but also unplanned activities that can also affect sensitive receptors. Credible unplanned activities will be determined and assessed similarly to planned activities.



### 4.3.7 Impact Prediction and Assessment

Key findings of the impact identification and evaluation will be presented in tabulated form classifying the relevant environmental significance of each impact. Each environmental impact associated with the proposed development will be rated in terms of the level of significance of the impact on the environment or other identified receptors. The existing site conditions and surrounding land-uses will influence the hazard assessment.

Mitigation strategies, where appropriate, will be defined and the impact of the mitigation rated in general terms. Taking the mitigation impact into account, a final discussion regarding the significance rating for each residual, unavoidable or cumulative impact will be provided, and results tabulated.

The degree of impacts associated with the Project both prior to and following implementation of mitigation measures will be assessed. Assessment of the level of impact is based on two criteria:

- Likelihood of the impact (Appendix F; Table )
- Consequence of the impact (Appendix F; Table F-2:)

The impact significance level is then based on the following calculation:

$$\text{Significance of impact} = \text{Likelihood Level} \times \text{Consequence Level}$$

Based on the above calculation, the level of the impact is classified in the following five levels and can be expressed in a matrix (Table 4-1).

- Extreme
- High
- Medium
- Low
- Negligible

**Table 4-1: Significance of environmental impact**

Likelihood Rating	Consequence Rating				
	A = Insignificant	B = Minor	C = Moderate	D = Major	E = Catastrophic
5 = Almost Certain	Low (5A)	Medium (5B)	High (5C)	Extreme (5D)	Extreme (5F)
4 = Likely	Low (4A)	Medium (4B)	High (4C)	High (4D)	Extreme(4E)
3 = Possible	Negligible (3A)	Low (3B)	Medium (3C)	High (3D)	High (3E)
2 = Unlikely	Negligible (2A)	Low (2B)	Medium (2C)	Medium (2D)	High (2E)
1 = Rare	Negligible (1A)	Negligible (1B)	Low (1C)	Medium (1D)	Medium (1E)

Overall, the following will be considered in the evaluation of impacts:

- Direct / indirect impacts
- Adverse / beneficial impacts
- Temporary, short-term or long-term impacts
- Reversible / irreversible impacts
- Cumulative impacts over time (as well as the combined impacts of the proposed project with existing developments and other land use activities in the project areas).

### **4.3.8 Identification of Mitigation Measures**

The EIA will develop and recommend mitigation measures to avoid, reduce or offset the identified environmental impacts. These will be categorised according to “clearly defined” and “ongoing” mitigating measures.

The recommended mitigation measures will be developed with the following objectives:

- Avoidance or prevention, where possible, of negative impacts
- Reduce likelihood, frequency and severity of negative impacts
- Enhance positive impacts
- Maximise the probability of Project compliance with the relevant environmental regulatory requirements.

The EIA will identify and evaluate the final residual environmental impacts that are anticipated after the mitigation measures have been implemented.

### **4.3.9 Development of Environmental Management and Monitoring Plan**

All identified and assessed mitigation measures will form the basis of a framework EMMP for the works. In addition, the framework EMMP will determine and integrate potential ways and means to facilitate Project compliance with relevant MME regulations, policies and guidelines. The EMMP will provide an adequate mechanism for:

- Maximising the probability of Project compliance with relevant MME standards for the management and mitigation procedures and processes required
- Monitoring the implementation and effectiveness of proposed mitigation measures

The EMMP will also define roles and responsibilities for implementing the recommended mitigation measures, carrying out monitoring activities and preparation of environmental reports.

### **4.3.10 Key Deliverables**

The key deliverables of the proposed Project will include the following:

- Draft ToR for the EIA (for MME comment)
- Final ToR for the EIA (incorporating MME's comments, if any)
- Draft EIA Report (for MME comment)
- Final EIA Report (incorporating MME's comments, if any).

# 5. Environmental Baseline Data Collection and Impact Prediction Approach

This section describes the environmental baseline data collection and impact prediction approach for developing the EIA Report.

## 5.1 Scope

The proposed scope and methodology for each element of the EIA is summarised in Table 5-1 and discussed in the succeeding subsections.

**Table 5-1: Proposed EIA Scope**

Environmental element	Proposed scope of EIA study	Methodology
<i>Scoped in</i>		
Air quality	Scoped in (refer to Table 5-2)	Desktop study and qualitative impact assessment
Noise and vibration		
Soil and groundwater		
Waste management		
Marine environment	Scoped in (refer to Table 5-2)	Desktop study and qualitative impact assessment
Socio-economics / social impact assessment	Scoped in (refer to Section 5.2)	Desktop study and qualitative impact assessment
Traffic and transport	Scoped in (refer to Section 5.3)	Desktop study and qualitative impact assessment
Stakeholder engagement	Scoped in (refer to Section 5.4)	Consultation meetings Information disclosure
<i>Scoped out</i>		
Terrestrial ecology	Scoped out (refer to 5.6.1 for justification)	
Culture, heritage and archaeology	Scoped out (refer to Section 5.6.2 for justification)	
Landscape and visual impact	Scoped out (refer to Section 5.6.3 for justification)	
Greenhouse gas (GHG)	Scoped out (refer to Section 5.6.4)	

## **5.2 Social Impact Assessment**

### **5.2.1 Baseline Condition Assessment**

The EIA will describe the proposed Project in the context of the surrounding land uses and community facilities of the local area. Available secondary data from MME and other relevant agencies will be used to characterise the socio-economic conditions<sup>1</sup> in the vicinity of the proposed site. Socio-economic information that will be included in the EIA are:

