RAS LAFFAN INDUSTRIAL CITY
DEVELOPMENT PLANNING AND ENGINEERING

ENGINEERING

Guidelines for Building Permit
Technical Submission to QP Industrial Cities in RLC

QGDL-IML-003
# Document Review History

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1.0 INTRODUCTION
Ras Laffan Support Service Areas (RSSA) was developed on the West and East sides of the Ras Laffan Industrial City to accommodate support service industries such as maintenance, logistics, supply and service providers, manufacturers, shut down services, and gas industry related specialist services that provide support services to End-users in Ras Laffan Industrial City.

Additional development in the RSSA includes infrastructure, utilities (such as road, power, desalinated water, potable water, firewater, sewage networks) wastewater treatment and waste management facilities.

Companies that are interested in establishing facilities within the RSSA shall follow the Land Application Process and enter into a Support Services Land Lease Agreement (SLLA) made between QP-RLC and the tenant for the allocated plot/plots for a duration of up to 15 years, renewable subject to QP-RLC procedures and policies.

Tenant shall then submit technical drawings and documents associated with the establishment of such facilities in accordance with the requirements of this document to QP-RLC for review / approval and shall also pay the necessary Building Permit Fee to obtain a Building Permit from QP-RLC.

2.0 OBJECTIVE
The objective of this document is to establish and maintain a documented Guideline outlining for all Tenants, the preparation of Building Permit technical submissions to QP-RLC.

This document will also acquaint the Tenants and their Consultants/Contractors with QP-RLC philosophy, regulations, and requirements for obtaining QP-RLC’s “Building Permit” and “Consent to Operate”.

3.0 SCOPE
This guideline covers the general requirements for the preparation of Technical Submissions related to Building Permit by Tenants in QP-RLC.

Prior to installation of any facility in RSSA East or West, the Tenant is required to submit all the technical details as applicable at relevant stages to QP-RLC for review and approval.

4.0 DEFINITIONS/ ABBREVIATIONS

4.1 Definitions
This section contains definitions/acronyms, which must be clearly understood by the Tenants /Contractors.

<table>
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<td>Building Permit</td>
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<td>utilities and buildings within RSSA (East &amp; West)</td>
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<tr>
<td>Consultant / Contractor</td>
<td>A party engaged by the tenant to perform works or services under a contract.</td>
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4.2 Abbreviations

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<td>Environment Baseline Assessment</td>
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<tr>
<td>e-CPW</td>
<td>Electronic Consolidated Permit to Work</td>
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<tr>
<td>EIA</td>
<td>Environment Impact Assessment</td>
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<tr>
<td>GFA</td>
<td>Gross Floor Area</td>
</tr>
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<td>GLA</td>
<td>Gross Leasable Area</td>
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<tr>
<td>HSSE</td>
<td>Health, Safety, Security and Environment</td>
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<td>Manager, Development Planning &amp; Engineering (RLC)</td>
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<td>NFPA</td>
<td>National Fire Protection Association</td>
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<tr>
<td>P &amp; ID</td>
<td>Piping &amp; Instrumentation diagram</td>
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<td>Qatar Construction Specification</td>
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<td>QHDM</td>
<td>Qatar Highway Design Manual</td>
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<td>QNG95</td>
<td>Qatar National Grid 95</td>
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<td>QTCM</td>
<td>Qatar Traffic Control Manual</td>
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<td>RLC</td>
<td>Ras Laffan Industrial City</td>
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<td>RSSA</td>
<td>Ras Laffan Support Services Area (East &amp; West)</td>
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<tr>
<td>SLLA</td>
<td>Support Services Land Lease Agreement</td>
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5.0 RELATED DOCUMENTS

It is incumbent upon the Tenant to confirm that the latest revision of the documents / guidelines / procedures / regulations / drawings are employed. All QP-RLC documents are available, upon written request from QP-RLC; other documents shall be obtained from the respective author/asset-holder.

a) QP-GDL-S-040: QP Guideline for Hazard Identification Study (HAZID)
b) QP-GDL-S-001: QP Guideline for Hazard & Operability Studies (HAZOP)
c) QP-PHL-S-100: QP Philosophy for HSE Risk Management
d) QP-GDL-S-050: QP Guideline for Registering Hazards & Effects
e) QP-GDL-S-030: QP Guideline for Safety Integrity Level Study
g) QP-GDL-S-032: QP Guideline for Quantitative Risk Assessment (QRA)
h) QP-GDL-S-068: QP Guideline for Fire and Explosion Risk Assessment,
i) QP-PHL-S-001: QP Philosophy For Fire & Safety
j) QP-STD-S-005: QP Performance Standard for High Sensitivity Air Aspirating Smoke Detection (HSSD) Systems
k) QRPH-RHF-001: Fire Protection Philosophy
l) QGL-RHF-001: Fire Alarm Installation requirement guidelines
m) QPR-DC-004: Land Management Procedure
n) QRG-DC-004: Procedure and Regulation Governing the requirements for Consolidated Permit to Work (CPW) In QP Industrial Cities Common Areas (Applicable to RLC & MIC)
o) QGDL-DC-009: Guidelines for Development of Roads, Temporary Access Road Tie-in and Design of Roads & Road Crossings in Industrial Cities
p) QGL-CE-001: Guidelines for Corridors And Corridor Crossings in RLC
q) RLC Signboard Regulations Part 1
r) QRG-CL-004 Regulation for Colour Code Identification for Pipework In RLC
s) QPR-RHR-011: Procedure for Emergency Muster Points and Emergency Shelter-In Place Evacuation
t) Environmental Regulations for Ras Laffan Industrial City
u) QP Engineering Standard ES-2-03-0001-Electrical Engineering Philosophy
w) NFPA 5000: Building Construction and Safety Code
x) QCS (Qatar Construction Specifications)
y) QTMC (Qatar Traffic Control Manual)
z) QHDM (Qatar Highway Design Manual)
aa) Building permit application forms (Appendix - D to J)
6.0 PROCESS OF SUBMISSION OF TECHNICAL DOCUMENTS

Tenant shall submit the technical documentation detailing the proposed item of work with necessary drawings and documents to QP-RLC. The details submitted shall be conclusive / comprehensive with regard to the relevant information to enable effective and responsive review. Unauthorized Consultants / Contractors tenant’s are not permitted to submit drawings or documents directly to QP-RLC.

All drawings and documents submitted for Building Permit review shall be reviewed, approved and signed off by the Tenant’s authorized representative (Consultant).

The technical submissions shall be made in accordance with the following:

6.1 Covering Sheet

The covering sheet must contain the following information as a minimum:

- A unique Submission number with date.
- Total number of pages included in the Submission.
- All the submissions shall be addressed to:
  The Assistant Manager
  Engineering,
  Development Planning and Engineering
  Ras Laffan Industrial City
  Ras Laffan, P.O. Box No. 22247
  e-Fax: 401-39823, Tel: 401-47708
- Information regarding the originator.
- Name and designation of the person to whom QP-RLC’s response to be sent.
- Name of the Tenant.
- Fax Number to which QP-RLC’s response to be sent.
- Name of the Facility and Subject.
- Brief Description of the request/ content of the submission.
- Contact details (Phone number, Mobile number, Email Id) of a person with whom clarifications on the subject matter are to be sought.
- Copy of Property Document for relevant plot and Lease Number with duration

All the submissions shall contain a ‘Covering sheet’ as per the format attached as in Attachment L.
A document/drawing list showing the document/drawing no., description, revision shall be attached with the covering letter.

6.2 Submission Category Code

Submissions are categorized under the following headings based on the nature of work/discipline. Indicate the appropriate submission category Code in the relevant box provided in the covering sheet.
Submissions under each category shall be made separately in accordance with the relevant attachment. The Attachments A to K describe the details that are to be submitted.
6.3 Purpose of Submission
The purpose of submission shall be indicated in the appropriate box in the covering sheet by inserting a tick mark. For this purpose, the following types are identified:

6.3.1 For Approval
The documents/drawings that are submitted to QP-RLC for review and issuance of necessary ‘Approval Letter’ are under this type. The approval letter is necessary for Tenant/Contractor to initiate the Consolidated Permit to Work and to obtain a Building Permit.

6.3.2 Supplementary submissions
A submission made subsequent to an earlier submission, supplementing the details that are required for QP-RLC’s review. This may be the result of a clarification meeting between QP-RLC & the Tenant/Contractor or a voluntary additional submission of details by the originator.

6.3.3 Revised Submissions
A subsequent submission made after an original submission revising the drawings & documents. This must supersede the original submission. This submission may be the result of a discussion/s with QP-RLC or any other authority involved in the approval/concurring process or a voluntary submission due to an engineering change.
6.3.4 Response to QP-RLC Letters
This type is applicable when revised /supplementary submission is made by the Tenant taking into consideration various comments/query communicated to the Tenant on an earlier submission in writing. This shall essentially reference the earlier communications from QP-RLC.

6.3.5 Information & records
The submissions that are made to QP-RLC wherein no action from QP-RLC is solicited will come under this type. This will be applicable in the case of reports, as-built details, etc.

6.4 Sequence of Technical Submissions
Tenant shall submit the technical drawings and documents in the following sequence:
1. An overview of the facility describing the facility shall be submitted along with the initial submission of the Site Development plan to understand the business model, process description/ business activity description, process flow diagrams (PFDs), Material Safety Data Sheet (MSDS) of chemicals, if any.
2. Category code 001 drawings and documents.
3. Category code 002 & 006 drawings and documents shall be submitted after Category code 001 documents have been reviewed and approved by QP-RLC.
4. All other category code drawings and documents shall be submitted after the above mentioned category documents have been reviewed and approved by QP-RLC.

6.5 Other Information
The submission must indicate previous reference(s)/ correspondence(s), if any.

6.6 Content of the submission
QP-RLC’s Review & Approval process mainly focuses on details, which are pertinent to ensure that the proposals are inline with QP-RLC’s Regulations and Guidelines. QP-RLC’s Review/Approval does not absolve the Tenant from checking and ensuring the technical content of the document with regard to its conformity with applicable Codes/Standards & Environmental requirements. Hence, all Tenants must refrain from submitting details such as fabrication drawings, piping isometrics, design/stress calculations etc. unless otherwise requested by QP-RLC.

6.7 Drawings & Documents
All documents shall be in A4 size.
All drawings shall be in the standard sheet size (A0/A1/A2 or A3) prepared as per standard engineering practice. Sketches are not acceptable.
All drawings must be numbered with revision.
At least three sets of drawings & documents shall be submitted.
Key plan with allocated PLOT number(s) shall be included in all drawings

6.8 Soft Copies
Complete set of technical submission shall be in PDF format (scanned copy with Tenant/Consultant's endorsement) and in addition, soft copies of drawings shall be submitted in AutoCAD format compatible with QP-RLC system. Site Development Plan
6.9 Coordinate System
The submitted drawings shall be in the QNG95 coordinate system. No other coordinate system will be entertained.

6.10 Check list
Tenant/Contractor shall submit necessary checklist in each submission wherever applicable (Ref. Attachments “N”, “O” & “R”)

6.11 Acknowledgement of Submissions
If Tenant/Contractor requires acknowledgement, QP-RLC will acknowledge the receipt of the submission from the Office of Asst. Manager, Engineering, Development Planning and Engineering department, RLC, on the duplicate of the covering sheet. No email submissions will be accepted.

7.0 REQUIREMENTS
The QP-RLC’s Building Permit is the authorization to build facilities/utilities and buildings within RSSA (West & East). Drawings and documents mentioned in the Attachments A to K shall fulfill the following requirements as minimum:

7.1 General Requirements
The general requirements are as follow:
1. Based on the nature of facility/business and/or Operation within the facility, the Tenant may be required to conduct Environmental Baseline Assessment (EBA) / Environmental Impact Assessment (EIA) and/or Quantitative Risk Assessment (QRA) during the building permit review process as per prevailing QP-RLC’s Regulations & Guidelines. Besides the requirements of this document, if any additional mitigating measures are required as per the recommendations of EBA/EIA/QRA, then requirements that are more stringent shall be applicable.
2. For facilities with Chemical storage, separate approval shall be obtained from Qatar Civil Defence Department (QCDD) for the Site Development Plan and all other relevant drawings and documents. Hazardous Chemicals/Material Storage Drawings will be reviewed by QP-RLC; however, the drawings as approved will be the basis for QCDD’s site inspection purpose.
3. With regards to Design Undertaking (Appendix D of Building Permit forms), Contractor Undertaking (Appendix F of Building Permit forms) and Supervisor Undertaking (Appendix H of Building Permit forms), Tenants shall ensure all parties for the intended particular undertakings shall have the necessary commercial registration with the Ministry of Economy & Commerce and registered with the Ministry of Municipality and Environment (MME), State of Qatar. Architects and Consultants shall be QCDD approved with registration number.
4. Tenants on the East Side shall have their own arrangement for utilities, which are not available.
5. All drawings and documents submitted for Building Permit review shall be reviewed and approved and signed off by Tenant’s authorized representative (Consultant) stating that the designs are complying with relevant Codes.
6. As per the requirements of QP-RLC Guidelines, the tenant shall submit the Master document register containing the list of drawings and documents for approval of the proposed facility by QP-RLC. This register shall be periodically updated and submitted to QP-RLC, during each submission.

7. Method Statement and Job Safety Analysis shall be submitted for all activities within the plot area for review and approval.

8. Separate Method Statement and Job Safety Analysis of works related to all tie-in activities and crossings shall be submitted to QP-RLC for review and approval.

9. Any request for deviation from this guideline must be submitted officially for approval.

10. Tenants shall ensure that the Electrical Design and Installation inside Tenant's Facilities including connection equipment comply with Local Statutory and Kahramaa Standards.

7.2 Specific Requirements
Tenants shall design and build their facilities in accordance with the minimum requirements given below.

7.2.1 General
The maximum coverage of all buildings and structures on a plot shall not exceed 65% of the extent of the plot.

