

POWER SUPPLY GUIDELINES

FOR MAJOR PROJECTS

UPDATE
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POWER & WATER PLANNING
POWER TRANSMISSION PLANNING SYSTEM PLANNING DEPARTMENT

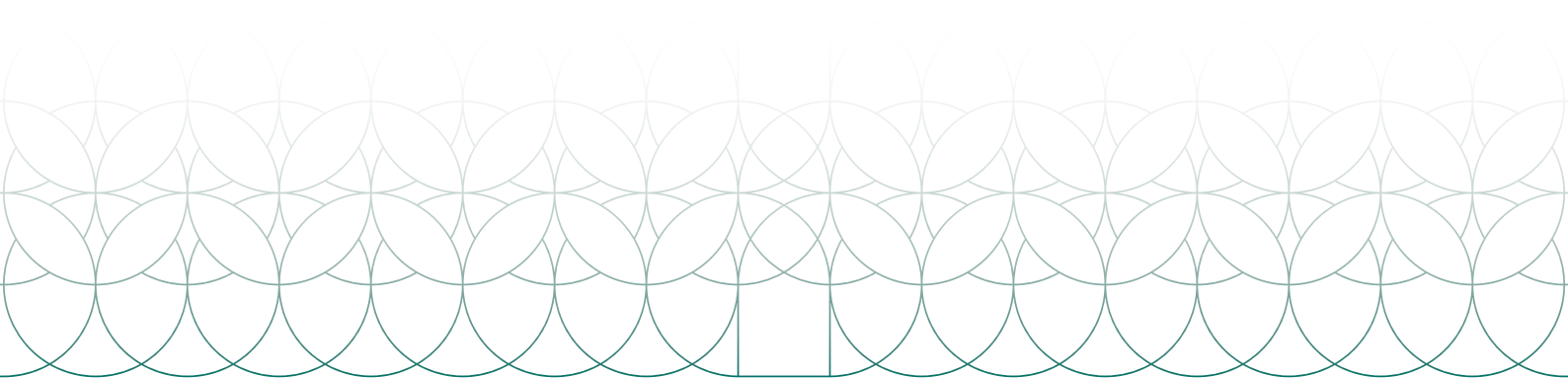


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1. INTRODUCTION

To ensure the timely availability of power, it is essential that DEWA receives the technical details of major projects well in advance from all prospective developers or their appointed consultants. These should include power phasing, the locations of any proposed 400/132kV substations (if any), 132/11kV substations and associated 132kV and 11kV corridors, plot-specific load details and any other requirements.

The purpose of this document is to:

- Provide guidelines to all major developers and their consultants regarding DEWA's power supply requirements rules and guidelines.
- Assist developers and their consultants in understanding the submission requirements for project/development master plan documents and to facilitate the timely supply of power to projects or developments.

In order to ensure a timely, optimal and reliable power supply network for major development projects across Dubai, it is essential that developers and their consultants prepare and submit their complete development project(s) master plans to DEWA.

The purpose of these guidelines is to provide developers/consultants with adequate information to help with the preparation and submission of their development master plans. The guidelines outline all requirements related to project power demand, power phasing, population, land use, 132kV and 11kV corridors, 132/11kV substation locations, plot-specific load details, network information and models, and other relevant information that must be submitted as part of DEWA's master plan review and approval process. This project information once approved will be used by DEWA for power infrastructure planning activities.

It is therefore essential that developers and their consultant prepare their development master plans in line with DEWA's Guidelines to facilitate a timely and efficient approval process. This document includes itemised requirements for each of the development master plan, as shown in Annexure-7.1.

2. MA'LEM DUBAI

MA'LEM DUBAI is an online service that allows enrolled/registered developers and consultants to submit power supply master plans for major project developments for DEWA's review.

3. POWER SUPPLY MASTER PLAN REQUIREMENTS

To ensure the timely availability of power supply for major projects or development, developers must submit and obtain approval for all technical pre-requisites in a timely man, as DEWA requires adequate lead-time.

3.1 Technical Requirements

The following technical requirements shall be submitted to DEWA for the planning 400/132kV and 132/11kV substations, the design of the 11kV Distribution Network and the allocation of the required 11kV cables from the associated 132/11kV substations:

3.1.1 Location and Layout of the Development Project

The project location, including DLTM coordinates, shall be shown on a map of Dubai. Furthermore, a detailed layout shall also be submitted, clearly indicating roads, buildings, parks, parking areas, open spaces, water bodies (ponds or canals), bridges and other relevant infrastructure.

3.1.2 Nature of the Project

A description of the project shall be provided, including the proposed land-use classification, such as residential, industrial, commercial, labour accommodation, data centre or any other applicable category.

3.1.3 Total Connected Load (TCL) and Expected Maximum Demand (MD)

The following information shall be submitted:

- The total connected load of the project, including a detailed breakdown by category, such as general load, cooling load, data centre load and other applicable loads.
- The type of cooling system and expected peak demand.
- A realistic power requirement date/phasing.
- A detailed load distribution by land-use category, including residential, commercial, industrial, data centre, labour accommodation, cooling and other applicable loads.
- Plot-wise load details in the standard format (refer to Annexure-7.2). The plot-wise load details should be organised in an Excel file with four sheets or tabs. The first sheet should display the project layout, while the subsequent sheets should include plot-wise load details, a substation-wise load summary and a cross-section checklist.

- In case ultimate load details are not available, the load requirement for the next five years should be submitted.
- Details of the district cooling plant loads, including capacity, location and the anticipated commissioning phases.

3.1.4 Distribution Renewable Resources Generation (DRRG)

For the projects incorporating DRRG facilities, the submittal shall include the DRRG plan (PV rooftop solar installations) which consists of:

- Planned DRRG capacity (kW) per plot and for the entire project.
- Expected commissioning dates of the PV solar installations.

3.1.5 Power Factor

Power factor is to be maintained at not less than 0.95 and any capacitor bank installation required at the customer's end (including installations at the 11kV level) shall be provided by the customer at their own cost.

3.1.6 Load Characteristics (quality of voltage, harmonics, flickering, dents, etc.)

- The main characteristics of the supply voltage expected at customer load supply terminals shall be in line with DEWA's regulations. Customers shall ensure that their equipment can adequately operate in line with the specified supply technical characteristics.
- For projects involving dirty loads or privately owned switchgear, the customer shall provide voltage drop calculations, harmonic studies, fault level calculations and any other relevant power quality assessments.
- Any special equipment and devices required to maintain compliance with the applicable standards shall be provided by the consumer at their own cost.

3.1.7 Power Supply Voltage

- A dedicated/shared 132/11kV substation is required to meet the power demand of any major development. Large loads requiring the allocation of several 132/11kV substation plots might require a 400/132kV source. The project developer should allocate plots for the required number of substations and associated 132kV and 11kV corridors.
- 11kV shall be the general distribution voltage.

3.1.8 Substation Plot Sizes and Layouts

- 400/132kV substation: 200m x 200m.
- 132/11kV substation: 60m x 50m (standard shape without any chamfer).
- Sikka of 7m width for 132/11kV substation.
- 11/0.4kV substation: Refer to Distribution Substation Guidelines.

- The standard setting out plan of 400/132kV substation is shown in Annexure-7.3.
- The standard setting out plan of 132/11kV substation is shown in Annexure-7.4.

3.1.9 Location of Substation Plot

3.1.9.1 400/132kV Substation Location

- The 400/132kV substation plot shall:
- Provide adequate access for heavy vehicles.
- Include sufficient space/corridors for incoming and outgoing 400kV overhead lines.
- Include enough space/corridors for incoming and outgoing 132kV cables.

3.1.9.2 132/11kV Substation Location

- The 132/11kV substation plot shall have access from two major roads or one major road and a sikka with a minimum width of seven metres. The longer side (60m) shall face the main road.
- The 132/11kV substation shall have one main gate, two sliding gates and a personal gate from main road to access the plot along the 60m side.
- The access road to the substation plot shall be accessible by heavy vehicles, including low-bed trailer and cranes, with adequate manoeuvring space.
- Provide sufficient space/corridors for incoming and outgoing 132kV cables.
- Provide sufficient space/corridors for up to 80 outgoing 11kV cables, including a duct arrangement maintaining a minimum separation of 150mm between the cables.
- The location of 132/11kV substations should be provided at the load centre and close to district cooling plants (DCP), where applicable.
- When a project requires more than one 132/11kV substation, the feeding zone of each substation shall be specified.

3.1.10 The 400/132kV and 132/11kV Substation Plot Verification Requirements

- In order to review the proposed 400/132kV substation plot, the developer/consultant must comply with and submit the standard substation plot verification checklist (refer to Annexure-7.5) for each 400/132kV substation plot, along with the respective drawings/layouts.
- In order to review the proposed 132/11kV substation plot, the developer/consultant must comply and submit the standard substation plot verification checklist (refer to Annexure-7.6) for each 132/11kV substation plot, along with the respective drawings/layouts.
- The 132/11kV substation layout drawing shall clearly indicate the plot-size, coordinates of all corners of the plot, access roads and sikka widths, gate locations, functions of surrounding plots/area (building, DCP, gas farm, water bodies, bridge, Metro line, Metro station, etc.).

3.1.11 Affection plans for 400/132kV and 132/11kV Substations

In accordance with the directive issued by His Highness Sheikh Mohammed bin Rashid Al Maktoum, Ruler of Dubai, on 26 July 2008, all existing and future land plots allocated for DEWA-owned 400kV and 132kV substations shall be registered under DEWA's name as private property and recorded as assets of the authority.

Approved affection plans for the substation plots, showing DEWA as the owner, shall be obtained from the concerned zoning authority. The affection plan shall show the access road (from the 60m-wide side) and the gate level of the 132/11kV substation (which shall be at least 50cm above the level of the nearest road).

Once the affection plans for the 400/132kV and 132/11kV substation plots have been issued, the concerned project developers shall submit a 'No-Objection letter' addressed to Dubai Land Department for the transfer of ownership of the substation plots to DEWA, in accordance with the enclosed 'No-Objection Letter for Transfer/Confirmation of Ownership of DEWA Plot' (refer to Annexure-7.7).

The developer shall confirm whether the building permit for the substation building will be issued by Dubai Municipality or another zoning authority.

3.1.12 Clearance Requirements between Gas Facilities and Power Transmission Infrastructure

If gas facilities (gas farms and/or gas distribution corridors) are located adjacent to DEWA power transmission substations or cable corridors within the major project area, the project developer shall engage a qualified consultant to review and confirm the applicable clearance requirements. The consultant's recommendations shall be submitted to DEWA together with responses to the following queries:

- a. The consultant shall assess the minimum vertical and horizontal clearance requirements between 132kV cable corridors and gas lines and provide recommendations for DEWA's review. In addition, horizontal clearance requirements between 132kV cable corridors and gas farms shall be provided, taking into consideration the installation of gas farms and distribution gas pipeline within the ROW and developer areas. Applicable international standards or reference guidelines shall be included.
- b. The consultant shall assess the minimum horizontal clearance requirements between 132kV cable joint bays, link boxes, gas farms or gas pipelines, and provide recommendations for DEWA's review. The consultant shall also clarify any restrictions related to working on 132kV joint bays or link boxes in proximity to gas farms or gas networks.
- c. The consultant shall assess operational safety concerns, including control measures to prevent gas leaks or fires that may affect 132kV cables.
- d. The consultant shall verify and confirm the minimum clearance required from gas farms or gas lines when carrying out machine excavation for installation and maintenance of cables.

- e. The consultant/developer shall clarify whether there are any technical and safety requirements that must be adhered to while performing cable maintenance near gas farms or gas pipelines.
- f. The consultant/developer shall provide the diameter ranges of gas distribution pipelines.
- g. The consultant/developer shall provide the operating pressure of gas distribution lines.
- h. The consultant/developer shall specify the depth at which gas pipelines are laid.
- i. The consultant/developer shall confirm whether gas pipelines are mechanically protected.
- j. The consultant/developer shall provide details of the materials and specifications of the gas tanks and distribution pipelines?
- k. The consultant/developer shall provide details about the gas plant storage capacity and storage pressure.
- l. The consultant/developer shall provide details of the safety features in the event of a gas leak.
- m. The consultant shall suggest/recommend any specific protection measures required to minimise the risk of gas pipeline failure.
- n. The developer/consultant shall clarify any procedure to be followed by the gas utility and when carrying out any work in areas where DEWA assets and gas pipelines are installed adjacent to each other.
- o. The consultant shall assess any potential interference from electrical fields where gas pipeline run parallel to DEWA's power transmission infrastructure, taking into consideration the material of the gas pipelines.

3.1.13 Undertakings for Transmission Substations and Corridors

The project developer is required to submit a letter for the 400kV/132kV substation plots and corridors allocated within the major project boundary, confirming that the developer shall:

- a. Divert all existing services (if any) within plots allocated for 400/132kV or 132/11kV substations well in advance of any construction work at site and bear all associated costs.
- b. Ensure DEWA has 24x7 unconditional access to 400kV and 132kV corridors for routine patrols and maintenance activities, including access for heavy machinery.
- c. Level the 400kV and 132kV corridors and keep them free of all obstacles, including trees and structures.
- d. Divert all existing infrastructure services (if any) within the allocated 400kV and 132kV corridors inside the project boundary and bear all associated costs.
- e. Install all 132kV ducts on site well in advance of any 132kV cable-laying work and bear all associated costs.