- Population and demographic movement
- Economic environment, employment and labour market
- Current land use
- Use of natural resources
- Health and education
- Language, ethnicity and religion
- Poverty and vulnerable groups

### **5.2.2 Impact Prediction Assessment**

The socio-economic assessment will aim to gain an appreciation of the relevance of the Project in the context of the existing facilities and future land use in the local area. It will discuss the impacts of the construction and operational activities on the social and economic aspects in the region including:

- Population and demographics (e.g. describe the workforce numbers and arrangement if there is any impact on community services and facilities)
- The national, regional, and local economies in terms of employment and business opportunities
- Availability of facilities and infrastructure

Socio-economic impacts and benefits will be identified and strategies will be proposed to mitigate and manage or alternatively enhance social opportunities. Pressure on existing infrastructure and services from the influx of worker population together with surrounding pressures for the current workers at the site will also be assessed.

## **5.3 Transport and Access**

### **5.3.1 Baseline Condition Assessment**

The EIA will describe the proposed Project in terms of the following:

- Site accessibility
- Traffic
- Available public transport infrastructure

### **5.3.2 Impact Prediction Assessment**

The EIA will provide a qualitative assessment of potential traffic and access impacts of the proposed IWPP Expansion Project such as:

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<sup>1</sup> Economic inputs to be included in the EIA comprise of employment opportunities and benefits as a result of Project construction and operation.

- Reduced amenity due to dust from construction vehicles
- Safety issues to the community and workers
- Nuisance to receptors associated with increased traffic

## 5.4 Stakeholder Engagement

The proposed IWPP Expansion Project will be developed to meet the requirements of Equator Principle and IFC Performance Standards. As part of the requirements, engagement with stakeholders in the areas of influence need to be undertaken in a manner that understands their concern and ensure they are considered in the project development. Some examples of impacts of the proposed project on the surrounding area include:

- Dust generation during project construction
- Noise impact during project construction and operation
- Traffic impact during project construction and operation

In order to fully address international requirements, stakeholder engagement will be undertaken. A stakeholder engagement plan (SEP) will be developed to define the strategies during the consultation phase. The SEP will comprise:

- Scoping and planning:
  - Stakeholder identification and analysis
  - Information materials
  - Consultation plan
- Engagement:
  - Consultation meetings and discussions with relevant government authorities (e.g. MME)
  - Information disclosure via Proponent's website or media releases (i.e. newspaper)
- Issues response and feedback:
  - Development of consultation report, which will feed to the social impact assessment (refer to Section 5.2)
  - Development of mitigation and management measures
- Ongoing engagement:
  - Stakeholder engagement following completion of EIA Report

## 5.5 Other Elements

The method for baseline collection and impact assessment for elements to be completed via desktop study are provided in Table 5-2.

**Table 5-2: Baseline collection and impact prediction for other environmental elements**

Environmental element	Baseline conditions	Impact assessment
Air quality	A desktop review of the following documents will be undertaken to describe the ambient air quality conditions at the Project site:	Impacts will be identified and qualitatively assessed, including exhaust emissions from construction

Environmental element	Baseline conditions	Impact assessment
	<ul style="list-style-type: none"> <li>Publicly available data provided by the MME or available data via the Ministry of Development Planning and Statistics</li> <li>Operational monitoring reports for the existing IWPP</li> </ul>	<p>equipment and vehicles and dust generation from land works.</p> <p>Qualitative assessment will be undertaken using the methodology provided in Section 4.3.7.</p>
Noise and vibration	<p>A desktop review of the existing IWPP operational monitoring reports will be undertaken to describe the existing conditions of the Project site relative to noise and vibration.</p>	<p>Impacts will be identified and qualitatively assessed using the methodology provided in Section 4.3.7.</p> <p>Impact assessment will include:</p> <ul style="list-style-type: none"> <li>Noise generated from construction equipment and vehicles.</li> <li>Impact of noise generated from the Project to the sensitive receptors.</li> </ul>
Soil and groundwater	<p>A desktop review of the existing IWPP operational monitoring reports will be undertaken to describe the existing soil and groundwater conditions of the Project site.</p>	<p>GHD will identify and qualitatively assess the impacts of the Project construction and operation on soil and groundwater. Qualitative impact assessment will be undertaken using the methodology provided in Section 4.3.7.</p>
Marine environment	<p>A desktop review of the IWPP Project operational monitoring reports will be undertaken to describe the existing condition of the marine environment that may potentially be impacted by the proposed RO plant expansion</p>	<p>GHD will identify and qualitatively assess the impacts of the Project construction and operation on marine environment.</p> <p>No active marine construction works will be undertaken for the Project. However, if dewatering will be required as part of construction works, this will be considered and assessed accordingly.</p> <p>An assessment will also be conducted of the discharge of the brine effluent into the surrounding marine environment during the operational phase of the Project.</p> <p>Qualitative impact assessment will be undertaken using the methodology provided in Section 4.3.7.</p>

Environmental element	Baseline conditions	Impact assessment
Waste management	The EIA will describe the wastes to be generated from the Project activities as well as generation trends including the available waste management facilities existing in Qatar. This will enable the Project to identify constraints and opportunities in regards to management of wastes generated.	<p>A qualitative assessment of the potential impacts associated with the identified waste streams will be presented in the EIA using the methodology provided in Section 4.3.7.</p> <p>The assessment will include:</p> <ul style="list-style-type: none"> <li>• Description of nature of wastes to be generated (e.g. solid, liquid, hazardous) and its planned management.</li> <li>• Impact to the existing waste management infrastructure in Qatar</li> </ul> <p>Based on these findings, recommendation for reduction, re-use and recycling will be developed.</p>

## 5.6 Environmental Elements Scoped out

This section outlines the environmental issues scoped out and the associated justification.