Setbacks:

- Sides: 6m
- Roadway: 6m
- Rear: 6m

Buildings, structures, sheds or any above ground facilities are not permitted in this area. However, soft landscaping and parking may be permitted in this setback area. In addition, miscellaneous supporting facilities such as guardroom, water tanks, pump rooms, electrical room and underground holding tanks may be permitted in the roadway frontage setback area subject to QP-RLC approval.

Height of any building or structure shall not exceed 16m, measured from Finished Grade Level to wall plate height. QP-RLC may grant consent for greater height if deemed critical to the function of the building or structure. Refer to Latest revision of typical drawing SKRLC-03283 in Attachment-M.

7.2.2 Levelling and Grading
The Finished Grade Level (FGL) of the plot(s) shall be minimum 0.5m lower than the adjacent QP Road level (existing or future).

7.2.3 Fencing
1. All plots shall be fenced to a minimum height of 2.4m measured from Finished Grade Level to the top of the fence. Refer to typical drawing # SK-RLC-03283 in Attachment-M.

2. Fence shall consist of a chain link, galvanized, PVC coated in green colour. Refer to typical drawing # SK-RLC-02839, in Attachment-M

3. Compound wall maybe considered when its presence is critical for operational requirements or insisted upon by QP-RLC when the utilization of a portion of the site will be such that it affects negatively on the character of the area.
4. Roadway side fence can have a wall with a maximum height of 0.60m from bottom of the fence for decorative purpose. The wall shall be painted in natural earth tones or colours. The remaining height of the fence shall be with palisades or columns or similar.
5. The foundation and fence structure shall not encroach the adjacent boundary.

7.2.4 Landscaping
1. A minimum of 3.5% of the total plot area shall be soft landscaped as per QP-RLC Environmental Regulations.
2. The vegetation to be used shall preferably be indigenous species requiring a minimum amount of water and be compatible with the prevailing environmental conditions such as salinity, soil composition, wind speed and temperature.
3. The Landscape Plan must contain a complete list of the plants to be used. "Desert-type" landscaping may be considered as part of the total landscaping proposal.
4. Tenant shall remain responsible for the maintenance of the landscaping as per the approved Landscape Plan for the duration of the lease of the plot.
5. Tenants shall install a separate irrigation water tank and pumping system within their plot. The treated sewage water maybe sourced from QP-RLC’s Waste Water Treatment Plants if available after making necessary service agreement with QP-RLC.

7.2.5 Storm Water Drainage
Tenants must contain storm water run off within their plot and design a suitable self-contained drainage system to accommodate 100% of the storm water.

7.2.6 Finishing Schedule
1. No un-plastered cement block wall/structure will be permitted.
2. Exteriors of all plastered and other structures including pre-coated rust resistant type shall be in the following colours to create a uniform aesthetic appearance: White; various hues of off-white that blend in with the immediate Desert Landscape; hues of sandy colour; hues of sienna; reddish brown/yellowish brown.
3. Tiles, if any, to be used to clad any wall or structure shall match with the above colours.

7.2.7 Parking, Loading and Off Loading
The following minimum parking and off-loading facilities must be accommodated on-site. Parking bay requirements are expressed as a number of bays per Gross Floor Area (GFA).

<table>
<thead>
<tr>
<th>Component</th>
<th>Bays per GFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office component</td>
<td>4 Bays per 100m² GFA</td>
</tr>
<tr>
<td>Industrial component</td>
<td>1 Bay/100m² GFA</td>
</tr>
<tr>
<td>Warehousing component</td>
<td>0.5 Bays/100m² GFA</td>
</tr>
</tbody>
</table>

GFA is defined as the area of a building of all floors and shall exclude the following:
- All exclusions from the definition of floor space
- Toilets
- Lift shafts, service ducts, vertical penetrations of floors, lift motor rooms and rooms for other mechanical equipment required for the proper functioning of the building
- Areas reasonably used in connection with the cleaning, maintenance and care of the building, excluding dwelling units for caretakers, supervisors, cleaners or maintenance staff.
- Interior parking and loading bays

All parking, loading facilities and manoeuvring space must be accommodated on-plot. Parking and Loading facilities will be provided in such a manner that vehicles will enter the plot in forward motion and exit the plot in forward motion.

Tenant will be required to indicate the proposed vehicular parking, internal circulation, loading, and off-loading proposals as part of the Site Development Plan.

Delivery Vehicles will not be permitted to wait off-plot for loading or off-loading purposes. There will be no off-plot parking/loading/waiting by trucks or other vehicles. Gatehouses or guardhouses shall not be located off-plot.

Tenants to fill up the Technical compliance statement (check list). Please refer to Attachment - R for the Technical compliance statement (checklist).

### 7.2.8 Potable water meter

Tenants shall design and install potable water meter in accordance with the minimum requirements given below:

1. Tenant shall locate the potable water meter as close as to the QP-RLC tie-in chamber such that QP-operations team can have access at all times for inspection and meter reading. The arrangement, type and model of the flow meter shall have QP-RLC approval prior to installation,
2. Electronic flow meter shall be used with accuracy of + 0.5%. Calibration certificates to be submitted to QP-RLC prior to installation.
3. The flow meter shall be sized to accommodate the maximum flow applicable for the plot.
4. The supply line to the plot to have a lockable type globe valve to set the flow and limit it within the allowable flow range.
5. A strainer shall be installed upstream of the flow meter.
6. In case the Flowmeter (FM) is installed inside a pit, it should be positioned in such a way that the meter readings can be taken without entering inside the chamber. Alternatively, external Display Unit to be installed above ground on the fence boundary facing outside and shall be encased in a protective enclosure.
7. Continuous power supply shall be ensured for the flow meter. It can be AC powered either with UPS or in built battery back up.
8. QP-RLC operations team shall have un-restricted access to the potable water flow meter at all times for the purpose of inspection and meter reading.
9. Tenants to ensure that all mandatory spares with respect to the FM installation and commissioning are readily available. Flow meter to be verified for calibration every year at Tenant’s cost. Faulty flow meters shall be replaced by the Tenant at their own cost at advice from QP-RLC.
10. Tenants to fill-up the check list of requirements for the potable water meter. Please refer to Attachment - N for the checklist.
7.2.9 Site Access

1. No vehicular access from major roadways (main roads) abutting these properties will be permitted. Typical drawing SK-RLC-02718 in Attachment-M indicates roads to which no access maybe taken. Pedestrian access gates/emergency access may however be provided on these road boundaries.

2. Emergency access gate of 6m wide shall be provided on the opposite side of main access gate with vehicle accessibility.

3. The entrance and exit proposals shall be reviewed with due consideration to existing configurations, proximity to existing access points, corners and intersections.

4. Minimum of two access ways (preferably not on one side of the plot) shall be provided, on condition that neither shall be closer than 15m from any existing or planned entrances/exits nor shall they be closer than 7.5m to any side boundaries. If the secondary access is provided at the adjacent/opposite side of the primary access, the same shall be considered as emergency, otherwise additional emergency access will be required to provide.

5. Turning radii into the plot shall be designed in accordance with QHDM.

6. Vehicular access to a corner plot within 50m of an intersection, measured from the edge of the asphalt roadway, will be subject to QP-RLC review and approval.

7. The guardhouse must be located in such a way that vehicles awaiting security clearance does not cause traffic congestion on the adjacent QP-RLC roads.

8. Any modification to existing roads due to the new access shall be in accordance with QHDM and QCS.

9. Proposed access road tie-in to QP main road shall comply with QP guidelines.

10. Provide cross sectional drawings, both directions (parallel and perpendicular) to proposed road to be included.

11. Tenants to fill-up the Technical compliance statement (check list). Please refer to Attachment - R for the Technical compliance statement (checklist).

7.2.10 Area Classification

Tenant shall submit hazardous area classification drawings, if applicable, in accordance with EI-15 Model code of safe practice of (EI 15, formerly referred to as IP 15) NFPA-70 : National Electrical Code and NFPA-497: Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapours and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas. All equipment and devices/instruments to be used/installed within the classified hazardous area shall be suitably rated and certified.

7.2.11 Lighting

Tenant shall provide and install additional area lighting that will effectively illuminate half portion of QP-RLC roads abutting the property. This shall be clearly depicted in the lighting layout drawing including details and supported by lighting calculation using validated software. The additional area lighting design shall be in accordance with QP Engineering Standard ES-2-03-0001-Electrical Engineering Philosophy. The calculation shall contain the minimum required information or details such as basis and assumptions, design considerations, requirements/standards, type of...
light fitting, position/orientation, and standard output data generated by the calculation software, and the calculation output results shall clearly demonstrate the actual site installation and confirm that the design meet the minimum requirements. However, this requirement does not apply where street lighting are already provided and installed along street boundaries with dual carriageways.

7.2.12 Road Marking/Signage and Signboards
Road marking and signage details in accordance with QTCM shall be submitted as part of Road Development Plan. A Signage Master Plan (SMP) must be submitted to QP-RLC as part of the Site Development Plan for directional signboard structures to guide vehicles and pedestrians to the facility. The SMP must be compliant with the stipulations and restrictions as set out in the QP-RLC Signboard Regulations –Part1.

7.2.13 Telecom
A brief description of the telecommunication facilities planned for the new building / facility with details of telephone, fax, intercom and data connections shall be submitted. Specify if any kind of radio installation is planned within the facility.

7.2.14 Fire & Life Safety
Floorplans shown Fire & Life Safety and Fire Fighting drawings must be consistent with floorplans shown on Architectural Drawings.

Tenants within RSSA and ESSA are required to submit the following for approval.
1. Fire risk assessment
2. Fire and life safety design philosophy
3. Site layouts including fencing, gate access to the site, proximity of all buildings, process areas, manufacturing sites, and storage exposures
4. Building layouts, including building area, the division of the building by firewalls, the degree of fire separations of storeys, shafts, and special rooms or areas
5. Architectural drawings showing fire separations
6. Fire alarm system layouts and associated details
7. Fire protection/suppression system details (Firewater, Sprinkler and gaseous suppression systems)
8. Life safety including means of egress, travel distances, occupant loads, exit light placement, emergency light placement, fire extinguisher locations including lighting calculation for emergency lighting
9. Hazardous processes and operations, if any

The facilities shall be designed as per the following documents:-
1. Fire Protection Philosophy (QRPH-CHF-001)
2. Fire Alarm Installation requirement guidelines (QGL-RHF-001)
3. QP Philosophy For Fire & Safety (QP-PHL-S-001)
4. QP Guideline for Hazard Identification Study (HAZID), (QP-GDL-S-040)
5. QP Guideline for Hazard & Operability Studies(HAZOP), (QP-GDL-S-001)
6. QP Philosophy for HSE Risk Management (QP-PHL-S-100)
7. QP Guideline for QRA, (QP-GDL-S-032)
8. Procedure for Emergency Muster Points and Emergency Shelter-In Place Evacuation (QPR-RHR-011)
11. NFPA 500

When an alternative protection measure is proposed in place of a measure prescribed by the referenced codes, standards, and these guidelines, adequate documentation shall be provided by the Tenant to demonstrate that the proposed alternative solution complies with QP-RLC requirements. QP-RLC reserves the right to permit or deny any alternative solution at its sole discretion.

7.2.15 Environmental Regulatory Requirements
Tenants shall obtain Ministry of Municipality and Environmental (MME) approval for installation of their facilities (Environmental Permit) as well as operation of their facilities (Consent to Operate).
Tenants shall comply with QP-RLC Environmental Regulations and QP-RLC Waste Management guidelines.

7.2.16 HVAC (Heat, Ventilation and Air Conditioning) control system requirements
Location of all HVAC ductwork along with supply and return registers, to be shown. Details of ductwork to be provided. HVAC return-air circulation in the HVAC system to be explained (Ducted-return, plenum-return or any other method). Detail of HVAC shutdown if provided, shall be included. If not, relevant standard/code provision to support the omission shall be indicated.
8.0 FACILITIES / UTILITIES PROVIDED BY QP-RLC and TIE-IN REQUIREMENTS

QP-RLC provides various facilities and utilities that are common to the Tenants of the RSSA (EAST & WEST). These include roads, power, potable water, firewater, sewerage, and telecommunication networks. However, firewater network is not available for RSSA (East).

QP-RLC distributes potable water and firewater to the Tenants of the RSSA (West) at plot boundaries or in the proximity through dedicated header.

Dedicated potable water header is available for supply in RSSA (East) and the Tenants may utilise the potable water for the fire fighting facility by providing necessary storage tank and pumps, as there is no dedicated firewater header available in RSSA(East).

Sewage collection network is also available which will collect sewage wastewater from individual plots in the RSSA (East & West). Each Tenant will be provided with a service connection for the Tenants to tie-in to these utilities and shall avail these facilities. Refer to typical drawing SK-RLC-03570 in Attachment-M.

Tenant shall arrange and carry out tie-in connections with QP-RLC existing facilities/utilities including required materials after obtaining necessary approval from QP-RLC. Separate CPW shall be raised for each tie-in work with QP-RLC network.

A dismantling joint is to be provided in the tie-in valve chamber for firewater and potable water connections. Tenant shall design and install independent pipe support for their portion of pipeline with in the chamber. Gap between the sleeve and pipeline in the valve chamber shall be sealed. A regular preventive and corrective maintenance of these pipes, fittings and accessories as well as cleaning of sewage chamber at the tie-in shall be under Tenant’s responsibility.

Power is provided to the Tenants through QP-RLC Power network.

QP-DC provides passive telecommunication infrastructure i.e telecom ducts space to lay fiber optic cable network for operation of telecommunication equipment, fire alarm management, SCADA systems and LAN within QP-DC. The contractor shall approach the designated Concession holder for allocation of telecom ducts within RLC in coordination with QP RLC Maintenance on chargeable basis at prevailing tariff rates. For further details, refer to para 8.6.

Identification tags/markers with the details like size, depth and type of utility shall be installed.