- f. Ensure that access roads to the 400/132kV and 132/11kV substations are available to facilitate the movement of machinery and vehicles during construction.
- g. Carry out all reinstatement works (tiles, footpath, landscaping, shrubs and any other special types of pavements) after 400kV/132kV cable-laying, maintenance or emergency works, and bear all associated costs.
- h. Ensure that the access roads to the 400/132kV and 132/11kV substation plots comply with DEWA standards and are sufficiently wide to allow heavy vehicles, including low-bed trailers and cranes, to manoeuvre safely.
- i. Ensure that a water network connection is available well before the commissioning of each 132/11kV substation within the project.
- j. Provide the approved RTA masterplan of the development. Alternatively, the developer shall submit an undertaking letter addressed to RTA confirming that RTA may proceed with releasing DEWA's NOC related to the 132kV cable routes serving the dedicated 132/11kV substation(s) within the major project. The letter shall confirm that the developer will be responsible for any diversion of the 132kV cable route to avoid rejection of the NOC.
- k. Remove any existing asphalt within DEWA's 132 kV corridor in accordance with the approved cross-sections, and keep the corridor free of obstructions.
- l. Bear the cost of any changes to the master plan that may result in an increase in the length of the proposed 132kV cable route.
- m. Provide a suitable storage area near the substation plot for use by DEWA's contractor, as required during the construction stage.

3.1.14 Corridors

3.1.14.1 400kV Overhead Lines (OHL)

- 50m-wide corridor (double circuit tower line).

3.1.14.2 132kV Underground Cables

- 2.5m-wide corridor for each 132kV cable circuit.
- Minimum horizontal clearance between 132kV corridor and nearby pressure pipeline (100mm to 450mm Ø) shall be 1m (edge of the pipe to edge of the trough).
- Minimum horizontal clearance between 132kV corridor and nearby pressure pipeline (500mm to 1200mm Ø) shall be 3m (edge of the pipe to edge of the trough).
- Minimum gap of 2m shall be ensured between 132kV corridors and nearest foundation/permanent structure/plot boundary.
- The 132kV cable under the dual carriageway is not acceptable. The surface above 132kV corridors shall be either soft landscaped or interlock-tiled only.

- The developer shall divert all existing infrastructure services (if any) within the allocated 132kV corridors inside the project boundary and bear all associated costs. Furthermore, the project developer shall level and keep the allocated 132kV corridors free from any obstacles (trees/structures).
- The 132kV duct bank arrangement for road crossing shall comply with DEWA standard (refer to Annexure-7.8).
- The developer shall install all 132kV ducts on site well in advance of any 132kV cable-laying works on site and bear all associated costs.
- The project developer/consultant shall update the approved 132kV corridors allocated within the project in Dubai Municipality's GIS System.

3.1.14.3 11kV Underground Cable

- Exclusively 11kV corridor of 7m (2x2.5m + 2m gap) width to be provided at two adjacent sides of 132/11kV substations up to the roads.
- Exclusive 11kV corridors of 2.5m width to be provided on both sides of the road around the 132/11kV substations.
- A single stretch on an 11kV corridor should not exceed 2.5m in width.
- A minimum clearance of 2m shall be maintained between adjacent 11kV corridors and between adjacent 132kV and 11kV corridors. Furthermore, the space between these may be used for non-heat generating services.
- Dedicated 11kV corridors shall be provided from the source 132/11kV substation to the district cooling plant (DCP).
- 11kV corridors shall not be located under carriageways, median, kerbstones and service roads. The surface above 11kV corridors shall consist of either soft landscaping or interlocking tiles only.
- A cross-section shall be provided for each road section, with dedicated 11kV corridors provided on both sides of road.
- The duct arrangement for each road crossing shall be provided.
- Where a 132/11kV substation is located away from the road Right-of-Way (ROW), the party shall provide a sufficient corridor between the substation boundary and the road.
- Protection barriers shall be provided between 11kV corridors and large trees or street-light poles wherever they are adjacent.
- In case a street-light pole is adjacent to a DEWA 11kV corridor, a minimum clearance of 50cm shall be maintained. Alternatively, the foundation of the street-light pole shall extend 150cm from the bottom of the cable.

3.1.15 LV Network.

The LV distribution network shall not be reviewed during the finalisation of in the power supply Master Plan. Therefore, the relevant drawings, load schedules, single-line diagrams and road cross-sections required for LV distribution network approval shall be uploaded through the online 'Getting Electricity' application system. These shall include details of 11kV substation locations and capacity; LV cable routes; feeder pillar locations; MDB/MCCB capacities; the connected load/maximum demand/demand factor for each plot or substation and voltage drop.

3.1.16 Policy on Construction of 400kV and 132kV Substations.

3.1.16.1 400/132kV Substation

DEWA requires sufficient lead time to construct a 400/132kV substation.

3.1.16.2 132/11kV Substation

Any 132/11kV substation required for a development project shall be constructed by the project developer in accordance with the project's power requirement phasing, through a DEWA-approved consultant and contractor. However, DEWA requires adequate lead time to arrange the 132kV cables for any new 132kV substations after finalisation of the load requirements, substation locations and cable corridors, and receipt of the original affection plan for the substation plot showing DEWA as the owner.

If the project developer wishes to finance and have DEWA manage the construction of the dedicated 132/11kV substation for their project, the developer should liaise directly with DEWA's Transmission Projects Department to finalise the Project Management Consultancy Services (PMCS) and the Asset Transfer Agreement (ATA). Accordingly, the construction schedule of the substation, clearly indicating the construction start date and commissioning date (month/year), should be submitted in coordination with DEWA's Transmission Projects Department.

Furthermore, the developer shall undertake to provide a suitable laydown/storage area near the substation plot during the construction stage, with sufficient space for the site offices and storage yard required for the substation construction works, at no costs to DEWA.

3.1.17 Project Parameter Report for 132kV Substations.

To obtain a Project Parameter Report (PPR) for the construction of a 132/11kV substation, the project consultant/developer shall finalise the power supply master plan of the major project development and the plot for the 132/11kV substation complying with DEWA's standards and requirements. Subsequently, the developer shall request the issuance of the PPR for the 132/11kV substation and submit the following:

1. A justification report for the requirement for a 132/11 kV substation.
2. The power phasing of the project.

3. The updated plot-wise load details.
4. A letter from the developer confirming the requirement for the 132/11 kV substation, along with the commissioning date in line with realistic project development timeline.
5. An undertaking from the project developer to construct the 132/11kV substation.
6. The original affection plan for the 132/11kV substation plot, showing DEWA as the owner, issued by the concerned authority and indicating access arrangements in accordance with DEWA standards.
7. The 'No-Objection Letter' addressed to Dubai Land Department for the transfer of ownership of the substation plot to DEWA, in accordance with the enclosed 'No-Objection Letter for Transfer/Confirmation of Ownership of DEWA Plot' (refer to Annexure-7.7).
8. An undertaking from the developer undertaking to divert, well in advance of construction, all services within the plots allocated for the 132/11kV substations, if any), and bear all associated costs.
9. An undertaking from the developer to divert all existing infrastructure services within the allocated 132kV corridors inside the project boundary, if any, and bear all associated costs. The project developer shall also level the allocated 132kV corridors and keep them free from any obstacles, including trees and structures.
10. The construction schedule of the 132/11kV substations, clearly indicating the construction start and commissioning dates (month/year). The schedule shall allow for tendering, award and construction lead times and reflect a realistic project development timeline.
11. The RTA-approved masterplan of the development. Alternatively, an undertaking letter shall be addressed to RTA, confirming that RTA may proceed with releasing DEWA's NOC for the 132 kV cable routes serving dedicated 132/11 kV substations within the major project. The letter shall confirm that the developer will be responsible for any required 132 kV cable route diversion to avoid rejection of the NOC.
12. The developer shall remove the existing asphalt falling within DEWA's 132kV corridor, if any, in accordance with the approved cross-sections, and the 132kV corridor shall be kept free from any obstructions.
13. The developer shall bear the cost of any changes to the master plan that may result in an increase in the length of the proposed 132 kV cable route.
14. A layout drawing clearly indicating the entry/exit arrangement of 132kV and 11kV cables around the proposed 132/11kV substation plot. Furthermore, developer/consultant shall indicate the access road to the substation plot and the same has to be approved by relevant authority.
15. The project developer/consultant shall submit drawings (AutoCAD + PDF) of all existing infrastructure services laid in the vicinity of the allocated 132/11kV substation plots and 132kV corridors within the project boundary.

16. The project developer shall confirm that they will ensure that water network connection is available well before commissioning of the 132/11kV substations.
17. An undertaking from the developer to submit a copy of RTA-approved cross-sections before issuance of Project Parameter Report (PPR) for the substation.
18. The developer shall also provide a list of the plots/developments planned to be supplied from the proposed 132/11kV substation under the ultimate scenario, in accordance with the following table:

Developments / Land Use	No. of Plots	TCL (MW)
Total		

19. The phasing of the loads planned to be supplied from the proposed 132/11kV substation shall correspond to the following table:

PRD	TCL (MW)			Cumulative TCL (MW)
	General	DCP (If any)	Total	
Substation Commissioning (Year)				
2 nd Year				
3 rd Year				
4 th Year				

Note: The power requirement date shall be in line with the realistic commissioning date of the proposed 132/11kV substation.

20. Prior to issue the Project Parameter Report (PPR) for the construction of 132/11kV substation, the project developer shall:
 1. Clear the 132/11kV substation site of all obstacles, services, utility infrastructure, etc.
 2. Finalise the access road and gate level of the 132/11kV substation plot. Please note that the gate level shall be at least 50cm higher than the nearest road.
 3. Submit information confirming the above requirements have been met.

3.1.18 Requirement for 11kV Network/Design Approval

- Latest development plan (soft copy).
- Location of the 11kV substation. Refer to the Distribution Substation Guideline for the approval requirements of 11kV substations.
- Total connected load, maximum demand and capacity for each 11kV substation.
- Realistic power requirement date.
- If more than one 132/11kV substation is required, zone-wise/phase-wise load details shall be provided for the respective 132/11kV substations.
- Where more than one 132/11kV substation is required, project loads shall be allocated to the respective 132/11kV substations on a phase-wise basis to facilitate effective network design. In addition, the commissioning of the 132/11kV substations shall be planned to match the power requirement dates of the projects.
- District cooling loads, if any, should be located adjacent to the related 132/11kV substation.
- Source metering is not allowed. Metering equipment shall be installed in the 11kV switchgear room.
- Details of 11kV corridors for all roads within the project boundary.
- The approved cross-section of all roads, indicating the 11kV corridors, shall be submitted with the 11kV network design request.
- Where private switchgear is proposed, approval of the single-line diagram shall generally be obtained prior to purchase.
- All distribution network design requirements and guidelines for 11kV supply shall be strictly followed in line with the latest design guidelines of the Distribution Power Division.

4. BACKUP POWER GENERATORS FOR MAJOR PROJECTS

- 4.1 In accordance with the directive of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of UAE and Ruler of Dubai, all real estate developers, companies and other relevant stakeholders shall install backup generators for major projects in Dubai.

The attached DEWA circular (refer to Annexure-7.9) requires the installation of backup power generators in major buildings and landmarks, including tourist, commercial and cultural buildings in Dubai. This is to ensure that essential power is available during emergencies to support public security and safety, while also ensuring the comfort and well-being of society and the public at large.

The backup power generators shall have sufficient capacity to supply lighting, elevators, escalators, automatic doors, surveillance cameras, alarm systems and fire and safety equipment.

The generators must be properly maintained to ensure that they operate effectively and promptly when needed, in accordance with the best safety practices.

- 4.2 Real estate developers, companies and other relevant stakeholders shall ensure that DEWA's mobile generators are provided with unobstructed access, where required.
- 4.3 The approval process for the installation of backup generators for major projects shall be coordinated directly with DEWA's Distribution Power Division/Connection Services Department.

5. COORDINATION AND GENERAL REQUIREMENTS

- 5.1 The main developer shall appoint a reputable consultant to prepare the infrastructure master plan, including the power supply master plan, for the major project in order to secure DEWA's approval.
- 5.2 The main documents required for the submission of the power supply master plan submission for major projects are indicated in Annexure-7.1.
- 5.3 Developers or their consultants shall submit the major project master plan or related master plan documents for DEWA's review thorough the MA'LEM DUBAI online portal (<https://www.dewa.gov.ae/en/builder/noc-services/malem-dubai>). The MA'LEM DUBAI user manual is available at <https://www.dewa.gov.ae/en/builder/noc-services/malem-dubai-electricity>.
- 5.4 The cover letter for any submission through the online portal shall be addressed to:

Dr. Nasser Tleis

Vice President – Power Transmission Planning Department.