### 5.6.1 Terrestrial Ecology

Prior to the development of the existing IWPP, the Project Site, although considered 'greenfield', has been significantly impacted by anthropogenic influences (Mott MacDonald, 2016). The land where the IWPP Expansion Project will be constructed, including its immediate environment, has been extensively disturbed by the construction and operation of the existing IWPP. Therefore, terrestrial ecology assessment will be scoped out in the EIA.

### 5.6.2 Culture, Heritage and Archaeology

Cultural heritage assets were not discovered during the construction of the existing IWPP. As such, archaeology and cultural heritage has been scoped out for both construction and operation

In order to mitigate against the loss of any archaeological assets that may be unearthed or discovered, a 'Chance Find' procedure will be incorporated into the construction management plans and will be implemented by the contractor, if a find is made during the construction phase of the Project. The following procedures will be followed:

- Project personnel will undertake an on-the-ground inspection to determine if the remains of structures or any archaeological material are discovered during earthmoving works.
- In the event a potential archaeology asset is identified, the following procedure should be followed by the contractor:
  - Work will cease immediately in the vicinity of the archaeological asset
  - GPS coordinates and photographs should be taken of the find and a description should be noted

- The QMA should be contacted for comment and advice on how to proceed.

### **5.6.3 Landscape and Visual**

The proposed IWPP Expansion Project is located in a designated industrial area where the existing IWPP is located. The proposed Project and required construction laydown area will be located in an already disturbed area. There are no nearby public roads from which the public can view the future installations.

Given the above, landscape and visual impact assessment during the construction and operation phases is proposed to be scoped out in the EIA.

### **5.6.4 Greenhouse Gas Assessment**

The aspects of the expansion Project that may result in GHG emissions include:

- Construction phase emissions
- Energy indirect emissions from power consumption
- Emissions from water and/or wastewater treatment.

Construction-phase emissions will largely consist of fuel combustion emissions from heavy machinery and other vehicles. However, construction phase-emissions are likely to be negligible when divided across the Project's design life of 30 years. As such, these are proposed to be scoped out.

Majority of the emissions anticipated to be associated with the additional RO unit will be from energy usage for powering and operation of the plant. However, as the plant will use electricity generated by the existing natural gas-fuelled power station, emissions will have already been accounted for as part of the existing facility, and no additional emissions from power requirements of the expansion Project are expected.

Finally, wastewater from the dissolved air flotation (DAF) plant will be sent to the existing wastewater treatment plant (WWTP) prior to final discharge. As pre-treatment at the DAF system involves chemical dosing during pH correction with sulphuric acid and during coagulation, wastewater from the DAF is not expected to contribute to the BOD load at the existing WWTP. As such, no GHG emissions will be attributed to the expansion Project from BOD treatment at the existing WWTP.

Furthermore, plant design has made provision for treatment of the clean-in-place backwash (which has its own neutralisation tank) to be sent to the existing WWTP should the quality require additional treatment prior to discharge. Wastewater treatment requirements for the expansion RO plant include polyelectrolyte dosing, sludge clarifiers, and dewatering centrifuges. Whilst some forms of wastewater treatment processes may result in direct GHG emissions (e.g., carbon dioxide from microbial respiration, nitrous oxide from nitrification/denitrification processes, and methane from anaerobic digestion), the treatment processes included in this Project preclude GHG generation for the following reasons:

- Polyelectrolyte dosing during coagulation and flocculation involves chemical treatment of the influent water, thereby removing biological microorganisms, thereafter precluding the production of GHG.
- Sludge clarifiers involve settlement, not digestion, of the sludge in the wastewater, which means that the sludge does not stay within the system long enough for anaerobic digestion to occur. As such, methane production is not expected.
- Dewatering centrifuges is a rapid solids separation system. The resultant "cake" is expected to be devoid of microorganisms involved in biodigestion as this process occurs



post-biocide treatment with sulphuric acid, as well as downstream of the polyelectrolyte/chemical dosing.

Additionally; in respect of the IFC general EHS guidelines, water treatment is not considered to be a sector from which significant GHG emissions are expected. Furthermore, the IFC sectoral EHS guidelines for Water and Sanitation excludes consideration of greenhouse gases.

In consideration of the above and in order to prevent double-counting, a separate GHG assessment as part of the expansion Project EIA is proposed to be scoped out.

## 6. Summary

The proposed IWPP Expansion Project will require the preparation of an EIA.

GHD has been commissioned by UHP as the Project environmental consultant to undertake an environmental impact assessment for the Project. The EIA will be prepared according to relevant Qatar environmental legislation and international guidelines such as the Equator Principle and the IFC Performance Standards.

The ToR presents a brief description of the proposed Project, the proposed scope and methodology for the baseline data collection, and subsequent impact assessment. Baseline data will be collected through review of available secondary data in order to describe the existing site condition. The results of the desktop review will be used in assessing the potential impacts of the project construction and operation phases. Qualitative impact assessment will be employed for the EIA study.

The EIA will be prepared with a view of providing accurate, detailed information in a clear and concise manner in order to allow MME to make an informed assessment of the potential impact of the Project on the environment. The EIA will also identify appropriate mitigation and management measures to minimise the identified impacts.