8.1 Potable Water

QP-RLC’s Potable Water (PW) distribution network at RSSA (West) is designed based on the following water demand quantities for each plot:

- For plot sizes 60m x 100 m : 23m³/day/hectare (ha) (Total 13.8m³/day)
- For plot sizes 200m x 120m : 61m³/day/ha (Total 146.4 m³/day)

The interface with the Tenants will be in an underground valve chamber located within each Tenant’s plot or in proximity to plot boundaries. These service connections shall
have the following sizes and is provided with an isolation valve located in the valve chamber. Refer to typical drawing SK-RLC-03573 in Attachment-M.

For plot sizes 60m x 100 m at RSSA (West): 25mm (1") pipe
For plot sizes 200m x 120m at RSSA (West): 40mm (1½") pipe
For plots at ESSA: 50mm (2") pipe

The maximum PW quantity that the Tenant can avail per plot will be limited to the design quantity mentioned above. However, request for higher quantities may be considered by QP-RLC.

Tenants shall verify the location and sizes of the tie-in service connections provided by QP-RLC at site before finalizing their tie-in arrangement drawings. Tenant shall develop a tie-in detail drawing showing isolation valve, strainer, flow meter, external display unit etc. and the tie-in chamber number provided on the top of chamber cover to be clearly specified in the drawing.

Tenant shall locate the water meter at the plot boundary so that QP-RLC operations team can have access at all times for inspection and meter reading. Refer to section 7.2.8 for potable water meter requirements.

The design parameters of the QP-RLC potable water distribution network are given below for Tenants to design and hydro test their potable water system in conformity to QP-RLC network design from the tie-in connection up to the storage tank. Tenants to size their supply lines based upon minimum available pressure. Material of construction shall be clearly specified in the drawings.

8.1.1 Potable water network at RSSA (West)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. supply pressure (at tie-in)</td>
<td>2 barg</td>
</tr>
<tr>
<td>Design Pressure</td>
<td>16 barg</td>
</tr>
<tr>
<td>Design Temp.</td>
<td>40°C</td>
</tr>
<tr>
<td>Vacuum</td>
<td>Full</td>
</tr>
<tr>
<td>Material of construction</td>
<td>GRP for pipes dia. 200mm &amp; above uPVC for pipes dia. less than 200mm.</td>
</tr>
</tbody>
</table>

8.1.2 Potable water network at RSSA (East)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. supply pressure (at tie-in)</td>
<td>2 barg</td>
</tr>
<tr>
<td>Vacuum</td>
<td>N/A</td>
</tr>
<tr>
<td>Material of construction</td>
<td>uPVC for buried pipe and Ductile iron epoxy coated for within chambers</td>
</tr>
</tbody>
</table>

Tenant shall install storage tanks inside their plot sufficient for storing minimum three days (72 hours) peak water demand. Tenants shall start availing potable water supplies from QP-RLC ONLY after entering into a Potable Water Supply Agreement with QP-RLC. For making the Potable Water Supply Agreement, the Tenant will be required to register for access to QP-RLC website www.qpic.qa and subsequently submit the agreement request online along with the supporting documents, such as, the Land Lease Agreement, Approved Potable Water, Tie-in Drawings etc. The Tenant is advised to contact the
not limiting to the minimum requirements as per Attachment - P, the Tenant shall make the necessary tie-in to QP-RLC Potable Water network.

Tenants to fill-up the Technical compliance statement (check list). Please refer to Attachment - R for the Technical compliance statement (checklist).

8.2 Firewater

QP-RLC’s Firewater (FW) network at RSSA (West) is designed to meet a maximum firewater demand of 35,000 liters per minute (LPM) at a minimum residual pressure of 2 barg.
Tenants shall ensure that all the materials used in the firewater system shall be UL/FM listed.
The interface with the Tenant will be in an underground valve chamber located within each Tenant’s plot or in proximity to plot boundaries. These service connections shall have a Post Indicator Valve Assembly (PIVA) of size 150 mm as tie-in valve located in the valve chamber. Refer to typical drawing SK-RLC-03571 in Attachment-M.
Tenants shall verify the location and sizes of the tie-in service connections provided by QP-RLC at site before finalizing their tie-in arrangement drawings. Tenant shall develop a tie-in detail drawing showing isolation valve, dismantling joint, flow meter, external display unit etc. and the tie-in chamber number provided on the top of chamber cover to be clearly specified in the drawing.

The supply source and specification of FW:

I. Please be informed that at present we are using the potable water as the source of the firewater network. The same will replaced with treated industrial water (TIW) in future.

II. Therefore, the design of the fire fighting system shall be suitable for TIW specifications. Please refer to Attachment – Q “Quality Criteria for Treated wastewater used for landscaping” (which can also be considered as specification for TIW).

Tenants shall design and install a water meter including pipes etc. listed for "fire service use" by UL/FM, on the Firewater line for QP-RLC to monitor and reconcile firewater consumption. Firewater availed from the QP-RLC for firefighting or testing of firefighting equipment / system ONLY and shall be free of cost. As per NFPA – 24 Clause # 8.2: The use of hydrants and hose for purposes other than fire related services shall be prohibited.

Therefore any other unintended consumption of Firewater shall be prohibited and considered as a violation and shall be accordingly chargeable as per applicable rates (same as potable water). In order to avoid any unintended usage of Firewater the water meter shall be tamper proof with seal.

The arrangement, type and model of the flow meter shall have QP-RLC approval prior to installation. Water meter shall be designed to meet all designed flow rates and pressure. Flow meters shall have an accuracy of + 0.5% and shall have a continuous power supply. Inspection, Testing and regular maintenance of flow meters shall be performed by Tenants in accordance with NFPA 25.
Tenants to fill-up the checklist of requirements for the firewater flow meter. Please refer to Attachment - O for the checklist.

The design parameters of the QP-RLC firewater network are given below for Tenants to design their firewater system in conformity to QP-RLC network design from the tie-in connection.

- Min. supply pressure (residual pressure) : 2 barg
- Design Pressure : 16 barg
- Design Temp. : 40°C
- Vacuum : Full
- Material of construction : GRP

(Refer Attachment # M (14) for Fire Flow vs Residual Pressure Graph – Residual Pressure Available during Fire Event, Package 1.

The firewater main shall be designed as per NFPA 24 and tenants shall workout Firewater demand as per NFPA 1, 11, 13 and 15. However, hydro testing of fire water lines directly connected to RLC firewater network shall be performed at 1.5 times the RLC network design pressure.

For the WSSA if the Firewater demand based on the fire risk analysis exceeds 35000 LPM @ 2 barg the Tenants shall install FW storage and pumping arrangements to meet this additional demand.

For the ESSA, Tenants to install Firewater pumps to cater for the Firewater demand which shall be worked out as per NFPA-24 (NFPA 1, 11, 13 and 15) method and to provide water storage tanks for 2-hour fire fighting as per NFPA.

Not limiting to the minimum requirements as per Attachment # P, the Tenant shall make the necessary tie-in to Firewater network.

### 8.3 Sewage Network

QP-RLC’s sewage collection network comprising sewers, service connections, manholes and rising mains in the RSSA (West and some plots in the East) will collect sewage wastewater from individual plots. Sewer lines from Tenants plots are gravity lines with uPVC as the material of construction and terminated at various collection chambers and pumped to QP-RLC’s wastewater treatment plant.

The interface with Tenant will be in an underground chamber located within each Tenant’s plot or in proximity to plot boundaries.

These service connections shall have the following sizes. Refer to typical drawing SK-RLC-03572 in Attachment-M:

- For plot sizes 60m x 100 m : 150mm
- For plot sizes 200m x 120m : 200mm

QP-RLC’s sewage collection network system at RSSA (West) is designed based on the following average sewage flows from each plot:

- For plot sizes 60m x 100 m : 20m³/day/ha (Total 12 m³/day)
- For plot sizes 200m x 120m : 52m³/day/ha (Total 124.8 m³/day)
The design parameters of the QP-RLC sewage system gravity lines are given below for Tenant to design their sewage system in conformity to QP-RLC network design up to the tie-in service connection.

Design Temp. : 40°C
Material of construction : uPVC

Tenant shall install gravity sewers to tie-in to the service connection. Any other wastewater is not allowed in the Sewage system and need to be contained and treated on plot.

Tenant shall verify the invert level and coordinates of the sewage tie-in chamber located inside, back calculate the slope, and design their internal sewage system accordingly.

Tenant shall install a sewage holding tank inside their plot sufficient for storing minimum three days (72 hours) sewage. However, the capacity of holding tank for camp facility to be agreed separately. The connection details/ flow arrangement from holding tank to QP-RLC tie-in manhole shall be clearly shown. No flow meters are to be installed on the sewer lines. Monthly billing for sewage quantities shall be based upon the monthly potable water quantities.

Isolation valves shall be provided in the sewage line connecting to the tie-in chamber as well as to the holding tank.

Tenant shall develop a tie-in detail drawing showing isolation valves, holding tank and the tie-in chamber number provided on the top of chamber cover to be clearly specified in the drawing. Septic tanks are not allowed inside QP-RLC

Tenants shall start availing sewage treatment services at QP-RLC ONLY after entering into a Service Agreement with QP-RLC. For making the Service Agreement, the Tenant will be required to register for access to QP-RLC website www.qpic.qa and subsequently submit the agreement request online along with the supporting documents, such as the Land Lease Agreement, Approved Sewage Tie-in Drawings etc. The Tenant is advised to contact the concerned QP-RLC division via e-mail at eicsupport@qp.com.qa with regard to the application of the service agreement.

Not limiting to the minimum requirements as per Attachment # P, the Tenant shall make the necessary tie-in to QP-RLC Sewage network.

Tenants to fill-up the Technical compliance statement (checklist). Please refer to Attachment - R for the Technical compliance statement (checklist).

8.4 Storm water drainage system
Storm water generated within the Tenant’s plot shall be managed within the plot limits by suitable methods like soak-away etc.

QP-RLC’s storm water drainage system is not designed to cater for the run-off from Tenant’s plot. Hence, tie-in to the QP-RLC’s existing or future storm water drainage is not permitted.

The drainage design basis shall be in accordance with Section 10 of the Qatar Highway Design Manual (QHDM) 2015 and Design criteria adopted by Drainage Affairs/ State of Qatar. Also, ensure that drainage capacity is adequate to cater firewater run-off.
The design intensity rainfall shall be found from the “Intensity–Duration–Frequency chart” as per Appendix-B of QHDM 2015. Return period of 10 years and storm duration of 1hr shall be considered.

Tenants to fill-up the Technical compliance statement (checklist). Please refer to Attachment - R for the Technical compliance statement (checklist).

8.5 Power Supply
The power distribution system/network consisting of Ring Main Units (RMU’s), Package Unit Substations (PUSS’s), and the associated feeders and cables are installed in RSSA (East & West) to cater the Tenant’s power requirements.

Each Tenant will be provided with a tie-in point (service connection) from the 11kV power distribution network or 415V power distribution system. The tie-in point shall be through the Ring Main Unit (RMU), Package Unit Substation (PUSS), or cable splice/joint on existing feeder cable of power distribution system/network depending upon the requirements, which shall be decided by QP-RLC.

Tenants shall ensure that the Electrical Design and Installation inside Tenant's Facilities including connection equipment comply with Local Statutory and Kahramaa Standards. In addition, Tenant shall also carry out risk assessment to determine the need of lightning protection in their facilities. If required, lightning protection system shall be provided/installed in accordance with NFPA 780 – Standard for the Installation of Lightning Protection Systems or BS EN 62305 – Protection against Lightning.

8.5.1 Tie-in Requirements/Provision on the Electrical Power Supply to Tenants
8.5.1.1 General
Based on the power demand, Tenants will be classified into four categories as given below (Refer Sec. 8.5.1.10 for complete details):

Category 1: Low Voltage (Power demand up to 200kW)
Category 2: 11kV (Power demand greater than 200kW up to 3500kW)
Category 3: 11kV (Power demand greater than 3500kW but less than 5000kW)
Category 4: 11kV or 33kV Bulk (Power demand 5000kW and above)

All works and services associated with the connection of power supply from QP-RLC Networks including tie-in, tariff metering, provision of Ring Main Units (RMU), Transformers, Switchgears, cables, modifications to existing installation, etc., shall be the responsibility of the Tenant and subject to approval by QP-RLC.

Tenant shall submit Load list/Schedule indicating the equipment to be connected and its Power (kW) requirements and demand factor to support its maximum power demand. Loads shall be clearly classified if continuous, intermittent, or standby. Refer to typical format in Attachment-M.

Tenant shall submit the maximum power demand forecast (kW/kVA) and energy consumption (kWh) for the first 5 years of the proposed facility as per the format specified in Clause 8.5.1.6 (Table E-1). Tenant may also be required to submit a 10-year maximum power demand forecast (kW/kVA) and energy consumption (kWh) of the facility.
Estimated Power and Energy demand as confirmed by the Tenant and approved by QP-RLC will be considered in the Power Supply Agreement (PSA) and will be the basis of the power distribution network design.

Cable from QP-RLC tie-in point to Tenant’s switchgear/RMU shall be provided and installed by the Tenant including any associated pilot wires/control cables required.

Tenants shall install cable markers from QP-RLC tie-in network to Tenant’s interface point in accordance with QP Engineering Standard - Electrical Cable Marker Post Dwg. No. ES.2.62.0016, Sh. 001 in Attachment-M. Minimum bending radius requirement shall be observed and implemented for cable installation.

HIPOT Test voltage for jointed cable shall be 80% of the test voltage applied previously for the existing RLC 11kV cable. Otherwise specified by RLC, the test voltage shall be 12.8 kV rms (phase to ground) (i.e. 18kV peak) using sine wave at 0.1 Hz for at least 15 mins up to 30 minutes, and to be jointly witnessed by QP-RLC O&M representative.

Electrical Room and Package Unit Substation area shall have adequate space meeting the required clearances as per standard/requirements to accommodate all the electrical equipment.

Battery bank installation shall be at a dedicated battery room or at the LV Room provided that it satisfy with the requirements of installing on the same room with the other equipment and as approved by QP-RLC.

Power cable crossing QP-RLC wet utility corridor shall be provided with RCC precast slabs of 100mm thick (installed between cable and pipeline). Minimum 600mm separation distance shall be maintained between cable and pipes.