Dubai Electricity and Water Authority

- 5.5 Drawings submitted shall be in AutoCAD/Microstation and PDF formats. Plot-wise load details shall be submitted in Microsoft Excel format. All other documents (such as covers letters, reports and response sheets) shall be submitted in PDF format only.
- 5.6 PDF and CAD drawing file names shall clearly indicate the drawing number and subject.
- 5.7 Cross-section drawings shall conform to the RTA standard format, with one cross-section per sheet showing the 'Typical', 'Existing' and 'Proposed' cross-sections, as shown in Annexure-7.10. The cross-sections shall be labelled alphabetically, for example, 'Cross-section A', 'A-A' and 'AA-AA'.
- 5.8 Drawing files submitted in PDF and CAD formats shall be georeferenced using the DLTM projection. File names shall follow the format specified in Annexure-7.11.
- 5.9 The file names and file formats of documents submitted through MA'LEM DUBAI shall comply with standard requirements set out in the MA'LEM DUBAI user manual (<https://www.dewa.gov.ae/en/builder/noc-services/malem-dubai-electricity>).
- 5.10 The power supply master plan submissions for major projects shall be made through MA'LEM DUBAI only. Any related correspondence shall be addressed to the emails listed below. To

schedule meetings or discussions related to power supply master plans for major projects, the following can be contacted:

- **System Planning Department** (System.Planning@dewa.gov.ae)
- **Mr. Mohamed Naceur Marzouki** (Senior Manager-System Planning)
Tel: 04 322 2900 Email: Mohamed.Naceur@dewa.gov.ae)
- **Mr. Vijayan Ayappan** (Manager – Planning Coordination)
Tel: 04 322 2909 Email: Vijayan.Ayappan@dewa.gov.ae)
- **Mr. Ahammed Sadique** (Sr. Engineer – Planning Coordination)
Tel: 04 322 2904 Email: Ahammed.kuttiadi@dewa.gov.ae)

5.11 The power supply master plan for major projects shall be submitted well in advance to DEWA and approved to avoid any delay in starting the project.

5.12 Once approved, DEWA expects the developer to adhere to it. Any changes to the project plan, changes to the project plan, including changes to the phasing, shall be communicated to DEWA in a timely manner and submitted for approval. Changes to the works during the execution stage shall not be entertained.

5.13 Any power supply required for the project shall be provided from the 132/11kV substation built for the project. The developer shall phase the developments and its associated power requirements in line with the commissioning schedule of the project's 132/11kV substation.

5.14 During the course of the project, the party shall submit updated information every six months, including:

- a. Details of the energised load to date.
- b. Confirmation by the developer on the loads of individual party that have applied for a power supply NOC as a part of their master plan, including the magnitude of the load and time. Loads under design or approval but not approved for a power supply NOC, including the project load, shall be in accordance with the agreement already signed between the party and the developer.
- c. The updated information shall be submitted by the party on area maps indicating plot numbers, power requirement dates and comparison with the original information received as per the approved master plan of the project or development.

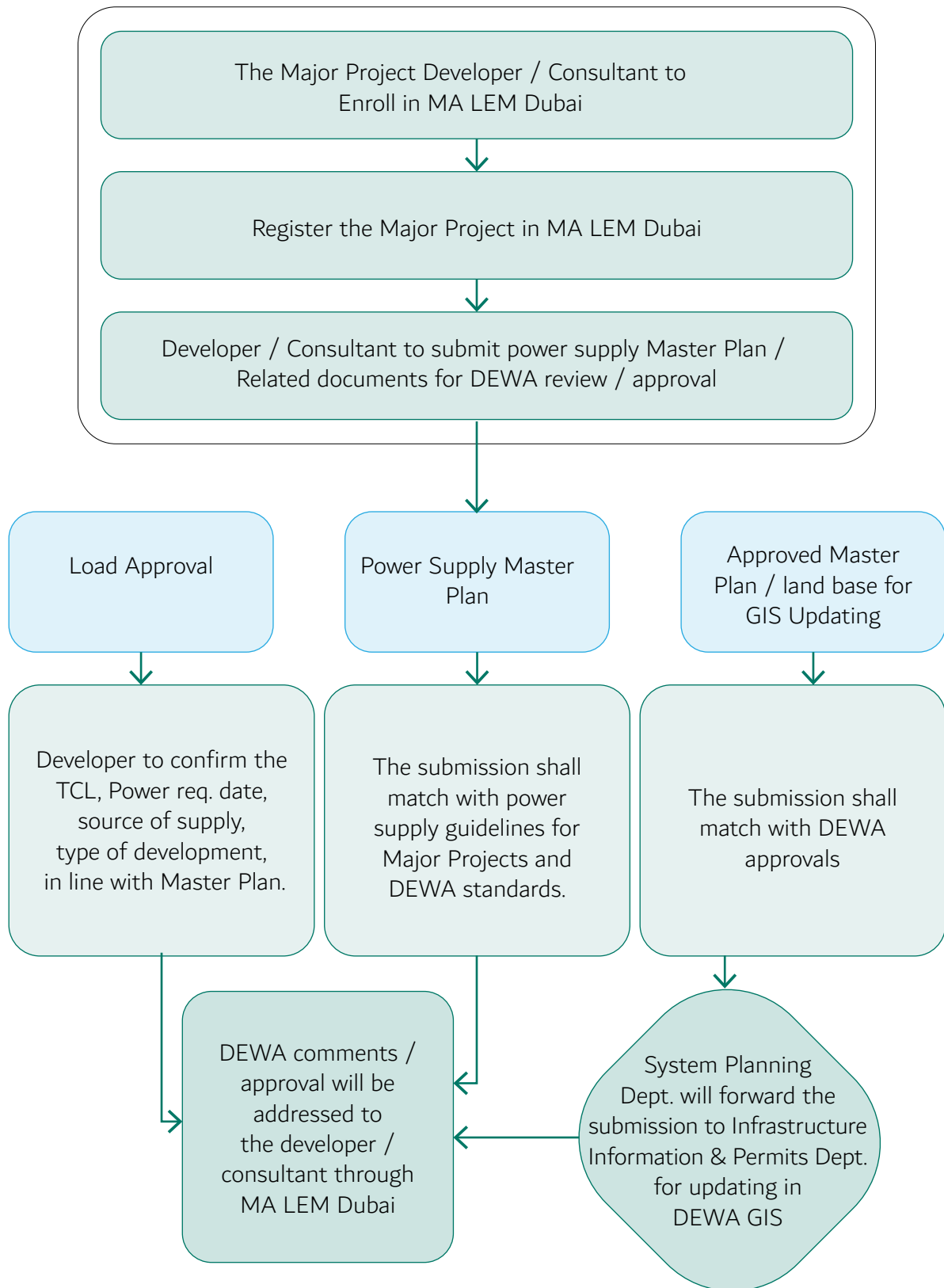
5.15 DEWA will not be responsible for any delay in commissioning resulting from changes or revision to the loads that may require the redesign of 11kV cable circuits.

5.16 After approval of the power supply master plan, the developer or consultant shall submit a soft copy of the final approved power supply master plan through the MA'LEM DUBAI online portal for uploading on DEWA's GIS system. The submission shall comply with the Digital Drawing Submission Requirements (refer to Annexure 7.12).

However, the developer or consultant shall ensure that the final submission is as approved by DEWA. The offset of ROW from the building line shown in the soft copy (AutoCAD and GIS drawings) shall also be in line with DEWA's approval and correspond with the PDF drawings.

- 5.17 The relevant drawings, load schedules, single-line diagrams and road cross-sections required for LV distribution network approvals shall be uploaded as part of the online power supply NOC application through the 'Getting Electricity' application system (www.dewa.gov.ae) on the DEWA website. These shall include details of 11kV substation locations, capacity, LV cable routes, feeder pillar locations, MDB/MCCB capacities, the connected load, maximum demand and demand factor for each plot/substation, voltage drop and other relevant information.
- 5.18 The approval of the 11kV substation plots/locations shall be finalised directly with the concerned DEWA Department (Connection Services Department) and does not form part of the power supply master plan approval process.
- 5.19 Following the approval of the power supply master plan, the plot owners or the consultant may apply for a power supply NOC for their plot through the 'Getting Electricity' e-service on the DEWA website, in accordance with standard procedure. The application should include a letter from the main developer confirming that the load figures indicated in the NOC application correspond to those in the plot-wise load details.
- 5.20 Once the power supply master plan for an entire major development or any portion (phase) of it has been finalized, the project developer/consultant shall approach the relevant zoning authority and DEWA's Infrastructure Information & Permits (II&P) Department at the Al Warsan Office to upload the project land base in GIS. The II&P department's requirements are listed in Annexure-7.12.
- 5.21 The project developer/consultant shall obtain the required design or construction NOC from DEWA's II&P Department during the infrastructure-design, approval and execution stages.

6. POWER SUPPLY MASTER PLAN PROCESS MAP



7. ANNEXURES

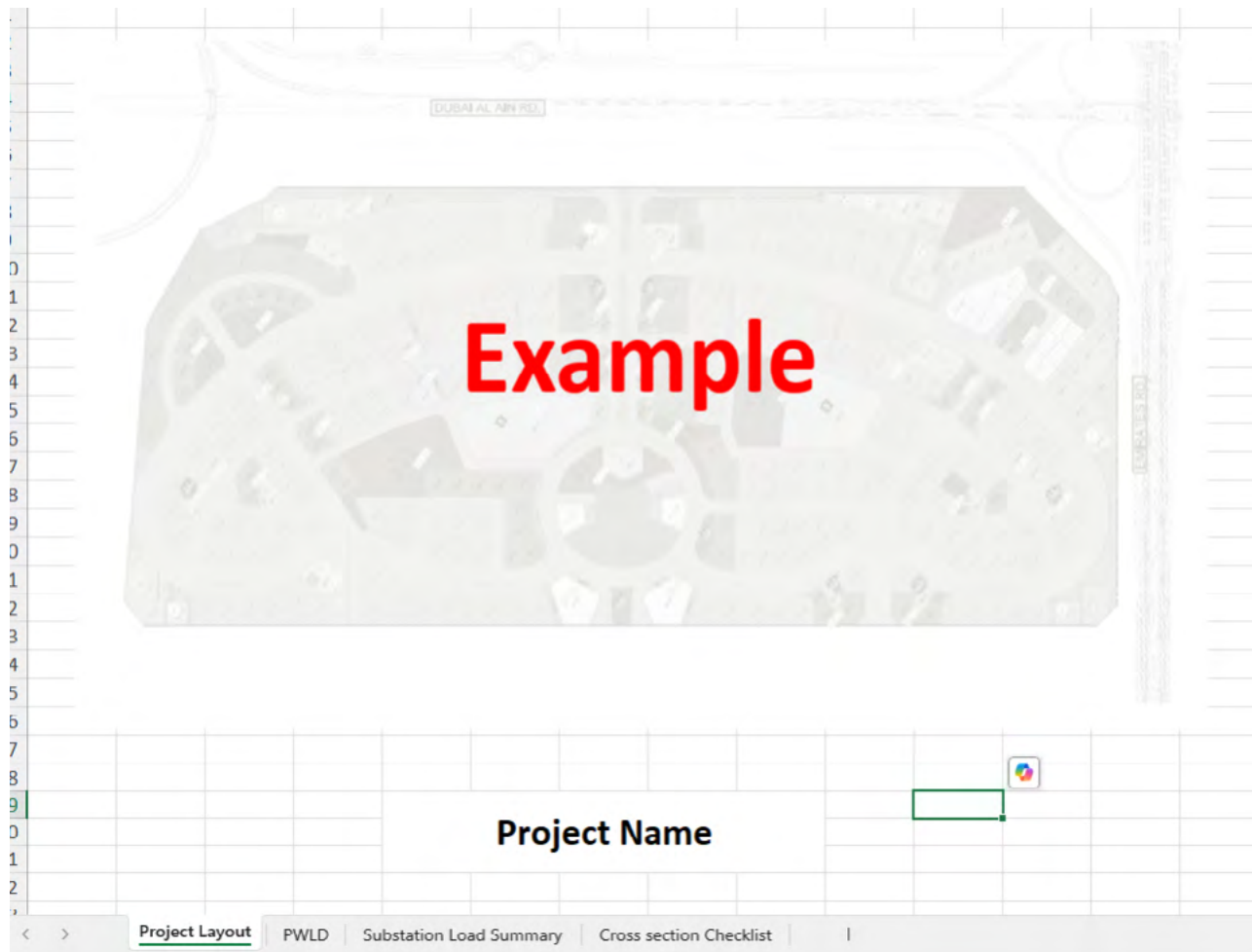
7.1 Annexure-1: List of Documents to be Submitted

S. No.	Documents	Remarks
1	Key plan showing the location and layout of the project, with coordinates, on a map of Dubai Map.	
2	Plot-specific load details in the standard format (refer to Annexure-2)	
	MS Excel format	
3	Annual power phasing	
4	Nature of load	
5	Details of district cooling loads (location/capacity, power requirement date, etc.)	
6	Locations of proposed 132/11kV substation(s)	
7	Locations of proposed 400/132kV substation(s)	
8	400kV corridors details within the project area	
9	132kV corridors details with detailed road cross-sections	
10	400kV/132kV substation plot verification checklist	
11	132kV duct arrangements	
12	11kV corridor details with detailed road cross-sections	
13	11kV duct arrangements	
14	Comments Response Sheet (CRS) detailing the responses provided to DEWA's earlier feedback on the subject submission.	
15	PV solar requirements in terms of capacity per plot	

The above documents shall be submitted in digital/soft copy only thorough the 'MA'LEM DUBAI' online portal.