## 7. References

5OES (2015). Marine Environmental Baseline Survey for Umm Al Houl Integrated Water & Power Project. Prepared by Five Oceans Environmental Services LLC (5OES) for Mott MacDonald. PO Box 660, PC 131 Sultanate of Oman

GHD (2019). Umm Al Houl Power Independent Water and Power Project (IWPP) Quarterly Monitoring Report for Operational Environmental Management Plan (OEMP). January 2019. Prepared by GHD Global Pty Ltd (GHD) for Umm Al Houl Power Company (UHP).

GHD (2018). Umm Al Houl Power Independent Water and Power Project (IWPP) Quarterly Monitoring Report for Operational Environmental Management Plan (OEMP). October 2018. Prepared by GHD Global Pty Ltd (GHD) for Umm Al Houl Power Company (UHP).

MDPS (2015). Qatar Ministry of Development Planning and Statistics – Census 2015. Accessed on 01 August 2017 through

<http://www.mdps.gov.qa/en/statistics1/StatisticsSite/Census/Census2015/Pages/default.aspx>.

Mott MacDonald (2016). Umm Al Houl Independent Water and Power Plant (IWPP) Environmental Impact Assessment (EIA). January 2016. Report prepared by Mott MacDonald for Umm Al Houl Power Company (UHP).

# Appendices

# **Appendix A** – Environmental Permit



State of Qatar  
Ministry of Environment

Environment Assessment Department

Ref: 1-20274-2015

Date: 6/12/2015

MoE 700-8

**Mr. Abdurrahman Al Nihma**

**Head of Health, safety and Environment Department**

**Qatar General Electricity and Water Corporation (KAHRAMAA)**

**Fax; 44845595**

**Doha**

Greetings,

**Subject: Environment Assessment and Permit Procedures - Project Power Plant and Water Desalination South of Wakra – Umm Al Houli (Facility D)**

After the technical review of the draft environment impact assessment study submitted on the project, and the remarks and visualization of the Ministry of Environment on them and the exchange of responses and submitted documents with your letters the last was the letter from Umm Al Houli Company ref (UHP/EIA/022) which we received on 26/11/2015 and our replies the last was our letter ref (19959) dated 30/11/2015 and the meeting held between the experts at the Ministry of Environment and the company on 30/11/2015 , kindly find attached the environment permit for the project.

Please give instructions to work according to it and all general and special terms therein and during all the project stages (design , construction, operation etc) and amend the





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environment impact assessment study in accordance with the remarks and visualizations of the Ministry of Environment and our reviews and our approval of the replies and documents submitted then resubmit it to the Ministry of Environment for review and approval in accordance to what have been indicated in the draft of the submitted study.

Thank you

*Signature*

*Ahmad Abdulkarim Al Ibrahim*

*Deputy Environment Assessment Department Manager*

Cc:

- Assistant Undersecretary for Technical Affairs
- Private Engineering Office/ Natural Reservations Sector
- Environment Assessment Department
- Environment Protection Department
- Reservations and Wildlife Department
- Information System Department
- Operations Department





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**Environment Permit**

- Project Name** : Project Power Plant and Water Desalination South of Wakra - Umm Al Houl (Facility D)
- Project Location** : Umm Al Houl, according to the coordinates and sketches, attached with this permit ((3) maps including geographical coordinates for the project site.)
- Owner** : Umm Al Houl Power Company
- Date of Issue** : 03/12/2015
- Date of Expiry** : 02/12/2016

**General Conditions:**

- 1- All safety precautions must be taken while working in the project.
- 2- Once the project is completed, the Ministry of Environment must be notified within a period not exceeding 30 days.
- 3- The Ministry is entitled to omit or change and of the conditions stated in this permit as well as to add any other conditions that the Ministry may find necessary to preserve the environment.
- 4- The Ministry of Environment has the right to withdraw the permit in case of not conforming to the stated conditions.
- 5- This permit is considered cancelled if not received within one month from issuance date.
- 6- The Ministry bears no responsibility for any typing error in the information stated in the permit once received by the authorized person.
- 7- Any omission or amendment or addition in this permit, it will cancel it and the owner will be legally accountable.







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- 8- It is necessary to keep this permit of copy thereof in the project site.
- 9- Coordination must be made with the competent municipality to discharge of the household waste and sewage in the treating stations and as per the applied procedures by the competent municipality.
- 10- Inform the Ministry of Environment in writing of any changes on the information stated in the application or attached thereto and obtain period approval before implementing any amendments (for example the site, operations, scope of work, characteristics of emissions etc).

**Special Terms:**

- 1- This permit was issued for the Project power plant and water desalination South of Wakra - Umm Al Houl (Facility D) , according to the coordinates and sketches attached with this permit (3 maps) and letters of KAHRAMAA and our replies on them among which our letter ref (6042) dated 29/5/2015 and our letter ref (10439) dated 4/8/2013 and the draft environment impact assessment study and the technical revision and the Ministry of Environment remarks and visualization of the Ministry on them and the exchange of responses and submitted documents with your letters the last was the letter from Umm Al Houl Company ref (UHP/EIA/022) which we received on 26/11/2015 and our replies the last was our letter ref (19959) dated 30/11/2015 and the meeting held between the experts at the Ministry of Environment and the company on 30/11/2015 .
- 2- Description of the project: it is located 2.5 km to the south of Wakra city and 15 km to the south of Doha city in Umm Al Houl area. It has power energy production units in addition to water desalination units and all related facilities and units and