Tenant’s cable crossing existing underground utilities shall be in accordance with QP-RLC Guidelines QGL-CE-001 (Guideline for Corridors and Corridor Crossings).

Power cables associated with QP-RLC power network tie-in shall be installed at a minimum depth of 1.1m.

### 8.5.1.2 Environmental Conditions

All equipment and devices to be provided and installed by the Tenant associated with QP-RLC tie-in interface shall be suitable for the following site conditions within RLC:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude</td>
<td>less than 1000 m</td>
</tr>
<tr>
<td>Ambient Temperature For design of electrical equipment</td>
<td>45°C</td>
</tr>
<tr>
<td>Installed indoor in Substation</td>
<td></td>
</tr>
<tr>
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<tr>
<td>Maximum shade temperature</td>
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</tr>
<tr>
<td>Minimum shade temperature</td>
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</tr>
<tr>
<td>Relative Humidity</td>
<td></td>
</tr>
<tr>
<td>Absolute maximum humidity</td>
<td>100%</td>
</tr>
</tbody>
</table>
Absolute minimum humidity : 1%

The atmosphere shall be considered dusty and corrosive, as normally associated with oil and gas processing plants, refineries, chemical plants, LNG plants, industrial sites, and the like. In addition, the atmosphere shall be considered as salt laden for coastal locations.

High humidity is experienced in all areas and condensation will occur on all equipment during some period of its lifetime and therefore all components, nuts, bolts and washers, etc., shall be of corrosion resistant material except where specifically stated otherwise and shall be tropicalized.

Equipment shall not result in improper operation or cause to malfunction due to the adverse effect of the above site conditions.

8.5.1.3 Tie-in and Battery Limits

The Battery Limit shall be the terminal of the QP-RLC RMU/switchgear to which the Tenant connects. This shall be clearly demonstrated in the relevant drawings to be submitted to QP-RLC. Connection to the Battery Limit facilities shall be done in such a way so as not to damage QP-RLC equipment or affect any other Tenants’ connection. Any damages caused due to negligence, Tenant shall be responsible to reinstate the same as directed by QP-RLC.

Where the Equipment/RMU is installed by the Tenant and become part of the existing QP-RLC ring network, the operation and control shall be by QP-RLC (ALL RMU CB’s and other devices), and maintain by the Tenant. Such condition applies where the tie-in point is at the existing feeder cable of power distribution system/network (i.e., 11kV ring to be cut and splice/joint).

Tenant’s Package Substation shall be tagged as per Tenant’s equipment tag numbering procedure/standard. Tag numbers shall be clearly indicated in the relevant drawings, i.e., Single Line Diagram, Equipment Layout, etc.

In the event where QP-RLC requires Tenant’s equipment/facility to be tagged in accordance with QP-RLC Tagging standard, then Tenant shall raise tagging request by completing the tag request form(s) to be submitted to QP-RLC.

Tenant shall coordinate with QP-RLC for the tie-in. Any work to be performed on the tie-in connection shall be under QP-RLC’s authorisation and in the presence of a QP-RLC representative. Work shall be carried out by Tenant’s electrical personnel authorized by QP-RLC for the required voltage level.

Tenant shall ensure that all materials used for the Tenant’s connection are of sufficient quality to ensure a reliable and safe connection to acceptable standards. Failure of the connection equipment due to material defect, inadequate design or poor workmanship and damage to other Tenant’s or QP-RLC’s equipment due to failure of the Tenant’s tie-in shall be to the Tenant’s account only.

Once tie-in point is approved, Tenant shall proceed with the necessary design of their power distribution network including the tie-in connection.

Tenant shall ensure that an appropriately rated circuit breaker with a trip characteristic that grades acceptably with the QP-RLC supply breaker shall be
installed in order that this breaker trips before the QP-RLC breaker in the event of any fault.

Tenant shall carry out necessary power system studies/calculation such as load flow, short-circuit, protection coordination, relay settings, and earthing (as required) including cable sizing (for the tie-in cables) and harmonics (if applicable) for the tie-in connection with QP-RLC power network and submit for review and approval.

Necessary interlocks for feeders, circuits and earthing to be provided between tie-in points and Tenant’s incoming power supply.

For PMS requirements, an RMU Gateway shall be provided by the Tenant and shall be an intelligent electronic module/device capable of acquiring data such as status of switching devices, voltages, T-off currents as a minimum and communicate the information through its input/output FO ports network and hence to the PMS.

Tenant shall also submit Vendor Data related to electrical tie-in to QP-RLC power network which provide details of the tie-in equipment (HV Switchgear, Transformer, LV Switchgear and all associated protection and metering schemes, tie-in cables, etc.

Multifunction meter (MFM) shall be incorporated by the Tenant/Contractor at all LV incomers (secondary of transformers) capable to measure kWh, kVar, power factor, voltage, current and maximum power demand as applicable, to supplement the tariff metering installed at 11kV. Such MFM would be beneficial when separate site verification of tariff meter functionality is required (such as during commissioning) and would be used as temporary tariff meter in the event of main tariff meter’s malfunction or having problem during operational period.

8.5.1.4 Connected Equipment

Electrical equipment proposed to be supplied and installed by Tenant shall comply with QP/QP-RLC requirements. Connection shall be three-phase, four-wire (3Ph, 4W) plus earth (E) in case of low voltage (LV) connection and three-phase, three-wire (3Ph, 3W) + E for 11kV tie-in. Copper area for neutral connection shall not be less than 75% of the phase conductor. Full size neutral connections are preferred.

Tenant shall ensure that the power factor is maintained at 0.9. Any deviation to the specified pre-set value of the power factor will be subject to QP-RLC approval. In addition, Tenant shall ensure that load is distributed between the three phases such that no imbalance of more than 5% of the maximum connected capacity exists between phases.

Tenant shall ensure that harmonics and flicker imposed on the QP-RLC network shall not exceed IEC norms. Total harmonic distortion shall not exceed 3%, with individual “even” harmonic contribution < 1.5% and “odd” harmonic contribution < 2%, under any circumstances. Tenant shall provide load list identifying high harmonics equipment, i.e., non-linear loads such as rectifiers, power electronics equipment, etc. Harmonics calculation shall be provided to support this requirement.
Necessary electrical protection requirements shall be provided by the Tenant as required by QP-RLC for smooth operation of QP-RLC Electrical Network. In the event of Tenant’s equipment failure tripping the QP-RLC breaker, the Tenant shall investigate and demonstrate to QP-RLC’s satisfaction that the cause of the fault has been cleared before requesting the breaker to be closed. At the sole discretion of QP-RLC, an appropriate system insulation test may be carried out on the Tenant’s Tie-in equipment from the battery limit with the Tenant’s downstream circuit breaker open, and/or an inspection of the Tenant downstream circuit breaker shall be carried out before the QP-RLC circuit breaker is closed.

Tenant shall ensure adequate earthing of the electrical supply such that an earth connection is maintained even if the earth connection to the QP-RLC tie-in point is interrupted. This shall be clearly detailed in the drawing.

8.5.1.5 Tariff Energy Meters

Tenant shall provide and install Tariff Energy Meter for each plot at the 11KV side or at the 415V incoming side if connected from QP-RLC Package Substation. Certification for the Tariff Energy Meter shall be furnished by the Tenant.

Tariff Energy Meters shall be provided in accordance with Kahramaa Tariff Energy Meter Specifications/Requirements as listed in Attachment-M, unless otherwise the requirements hereunder are more stringent as determined by QP-RLC. Tenant shall submit specification and compliance sheet to the requirements as listed in Attachment #M (12), for the tariff meter including data/catalogue sheets for review and approval.

Tariff Energy Meters shall be in compliance but not limited to the following:

- IEC 62053-22: Electricity metering equipment (a.c.) Particular requirements Part 22: Static meters for active energy (classes 0.2 S and 0.5 S).
- BS EN 62058-31:2010: Electricity metering equipment (a.c.). Acceptance inspection. Particular requirements for static meters for active energy (classes 0.2 S, 0.5 S, 1 and 2, and class indexes A, B and C).
- BS EN 60687:1993: Alternating current static watt-hour meters for active energy (classes 0.2 S and 0.5 S).
- Properly sized CT/VT shall be provided for Tariff Energy Meter to be able to have accurate reading on low level of loading at initial stages.

The tariff energy meter shall be a three-phase, four-wire single tariff electronic type meter, giving running kW, kVAr and KVA, total kWh, kVAh and maximum kVA over a half-hour period, retained for a calendar month and then automatically reset.
Tenant shall provide access (unconstrained) to QP-RLC at all times into their facilities, which are associated with tariff energy meter and power tie-in to QP-RLC.

Tenant shall design such that the location of the tariff energy meter is close to the tie-in point. In case the installation of tariff meter is not possible at QP-RLC tie-in point location, Tenant has to submit to QP-RLC the equivalent power loss between QP-RLC tie-in point and the location where tariff energy meters are installed. The power loss will be calculated and added in the monthly energy consumption for billing at the same rate as the normal tariff described in the agreement.

Tariff energy meter provided by the Tenant shall be calibrated on installation and subsequently every 5 years or on QP-RLC’s request when there is sufficient evidence of a meter error in the same group of Tenants. Calibration shall be performed by a Kahramaa approved third party calibration agency/company. Calibration certificate shall be furnished to QP-RLC.

The tariff energy meter to be provided and installed shall have “time-of-use” (TOU) features and has the capability/suitability to record energy consumption during “peak” and “off-peak” periods. It shall be configured to enable the following power consumption recording:

a. Power consumption during peak time (12 noon - 6pm)

b. Power consumption during non-peak time (6pm - 12 noon)

The terminals of the tariff energy meter shall be sealed at all times and shall not be broken except in the presence of QP-RLC and shall be non-resettable.

The tariff energy meter shall be installed in a lockable cabinet/enclosure clearly visible and accessible from the outside of the Tenant’s facility. Lock shall be of the standard triangular electrical cabinet key. The tariff energy meter cabinet shall not be located inside any fenced or access-restricted areas. It shall be labelled with the Tenant’s name, the meter serial number and the plot number in a metallic or traffolyte tag with two (2) cm high black letters on a red background. It shall be black/yellow striped or if installed in a wall, shall have a black/yellow striped surround not less than two (2) inches thick.

Tenant shall ensure that the Tariff Energy Meter is fully functional/operational. In case of sudden malfunction, improper operation, or out of order, Tenant shall arrange for the immediate rectification of the energy meter with due information to QP-RLC. Energy readings during the rectification period will be taken based on the previous month or the month immediately after rectification to be decided by QP-RLC.

Tenant shall be responsible for Submission of meter reading at the end of each month by Fax/E-mail. Monthly meter reading shall be performed by QP-RLC O&M. Meter shall be read by QP-RLC to confirm consumption prior to connection of tie-in equipment, on removal of tie-in equipment and a minimum of once per month thereafter. In the event of a metering or usage dispute, Tenant may request QP-RLC to verify the meter reading once per year at no cost.

8.5.1.6 Maximum Power Demand Commitment by Tenant
Tenant shall provide Power Demand Forecast for next 5 years, in addition to the monthly Maximum Power Demand, as given below in the table format (Table E1).

Table E1. Five-Year Power Demand Forecast

<table>
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<tr>
<th>YEAR (***)</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
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<tr>
<td>Connected Load (kW)</td>
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<td>Max. Demand (kW)</td>
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</tr>
<tr>
<td>Estimated power consumption (kWh)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Demand (kVA)</td>
<td></td>
<td></td>
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</table>

(***) Tenant shall define exactly the Year (e.g., 2018, 2019...). Year 1 is considered as the initial year where the Tenant anticipates QP-RLC power is required for its plot/facility’s power demand.

8.5.1.7 As-Built Drawings/Documents by Tenant

Drawings shall be updated/ revised by the Tenant on the basis of the final tie-in details provided by QP-RLC. Tenant shall submit the “As-Built” drawings including “Load Schedules” and Protection details to QP-RLC upon completion of the connection. Refer Sec #10 of this document for further requirements related to As-Built submittal.

8.5.1.8 Other Conditions

Existing facilities shall be reinstated to the original condition by the Tenant to QP-RLC’s satisfaction, upon completion of tie-in job. All equipment used for the Tenant to connect to QP-RLC facilities shall be removed by the Tenant and reinstated to original condition to QP-RLC’s satisfaction upon completion of the Tenant’s lease agreement. In the event the Tenant does not remove any equipment connected to QP-RLC facilities after the Tenant has vacated the site, this equipment shall be removed by QP-RLC at Tenant’s cost, and stored by QP-RLC at Tenant’s cost. After three (3) months title will be deemed to pass to QP-RLC and it will be disposed of by QP-RLC to defray expenses.

Power Supply Start Date shall be the moment when Tenant’s facility is energized through QP-RLC power distribution network. The Tenant is required to make the necessary payment for the energy consumption to QP-RLC or Kahramaa as decided and advised by QP-RLC which is in line with the Tenant’s maximum power demand. Necessary requirements shall be arranged and complied by the Tenant in order to make and complete the payment of the billed energy consumption.

8.5.1.9 Operation and Maintenance

QP-RLC Electrical Distribution System will be operated by QP-RLC at QP-RLC’s discretion on the basis of QP-RLC’s priorities. Load shedding, if applicable, shall be notified to the respective Tenants. All equipment including tie-in cables installed by the Tenant shall be maintained by the Tenant. However, the Battery Limit for QP-RLC operation perspective shall be up to the interface point of the system (interface circuit breaker) installed by the Tenant. Tenant shall coordinate with QP-RLC for interface switching.
Tenant will ensure the operation of their switchgear by experienced switching personnel at their end including incoming power supplies from QP-RLC and tenant will be fully responsible for any eventuality caused by any wrong switching at their end. Any maintenance activities to be performed by the Tenant on the interface equipment (at battery limit) connected to QP-RLC Electrical Distribution Network shall be carried out on the basis of approved permits from QP-RLC and controlled by joint switching operation by both QP-RLC and the Tenant.