7.2 Annexure-2: Standard Format for Plot-wise Load Details

The plot-wise load details should be organised in an Excel file with four sheets or tabs. The first sheet should display the project layout, while the subsequent sheets should include plot-wise load details, a substation-wise load summary and a cross-section checklist. Formats are given below.



Sheet-1: Project Layout

Project Name:	
Developer Name:	
Consultant Name:	

[illegible]

Sheet-2: Plot-wise Load Details

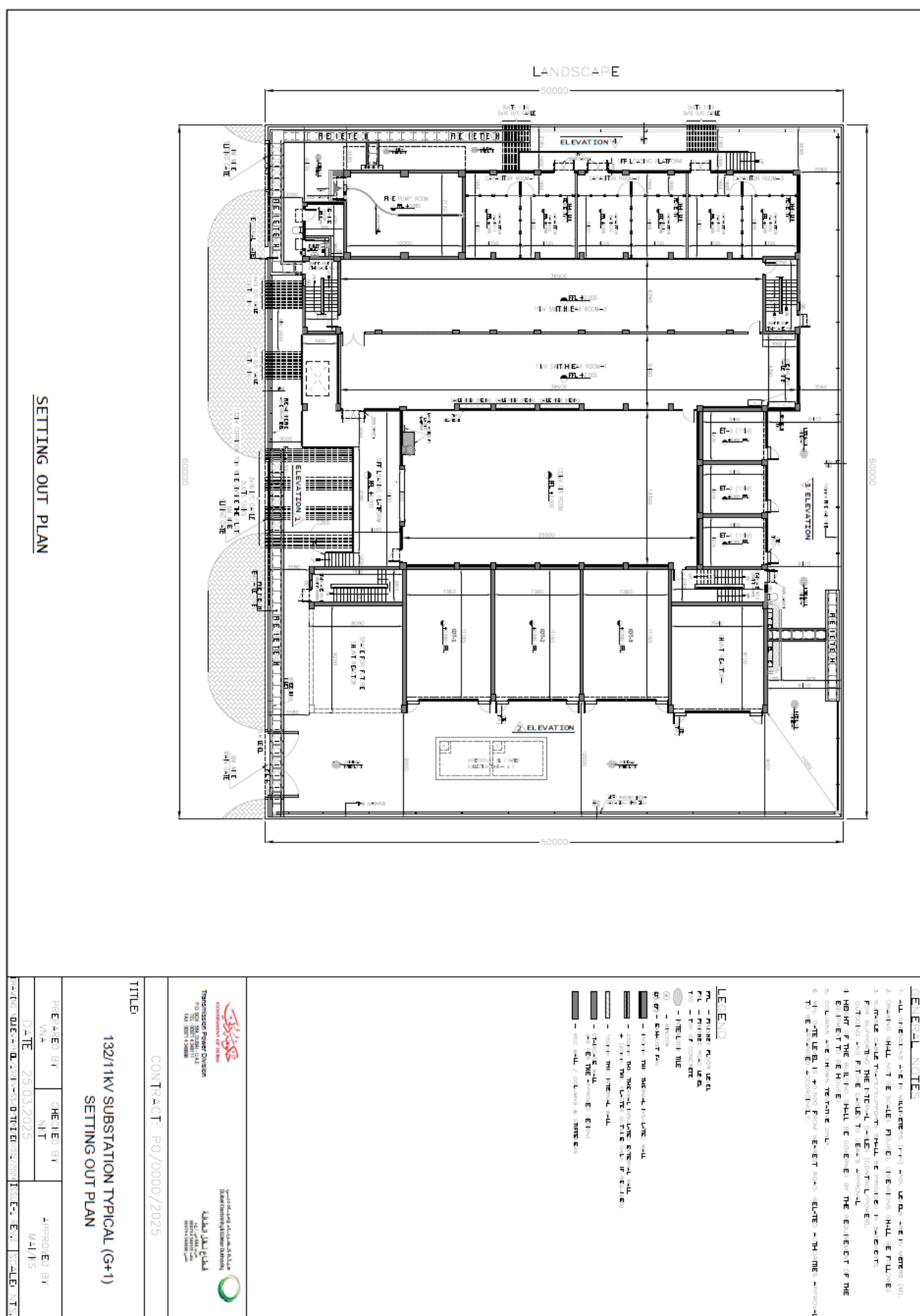
[illegible]

Sheet-3: Substation Load Summary

[illegible]

Sheet-4: Cross-section Checklist

7.4 Annexure-4: Standard Setting Out Plan of a 132/11kV Substation



7.5 Annexure-5: The 400/132kV Substation Verification Checklist



Document Title	Plot Name	Plot No.	Revision No.	Date	Previous revision approval status
Transmission 400/132kV Substation Plot Verification					

SR.	Description	Complied with	Remarks
1	Pre-requisite Documents (To be attached with submittal)		
1.1	Provide Plot coordinates.		
1.2	Initial/Draft Developer Master Plan.		
1.3	Substation corridors for 400 & 132kV cables.		
1.4	Duly Filled Plot verification checklist.		
2	Technical Details		
2.1	Proposed Substation's Plot		
2.1.1	Size of the proposed plot should be 200m (Width) x 200m (Length).		
2.1.2	Affection plan reflecting the height of B + G+ 1 (Max of 23 m) to be confirmed.		
2.1.3	The proposed plot should have a regular shape without any chamfer.		
2.1.4	To confirm that the proposed plot is free from any services.		
2.1.5	To confirm that the proposed plot is not located above a tunnel, under a bridge or a metro line, earlier been used as a damp fill area, an earlier structure has been constructed in the plot, etc.		
2.1.6	To confirm that the proposed plot have minimum clearance as below:		
2.1.6.1	Gas farm/DUSUP Corridor - minimum clearances is inline with the authority regulations (e.g. DCD, etc) .		
2.1.6.2	Water bodies or water structure or revetment - minimum 7m.		
2.1.6.3	To confirm that the proposed plot is not located above or near an existing or future Metro line.		
2.1.6.3.a	In case there is an existing or future nearby (over ground) Metro or Railway line, the below shall be confirmed/provided: a. The distance between the Metro/Railway line to end of DEWA cable corridor shall be minimum of 20m. b. To confirm the submission of study of settlement and vibration for DEWA review prior to starting the construction.		
2.1.6.3.b	In case there is an existing or future nearby (underground) Metro or Railway line, the below shall be confirmed/provided: a. To confirm that the end of influence zone shall be outside of end of DEWA corridor. b. To confirm the submission of study of settlement and vibration for DEWA review prior to starting the construction.		
2.1.7	The availability of permanent water line connection prior to energization to be confirmed.		
2.1.8	Required Leveling shall be highlighted in the submission as per site status.		
2.1.9	To confirm that the required leveling will be under developer responsibility before project awarding.		
2.2	Proposed Substation's Plot Surroundings		
2.2.1	The proposed plot should be surrounded with minimum of one main road and one side road.		
2.2.2	Proposed Substation plot should be surrounding with Minimum two 132kV cable corridor.		
2.2.3	The proposed plot should have proper road clear access where substation should be accessed directly from the road.		
2.2.4	Clear width of access roads should be minimum 20 meters to allow smooth maneuvering of large vehicles while accessing the plot.		
2.2.5	Detailed data of surrounding plots to be provided including the land use, Height & Function of the future surroundings (buildings/projects) and type of utility near the proposed substation plot to be provided by the developer.		
2.3	Proposed Substation's Plot Access Gate		
2.3.1	Minimum of one main gate (8m) from main road, one emergency gate (6m) from side road and a personal gate shall be provided to access the plot and shall be indicated in the layout drawing for the substation entry.		
2.3.2	To confirm that Gate Location is verified & suitable for the proposed layout in line with authorities' regulation.		
2.3.3	Undertaking letter to obtain RTA approval for the proposed access gate location prior to awarding the project to be submitted.		
2.3.4	Study of vehicle movement/entry to be submitted to proposed plot and for each access gate.		
2.3.5	All gate levels shall be 50cm minimum above the road level.		
2.4	Proposed Substation's Plot OHL and Corridors		
2.4.1	Substation entry/exit corridors for 400kV OHL and the connecting corridors to be shown clearly for the proposed plot.		
2.5	Proposed Substation's Plot Cables and Corridors		
2.5.1	Substation entry/exit corridors 400kV Cable & 132kV cables and the connecting corridors to be shown clearly for the proposed plot.		
2.5.2	132kV outgoing cables shall be in the arrangement of 2x4 150Ø ducts with a minimum of 2.5 meter width for each set for a total of 22 sets.		
2.5.3	The cable corridor for six 400kV incoming feeders shall be shown. The corridor width for each feeder shall be a minimum of 3.5 meters.		
2.5.4	Total width of connected 400kV cable corridor should be minimum of 20 meters.		
2.5.5	Width of 400kV cable corridor in substation entry should be 20 meters.		
2.5.6	400kV and 132kV corridor to the substation shall be free from any future construction/development and accessible for heavy machinery for cable installation and maintenance.		

* Note: If 2.3.3 can't be complied with, than this comment to be given in Rev. 1 (any delay in obtaining the approval of the gates location (one main gate, two sliding gates and a personal gate) after the project award will be the developer's responsibility)

Architectural Team	Dy Mgr. - Civil Architectural	Sr Mgr. - Trans Engg Civil & Electro Mech	VP-TE
PREPARED BY	CHECKED BY	APPROVED BY	DEPARTMENT HEAD

7.6 Annexure-6: The 132/11kV Substation Verification Checklist (Version 3)



Document Title	Plot Name	Plot No.	Revision No.	Date	Approval status
Transmission 132/11kV Substation Plot Verification					

SR.	Description	Complied with (rev. x)	Remarks (rev. x)
1	Pre-requisite Documents (To be attached with submittal)		
1.1	Plot coordinates.		
1.2	Initial/Draft Developer Master Plan.		
1.3	Substation entry/exit corridors for 132kV and 11kV cables.		
1.4	Duly Filled Plot verification checklist.		
2	Technical Details		
2.1	Proposed Substation's Plot		
2.1.1	Size of the proposed plot should be 60m (Width) x 50m (Length).		
2.1.2	To confirm that the affection plan reflects the height of B + G+ 1 (Max of 16 m).		
2.1.3	To confirm that the affection plan reflects all gate levels shall be 50 cm minimum above the road level.		
2.1.4	The proposed plot should have a regular shape without any chamfer.		
2.1.5	To confirm that the proposed plot is free from any services.		
2.1.6	To confirm that the proposed plot is not located above a tunnel, under a bridge or a metro line, earlier been used as a damp fill area, an earlier structure has been constructed in the plot,etc .		
2.1.7	To confirm that the proposed plot have minimum clearance as below:		
2.1.7.1	OHL - vertical or horizontal clearances of line conductor full swing to any object is 8 m		
2.1.7.2	Gas farm/DUSUP Corridor - minimum clearances is inline with the authority regulations (e.g. DCD, DEWA, etc) .		
2.1.7.3	Water bodies or water structure or revetment - minimum is 7m		
2.1.7.4	To confirm that the proposed plot is not located above or near an existing/future Metro or Railway line.		
	In case there is a nearby (over ground) Metro or Railway line, the below shall be confirmed/provided:		
	a. The distance between the Metro/Railway line to end of DEWA cable corridor shall be minimum of 20m.		
	b. To confirm the submission of study of settlement and vibration for DEWA review prior to starting the construction.		
	In case there is a nearby (underground) Metro or Railway line, the below shall be confirmed/provided:		
	a. To confirm that the end of influence zone shall be outside of end of DEWA corridor.		
	b. To confirm the submission of study of settlement and vibration for DEWA review prior to starting the construction.		
2.1.8	The availability of permanent water line connection to prior to energization to be confirmed.		
2.1.9	Required Leveling shall be highlighted in the submission as per site status.		
2.1.10	To confirm that required level will be under developer responsibility before project awarding.		
2.2	Proposed Substation's Plot Surroundings		
2.2.1	The proposed plot should have proper road clear access where substation should be accessed directly from the road (main road access from 60 m side)		
2.2.2	The proposed plot should be surrounded with a minimum of one main road and one sikka perpendicular to main road.		
2.2.3	Clear width of main access road in front of proposed plot should be minimum 10 meters to allow smooth maneuvering of large vehicles while accessing the plot.		
2.2.4	Width of sikka should be minimum 7 meters.		
2.2.5	Detailed data of surrounding plots to be provided including the land use: Height & Function of the future surroundings (buildings/projects) and type of utility near the proposed substation plot to be provided by the developer.		
2.2.6	Location of laydown area and site office nearby proposed plot to be indicated in the master plan.		
2.3	Proposed Substation's Plot Access Gate		
2.3.1	One main gate, two sliding gates and a personal gate shall be provided from main road to access the plot along the 60 meters side and shall be indicated in the layout drawing for the substation entry.		
2.3.2	To confirm that Gate Location is verified & suitable for the proposed layout in line with authorities' regulation.		
2.3.3*	Undertaking letter to obtain RTA approval for the proposed access gate location prior to awarding the project to be submitted.		
2.3.4	Study of Vehicle maneuvering route from main road (project's boundary) through master plan to proposed plot's access gates shall be indicated.		
2.3.5	Minimum distance from plot limit to the nearest turn/roundabout shall be as per authorities requirements (15 meters).		
2.4	Proposed Substation's Plot Cables and Corridors		
2.4.1	Substation entry/exit corridors for 132kV and 11kV cables and the connecting corridors to be shown clearly for the proposed plot.		
2.4.2	11kV outgoing cables shall be in the arrangement of 4 sets of (2x100) with a minimum of 2.5 meter width for each set.		
2.4.3	The exit location for 11kV outgoing cables shall be from sikka and road side.		
2.4.4	The 11kV exit corridors' location shall be shown from the 11kV cable basement.		
2.4.5	2 meters gap shall be provided between every 2 sets of 11kV outgoing cables.		
2.4.6	132kV incoming cables should be in the arrangement of 4 sets of (2x4) with a minimum of 2.5 meters width for each set.		
2.4.7	Total width of connected 132kV cable corridor should be minimum of 10 meters.		
2.4.8	Width of 132kV cable corridor in substation entry should be 10 meters.		
2.4.9	Entry location of 132kV cable sets should preferably be from one side (60 meters side) of the proposed plot.		
2.4.10	132kV corridor to the substation shall be free from any future construction/development and accessible for heavy machinery for cable installation and maintenance.		
2.4.11	The 132kV corridor, along with cross-section details, shall be provided.		