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infrastructure that are necessary to operate the facility. The project consists of components / main and auxiliary units and as follows:

- 2,520 MW power generations based on combined cycle gas turbines running on natural gas fuel with no single unit greater than 300MW. No dual fuel capability is required.
- 136.5 MIGD potable water production:
  - 60MIGD Reverse osmosis.
  - 76.5MIGD Thermal desalination plant.
- Power blocks including: Gas Turbines, Heat Recovery Steam generators (HRSG) and Steam Turbines.
- Desalination block including: Reverse Osmosis (RO) and multi- Stage Flash Distiller (MSF).
- Seawater intake [total of 2.75km 90-1 km Dry works and 1.6- 2.75km Wet works]] and outfall [0.2.2km Dry works].
- Wastewater treatment facilities.
- Process and plant drainage systems
- Potable water facilities including: Pumping stations, Reservoirs and connection pipelines.
- Potable water disinfection facilities.
- System control and data acquisition (SCADA) connection between facility,





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substations and control centres.

- Administration and support buildings including workshop, laboratory, first aid, security, storage, mosque.
- 3- The design and implementation of the project mentioned in this permit shall be made in accordance to the specification of the design and implementation approved by the competent authorities among which the Ministry of Municipality and Urban Planning and the Standards and Metric Authority (Qatar Construction Specifications) etc.
- 4- The design and implementation of the mentioned project in this permit shall be done within the location approved by the Ministry of Municipality & Urban Planning which is approved by the Ministry of Environment and this shall have all the related works and activities directly or indirectly to the project among which for example and not limited to: traffic detours, offices, car parks, collection of reclamation etc.
- 5- Total commitment with what is indicated in the environment permit application and all attached information and documents and all the correspondents and documents submitted by the employers and the remarks of the Ministry of Environment regarding the environment permit application and in case of contradictions the harsher action and description and text shall be applied.
- 6- In case of amendments or change to any of the information and /or sketches submitted among which those indicated above, then in this case an application shall be submitted to the Ministry of Environment / Environment Assessment Department for this amendments / changes and in good time to permit review and





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taking decision on it and on the requirements of the necessary environment assessment and permit.

- 7- Due to the volume of shortage and negligence shown in the draft of the submitted study , the project's environment impact assessment study shall be amended as per the remarks and visualization of the Ministry of Environment and the reviews and approval to the replies and documents submitted and the remarks and requirements indicated in the environment permit and resubmit them to the Ministry of Environment (in complete and final form) maximum by 15/1/2016 to be reviewed and approved provided that the sections amended in the study shall be indicated and table of done amendments shall be submitted and all the replies and submitted documents in the stage of reply on the remarks and visualization of the Ministry of Environment in a separate appendix in the study.
- 8- This permit was issued with regard to the environment side only from the above project and the employer shall obtain all the administrative and technical approvals for the project from the competent parties and authorities in the country and shall fully conform to the indicated requirements and conditions in the entire stages of the project among which the initial, preliminary and detailed design and construction.
- 9- Approval and no objection shall be obtained from the Natural Reservations sector at the Private Engineering Office before starting any main or preliminary or secondary works relate to the project and any location of the project and shall fully adhere to the requirements and conditions issued by them.
- 10-Asbestos shall not be used in the temporary or permanent construction related directly or indirectly to the project.





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11-All the reports and plans and studies and any similar matters that shall be required to be prepared or submitted in accordance to the environment impact assessment study or remarks and requirements of this permit shall be prepared by an experienced environment consultant who shall have previous experience in similar matters.

12- **With regard to the laws related to the project/permit**

12-1 Total commitment with the entire related national policies and legislations applied (directly or indirectly) with the protection of environment and safety and health related to the working sites among which law no 30 for the year 2002 and executive chart thereof etc.. and those indicated in the environment impact assessment study and the correspondent issued by the Ministry of Environment and in case of contradiction in the text or value or limits then the harsher text and value and limit shall be applied.

12-2 Any thins that shall not be national applied environment laws nor the conventions and international regional and mutual treaties ratified by the state then what shall be needed from laws and specifications and limits and standards and technical proofs or guides for investigation and collection and analysis and assessment etc that shall be necessary to the implementation of the project and the requirements and conditions stated in this permit among which what shall be related to the studies/ reports/plans that shall be prepared and submitted to the Ministry of Environment shall be set provided that the name and number of the law/report/plan that shall be prepared and submitted to the Ministry of Environment provided that the





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name and number of the law/specification/guide shall be defined accurately with mentioning of the issuing party or approval and the year.

12-3 In case of contradiction in the text or value or limits stated in the what was mentioned in the above clauses then the harder text and value and limits that shall be harder in all the stages of the project (construction and cases of operation) and in the preparation of studies /reports /plans within the entire cores (analysis and assessment and conclusions etc).

13- **With regard to soil and ground water**

13-1 In case of any indications that there are pollution to the soil or ground water then the employer shall stop all the work and activities of the project and submit a detailed report on the investigation of environment for the pollution of soil and ground water to the Ministry of Environment for review including set and detailed action on the mechanism of dealing with this pollution wherever existing and according to the requirements of the preparation of these reports. Moreover, no work or activities shall be proceeded in these sites except after the Ministry of Environment shall approve the report submitted and issue an environment permit thereof.

13-2 Total commitment with the indicated requirements and conditions and mentioned in this permit and those described in appendix (1) with regard to the implementation of environment and technical investigation of the soil and ground water (geotechnical for soil and groundwater) and include the results of this investigation with the above mentioned report.