O&M Requirements of QP-RLC may involve power shutdown of the Tenant’s facility on “as needed” basis with prior notification.

8.5.1.10 Review of Requests, Network/Substation Adequacy Checks and Approval to Proceed

QP-RLC estimate the power demand per unit area as 0.04kW per square meter of plot area for power supply distribution network design.

Details of Tenant’s power demand categories are considered as follows:

A. Category 1: Low Voltage (LV)
   Low Voltage distribution at 415V is available only in limited locations where the maximum load allowed is 200kW at a maximum distance of 200m subject to availability of corridor space. If the LV substation is not available within 200m from his plot, it is the responsibility of the Tenant to provide his own LV distribution using package substation connected directly from the 11kV ring circuits.

B. Category 2: 11kV (Power Demands greater than 200kW up to 3500kW)
   Individual Tenant will be allowed to connect to the 11kV ring mains with a load demand of up to 3,500kW and provide his own RMU/Package Substation in his plot, subject to the availability of ring mains capacity.

C. Category 3: 11kV (Power Demands greater than 3500kW but less than 5000kW)
   Tenant with power demand above 3500kW but below 5000kW may be allowed to connect to the 11kV ring on a case-by-case basis depending on the current loading of the ring circuits. If the existing ring circuits could not accommodate the additional loads, the Tenant will be required to install his own 11kV ring directly connected to the 11kV switchgear at the substation including the 11kV circuit breakers (switchgear extension) subject to availability of substation capacity and space for the switchgear extension, and allow other Tenants to connect to the same ring circuits in the future to a total load of not exceeding 5000kW.

D. Category 4: 11kV or 33kV Bulk (Power Demands 5000kW and above)
   Tenant with power demand 5000kW and above shall be subject to availability of network/substation capacity. This may be connected directly either from the 11kV or 33kV switchgear whichever is available.

QP-RLC will review the load list and the forecasts for estimated Power (kW/kVA), Energy (kWh) as described in Clauses 8.5.1.1 and 8.5.1.6 above, its technical proposals and check the network and substation adequacy for the power supply provision.
8.6 Telecom / Fiber Optic Network

Telecom ducts are available throughout RLIC except the greenfield areas for lease based on feasibility. Tenants shall liaise with designated concession holder in coordination with QP RLC Maintenance to lease the ducts & other telecom services on a chargeable basis. The tenant shall officially apply separately to designated concession holder with a copy to Manager, Ras Laffan Industrial City (Operations) for leasing the telecom ducts and to Asst. Manager Infrastructure, Information & Communication Technology for equipment space in telecom room(s). The last mile connectivity for extending the telecom duct infrastructure will be the responsibility of the designated concession holder. The charges incurred for such provisions either will be back charged or amalgamated with the duct usages charges levied by concession holder as applicable. Telecom services in the state of Qatar are provided by the telecom service providers. Tenants shall approach service provider(s) for provisioning of services with a No Objection Certificate (NOC) issued by QP-DC. NOC is issued subject to availability of telecom infrastructure to extend such services as requested by the tenant.

Following are the requirements for telecom ducts / Fiber Optic Network.

(a) Cable drum shall be tested before pulling and witnessed by RLC representative.
(b) Single Mode 24 Core FO Cable, preferably of Belden, Ericsson, Nexans Panduit or any other brand listed in QP Preferred Vendor List.
(c) 12/24 port Optical Distribution Frame with SM SC-PC connectors, associated with pig tails and FO patch cords of required length.
(d) Termination of OFC shall be done in the nearest tie-in point at TER as per QP RLC approval.
(e) A valid permit for laying the OFC shall be obtained before commencement of the work, where the Method of Statement and JSA shall be approved prior to applying for permit.
(f) Contract shall liaise with designated concession holder for allocation of duct space in the approved duct route by QP-DC.
(g) The tenant shall use the allocated duct only for cable pulling. At no stage, the duct allocated shall be changed without the permission of designated concession holder/QP-DC.
(h) If there is blockage noticed during the pulling, it is the responsibility of the contractor to clear the blockage and no deviation from the allocated duct is permitted. The services of concession holder may be sought on chargeable basis as defined by the concession holder.
(i) The tenant shall reinstate the pull rope after pulling the cable through the duct. If no pulling rope is available, the tenant shall provide the same in the allocated duct.
(j) The entry of the ducts after pulling cable shall be sealed with foam to avoid ingress of water & other materials.
(k) The tenant shall take all precautions to avoid any damage to the existing cables in the manholes. In case of any damage, the same shall be reported to concession holder & QP RLC immediately. Shall restore the damage to its original status in coordination with designated concession holder / QP RLC & concerned third party.
(l) Upon termination of OFC, testing with OTDR and LSPM in both directions and commission. Results shall be submitted for review and approval.
(m) Stainless Tags with details such as "24 cores XXXX. to XXX TER" shall be installed for the cable pulled in each and every manhole.
(n) Slack of minimum 10 meters shall be left at starting and end manholes for maintenance.
(o) Loop of 02 - 03 meters shall be kept in manhole, for a smooth change of direction.
(p) The cable route drawing in CAD between tenant’s site to the nearest TER shall be submitted to concession holder & QP RLC for updating the consolidated telecom infrastructure drawings of RLC.

(q) For Fire Alarm integration, MOXA switch, Model IKS-6726A equipped with IM-6700A-8SFP (Fiber Port Module) & IM-6700A-8TX (Ethernet Port Module) having dual power supply modules, powered by 240V AC.

8.7 Access Road to Facility and Road Crossing Philosophy

8.7.1 Access Roads
Tenant shall tie-in to the existing QP-RLC road network as per requirements mentioned in Clause 7.2.9.

8.7.2 Crossing Philosophy
Tenants shall adhere to the following crossing philosophy while developing their access roads. Refer to typical drawing SK-RLC-03475 in Attachment-M.

8.7.2.1 For occupied corridors
1. RCC precast slabs shall be provided to protect the existing wet utility lines. Maximum weight of each slab shall not exceed 3.5ton with the minimum thickness of 0.35m. A 1000 gauge thick polythene damp proof membrane shall be placed below the slabs.
2. Duct banks shall be installed for wet utility pipeline crossings in case of single access to the plot.
3. Concrete duct bank shall be installed for the entire width of power and telecom corridor with necessary spares and split sleeves for the existing power and telecom cables.

8.7.2.2 For un-occupied corridors
1. Concrete duct bank Type-9 shall be installed for the entire width of wet utility corridor. Refer to typical drawing SK-RLC-00163, Sht.1 in Attachment-M. However, 600mm diameter sleeves shall be used instead of 900mm diameter sleeves.
2. Concrete duct bank Type-5 shall be installed for the entire width of power and telecom corridor. Refer to typical drawing SK-RLC-00163, Sht.1 in Attachment-M. However, duct bank width and sleeve configuration shall be decided on case by case, if corridor width is non-standard.

8.7.3 General requirements
1. Start and end coordinates of culvert and access roads in QNG95 shall be furnished.
2. Removable type hydraulically pressed heavy duty concrete pavement blocks of minimum 80mm thick shall be provided over utility corridor crossings for access road (between culvert and plot boundary).
3. RCC culvert shall be installed for drain crossing.
4. The alignment of access road shall not block the entry/exit points of existing duct banks in QP-RLC roads and other facilities in the utility corridor.
5. The spare ducts in the electrical duct bank shall have pull chord and sealed on either side for future use.
6. Duct banks / culverts shall be provided with identification tags/cable markers on either side with the details like number of sleeves, sizes of sleeve, type of utility and length of duct bank including SAP number (if any).
7. Footprints on all the underground utilities shall be included.
8. Cross sectional drawings, showing sections in both directions (parallel and perpendicular to proposed road) shall be included.

9.0 INSPECTION AND TEST REQUIREMENTS PRIOR TO TIE-IN
Once the facility is constructed in accordance with the Building Permit requirements, Tenants shall complete the installation and testing of their systems within their facility before it is connected to QP-RLC networks. A copy of the inspection and test reports of all systems which are connected to the QP-RLC networks shall be submitted to QP-RLC for review and to obtain approval for tie-in. Approval letter for each tie-in shall be attached along with the CPW. Refer to QP-RLC’s “Minimum Requirements for Inspection and test Reports” in Attachment # M (13).

10.0 AS-BUILT INFORMATION
As-built drawings shall be submitted to QP-RLC for records along with the request for “consent to operate”/occupancy certificate. The As-built drawings shall include two sets of hard copies and a soft copy prepared in AutoCAD format compatible with QP-RLC system.
# 11.0 ATTACHMENTS

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<tr>
<td>R</td>
<td>Technical Compliance Statement (Check List)</td>
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ATTACHMENT A: Category Code 001: Site Development Plan

A site development plan indicating internal configuration and proposed land uses of the plot area shall be submitted for QP-RLC review and approval.

This drawing shall include the following information as minimum:

a. Site Boundary (Coordinates in QNG95 systems shall be given) to match with SLLA drawing
b. Key plan with allocated plot number(s)
c. Plan view of all Buildings, Structures (above and belowground) and Facilities including process areas, manufacturing sites, and storage exposures etc.
d. Brief Description of the facility, e.g., Process Flow Diagram (PFD), Process Description etc.
e. Temporary facilities, if any
f. Parking areas with calculations
g. Site Access with coordinates
h. Safe inter distance between various facilities
i. Emergency access/gates
j. North Arrow
k. Prevailing Wind Direction
l. Location and names of roads serving the site
m. Location of above or/underground storage tanks with name and capacity
n. Finished Grade Levels and Finished Road Levels in QNHD
o. Legends and References
p. Maximum Building Occupancy (No. of occupants)
q. Area statement (Covered area, Built up area including floor area per floor and total floor area for each building, and total landscape area.) plus total plot area and built up area as a percentage of the total plot area
r. Consultant’s endorsement stating that the design and layout is complying with NFPA/relevant code requirement.

Tenants to fill-up the Technical compliance statement (check list). Please refer to Attachment - R for the Technical compliance statement (checklist).

ATTACHMENT B: Category Code 002: Architectural Drawings & Documents

Tenant shall submit the following drawings/documents to QP-RLC for review and approval.
a. Floor plans, Elevations, and Sectional details of all buildings and structures  
b. Finishing schedule (exterior) of the buildings/structures  
c. Boundary fence and gate details  
d. No. of occupants shall be indicated in the Floor plans  
e. Occupancy classification

Tenants to fill-up the Technical compliance statement (check list). Please refer to Attachment - R for the Technical compliance statement (checklist).

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**ATTACHMENT C: Category Code 003: Civil / Structural Drawings & Documents**

Civil / Structural drawings and documents shall include the following detail information:

a. Site Grading Plan
b. Access road and its tie-in with QP-RLC road including corridor crossing details

c. Road marking and signage

d. Storm water drainage management system with calculation

e. Structural Drawings

f. Earthwork/Foundation details of buildings and structures

g. Fence and gate foundation details

Tenants to fill-up the Technical compliance statement (check list). Please refer to Attachment - R for the Technical compliance statement (checklist).

ATTACHMENT D: Category Code 004: Electrical Drawings and Documents
Tenant shall submit the following electrical drawings and documents with the minimum required information as described below:
1. Overall Single Line Diagram (SLD) – showing the Tenant's electrical distribution system, tie-in to QP-RLC’s Substation/RMU or splice point at 11kV ring, total connected load and demand load in kVA. Also, earthing arrangement depicting earthing system philosophy in case of generator back-up.

2. Protection and Metering Diagram – showing the CT’s with the ratio, VT’s, type of protection, tariff metering, alarm/tripping communication, etc.

3. Protection coordination study, relay settings calculation, short circuit study

4. In case of generator back-up, operating philosophy of the DG set during normal and emergency conditions

5. Load Summary showing the Tenant's Total Connected and Demand Loads in kVA.

6. Site Electrical Layout and Details - showing the following:
   a. Tenant's Service Equipment/Substation
   b. Tariff Metering
   c. Electrical Tie-in point (QP-RLC Substation/RMU or splice point at 11kV ring)
   d. Cable layout and details of duct bank/cable trench from Tenant's Service Equipment/Substation to Electrical Tie-in point (QP-RLC Substation/RMU or splice point at 11kV ring)

7. Equipment Layout of Substation or Electrical Room (Tenant installing new Substation complete with RMU/Transformer/Switchgears with dimensions/clearances)

8. Cable sizing calculation for tie-in cables

9. External Lighting Layout - which includes additional area lighting that will illuminate half portion of QP-RLC roads abutting the property along with the lighting calculation to support the design.

10. Earthing Layout – showing the no. of earth pits, size of earthing conductor and other relevant details associated with QP-RLC system tie-in.

11. Earthing calculation/study - as requested by QP-RLC.

12. Estimated monthly power demand (kW) and energy consumption (kWH) for the first 5 years. (Refer to clause #8.5.1.6 above)

13. Estimated yearly power demand (kW) and energy consumption (kWH) for the next 10 years (as and when required by QP-RLC)

14. Plant operating philosophy in terms of electrical loading, i.e., continuous and intermittent (as required by QP-RLC).

15. Hazardous Area Classification, if applicable.

Tenants to fill-up the Technical compliance statement (check list). Please refer to Attachment - R for the Technical compliance statement (checklist).