* Note: if 2.3.3 can't be complied with, than this comment to be given in Rev. 1 (any delay in obtaining the approval of the gates location (one main gate, two sliding gates and a personal gate) after the project award will be the developer's responsibility).

Architectural Team	Dy Mgr - Civil Architectural	Sr Mgr - Trans Engg Civil & Electro Mech	VP-TE
PREPARED BY	CHECKED BY	APPROVED BY	DEPARTMENT HEAD

7.7 Annexure-7: Developer's No-Objection Letter for Transfer of Substation Plot Ownership

[Developer's Letterhead]

Date: [Insert Date]

To:

Dubai Land Department
Government of Dubai

Cc:

Dubai Electricity & Water Authority (DEWA)

Subject: No Objection Letter for Transfer / Confirmation of Ownership of DEWA Plot

Dear XXX,

With reference to the above subject, we, [Developer Name], the master developer of [Project / Community Name], hereby confirm our *No Objection* for the transfer and registration of the below-listed plot(s) to the ownership of **Dubai Electricity & Water Authority (DEWA)**.

This request is in line with the standard procedure to facilitate the development and transfer of utility infrastructure and to ensure the proper registration of DEWA assets with Dubai Land Department.

No.	Community / Development	Plot Number	Land Use	Plot Area (sq.m.)
1	[Insert Community Name]	[Insert Plot Number]	[Insert Land Use]	[Insert Area]
2				

We confirm that the above plot(s) are designated for DEWA use and that we have no objection to their transfer and registration under **Dubai Electricity & Water Authority** ownership.

Regards,

[Authorized Signatory Name]

[Position]

WARNING TAPE

100mm DIA UPVC DUCT

F.O. CABLE

CONCRETE

DN 150 UPVC DUCT

132kV POWER CABLE

1000 G POLYTHENE SHEET

COMPACTED SAND BED

FRL / FGL

630

830 (VARIES)

200

150

50

670 (VARIES)

1500

200

100

100

200

50

50

50

50

1710 (VARIES)

**TYPICAL DUCT BANK FOR ROAD CROSSING
FOR 132kV CABLES**

7.9 Annexure-9:
DEWA Circular Regarding Backup Generators



هيئة كهرباء ومياه دبي
Dubai Electricity & Water Authority



المرجع: ع م / 146 / 2017

التاريخ: 2017 / 4 / 25

تعميم

إلى المطورين العقاريين والاستشاريين والمقاولين
وكافة الجهات المعنية الأخرى

الموضوع: توفير مولدات كهرباء احتياطية في المباني والمرافق والمنشآت الحيوية ذات الطابع الحضاري والسياحي والتجاري في إمارة دبي

بناء على أمر صاحب السمو الشيخ محمد بن راشد آل مكتوم نائب رئيس الدولة رئيس مجلس الوزراء حاكم إمارة دبي رعاه الله، بإلزام المطورين العقاريين والشركات وكافة الجهات المعنية الأخرى التي تعمل على تنفيذ المشاريع العمرانية الكبرى والمباني والمرافق والمنشآت الحيوية ذات الطابع الحضاري والسياحي والتجاري في إمارة دبي بتوفير مولدات كهرباء احتياطية في هذه المباني والمرافق والمنشآت لضمان تزويدها بالطاقة الكهربائية اللازمة في الحالات الطارئة لاعتبارات الأمان والسلامة العامة، وتأمين الراحة للمجتمع والجمهور اعتباراً من 25 أبريل 2017.

على أن تكون قدرة هذه المولدات الاحتياطية كافية لتغطية المتطلبات الأساسية بما فيها الإنارة الكافية والمصاعد والسلالم المتحركة والأبواب الأوتوماتيكية وكاميرات المراقبة وأجهزة الإنذار والسلامة ومكافحة الحريق وغيرها، مع التأكد من الصيانة الدورية لضمان عمل هذه المولدات الاحتياطية في الحالات التي تستدعي ذلك بشكل فعال ووقت مناسب مع مراعاة اشتراطات وإجراءات السلامة.

ولتنفيذ هذا الأمر السامي، يرجى التعاون التام مع هيئة كهرباء ومياه دبي كونها الجهة ذات الاختصاص والمسؤولة عن متابعة هذا الأمر والإشراف على تنفيذه مباشرة.

سعيد محمد الطاير
العضو المنتدب والرئيس التنفيذي



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POWER SUPPLY GUIDELINES FOR MAJOR PROJECTS



7.11 Annexure-11: File-naming Format

Project Code	File Description	File Format
(as per MA'LEM DUBAI Registration)		
MP00126	Layout Drawing (DLTM)	MP00126-LD
MP00126	132kV Corridors Drawing (DLTM)	MP00126-132CD
MP00126	11kV Corridors Drawing (DLTM)	MP00126-11CD
MP00126	132kV Road Crossing Ducts (DLTM)	MP00126-132RCD
MP00126	11kV Road Crossing Ducts (DLTM)	MP00126-11RCD
MP00126	Cross- Ssection markers drawing (DLTM)	MP00126-CSMD
MP00126	Ultimate Feeding Zone Drawing (DLTM)	MP00126-UFZD-SS1(SS*)
MP00126	Interim Feeding Zone Drawing (DLTM)	MP00126-IFZD-SS1(SS*)
MP00126	Entry/Exit exit of 132kV and 11kV Corridors (DLTM)	MP00126-EE-132-11-SS1(SS*)
MP00126	Detailed Cross -Sections section Drawing (Bulk Drawing)	MP00126-XS-AA(AA*)- PDF

Digital Drawing Submission Requirements for Power Supply Master Plan



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1. INTRODUCTION

The purpose of this document is to provide geospatial data submission guidelines for all DEWA customers. The layers/levels in a GDS submission shall comply with DEWA requirements. Therefore, DEWA customers are requested to submit power supply master plan projects to DEWA PTP in the predefined format, which will enable us to work in an orderly manner. These guidelines are intended to help customers understand and comply with DEWA's II&P requirements for uploading the project's land base to DEWA's GIS system.

Any questions concerning these standards, or exceptions to these standards due to special circumstances, should be referred to DEWA's II&P Department for further clarification.

The format and the content of the GDS template file are explained in the following sections.

1.1 GDS File Format

The format of the GDS file can be either ESRI GeoDatabase (GDB), AutoCAD (DWG) or MicroStation (DGN). DEWA accepts all the above formats for data exchange from data submitters.

The GDS file defines the following;

- a. The coordinate system that shall be used in preparing the drawing;
- b. How map features are organised into layers;
- c. How those layers are named;
- d. How existing features and layers in DEWA's GIS are symbolised.

Once the customers started to submit the drawings in the above-specified manner, then DEWA's II&P Department GIS team can update to database to DEWA's GIS.

Important note:

Drawing files submitted by the customers should strictly follow these guidelines, including the requirements for 'Level or Layer/Feature Class Name', 'Symbolology' and 'Coordinate system', as specified in the Layers Data Field Definition (refer to Section 2.1). For example, if customer does not comply with specified Layers Data Field Definition, the GDS will not be recognised as data.

Most importantly, the drawing file submitted by the customer must not contain the following.

1. Title block
2. Border line
3. Notes in the drawing

2. GDB/CAD/CSV file Submission Details

The following guidelines should be considered while preparing CAD/GDB for road network layers and CSV for proposed duct/utility cross-section marker submissions. The file name should start with the project name, along with file details. For example, Projectname_Crosssection.csv, Projectname_Dist_duct.csv, Projectname_roadlayout.dgn, Projectname_roadlayout.dwg, Projectname_Trans_duct.csv. (Ref. Appendix 1)

2.1 Layers, Data Field and Definitions

ROAD NETWORK LAYERS				
S.No.	Layer_Name	Description	Geometry Type and Color Code CAD	Geometry Type GDB
1	Road Width	The width allocated to lanes for motorists, buses, trucks, bikes. This is also called carriage way.	Polyline and Point (RGB: 0:0:255)	Polygon
2	Roundabout	Non-pedestrian islands within the road surface that normally contains grass, trees, flowers or other vegetation.	Polyline and Point (RGB: 255:102:102)	Polygon
3	Road Divider	The area that separates opposing lanes of traffic on divided roadways. Also called the central reservation.	Polyline and Point (RGB: 255:0:255)	Polygon
4	Right-of-way	Right-of-Way is the land on which a road and its associated facilities and appurtenances are located. Highway right-of-way accommodates the entire roadway (i.e., travel lanes and shoulders), as well as adjacent sidewalks and the roadside corridors on which utilities are located.	Polyline (RGB: 0:255:0)	Polygon
5	Pavements	A path consisting of a paved area on the side of a road for pedestrians, also called a sidewalk.	Polyline and Point (RGB: 204:0:0)	Polygon
6	Parking Lots	Should represent the boundaries of vehicle parking areas.	Polyline and Point (RGB: 0:255:0)	Polygon
7	Cross-section	A simple line should be drawn across the road, covering all utility allocations and associated road features. The cross-section marker should not extend beyond the ROW. The cross-section ID should be provided in text format, which should correspond with the section ID in the detailed cross-section PDF. Alternatively, the CSV file should include the start and end coordinates, together with the attributes specified by DEWA. Cross-sections shall be digitized from right (X1,Y1) to left (X2,Y2) according to the specified orientation.	Line, Text and CSV (RGB: 255:255:255)	Line