13-3 The accurate technical investigation for the underground cavities phenomena in the area within the mentioned study above on the soil through





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making necessary field survey to define the existence of this phenomena in the project location and the extent of its impact on the project and specific detailed description to the engineering and technical necessary action to remove this impact if any.

- 13-4** Commitment to the implementation of the long term monitoring and control for the quality of the ground water in the suggested facility location for the environment impact assessment study by using five control wells in the site (five control wells) and submit periodical reports for the monitoring and control results through the construction and operation stages as shall be indicated below and for the entire used polluters in the environment impact assessment study:

13-4-1 Monthly report during the first six months of the construction period then quarter yearly report for the next periods until the end of the construction works provided that these reports shall be submitted as part of the periodical follow up reports submitted to meet the requirements of the construction environment management plan (CEMP) and the Ministry of Environment shall be entitled to amend the extension the submitting of the reports according to the developments.

13-4-2 Quarter yearly report during the operation stage works provided that these reports shall be submitted as part of the periodical follow up reports submitted to meet the requirements of the operation environment management plan (OEMP) and the Ministry of





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Environment shall be entitled to amend the extension the submitting of the reports according to the developments.

14- **With regard to the sand leveling and reclamation:**

- 14-1 No sweeping of soil or bushes shall be permitted in the project site or any of its sites.
- 14-2 The usable reminder of the excavation and leveling and reclamation (mud/sand etc) that shall be transported to the certified collection discharge locations in cooperation with the Reservations and Wild Life Department and the Environment Protection Department at the Ministry of Environment or be used in the state projects after coordination with these two parties and the Private Engineering Office (reservations sector) and the competent municipality and the Public Works Authority.
- 14-3 The un- usable reminder of the excavation and leveling and reclamation (mud/sand etc) that shall be transported to the certified collection discharge locations in cooperation with the Reservations and Wild Life Department and the Environment Protection Department at the Ministry of Environment and after coordination with the competent municipality and the Public Works Authority.
- 14-4 In case of need to materials for the reclamation or sand leveling then coordination shall be made with the competent municipality to be provided from the certified sites and who shall be permitted environmentally by the Ministry of Environment and with the same technical characteristics of the soil existing in the site of the project.







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15-Trees or wild bushes in the project site or any of its sites shall not be removed except after obtaining the written approval of the Reservations and Wild Life Department and according to an official request by the project owner to them and according to the following requirements and procedures and through the direct liaison with the two mentioned parties and under their direct supervision:

15-1- The removal and transport according to the mechanism and terms and requirements approved by the agricultural production and supply at the agriculture department at the Ministry of Environment.

15-2- Removal and planting to the allocated places approved by the Reservations and Wild Life department at the Ministry of Environment.

15-3- The project owners shall implement all the works related to the removal and transport and planting among which that deal with excavation and planting and the preparation of the allocated locations to remove trees and bushes according to the mechanisms and conditions and requirements above mentioned.

16- **With regard to archeology and heritage:**

16-1- Approval of the competent authority's projection of archeology and heritage shall be obtained before starting any works or activities in any of the project's sites.

16-2- The project owners shall stop all works in the site in case of indications that there are any heritage or social or archeological values and the competent parties shall be notified among which Qatar Museum Authority and shall abide to their instructions and recommendations in this regard.





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17- **With regard to noise:**

- 17-1- All the precautionary action mentioned in the guides of the related environment practices of the environment protection during the construction stage including what is related to maximum limits of noise and vibrations and intense lights that must be used at night and places of installation.
- 17-2- Apply the best environment practices in order to avoid not increasing the noise level over the maximum stated in the approve laws among which what is related to protection of life in the marine environment.
- 17-3- A plan shall be put to avoid causing harm to the marine creatures (fish, turtles etc...) during mating season during the construction operation and include it within the environment management construction operations.
- 17-4- Marine mammals shall be watches during the peak period to decrease any passive impact expected on the coastal marine mammals provided that this shall be done through Marine Mammal Observer MMO who shall be an expert and with previous experience.
- 17-5- Total commitment with the limits and standards of noise stated in the applied environment laws among which those stated in the appendix no (2) herein and this with regard to the surrounding environment with working according to the requirements indicated within the clause no (12) of the environment permit.





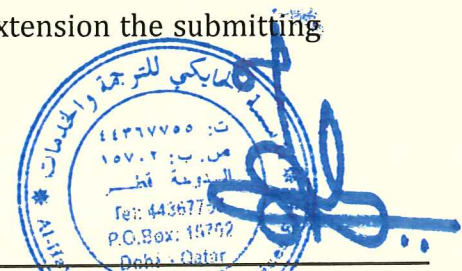
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17-6- With regard to the requirements of ventilation within the public environment (closed and semi closes areas) commitment shall be made to the requirements that must be followed (at minimum rate) in the applied environment laws among which those indicated in appendix no (4) herein with working according t the requirements indicated in the clause no (12) of the environment permit.

17-7- Commitment with implementing monitoring program for noise generated from the facility units and not less than five locations that shall be suggested and given with maps and justifications to the Ministry of Environment for review and approval provided that periodical reports shall be submitted for the results of the monitoring during the construction and operation stages and as clarified below:

17-7-1 Quarter yearly report during the construction stage provided that it shall be submitted as part of the periodical follow up reports submitted to meet the requirements of the construction environment management plan (CEMP) and the Ministry of Environment shall be entitled to amend the extension the submitting of the reports according to the developments.