**ATTACHMENT E: Category Code 005: Mechanical Drawings and Documents**

Tenant shall submit the following mechanical drawings and documents with the minimum required information as described below:

A. Potable Water
1. Potable water demand calculation (expected total peak demand in m$^3$/day)
2. Potable water tie-in arrangement with QP-RLC network (including sectional details of tie-in valve chamber)
3. Water meter details and arrangement
4. Pipe sizing calculation from tie-in point to the storage tank
5. Ground storage tank sizing calculation
6. Plumbing layout and material of the potable water distribution network within the facility.
7. Pumping arrangements for potable water

B. Firewater
1. Firewater tie-in arrangement with QP-RLC network (including sectional details of tie-in valve chamber)
2. Layout of the Firewater network and material of construction
3. Details of Firewater storage and pumping arrangements, if proposed

C. Sewage System
1. Sewerage calculation for normal and peak flows
2. Tie-in with QP-RLC sewerage network (including sectional details of tie-in manhole)
3. Layout of sewerage network within the facility and material of construction
4. Sewage holding tank sizing calculation

D. HVAC system (only packaged A/C units)
1. HVAC overall system Layout
2. HVAC ducting arrangement
3. Refrigerant specifications

E. Fuel oil/Fuel gas system (if applicable)
1. Fuel oil/gas storage tanks layout
2. Fuel oil/gas piping arrangement

Tenants to fill-up the Technical compliance statement (check list). Please refer to Attachment – R for the Technical compliance statement (checklist).
ATTACHMENT F: Category Code 006: Fire & Life Safety, Loss Prevention Drawings and Documents
Tenant shall submit the following Fire & Life Safety, Loss Prevention drawings and documents with the minimum required information as described below:

CATEGORY CODE 006A
1. Fire risk assessment,
2. Fire and life safety design philosophy,
3. Building layouts, including building area, the division of the building by firewalls, the degree of fire separations of storeys, shafts, and special rooms or areas,
4. Source of information for fire-resistance ratings of elements of construction (to be indicated on large-scale sections),
5. Escape Routes
6. Life safety drawings: Including means of egress, travel distances, occupant loads, exit light placement, emergency light placement, fire extinguisher locations and other life safety equipment
8. Fuel gas system (design basis, piping layout, P& ID, schematic drawings)

CATEGORY CODE 006B
1. Traffic Signal Sequence, Intersection Traffic Light Lay-out and Traffic Signal Wiring Diagram , if required
2. Material Submittals of Fire Protection Equipment
3. Acceptance Tests for all fire systems, including fire pumps
4. Fire Equipment listings/test reports where required

The drawings related to Loss Prevention systems shall include Consultant’s endorsement stating that the design and layout is complying with NFPA / relevant code requirements.
ATTACHMENT G: Category Code 007: Fire Alarm (FA) & Fire Fighting (FF)/Fire Protection Systems Drawings and Documents

Tenant shall submit the following Fire alarm & fire fighting/ fire protection systems drawings and documents with the minimum required information as described below:

1. FIRE & GAS SYSTEM
   1.1 Layout drawings.
   1.2 Single line diagram (schematic showing all interface to other electromechanical system)
   1.3 HVAC Control systems with fire and smoke dampers
   1.4 Riser diagram.
   1.5 Cause and Effect matrix.
   1.6 High Sensitivity Smoke Detection (HSSD) system details and layout.

2. FIXED FIRE FIGHTING INSTALLATION
   2.1 Sprinkler system/ Deluge system :
      2.1.1 Design basis
      2.1.2 Layout and associated details
      2.1.3 Hydraulic calculation
      2.1.4 Material submittal
      2.1.5 Full height cross section or schematic diagram
   2.2 Firewater System :
      2.2.1 Design basis
      2.2.2 Layout and pump details.
      2.2.3 Hydraulic calculation.
      2.2.4 Material submittal
   2.3 Gaseous suppression system
      2.3.1 Design basis
      2.3.2 Layout and other details.
      2.3.3 Hydraulic calculation.
      2.3.4 Material submittal

3. FIRE ALARM INTEGRATION REQUIREMENTS FOR RLC (TENANT SCOPE)
   3.1 Installed fire alarm control panel (FACP), shall be able to integrate with the existing RLC Central Fire Alarm Monitoring System (CFAMS) (M/s Autronica or M/s Simplex or Approved equivalent). Original Equipment Manufacturer (OEM) confirmation for integration is required.
3.2 The new facility fire alarm system shall be integrated to nearest Fire Station and ERCC (Emergency Response & Control Centre).

3.3 The required integration, programming and configuration of RLC CFAMS shall be done by or under supervision of OEM or their authorized agent only.

3.4 All fire alarm drawings (Fire alarm floor layout, FACP wiring and schematic drawings, Devices standard text list and Cause & Effect matrix) shall be reviewed, approved and stamped by QP Fire department.

3.5 Number of points required to be configured for the project at the CFAMS shall be approved by QP Fire department.

3.6 Communication wiring diagram and network block diagram from the FACP to CFAMS shall be reviewed and approved by QP, with any new hardware devices and cables to be installed / replaced.

3.7 As per advice of QP, wherever required, Industrial Ethernet switch shall be provided, installed and connected for integration of fire alarm system to QP telecom network.

3.8 FACP 72 hours stability test shall be conducted by the tenant and the stability test report shall be approved by RLC Fire division of RLC HSSE department.

3.9 Central fire alarm monitoring system configuration back up CD’s for ERCC and nearest Fire Station shall be provided to RLC maintenance.

3.10 Fire alarm graphic system network at RLC shall be updated, highlighting the FACP IP address, No. of devices in each FACP and communication equipment is used.

3.11 As built drawings shall be provided.
ATTACHMENT H: Category Code 008: Telecom Drawings and Documents

Tenant shall submit the following telecom drawings and documents with the minimum required information as described below:

1. Drawing showing complete telecommunication cable route between Tenant’s facility and nearest QP-DC telecom tie-in node.

2. Existing ducts/manholes and new ducts/manholes for the entire cable route shall be clearly identified in the drawing. Type (such as fiber optic/copper cable) and capacity of the cables shall be identified in the drawing.

3. Ducting and manhole details. No direct buried telecom cable shall be permitted. Telecom cables shall be laid through JRC14/12 manhole and duct network.

4. Equipment rack face layout with details of proposed equipment, MDF, Junction box, ODF’s and IDF’s.

5. Telecom room equipment layout showing layout arrangement for all equipment racks. All telecom equipment indicated in the drawing shall be earthed to clean separate telecom earth and value of less than 1 ohm shall be indicated in the drawing.


7. Details of required telecom infrastructure/services such as duct space, equipment space in rack/cabinet, optic fiber cable cores, Number of PRI/ telephone lines and internet lines and/or any other telecom requirement shall be identified in the telecom submittal.

8. Details of Radio installations with antenna locations, if any.

9. Schematic/block diagram of telecom systems (if any) for the proposed tenant facility.

10. Communication wiring diagram and network block diagram for integrating Tenant Fire Alarm Control Panel to QP-DC Central Alarm Monitoring System (ERCC and the nearest Fire Station). The integration involves upgrading of GUI in Fire Alarm Monitoring Servers at ERCC and nearest Fire Station to include alarms registered at tenant’s site/facilities.
ATTACHMENT I: Category Code 009: Environmental Drawings and Documents
Tenant shall submit the following environmental drawings and documents with the minimum required information as described below:

1. Environmental Permit issued by MME.
   In case an Environmental Permit is issued by MME, Consent to Operate Application Form must be submitted to QP-RLC before commissioning of the project.

2. EBA (Environmental Baseline Assessment) must be obtained before submitting CPW for construction.
   EBA will verify the requirements of checking for top soil, flora, fauna and any existing spills.

3. EMP (Environmental Management Plan)
   Tenant/Contractor must devolve Construction EMP to QP-RLC for review and approval.

ATTACHMENT J: Category Code 010: Landscaping Drawings and Documents
Tenant shall submit the following landscaping drawings and documents with the minimum required information as described below:

1. Overall Landscaping plan
2. Typical landscaping details (list of plants etc.)
3. Irrigation water storage and pumping system layout

Tenants to fill-up the Technical compliance statement (checklist). Please refer to Attachment - R for the Technical compliance statement (checklist).
ATTACHMENT K: Category Code 011: Other Categories - Drawings and Documents

Tenant shall submit all other drawings and documents, which are not covered in other category codes under category code 011 for information and record purposes.

If there are any hazardous process/ manufacturing unit, hazardous chemical storage/ handling involved in the facility operation - tenant shall submit the following process related documents, as minimum.

1. Facility layout / Plot Plan(s)
2. Process Description or Business Activity Description
3. Process Flow Diagrams
4. Piping and Instrumentation Diagrams
5. Summary of Hazardous Materials involved / Storage Inventories
6. Material Safety Data Sheets (MSDS)
7. Other relevant documents

<table>
<thead>
<tr>
<th>S. No</th>
<th>Description</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Facilities without hazardous chemicals as part of their business processes such as mechanical workshop, fabrication yards etc.</td>
<td>Risk Management Plan to be developed in consultation with HSE Risk division of QP-RLC HSSE Department.</td>
</tr>
<tr>
<td>2</td>
<td>Facilities involving handling, storage and transportation of hazardous chemicals such as chemical warehouse, chemical manufacturing industries</td>
<td>HAZID to be performed in line with QP-GDL-S-040 during the early stages of the project which will establish the requirements for other safety studies such as HAZOP, QRA, SIL etc.</td>
</tr>
<tr>
<td>3</td>
<td>Facilities involving hydrocarbons/ hazardous materials that could potentially lead to major fire, toxic or explosion impacts</td>
<td>HAZID, HAZOP, QRA, SIL would be required.</td>
</tr>
</tbody>
</table>
ATTACHMENT L: Covering Letter Format

NAME OF THE COMPANY
(LOGO)

BUILDING PERMIT TECHNICAL SUBMISSIONS

SUBMISSION REFERENCE No. ..............
Date: .............
NUMBER OF PAGES: ...........

To From

The Assistant Manager
Engineering
Development Planning & Engineering
Department
Ras Laffan Industrial City
Ras Laffan, P.O. Box No. 22247
e-Fax: 401-39823, Tel: 401-47708

--------------------(Name of the Originator)
--------------------(Name of the Company)

REPLY TO BE FAXED TO : XXXXXXXXXXX

NAME OF THE FACILITY :
SUBJECT:

BRIEF DESCRIPTION

---------------------------Name of the Contact Person (for clarifications, if any, on the subject)
Tel : Mobile :
Email :

SUBMISSION CATEGORY CODE:

PURPOSE OF SUBMISSION (Please tick)

Approval
Supplementary submission*
Revised submission *
Response to RLC letters*
Information and Records

*Previous references
1.
2.

Attachments:

Signature Name
ATTACHMENT M: Reference Drawings/ Documents

1. Drawing No. SK-RLC-03283: Road way frontage, building height & fence height
2. Drawing No. SK-RLC-02839: Typical Fence details for boundary
3. Drawing No. SK-RLC-02718: Land use regulations - vehicular access
4. Drawing No. SK-RLC-00163 (Sht.1 & 2): Utility crossing & pipe culvert details
5. Drawing No. SK-RLC-03475: Typical crossing detail for access road at RSSA (West)
6. Drawing No. SK-RLC-03570: Typical service connection details at RSSA(West)
7. Drawing No. SK-RLC-03571: Typical details of Firewater tie-in chamber at RSSA(West)
8. Drawing No. SK-RLC-03572: Typical details of sewage tie-in chamber at RSSA(West)
9. Drawing No. SK-RLC-03573: Typical details of potable water tie-in chamber at RSSA
10. Drawing No. ES.2.62.0016, Sht. 001: Electrical Cable Marker Post
11. Typical format for Load Schedule
12. Kahramaa’s Tariff Energy Meter specification/requirements (2 sheets)
13. Minimum Requirements for Inspection and test Reports (3 sheets)
14. Fire Flow vs. Residual Pressure Graph – Residual Pressure Available During Fire Event, Package 1(1 sheet)
Guidelines for Building Permit
Technical Submissions to QP
Industrial Cities in RLC

ATTACHMENT M (6)

SERVICE CONNECTION

SCALE: NTS

GENERAL NOTES:
1. TENANT SHALL VERIFY THE DETAILS AT SITE BEFORE FINLALIZING THE TIE-IN ARRANGEMENTS.
2. ACTUAL DIMENSIONS MAY VARY.
3. P otable water connection will be 25mm (1")
   for plot size 40m x 100m and 40m x 50m (1.5")
   for plot size 200m x 120m.
4. Fire water connection will be 150mm.

TYPICAL SERVICE CONNECTION DETAILS AT RSSA

SCALE: NTS

TITLE:

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Guidelines for Building Permit
Technical Submissions to QP
Industrial Cities in RLC

ATTACHMENT M (B)

GENERAL NOTES:
1. Tenant shall verify the details at site before finalizing the tie-in arrangements.
2. Actual dimensions may vary.
3. Sewage connection will be 150mm for plot size 60m x 18m and 200mm for plot size 200m x 150m.

TYPICAL DETAILS OF SEWAGE TIE-IN CHAMBER AT RSSA

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THIS INFORMATION IS TO BE HELD IN CONFIDENCE. NO DISCLOSURE OR OTHER USE OF THIS DOCUMENT IS TO BE MADE WITHOUT PRIOR WRITTEN CONSENT OF QP — DC INDUSTRIAL CITIES MANAGEMENT.
## Load Schedule (typical format)

<table>
<thead>
<tr>
<th>SN</th>
<th>Description</th>
<th>Absorbed Load KW</th>
<th>Rating KW</th>
<th>Load Factor (A/B)</th>
<th>Demand Factor</th>
<th>Eff.</th>
<th>Consumed Loads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(A x D)/E</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Intermittant</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Standby</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[Sum C] (KW)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[Sum I] (KW)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[Sum S] (KW)</td>
</tr>
</tbody>
</table>

### Total Connected Loads

Total Plant Running Load (TPRL) = X x Sum C + Y x Sum I

Where X = 1.0 for continuous load, 0.90 shall be used for non-process areas i.e. offices, workshop lighting, etc.

Y = 0.50 for intermittent load, but not less than the largest single intermittent load

Total Plant Peak Load (TPPL) = T x PRL + Z x Sum S

Where Z = 0.13 for standby load

* Continuous loads are loads that operate continuously for 3 hours or more.
** End users may use different factors for X, Y and Z, but the result shall not be more than calculated using the above factors.
KAHRAMA Tariff Energy Meter Specifications/Requirements

The following is a complete extract from Kahramaa Tariff Energy Meter Specifications/Requirements document to be fulfilled by the Tenants in the provision and installation of tariff energy meters within Ras Laffan Industrial City for the energy consumption of their leased sites.