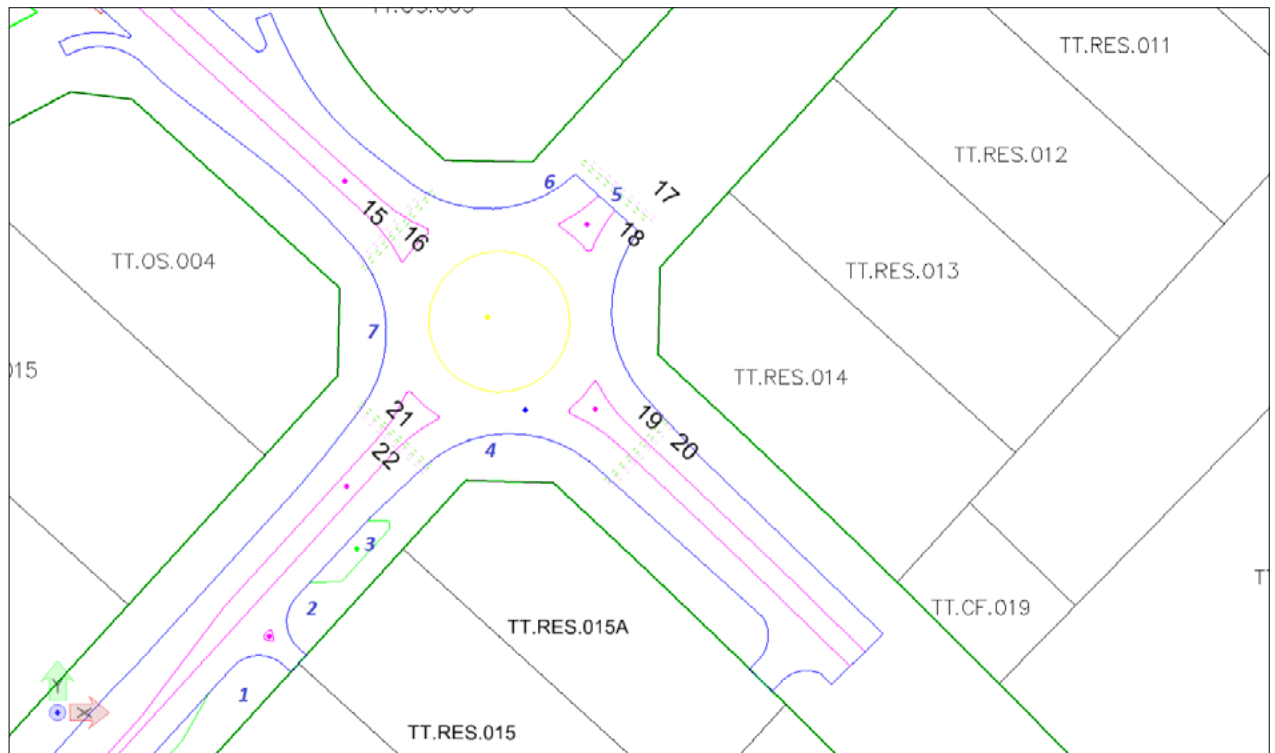
ROAD NETWORK LAYERS				
S.No.	Layer_Name	Description	Geometry Type and Color Code CAD	Geometry Type GDB
8	Parcels	The parcel boundary and ID shall match the records of the relevant authorities (DM, DSO, etc) This parcel ID should correspond with the Parcel ID column in the CSV file.	Polyline/Text/CSV (RGB:51:0:0)	Polygon
9	Conduit 132kV Planned (CAD) Electric Transmission Data Set /T_Conduit line (GDB).	Should represent simple line.	Line and CSV (RGB:255:170:0)	Line
10	Conduit11kV_33kV Planned (CAD) Electric Distribution Data Set / Conduit line (GDB).	Should represent simple line.	Line and CSV (RGB:76:230:0)	Line
11	Conduit LV Planned (CAD) Electric Distribution Data Set / Conduit line (GDB).	Should represent simple line.	Line and CSV (RGB:244:179:252)	Line
12	Duct_No and No. of Ways	This duct ID should match the Ref No. column in the DEWA CSV file.	Text (RGB:204:204:0)	NA
13	Corridor	Should represent simple line.	Polyline (RGB:245:255:255)	NA
14	UC_EHV	Transmission Power Network Corridor (132kv and 400kv).	Point (RGB:127:127:127)	Polygon
15	UC_HV	Distribution Power Network Corridor (33kv, 11kv, and 6.6kv).	Point (RGB:255:0:0)	Polygon

Other than GIS data, DEWA's II&P Department expects the customer to submit the proposed duct/utility cross-section in CSV format. This CSV file shall comply with the instructions specified in Ref.3.0 concerning coded values for the various CSV fields, and Ref 4.0 concerning coded values for various CSV cross-section fields.

Note: There is no need to provide CSV files when submitting GDS data in ESRI GDB format.

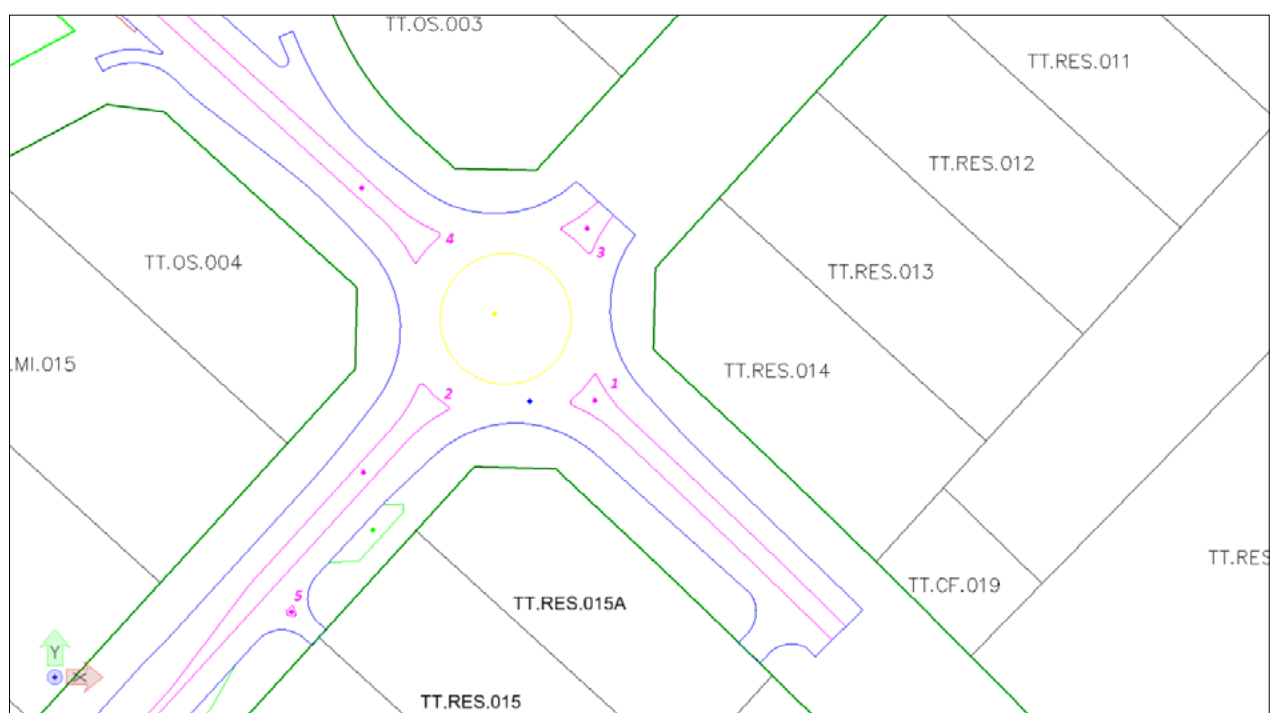
2.1.1 Road Width and Duct

The road width should be captured as a line string, as shown in the picture below, with each segment end-snapped to adjacent features. The duct should be captured as a single-line segment with the duct number provided as text.



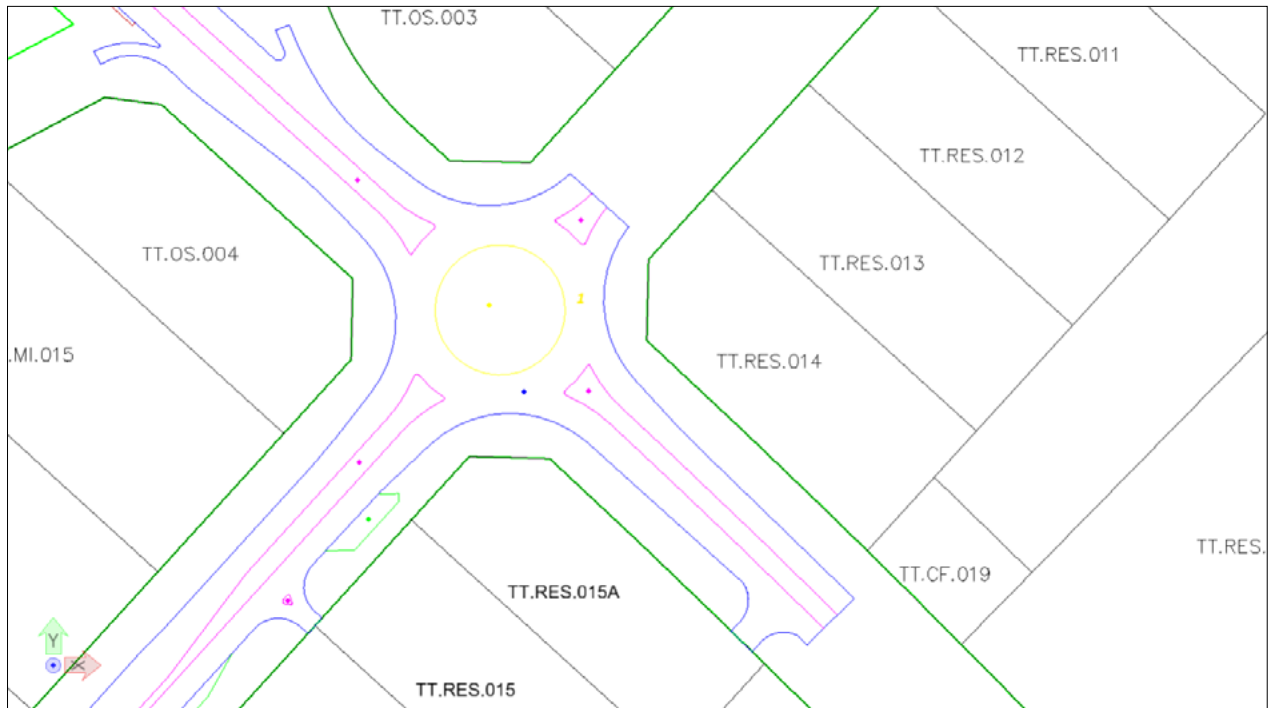
2.1.2 Road Divider

The road divider should be captured as a line string, as shown in the picture below, and each segment should be end-snapped to adjacent features.



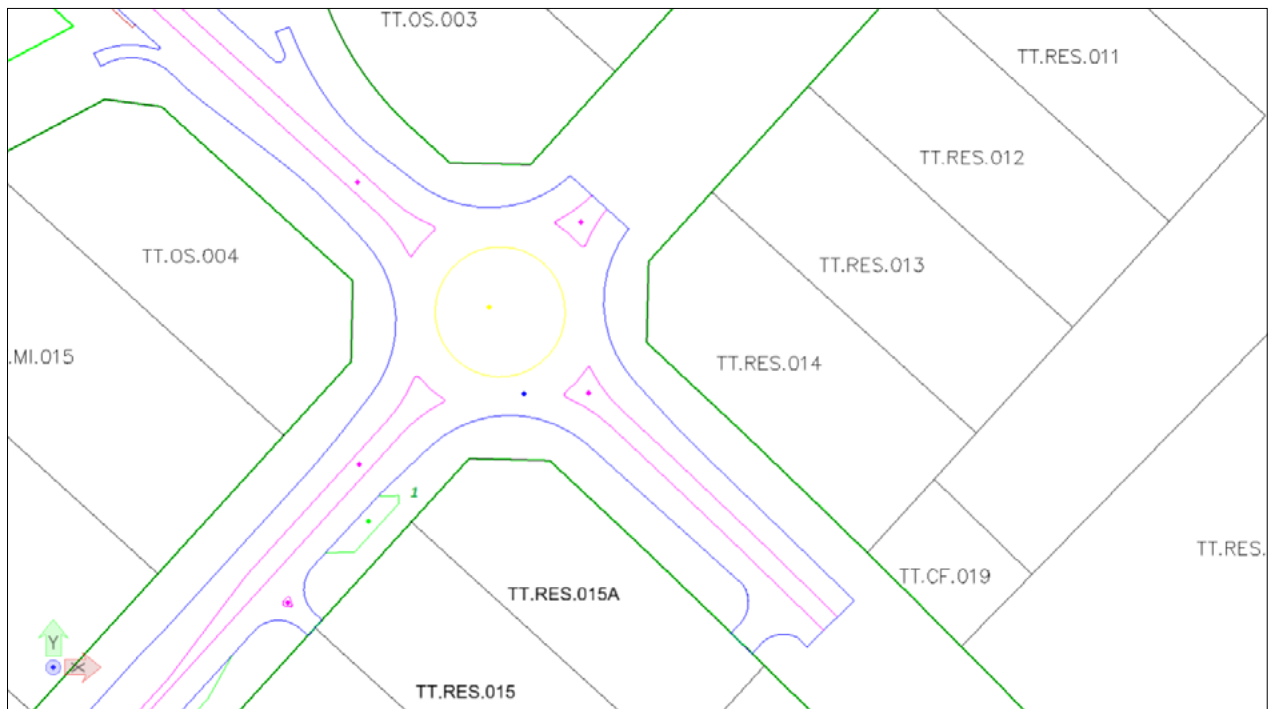
2.1.3 Roundabout

The roundabout should be captured as line string as specified in the picture below.