17-7-2 Quarter yearly report during the operation stage works provided that these reports shall be submitted as part of the periodical follow up reports submitted to meet the requirements of the operation environment management plan (OEMP) and the Ministry of Environment shall be entitled to amend the extension the submitting of the reports according to the developments.





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**18- With regard to the environment aerobic axis (quality of air and emitted air polluters:**

- 18-1- The generated emissions from all the units and components of the project during the construction and operation stages shall not exceed the limits and standards applied as part of the policies of lowering the emissions that are indicated in the laws and systems applied and those stated in the environment impact assessment study and the correspondence issued by the Ministry of Environment. In case of contradictions in the text or value or limits then the harder text and value and limit shall be applied.
- 18-2- The maximum limit for the concentration of Nitrogen dioxide (NO<sub>x</sub>) allowed to be emitted from the facility units shall be (9ppm (20 mg/Nm<sup>3</sup>) at 0° C, 1 atm & 15% O<sub>2</sub>) which shall be applied on all cases and positions of facility's operation and for each unit of the units separately.
- 18-3- Emissions shall be monitored (collect data and analyze them) according to the approve specifications in order to ensure not exceeding the set limits and standards that are mentioned and their source in this permit.
- 18-4- CEMSs continuous control devices shall be installed to monitor the gas emissions (NO<sub>x</sub>, SO<sub>2</sub> & PM) emitted from the chimneys in addition to the characteristics of the emissions (temperature, velocity, O<sub>2</sub>, etc) provided that the registered readings from this system shall be instantly and directly and shall be transmitted directly and immediately (direct link) to the monitoring system and registration at the Ministry of Environment.





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- 18-5- Install devices to monitor the gases (O<sub>2</sub>, CO, CO<sub>2</sub>) emitted from the gas turbines in the Combustion control system in order to ensure efficiency in keeping the emissions within the applied limits and standards.
- 18-6- The project owners shall submit periodical reports (quarter yearly) on the concentrations of the emitted air pollutants from the facility units (NO<sub>x</sub>, SO<sub>2</sub>, CO, VOC<sub>s</sub>, PM & Hg) and the periodical half yearly reports on measured pollutants shall be done with the use of continuous control devices (CEMSs).
- 18-7- Apply the best technological practices used to control the emissions of Nitrogen oxides and conform to the maximum limits mentioned in the above clauses.
- 18-8- Install and operate the control and monitoring devices according to the specifications and regulations and recommendations of the factory and the Ministry of Environment and those approved by the specifications.
- 18-9- the natural gas used in operating the turbine units and the entire facility units shall conform to the approved specifications by the specifications and metrics authority and metrics authority and shall be free from sulfur and mercury.
- 18-10- Install and operate and maintain two terminals to monitor and control the surrounding air quality through momentary monitoring (instantly) and direct to the concentration of all the polluters in the surrounding air environment and Meteorological elements in accordance with the suggestion of the project owner in the environment impact assessment study. Provided that a detailed document shall be submitted for these two terminals including measured components and polluters in details and the suggested location and the





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technical justifications in details to the Ministry of Environment for review and approval before supply and installation. These two terminals shall be directly linked with the control and registration at the Ministry of Environment which shall ensure transmitting registered data directly and momentarily.

18-11- In case of amendments shall be done on the control and monitoring system on the emitted air polluters and from this amendment resulted on emissions or generated or discharge of polluters in any form then the environment impact assessment study of the project and for the all related parts and sections shall be amended through making quantitative analysis and assessment and modeling of these polluters then amend the outcome and recommendations of the study and the precautionary actions and other matters accordingly provided that as first phase the terms of reference and scope of work document shall be submitted for the amendment on the study before starting any works related to this study.

**19- With regard to the marine environment**

19-1- Due to the environment harm resulting from the project in all phases on the sensitive marine environments that are mentioned in the study then the project owner shall submit a written a detailed and comprehensive compensation plan to the Ministry of Environment which shall contain the application of "similar to similar and location to location mechanism in order to create a balanced ecological environment and the entire harmed environments (coral, sea - grass, oysters , beds, alga etc) in the similar size and quality that shall ensure similar compensation according to the laws and systems and applied procedures.





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- 19-2-** Due to the harm resulting from losing the public beach (as mentioned in the environment impact assessment study section 10,4,5) the project shall submit detailed and comprehensive compensation plan to the Ministry of Environment that shall ensure similar compensation according to the laws and systems and procedures applied and in coordination with the competent authorities.
- 19-3-** The limits of discharging the salty water to the marine environment shall not exceed (265,000) cubic meters per day.
- 19-4-** All used reclamation materials on the construction of the marine environment shall be subject to testing and analysis before use ensures that it is free from any polluters.
- 19-5-** It shall be strictly prohibited to discharge the outcome of the marine excavation to the marine environment and shall be transmitted to the approved locations by the Ministry or Environment.
- 19-6-** Difference in temperature of the discharged cooling water compared with the referral point (in ordinary and non ordinary cases) shall not exceed 3 centigrade (3C) in the mixing and end area.
- 19-7-** Set a quantitative program to measure the number and length of marine plants and other ecological marine types per one square meter and include it in the CEMP construction environment management plan.
- 19-8-** Precautionary and necessary measures shall be taken to prevent marine organism from slipping inside the withdrawing water tube.