1.0 Current Transformer (CT)
   1. CT shall be Class 0.2s FS5, 30 VA, IEC 60044-1 Standard.
   2. CT wiring should be with 2.5 mm² wire minimum for 1A secondary and 4 mm² wire for 5A secondary with proper shorting facility.
   3. CT test report for 25% and 100% burden at 0.8 PF shall be submitted.

2.0 Voltage Transformer (VT)
   1. VT shall be Class 0.2, 100 VA, IEC 60044-2 Standard.
   2. VT wiring should be with 2.5 mm² wire minimum with proper isolating links.
   3. VT test report (as per IEC 60044-2 clause 12.4 and 13.7) for 25% and 100% burden at 0.8 PF, 100% and 120% at rated voltages shall be submitted.

3.0 Energy Meter
   1. The energy meter shall be of the approved type numerical with with IEC Class 0.2s accuracy. Safety isolation voltage shall be as per IEC 687/1036.
   2. The energy meter shall be capable of measuring at least MWh, MVARh, MVAR, MW, MVA, MVAR, V and A.
   3. The inputs shall be suitable for current = 1A (minimum measuring range is 1-150% @ frequency 45-60 Hz), voltage = 110V (measuring range 90-110% @ frequency 45-60 Hz). Auxiliary supply = 110V DC (working range of 85-115%). The overload capacity for these inputs shall be a minimum current of = 2 times continuous and 30 times 1 sec; voltage = 1.25 times and Auxiliary DC = 1.25 times.
   4. Display number of digits minimum shall be six (6) and 2 (two) decimals or LCD display with minimum 26 characters.
   5. Capable of working with the required accuracy between the minimum temperature limits of -10°C to +55°C.
   6. Data communication requirements shall be RS 232/485/IEC 1107. Suitable converters shall be provided if required.
   7. Upgrading of software if required at a later stage, shall be provided by the Manufacturer.
   8. Minimum two (2) binary inputs to use with 50-200V DC and three (3) binary potential free outputs shall be available to use on requirement.
   9. Pulse outputs shall be available for calibration.
   10. Required spare parts, software, etc., shall be supplied.
   11. Site calibration shall be carried out by authorized calibration agencies with prior information to KAHRAMA to witness it.
   12. Installation, setting, testing and commissioning of the energy meter at site should be carried out by the Contractor with prior information to KAHRAMA to witness.
   13. CT’s and VT’s should conform to the tariff energy meter accuracy class. Detailed schematic drawings showing the metering CT and VT connections to the tariff meter from the actual CT and VT, site test reports of the metering CT and VT, and wiring check reports shall be submitted for review.

Uncontrolled document after printing
14. VT MCB shall be located on the metering panel and an alarm shall be wired to the Control Centre for “Metering VT MCB trip”.
15. The secondary wiring has to reach the panel on which tariff meters are installed and terminated at the terminals mounted inside the panel. The terminal for CT’s should be heavy duty and shall be provided with isolation and shorting facility. The VT’s terminals shall be isolatable type. Remote alarm for failure of VT shall be available.
16. The whole panel shall be padlockable. The front cover of the panel shall be transparent through which the energy meter’s reading can be taken.
17. Suitable provisions shall be provided to avoid any type of human intervention with the energy meter reading.
18. Reference list of Users in Middle East shall be submitted by the Manufacturer prior to approval.
19. Initial reading shall be jointly taken and recorded in the respective registers by the representative of KAHRAMAA and the Bulk Consumer.
20. Site calibration of the instrument by an approved, qualified calibrating agency as per the below mentioned table is requested. The calibration shall be witnessed by KAHRAMAA, Bulk Consumer and the calibrating agency representative. Details of the calibrating instruments, their percentage uncertainties and next calibration due date, etc., should be clearly given in the calibration report.

<table>
<thead>
<tr>
<th>SI No.</th>
<th>Inputs</th>
<th>Calculated MWh &amp; MVAh</th>
<th>Reading</th>
<th>Actual MWh &amp; MVAh</th>
<th>% Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>V = 100% I = 100% PF = 1</td>
<td>MWh</td>
<td>MWh</td>
<td>MVAh</td>
<td>MVAh</td>
</tr>
<tr>
<td>2</td>
<td>V = 100% I = 100% PF = 0.5</td>
<td>MWh</td>
<td>MWh</td>
<td>MVAh</td>
<td>MVAh</td>
</tr>
<tr>
<td>3</td>
<td>V = 100% I = 100% PF = 1</td>
<td>MWh</td>
<td>MWh</td>
<td>MVAh</td>
<td>MVAh</td>
</tr>
<tr>
<td>4</td>
<td>V = 80% I = 10% PF = 1</td>
<td>MWh</td>
<td>MWh</td>
<td>MVAh</td>
<td>MVAh</td>
</tr>
<tr>
<td>5</td>
<td>V = 80% I = 10% PF = 0.5</td>
<td>MWh</td>
<td>MWh</td>
<td>MVAh</td>
<td>MVAh</td>
</tr>
<tr>
<td>6</td>
<td>V = 80% I = 10% PF = 0.5</td>
<td>MWh</td>
<td>MWh</td>
<td>MVAh</td>
<td>MVAh</td>
</tr>
<tr>
<td>7</td>
<td>V = 120% I = 120% PF = 1</td>
<td>MWh</td>
<td>MWh</td>
<td>MVAh</td>
<td>MVAh</td>
</tr>
<tr>
<td>8</td>
<td>V = 120% I = 120% PF = 0.5</td>
<td>MWh</td>
<td>MWh</td>
<td>MVAh</td>
<td>MVAh</td>
</tr>
<tr>
<td>9</td>
<td>V = 120% I = 120% PF = -0.5</td>
<td>MWh</td>
<td>MWh</td>
<td>MVAh</td>
<td>MVAh</td>
</tr>
</tbody>
</table>
MINIMUM REQUIREMENTS FOR INSPECTION AND TEST REPORTS

Tenants shall submit the following Inspection and Test Reports, as minimum, to obtain approval for tie-in. All the tests shall be done in accordance with the requirements of applicable codes and shall be compatible to tie-in to RLC network.

RLC may witness the work and tests in progress and inspect the equipment and workmanship at the Tenant’s facility. RLC reserves the right to require additional testing, at any time, to conform or further investigate, a suspected fault. The cost incurred shall be to the Tenant’s account. The Tenant shall record all tests, and a copy of the results shall be retained at the Tenant’s facility. A copy of all RLC approved drawings and documents along with material certifications shall be made available at the facility at the time of inspection. In no case shall any action of RLC, relieve the Tenant of his responsibility for material, design & quality.

Refer to NFPA 25/other applicable standards for acceptance and commissioning test formats related to fire and life safety or can be obtained from RHF section.

1. FIRE WATER SYSTEM
   a) Hydro test report
   b) System flushing report
   c) As Built drawing / RLC approved drawing copies
   d) Testing & Acceptance report as per NFPA 20, 24 & 25
   e) Inspection documents
   f) FAT and SAT details
   g) Material Certification
   h) Pre Start-Up Safety Review (PSSR)
   i) System Commissioning Procedure
   j) Operation & Control Philosophy
   k) Overall functional testing and commissioning report
   l) Battery limit of the system on the Operation & Maintenance by Tenants.
   m) Tenants contact person.

2. SPRINKLER SYSTEM
   a) Hydro test report.
   b) System flushing report.
   c) As Built drawing / RLC approved drawing copies
   d) Testing & Acceptance report as per NFPA 13 & 25
   e) Inspection documents.
   f) FAT and SAT details
   g) Material Certification

3. FIRE ALARM SYSTEM
   a) As Built drawing / RLC approved drawing copies
   b) Testing & Acceptance report as per NFPA 72
   c) Stability report (for 6 weeks prior to tie-in )
   d) Official approved letter for the new Fire Alarm System installation by RLC management.
   e) RLC approved Cause & Effect matrix by RLC.
   f) Installation and integration to RLC monitoring system Method statement.
   g) Approved communication network drawings for integration with RLC central fire alarm monitoring system
h) Number of points to be configured and added to RLC central fire alarm monitoring system.
   i) Operation & Control Philosophy.
   j) Official letter with approval of new fire alarm system compatibility with RLC central monitoring system and possibility of integration with it
   k) Demo simulation for the new fire Alarm System with RLC central monitoring system.
   l) Contact No’s in case of Emergency or FAS failure.
   m) Battery limit of the system on the Operation & Maintenance by Tenants.
   n) Programming software and back up’s for the new FAS and configuration updates of RLC central monitoring system.
   o) Functional test and commissioning report

4. GASSEOUS SUPPRESSION SYSTEM.
   a) As Built drawing / RLC approved drawing copies
   b) Testing & Acceptance report as per NFPA-12 and NFPA 2001
   c) Testing and Inspection documents.
   d) Material Certification

5. OTHER FIRE PROTECTION SYSTEM
   a) Hydro test report. (if applicable)
   b) As Built drawing / RLC approved drawing copies
   c) Testing & Acceptance report as per NFPA.
   d) Inspection documents

6. POTABLE WATER SYSTEM
   a) Hydro test report.
   b) Flushing and disinfection report.
   c) Confirmation regarding all installation as mentioned in Section 7.2.10 and Section 8.1 (Guidelines for Building Permit Technical Submission in RLC)
   d) Calibration report for the potable water meter and the pressure gauge at the battery limit.
   e) Confirmation regarding continuous power supply (UPS) to the electronic flow meter
   f) Pre Start-Up Safety Review (PSSR)
   g) As Built drawing / RLC approved drawing copies
   h) System commissioning Procedure
   i) Operation & Control Philosophy.
   j) Overall functional testing and commissioning report
   k) Battery limit of the system on the Operation & Maintenance by Tenants.
   l) Tenants contact person.
   m) A copy of signed Service Agreement for availing Potable Water Supplies from RLC

7. SEWAGE SYSTEM
   a) Leak test report
   b) Flushing report
   c) Level check reports
   d) As Built drawing / RLC approved drawing copies
   e) Pre Start-Up Safety Review (PSSR)
ATTACHMENT #M(13) Sheet 3/3

8. ELECTRICAL POWER SYSTEM
   a) Transformer/switchgear test reports
   b) HV cable test reports
   c) Stability test report
   d) Relay Coordination Studies and relay settings report
   e) Punch list closeout report
   f) Earthing test report
   g) Switchboard Hi-Pot & Megger test report
   h) Operation Philosophy of electrical system
   i) As Built drawing / RLC approved drawing copies
   j) Required Interlock scheme
   k) Battery limit of the system on the Operation & Maintenance by Tenants.
   l) Tenants contact person

9. TELECOM SYSTEM
   a) RLC approval letter for using existing RLC telecom infrastructure.
   b) Copper cable test reports.
   c) Equipment earthing test report.
   d) Fiber cable test report.
   e) Review and approval of subcontractor/CVs for carrying out tie-in works.
   f) Review and approval of tie-in/integration procedure/method statement.
   g) As Built drawing / RLC approved drawing copies

10. ACCESS ROAD/ CORRIDOR CROSSINGS
    a) As Built drawing / RLC approved drawing copies
ATTACHMENT # M (14)

Fire flow vs residual pressure
(Residual pressure available during fire event, package 1)

Residual pressure in the system (bar)

Total flow at the critical point (lpm)

The residual pressure and flow are within the limit of NEC for新建 of generation supplied.
### ATTACHMENT N: Check List of Requirements for Potable Water Flow Meter

<table>
<thead>
<tr>
<th>No.</th>
<th>Item Description</th>
<th>RLC Requirement</th>
<th>Proposed by Tenant</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Flow meter installation</td>
<td>As close as to the tie-in chamber</td>
<td>Section 7.2.8(1)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Flow meter accuracy</td>
<td>Accuracy = ± 0.5%</td>
<td>Section 7.2.8(2)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Calibration certificates</td>
<td>To be submitted prior to installation</td>
<td>Section 7.2.8(2)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Pipe size</td>
<td>RLC pipe sizes: 1&quot; (50 x 100m) &amp; 1 1/2&quot; (200 x 120m)</td>
<td>Section 8.1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Flow rate</td>
<td>Rated for the maximum flow</td>
<td>Section 7.2.8(3)</td>
<td>Reading on flowmeter shall be in m³</td>
</tr>
<tr>
<td>6</td>
<td>Lockable type globe valve</td>
<td>Lockable globe valve to set the flow within the allowable range</td>
<td>Section 7.2.8(4)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Strainer</td>
<td>A strainer upstream of the flow meter</td>
<td>Section 7.2.8(5)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Meter reading</td>
<td>Meter readings can be taken without having to go inside the chamber</td>
<td>Section 7.2.8(6)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>External display unit (this is alternate arrangement for meter reading)</td>
<td>External display unit to be installed above ground on the fence boundary facing outside enased in protective enclosure</td>
<td>Section 7.2.8(6)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Power supply</td>
<td>Continuous power supply, it can be AC powered either with UPS or in built battery back up</td>
<td>Section 7.2.8(7)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Access</td>
<td>Unrestricted access to the flow meter for RLC operations team</td>
<td>Section 7.2.8(8)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Spares and maintenance</td>
<td>Ensure availability of mandatory spares and calibration verification</td>
<td>Section 7.2.8(9)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Minimum straight pipe length requirements</td>
<td>Manufacturer recommendation</td>
<td>Manufacturer recommendation</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Material</td>
<td>Manufacturer recommendation</td>
<td>Manufacturer recommendation</td>
<td></td>
</tr>
</tbody>
</table>
### ATTACHMENT O: Check List of Requirements for Firewater Flow Meter