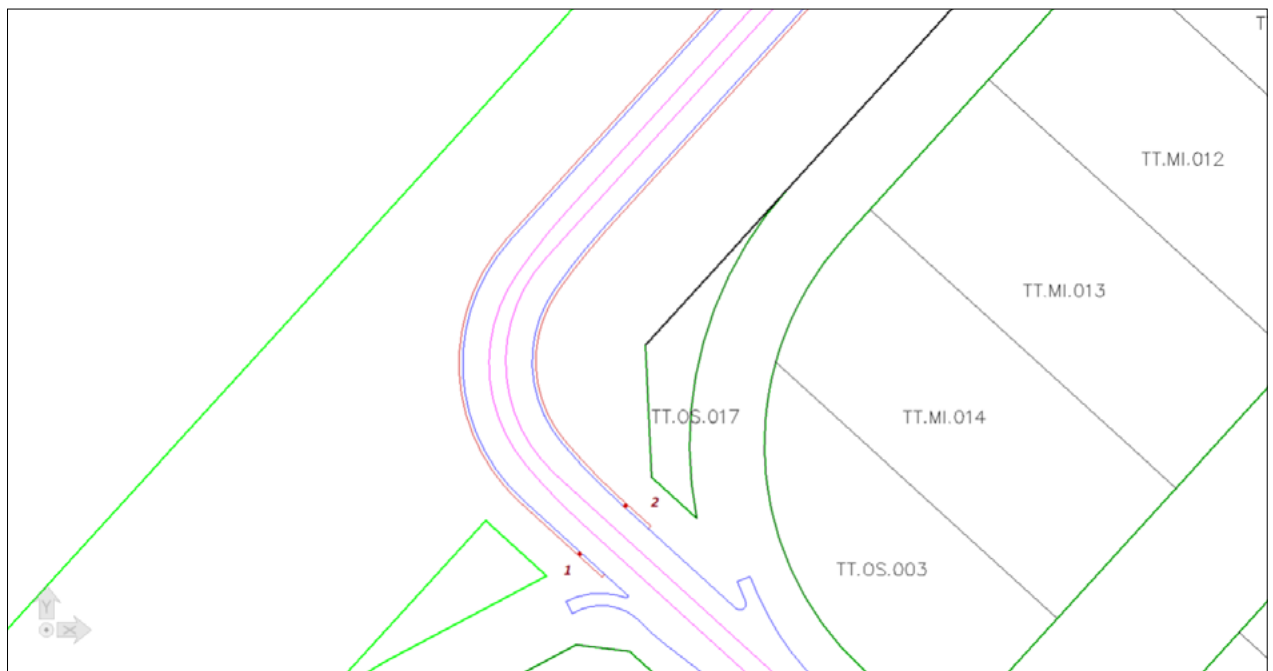
2.1.4 Parking

The parking should be captured as a line string, as shown in the picture below, and each segment should be end-snapped to adjacent features.



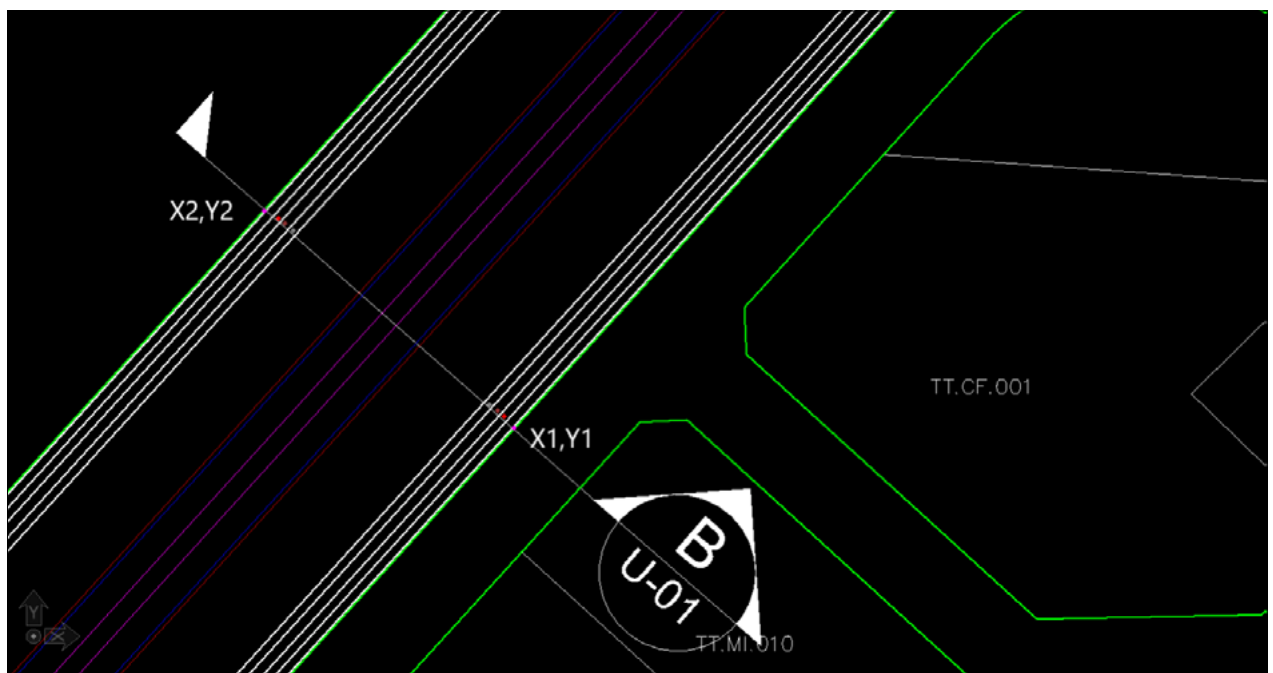
2.1.5 Pavement

The pavement should be captured as a line string, as shown in the picture below, and each segment should be end-snapped to adjacent features.



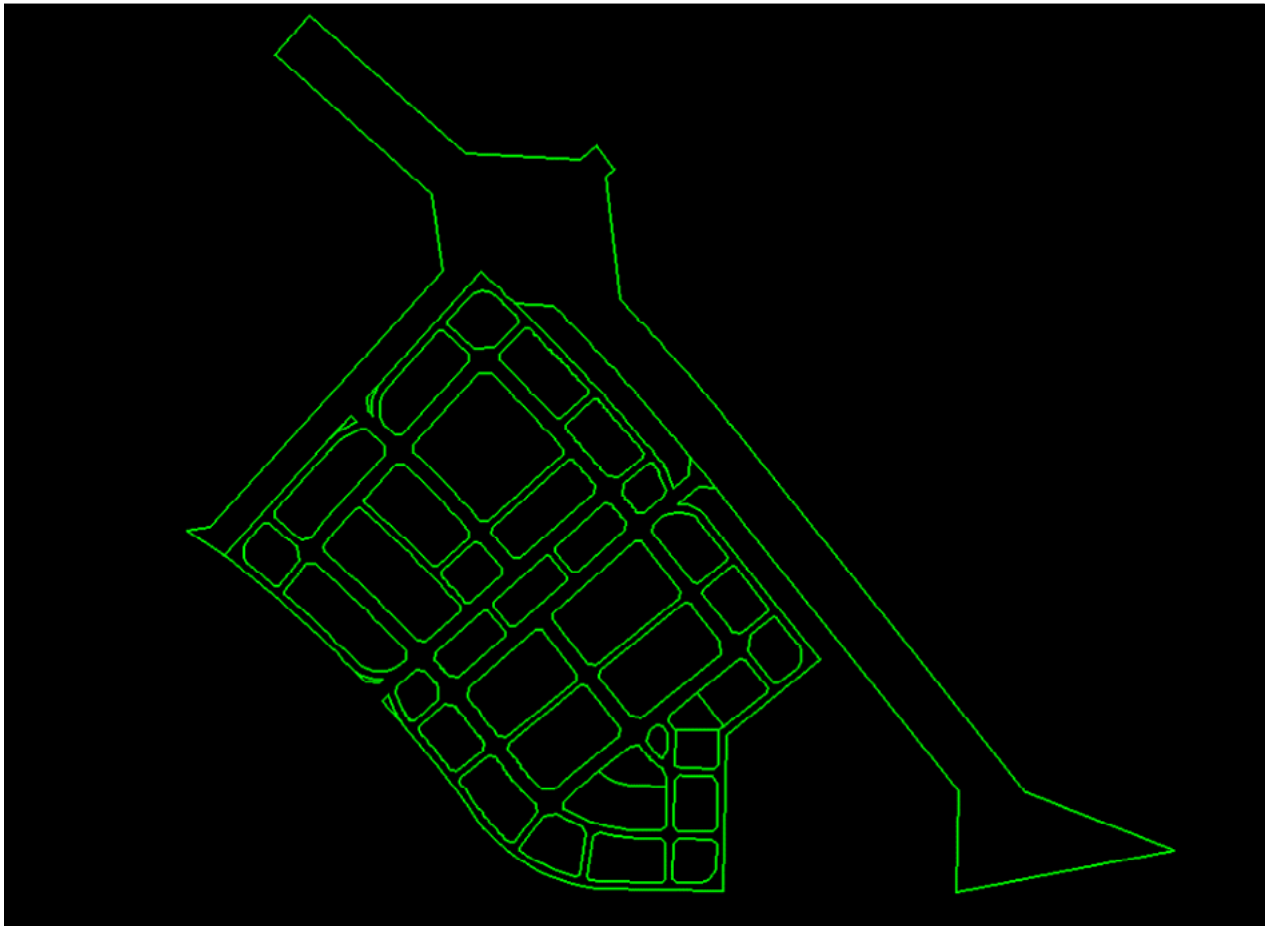
2.1.6 Cross-section

The cross-section should be captured as a single-line segment, with the section number provided as text. The orientation for digitised cross-section should be from right (X1,Y1) to left (X2,Y2), according to the specified orientation.



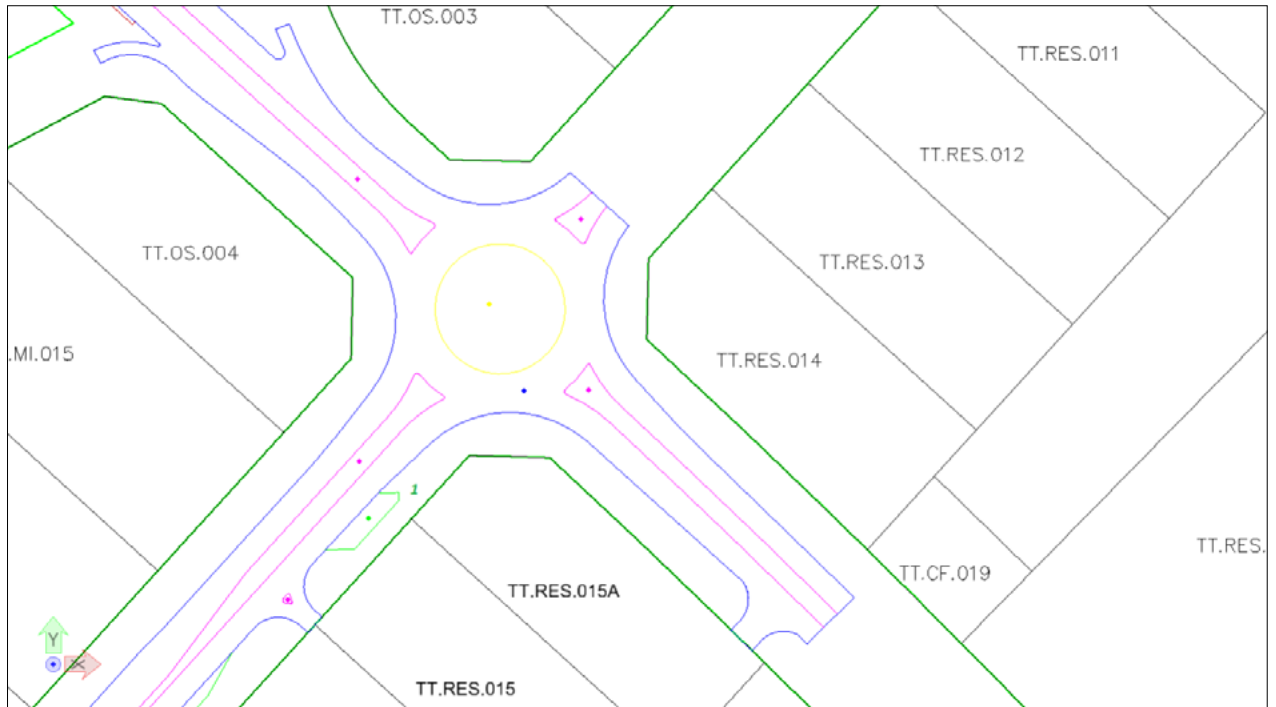
2.1.7 Right of Way

The Right of Way should be captured as a line string, as shown in the picture below, and each segment should be end-snapped to adjacent features.



2.1.8 Parcel

The parcel boundary and ID shall match the records of authorities (DM, DSO, etc). The parcel boundary polyline shall not share a common segment with an adjacent polyline. The parcel ID text should fit within the parcel boundary.



2.1.9 DEWA Utility Corridor

DEWA utility corridors should be captured as a line string, with point features as specified in the picture below, and each segment should be snapped to adjacent features. The corridor boundary should be captured based on the detailed cross-section submitted with the master plan. The different type of utility corridors in DEWA's GIS include UC_EHV (Transmission Power 132kV and 400kV) and UC_HV (Distribution Power 33kV, 11kV, and 6.6kV).



2.2 Coordinate System

Features in DEWA's GDS compliant files must be represented in their real-world locations as referenced by the Dubai Local Transverse Mercator projection (DLTM) parameters as given below.