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- 19-9-** Pulsed doses of chlorine shall be used instead of the continuous doses to limit the total volume of used poisons in the Bio-control system.
- 19-10-** Control in the concentration of chlorine and copper in salt water so as not to exceed the permitted limit in law.
- 19-11-** Take into consideration the use of additional pumps during the experimental stage in the RO units to limit the concentration of salt in the water for the purpose of the station entering the stage of complete operation.
- 19-12-** Cut on the chemical uses in the desalination operation in order to cut the environment impact of the discharged salty water.
- 19-13-** Control and monitor within the operation stage (following plans and programs shall be set in details and comprehensively and submit it to the Ministry of Environment for review and approval including all the axis and required details (measurement location, number of measuring times, etc) so as to prepare the requirements of implementation as part of the operation environment management plan (OEMP) for the purpose of continuous long term monitoring within the operation stage):
- 19-13-1-** Monitor and control the marine environment water quality in the operation stage (referral points (not less than three locations), and affected environment locations) as well as monitoring the discharged water from the discharge pipes at the beginning middle and end of the mixing area for all the elements indicated in the







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environment permit and the environment impact assessment study and the executive chart of the environment protection law.

19-13-2- Program to monitor the rate of clash, damage and killing the marine creatures and include it in the operation environment management plan (OEMP).

19-13-3- Detailed monitoring plan for the Levels of plankton in the marine environment.

19-13-4- Detailed monitoring plan to marine mammals and turtles.

20- **With regard to the marine excavation works**

20-1- The marine excavation work for the withdrawing tunnel shall be defined between point (1,6 km) and (2,75 km) from the coastal line only.

20-2- The best practices shall be applied in the marine excavation that shall conform to the Sediment and turbidity standards applied according to the requirements indicated in the clause (12) of the permit.

20-3- Daily monitoring to the marine organisms and commitment to stop all work once these organisms exist within 500 meters and work according to the requirements indicated in the clause 13.4 of the permit with regard to MMO).

20-4- Marine excavation shall be strictly prohibited in case of high waves and strong winds provided that the height of waves and strength of marine tide and winds at which all work shall be stopped shall be set within the construction environment management plan (CEMP) and shall work in accordance with the requirements stated in clause (12) of the permit.





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20-5- The marine environment water quality shall be monitored during the construction periodically in order to ensure that it conforms to the standards and limits indicated in the law. The monitoring points and measured pollutants shall be set and the measurement period and submit reports within the construction environment management plan (CEMP) and work according to the clause (12) of the permit.

20-6- Silt curtains barriers shall be fixed around the entire working area in the marine environment.

21- With regard to the internal work environment

21-1- With regard to noise, temperature and humidity and lighting that must be provided and the maximum limits for the concentration of physical and chemical pollutants in the internal working environment, commitment must be made to the limits and standards stated in the applied laws among which those in the appendix no (3) of this permit with working according to the requirements stated in the clause no (12) of the permit.

21-2- With regard to ventilation in the internal working environment, commitment must be made with the limits and standards stated in the applied environment laws among which those stated in the appendix no (4) of this permit with working according to the requirements stated in the clause no (12) of the environmental permit.

22- With regard to the green spaces that are planned within the site:

22-1- Total commitment shall be made with the entire requirements and conditions of the competent parties in the state and particularly the types of plants and thickness and mechanism of planning it and irrigation with





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stressing on the not using alien plants on the bio environment system in the country.

- 22-2- Use of the treated discharged water to irrigate the green areas and trees and bushes and the Physical, chemical and biological properties of these water (treated sewage) shall be within the maximum limits stated in the applied environment laws among which those stated in the appendix no (5).
- 23- It shall be strictly prohibited to dewater ground water in the project site and its sites except after applying to request environment permit from the Ministry of Environment with which a detailed plan shall be attached on the implementation mechanism including certain solutions with regard to the transport and collection and discharge actions (with the engineering diagrams) and obtain an environment permit before starting any main or secondary works or activities in this matter in the site or outside it and according to the administrative and technical approve procedures.
- 24- It shall be strictly prohibited to dig any wells in the project site or Ministry of Environment and competent authorities.
- 25- With regard to the treatment station of generated sewage from the facility's units: due to the shortage and negligence that were found in the draft of the environment impact assessment study of the project with regard to this axis and in the entire sections of the study related to (analysis, assessment , conclusions and actions and procedures of monitoring and control etc) then this study must be amended as per what was send in remarks and requirements of the Ministry of Environment in this regard and those are as follows:





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- 25-1- Study the (analysis, assessment and procedures etc) of the impact of polluters in the discharged treated water and the load generated from it on the marine environment and in details and quantitatively.
- 25-2- Study the (analysis, assessment and procedures etc) of the impact of sludge generated from the treatment operation on the environment with regard to the concentration of polluters on the sludge and its nature and degree of harm and the storage mechanism and dealing and transport and discharge off.
- 25-3- Detailed plan for the monitoring and control of discharged water from the treatment units (on exit from the treatment system and before entering the transport network) and the generated sludge and all polluters and submit a comprehensive and detailed plan to the Ministry of Environment for review and approval including all axis and the required details (measurement location number of measuring times etc).
- 26- All the waste and garbage generated from the works included in this permit shall be discharged of according to the applied laws and the approved action in the certified allocated places after coordination with the competent parties in the country (municipality etc).
- 27- All laboratories and environment services practitioners (investigator site works, sampling, testing, laboratory testing etc) that assisted or shall assist must meet the requirements of the applied laws and those indicted in the permit (any stage may be) and must be registered and accredited at the competent parties (Ministry of Environment/ Laboratories and standardization secto etc..).