<table>
<thead>
<tr>
<th>No.</th>
<th>Item/Description</th>
<th>RLC requirement</th>
<th>OQDLM-ML-003 Ref</th>
<th>Proposed by Tenant</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Flow meter installation</td>
<td>As close as to the tie-in chamber</td>
<td>Section 7.2.6(1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Flow meter accuracy</td>
<td>Accuracy = ± 0.5%</td>
<td>Section 7.2.6(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Calibration certificates</td>
<td>To be submitted prior to installation</td>
<td>Section 7.2.6(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Pipe size</td>
<td>60mm (6&quot;)</td>
<td>Section 8.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Flow rate</td>
<td>Rated for the maximum flow as per fire demand</td>
<td>Section 8.2</td>
<td>Reading on flowmeter shall be in m³</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Lockable type globe valve</td>
<td>Not required</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Strainer</td>
<td>Not required</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Meter reading</td>
<td>Meter readings can be taken without having to go inside the chamber</td>
<td>Section 7.2.6(6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>External display unit (this is alternate arrangement for meter reading)</td>
<td>External display unit to be installed aboveground on the fence boundary facing outside encased in protective enclosure</td>
<td>Section 7.2.6(6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Power supply</td>
<td>Continuous power supply. It can be AC powered either with UPS or in built battery back up</td>
<td>Section 7.2.6(7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Access</td>
<td>Unrestricted access to the flow meter for RLC operations team</td>
<td>Section 7.2.6(8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Spares and maintenance</td>
<td>Ensure availability of mandatory spares and calibration verification</td>
<td>Section 7.2.6(9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Minimum straight pipe length requirements</td>
<td>Manufacturer recommendation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Material</td>
<td>Manufacturer recommendation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Tamper proof with seal</td>
<td>Manufacturer recommendation</td>
<td>Section 8.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>UL/FM listing</td>
<td>Listed for fire service use by UL/FM</td>
<td>Section 8.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ATTACHMENT P: Utilities Tie-In Requirements

**Sewage Tie-in Requirements:**
1. Tie-in Point: Clearly Identify the QP-RLC tie-in chamber on the drawing with valve chamber number & coordinates.
2. Holding Tank: Each tenant shall have a holding tank capable of storing sewage for up to 3 days.
3. Gravity Lines: Tenant shall install gravity sewer lines from their holding tank till the QP-RLC tie-in chamber.
4. Isolation valve: In between the holding tank and QP-RLC tie-in point, there shall be an isolation valve.
5. Avoid Oil/Grease into the sewage system: End-user shall ensure that oil/grease does not get into the sewage network. End-user shall confirm that only the domestic sewage is routed to the QP-RLC network. Apart from domestic sewage, other stream (from workshop, oil/grease drain, chemical wash) shall NOT be routed to QP-RLC network.

**Potable Water Tie-in Requirements:**
1. Tie-in point: Clearly Identify the QP-RLC tie-in chamber on the drawing with valve chamber number & coordinates.
2. Storage Capacity at Site: End user to confirm their peak daily demand and accordingly confirm 3 days of storage at site (calculated as per peak daily requirements).
3. Flowmeter: All flow meter requirement shall be as per FM checklist. Flowmeter unit shall be in m$^3$. Flowmeter calibration certificates to be submitted to QP-RLC prior to tie-in.

**Firewater Tie-in Requirements:**
1. Tie-in point: Clearly Identify the QP-RLC tie-in chamber on the drawing with valve chamber number & coordinates.
2. Flowmeter: All flow meter requirement shall be as per FM checklist and FM installation shall be as per vendor recommendations. Flowmeter unit shall be in m$^3$. Flowmeter calibration certificates to be submitted to QP-RLC prior to tie-in.
## ATTACHMENT Q: Quality Criteria for Treated Wastewater Used for Landscaping

### Standard for Treated Wastewater from Industrial Land based Facilities Used for Irrigation:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Limit for Irrigation</th>
<th>Limit for landscape</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1- Physical Tests</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>TDS</td>
<td>2000</td>
<td>2000</td>
<td>mg/L</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>TTS</td>
<td>50</td>
<td></td>
<td>mg/L</td>
</tr>
<tr>
<td>pH</td>
<td>ph</td>
<td>6-9</td>
<td>6-9</td>
<td></td>
</tr>
<tr>
<td>Floating Particles</td>
<td></td>
<td>Nil</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td><strong>2- Inorganic Matters</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ammonia as N</td>
<td>NH4+</td>
<td>15</td>
<td>15</td>
<td>mg/L</td>
</tr>
<tr>
<td>Chlorine Residual</td>
<td>Cl2</td>
<td>0.1</td>
<td>0.1</td>
<td>mg/L</td>
</tr>
<tr>
<td>Cyanide (Total)</td>
<td>CN</td>
<td>Nil</td>
<td>0.2</td>
<td>mg/L</td>
</tr>
<tr>
<td>Dissolved Oxygen</td>
<td>DO</td>
<td>&gt; 2</td>
<td>&gt; 2</td>
<td>mg/L</td>
</tr>
<tr>
<td>Fluoride</td>
<td>F</td>
<td>15</td>
<td>15</td>
<td>mg/L</td>
</tr>
<tr>
<td>Phosphate as P</td>
<td>PO4-3</td>
<td>30</td>
<td>30</td>
<td>mg/L</td>
</tr>
<tr>
<td>Sulphate</td>
<td>SO4-2</td>
<td>400</td>
<td>400</td>
<td>mg/L</td>
</tr>
<tr>
<td>Sulfide</td>
<td>S-2</td>
<td>0.1</td>
<td>0.1</td>
<td>mg/L</td>
</tr>
<tr>
<td>Biochemical Oxygen Demand</td>
<td>BOD5</td>
<td>10</td>
<td>50</td>
<td>mg/L</td>
</tr>
<tr>
<td>Total Kjeldahl Nitrogen as N</td>
<td></td>
<td>35</td>
<td>35</td>
<td>mg/L</td>
</tr>
<tr>
<td>Chemical Oxygen Demand</td>
<td>COD</td>
<td>150</td>
<td>150</td>
<td>mg/L</td>
</tr>
<tr>
<td><strong>3- Trace Metals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminum</td>
<td>Al</td>
<td>15</td>
<td>15</td>
<td>mg/L</td>
</tr>
<tr>
<td>Arsenic</td>
<td>As</td>
<td>0.1</td>
<td>0.1</td>
<td>mg/L</td>
</tr>
<tr>
<td>Barium</td>
<td>Ba</td>
<td>2</td>
<td>2</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th></th>
<th>mg/L</th>
<th>mg/L</th>
<th>mg/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boron</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.05</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Chromium, total</td>
<td>0.01</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Cobalt</td>
<td>0.2</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td>0.2</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td>0.1</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Manganese</td>
<td>0.05</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td>0.001</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Nickel</td>
<td>0.2</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Zink</td>
<td>0.5</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Sodium Absorption rate</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

4-Organic Matters

<table>
<thead>
<tr>
<th></th>
<th>mg/L</th>
<th>mg/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil &amp; Grease</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Phenols</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>75</td>
<td>75</td>
</tr>
</tbody>
</table>

5-Biological Tests

<table>
<thead>
<tr>
<th></th>
<th>MPN/100 ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Coliform</td>
<td>2.2</td>
</tr>
<tr>
<td>Egg parasites</td>
<td>1 &lt;</td>
</tr>
<tr>
<td>Worm parasites</td>
<td>Nil</td>
</tr>
<tr>
<td>Toxicity Evaluation</td>
<td>Study each case independently</td>
</tr>
</tbody>
</table>
### ATTACHMENT R: Technical Compliance Statement (Check List)

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Description</th>
<th>QP- RLC Guideline requirements</th>
<th>RLC Guideline Section reference No.</th>
<th>Proposed by the Tenant</th>
<th>Compliance</th>
<th>Approval submission category code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td><strong>Drawings &amp; documents</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Inclusion of Key Plan with allocated Plot number(s)</td>
<td>6.7</td>
<td>6.7</td>
<td>Yes/ No</td>
<td>001</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Coordinate System</td>
<td>QNG95</td>
<td>6.9</td>
<td>Yes/ No</td>
<td>001</td>
<td></td>
</tr>
<tr>
<td><strong>B</strong></td>
<td><strong>General Requirements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>The coverage area of buildings and structures</td>
<td>7.1</td>
<td>7.2.1</td>
<td>Yes/ No</td>
<td>001</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Setbacks:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sides/ Roadway/ Rear</td>
<td>&gt; OR = 6m</td>
<td>7.2.1</td>
<td>Yes/ No</td>
<td>001</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Height the building or structure</td>
<td>&lt; OR = 16m</td>
<td>7.2.1</td>
<td>Yes/ No</td>
<td>002</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Finished Grade Level (FGL) of the plot</td>
<td>&gt; OR = 0.5m below FRL</td>
<td>7.2.2</td>
<td>Yes/ No</td>
<td>001 &amp; 003</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Height of Fence</td>
<td>&gt; OR = 2.4m</td>
<td>7.2.3(1)</td>
<td>Yes/ No</td>
<td>001 &amp; 003</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Roadway side fence: Maximum height of wall</td>
<td>&lt; OR = 0.60m</td>
<td>7.2.3(4)</td>
<td>Yes/ No</td>
<td>001 &amp; 003</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Soft Landscaping</td>
<td>&gt; OR = 3.5% of total plot area</td>
<td>7.2.4</td>
<td>Yes/ No</td>
<td>010</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Storm Water Drainage system to contain within the plot</td>
<td>100%</td>
<td>7.2.5</td>
<td>Yes/ No</td>
<td>003</td>
<td></td>
</tr>
<tr>
<td><strong>C</strong></td>
<td><strong>Parking, Loading and Off Loading</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Office component</td>
<td>&gt; OR = 4 Bays per 100m² GFA</td>
<td></td>
<td>Yes/ No</td>
<td>001</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Industrial component</td>
<td>&gt; OR = 1 Bay/100m² GFA</td>
<td></td>
<td>Yes/ No</td>
<td>001</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Warehousing component</td>
<td>&gt; OR = 0.5 Bays/100m² GFA</td>
<td></td>
<td>Yes/ No</td>
<td>001</td>
<td></td>
</tr>
<tr>
<td><strong>D</strong></td>
<td><strong>Site Access</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Minimum width of Gate</td>
<td>&gt; OR = 6m</td>
<td>7.2.9(2)</td>
<td>Yes/ No</td>
<td>001 &amp; 003</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Minimum number of access</td>
<td>2 Nos</td>
<td>7.2.9(4)</td>
<td>Yes/ No</td>
<td>001 &amp; 003</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Minimum distance between two accesses</td>
<td>&gt; OR = 15m</td>
<td>7.2.9(4)</td>
<td>Yes/ No</td>
<td>001 &amp; 003</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Minimum distance from any side boundary to the new access</td>
<td>&gt; OR = 7.5m</td>
<td>7.2.9(4)</td>
<td>Yes/ No</td>
<td>001 &amp; 003</td>
<td></td>
</tr>
</tbody>
</table>

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### ATTACHMENT - R (Sheet 2/3)

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Description</th>
<th>QP-RLC Guideline requirements</th>
<th>RLC Guideline Section reference No.</th>
<th>Proposed by Tenant</th>
<th>Compliance</th>
<th>Approval submission category code</th>
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<tbody>
<tr>
<td>E</td>
<td>Tie-in Requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Power Supply</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>Electrical Load list/Schedule</td>
<td>8.5</td>
<td>8.5.1.1 and Attachment M: No. 10</td>
<td>Yes/No</td>
<td>004</td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td>Maximum power demand forecast (kW/kVA) and energy consumption (kWh) for the first 5 years</td>
<td>&gt; OR = 5 years</td>
<td>8.5.1.1</td>
<td>Yes/No</td>
<td>004</td>
<td></td>
</tr>
<tr>
<td>(iii)</td>
<td>Tariff Meter (Compliance Sheet to Attachment M: No.11 to be submitted)</td>
<td>Attachment M: No. 11 Requirements and TOU Feature to record Peak and Non-Peak energy consumption</td>
<td>8.5.1.5 and Attachment M: No. 11</td>
<td>Yes/No</td>
<td>004</td>
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<td>(iv)</td>
<td>Maximum Power Demand Load up to 200kW (Category 1)</td>
<td>LV Substation (QP-RLC PUSS) with max. distance 200m (if QP-RLC PUSS is not available within 200m, Tenant to provide own RMU/package substation in his Plot)</td>
<td>8.5.1.1 and 8.5.1.10</td>
<td>Yes/No</td>
<td>004</td>
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<td>(v)</td>
<td>Maximum Power Demand Load greater than 200kW up to 3500kW (Category 2)</td>
<td>QP-RLC 11kV RMU (if available for the Plot). Otherwise, cut &amp; splice to existing 11kV Ring and Tenant to provide own RMU/package substation in his Plot</td>
<td>8.5.1.1 and 8.5.1.10</td>
<td>Yes/No</td>
<td>004</td>
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<tr>
<td>Sl.No.</td>
<td>Description</td>
<td>QP- RLC Guideline requirements</td>
<td>RLC Guideline Section reference No.</td>
<td>Proposed by the Tenant</td>
<td>Compliance</td>
<td>Approval submission category code</td>
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<td>F</td>
<td>Tie-in Requirements</td>
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<tr>
<td>2</td>
<td>Potable water</td>
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<td>8.1</td>
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<td>a.</td>
<td>Potable water network at RSSA (West)</td>
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<td>8.1.1</td>
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<td>(i)</td>
<td>Design Pressure/ Temp</td>
<td>&gt; OR = 16 barg/ &gt; OR = 40°C</td>
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<td>Yes/ No</td>
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<td>(ii)</td>
<td>Vacuum</td>
<td>Full</td>
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<td>Yes/ No</td>
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<td>(iii)</td>
<td>Minimum storage capacity tanks inside the plot</td>
<td>&gt; OR =3 days (72 hrs) peak demand</td>
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<td>Yes/ No</td>
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<td>b.</td>
<td>Potable water network at ESSA</td>
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<td>(i)</td>
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<td>Design Temp.</td>
<td>&gt; OR = 40°C</td>
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<td>Yes/ No</td>
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<td>(iii)</td>
<td>Vacuum</td>
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<td>Yes/ No</td>
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<td>Material of construction</td>
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<td>Sewage Network</td>
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<td>Yes/ No</td>
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<td>Minimum capacity of sewage holding tank</td>
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