Projection:

Dubai Local Transverse Mercator

Parameters:

Longitude of Origin 55:20:00.00 d:m:s

Latitude of Origin 0:00:00.000 d:m:s

False Easting 500,000.000 m

False Northing 0.000 m

Scale Factor along Longitude of Origin 1.0000

Geodetic Datum: WGS84

Ellipsoid WGS84 (Standard parameters)

Equatorial Radius: 6378137.000 m

Polar Radius: 6356752.314 m

Eccentricity: 0.0818191908426215

Flattening: 0.00335281066474746

Flattening Inverse: 298.257223563002

Units and Formats:

Geographic Units: d: m: s

Format: Long/lat. Precision: 4, Positive N,E

Projection Units: m

Format: Easting/Northing Precision: 3

Height Units: m Precision: 3

Geocentric Units: m Precision: 3

Distance Units: m Precision: 3

Angular Units: deg Precision: 6

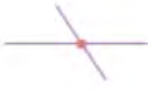
2.3 CAD / GDB data submission guidelines

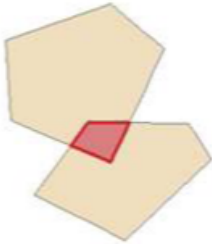
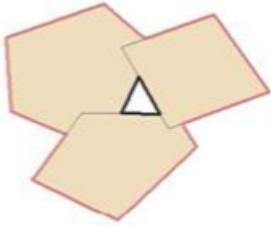
If the Data Submitter is unable to provide the required spatial information in accordance with the DEWA's GDS, the following guidelines should be followed when preparing CAD data for submission to the DEWA that will be used by the GIS Section:

- Layer/feature class names need to follow the DEWA's GDS naming format
- Each Feature Class and/or its sub-types need to be in a separate layer in the CAD file.
- Ellipse and Spline shall not be used at all.
- Overlapping, Self-intersecting and Zero Length are not allowed.
- Where two Polylines logically join, intersecting features within the same layer these shall be snapped at the point of intersection.
- Each text/point representing information about an area should fit well inside it.
- Digitization of lines (for example where these are roads) should be undertaken in their direction of travel where the road links are 'one-way' links. Two-way links represented as one link can be digitized in either direction.
- All new Conduits (Line features) must be clearly distinguishable from existing features by symbology and labels (Existing/New/Proposed).
- For each feature the following spatial data is required: StartPoint, EndPoint and TurningPoints (if applicable). Features must have x,y co-ordinates as label text near the respective location on the drawing. These co-ordinates shall be on level 10.
- All drawings delivered to DEWA shall have an attached CSV file containing all features, their X,Y location (StartPoint, EndPoint and TurningPoints) and shall include attributes (ref 3.Specification of coded values for various fields-CSV(Duct) and 4.Specification of coded values for various fields-CSV(Crosssection)) specified in a tabular form. Sample CSV template available in Appendix 1 Sample CSV/CAD file template.
- An additional reference number in duct/section_id in Crosssection (refno-Ref Appendix 1 Sample CSV/CAD file template) can be added (if required) to enable relationships between the graphics in CAD and attributes in CSV.

2.4 Topology Rules

It is important that some basic topological rules are enforced whilst creating and maintaining existing data. These rules should be in CAD format to facilitate easy conversion to GIS format should DEWA need to undertake such a conversion. Examples are shown below:

1	Must Not Overlap	Requires that lines not overlap with lines in the same feature class. This rule is used where line segments should not be duplicated.	
2	Must Not Intersect	Requires that line features from the same feature class not cross or overlap each other. Lines can share endpoints. This rule is used in cases where the intersection of lines should only occur at endpoints, such as street segments and intersections.	
3	Must not have Dangles	Requires that a line feature must touch lines from the same feature class at both endpoints. An endpoint that is not connected to another line is called a dangle. This rule is used when line features must form closed loops, such as when they are defining the boundaries of polygon features. It may also be used in cases where lines typically connect to other lines, as with networks, such as road links. In this case, exceptions can be used where the rule is occasionally violated, as with cul-de-sac or dead end street segments.	
5	Must not intersect or Touch Interior	Requires that a line in one feature class must only touch other lines of the same feature class at endpoints. Any line segment in which features overlap or any intersection not at an endpoint is an error. This rule is useful where lines must only be connected at endpoints, such as in the case of plot lines, which must split.	
6	Must not Overlap with	Requires that a line from one feature class not overlap with line features in another feature class. This rule is used when line features cannot share the same space. For example, roads must not exactly follow a railway line.	 Where the purple lines overlap is an error.
7	Must not Self Overlap	Requires that line features not overlap themselves. They can cross or touch themselves, but must not have coincident segments. This rule is useful for features such as streets, where segments might touch in a loop, but where the same street should not follow the same course twice.	 The individual line feature overlaps itself, with the error indicated by the coral line.
8	Must not self Intersect	Requires that line features not cross or overlap themselves. This rule is useful for lines, such as contour lines, that cannot cross themselves.	
9	Must be a Single Part	Requires that lines have only one part. This rule is useful where line features, such as highways, may not have multiple parts.	 Multipart lines are created from a single sketch.

S.no	Topology Rule	Rule Description	Example
1	Must Not Overlap	Requires that the interior of polygons in the feature class not overlap. The polygons can share edges or vertices. This rule is used when an area cannot belong to two or more polygons. It is useful for modelling administrative boundaries, such as building plots, districts, and mutually exclusive area classifications, such as land cover or landform type.	
2	Must Not Have Gaps	This rule requires that there are no voids within a single polygon or between adjacent polygons. All polygons must form a continuous surface. An error will always exist on the perimeter of the surface. You can either ignore this error or mark it as an exception. Use this rule on data that must completely cover an area. For example, Land Uses polygons cannot have gaps.	

The following definitions clarify the subject of the DEWA's GDS:

Polyline: A polyline is a sequence of joined vertices. Each vertex has an X and Y. Attributes further describe the polyline. A polyline must be uniquely identified and duplicates are not permitted, unless the justification for a duplicate is provided by the data submitter.

Polygon: A polygon, like a polyline, is a sequence of vertices. However, in a polygon, the first and last vertices are always at the same position. Overlapping polygons are not permitted, unless the justification for any overlap is provided by the data submitter.

Dangle: Dangles are topological errors where an arc or a line does not end at the point where it should. These are created due to improper digitisation. There are two types of dangles– overshoots and undershoots. Dangles can be avoided if proper snapping tolerance is defined before starting digitisation. Dangles are not permitted, unless justification for any dangles is provided by the data submitter.

Undershoots: When an arc or a line terminates before connecting to another arc at a required location, it is called as undershoot. Undershoots can occur when a line feature (e.g. a road) does not exactly meet another feature to which it should be connected. Undershoots are not permitted, unless justification for any undershoot is provided by the data submitter.

Overshoots: When an arc or a line does not end at its termination point on another arc and goes beyond it is called as overshoot. Overshoots can occur when a line feature such as a road does not meet another road exactly at an intersection. Overshoots are not permitted, unless justification for any overshoot is provided by the data submitter.

Spurious Polygons: Spurious polygons or slivers are often created during the overlay of two or more polygon layers. Slivers are small polygons caused by overlay operations of polygons whose edges do not match. Slivers can occur when the edges of two polygon areas do not meet properly. Slivers are not permitted, unless justification for any sliver is provided by the data submitter.

Compliance: Data submitter shall comply with DEWA's GDS requirements, including those relating to the coordinate system and layer names. The prescribed layers shall be populated with the appropriate survey or engineering data. Supporting documentation shall be provided to enable DEWA to fully understand the information provided and identify that should be considered when using the data.

Naming Convention: Layers must be submitted in accordance with a naming convention that is consistent with the DEWA's own naming convention.

3. Specification of coded values for various fields-CSV (Duct)

Subtype

Code	State
1	Duct Bank
2	Trench
3	Turf
4	HDD
5	Unknown

Status indicator

Code	State
Proposed	Proposed
Cancelled	Cancelled
In service	In service
Approved for Construction	Approved for Construction
Constructed as laid	Constructed as laid

Operating Voltage

Code	Conduit Nominal Voltage
400	400kV
132	132kV
11	11kV
33	33kV
LV	LV

Encasement Type

Code	Encasement Type
Backfil	Back-fill
Concrete	Concrete
NDRC	NDRC
Smart Sand	Smart Sand
0	Unknown

Material

Code	Material Type
HDPE	HDPE
UPVC	UPVC
UNK	Unknown

Duct Size

Code	Duct Size
2	2"
4	4"
6	6"
12	12"
18	18"
24	24"
30	30"
36	36"
42	42"
48	48"

Number of Ducts

Code	No of Ducts	Code	No of Ducts	Code	No of Ducts	Code	No of Ducts	Code	No of Ducts
4	1	48	27	32	2x30	55	4x(2x5)	62	2x2
5	2	49	28	33	2x35	1	IV(1)		
6	3	50	29	34	2x40	3	IV(3)		
7	4	51	30	35	2x45	399	IV(39)		
24	5	12	1x6	36	2x50	2	Unknown		
17	6	56	1x8	10	3x4	100	9		
25	7	58	1x11	39	3x5	8	2X4		
15	10	57	1x12	14	3x6	12	1x6		
37	11	8	2x4	22	3x8	14	3x6		
38	13	26	2x5	60	3x11	15	10		
16	16	13	2x6	23	3x12	17	6		
9	18	19	2x8	21	3x16	101	8		
41	19	29	2x10	40	4x4	102	12		
42	20	59	2x11	99	4x6	103	14		
43	21	20	2x12	61	4x11	104	15		
44	22	27	2x15	11	6x4	105	17		
45	23	30	2x20	52	1x(2x5)	106	8x11		
46	25	28	2x24	53	2x(2x5)	107	2x3		
47	26	31	2x25	54	3x(2x5)	108	2x7		

4. Specification of coded values for various fields-CSV (cross-section)

Status

Domain Type:	Coded Value
Code	Value
AB	As-built
C	Construction
FD	Final design
PD	Preliminary design

Undertaking Letter Indicator

Domain Type:	Coded Value
Code	Value
N	No
NA	Not applicable
UNK	Unknown
Y	Yes

5. Specification of coded values for various fields (Parcel Planning)

ENTITLEMENT_E	
Domain Type:	CodedValue
Code	Value
1	Private
2	Granted
3	Lease
4	Null
5	Rented
6	Reserved
7	Utilities
8	Government

PARCEL_TYPE	
Domain Type:	Coded Value
Code	Value
1	DM Code
2	Developer/contractor code
4	JAFZA
5	DWC
6	TRAKHEES
7	Meydan
8	DCCA
11	Jumeirah Golf Estate
12	Nakheel
13	TECOM
14	Dubai Silicon Oasis
15	DAFZA
16	DMCC
17	Jumeirah Lake Towers
18	EO
19	EMAAR

PARCEL_TYPE	
Domain Type:	Coded Value
Code	Value
20	DUBAI PROPERTIES
21	DUBAI PORT AUTHORITY
22	DIP
24	MERAAS
25	MBRHE
26	BUSET
27	SOBHA
28	DIRE
29	MAF
30	DFC
31	DHCC
32	HABTOOR
33	DAMAC
34	DUBAI SPORTS CITY
35	UNION PROPERTIES
36	MUSTAFA GALADARI
37	AL BARARI
38	TANMIYAT GROUP
39	DIAMOND
40	FCW
41	TIGERWOOD
42	PCFC
43	LIMITLESS
44	DCA
45	DWTC
46	DIC
48	Deira WaterFront Development
49	NSHAMA
50	DIB
51	DGC
52	Al Wasl
53	DREC
54	Dubai Holding
55	Dubai Maritime City
56	Gulf Developers
57	Nobility
58	GFH
61	Al Ahli Group
62	DHE

ZONING AUTHORITY	
Domain Type:	CodedValue
Code	Value
1	DM
2	DCCA
3	TRAKHEES
4	DWC
5	DSOA
6	JAFZA
7	DAFZA
8	EO
9	DPA

LANDUSE_DESC (Land Use Description)	
Domain Type:	Coded Value
Code	Value
1	Residential
2	Mixed use(Residential-Office-Retail)
3	Commercial
4	Public facilities
5	Hotels and apartments
6	Parks
7	Open space and recreation
8	Utilities
9	Landscaping
10	Sikka
11	Buffer zone
12	Hospital/clinic
13	Schools
14	Transport

SUBTYPECD	
Domain Type:	Coded Value
Code	Value
1	Free Zone
2	DM

Status

Domain Type:	Coded Value
Code	Value
1	Preliminary Design

6. General Requirements

All digital drawings submitted to DEWA must confirm to the following requirements.

6.1 Documentation

The following documentation is required when submitting digital drawings to DEWA

- Document describing the content of digital data, including project details. Example:

Project Name: Palm Island

File Name(s): 132kV_ThePalm.shp, 33kV_ThePalm.shp, etc

Date: July 1, 2004

Company Name: Contractor LLC

Contact Person: John Doe

Contact Phone: +971 50 555 5555

Contact E-mail: John.Doe@contractor.co.ae

Format: DWG2000/DXF/GDB/DGNv8

Layers submitted: As specified in the Table 1.0

Thumbnail images of drawings

- Digital drawing files (DGN/DWG/DXF/GDB files)
- Comma Delimited File (CSV) sheet describing attributes of features included in the CAD drawings. This document is not required if digital drawing is submitted in ESRI GDB file format.

All documentation, including drawings, shall be submitted only on CD-ROM/DVD.

6.2 Accuracy of co-ordinates in digital drawings

The accuracy of the co-ordinates submitted to DEWA shall be clearly mentioned within the submitted drawings or the attached documentation.

6.3 Digital drawing format standards

All drawings submitted to DEWA must be delivered in one of the following standardized drawing formats.

MicroStation design files (.dgn) up to Version 8i AutoCAD drawing files .dwg) up to AutoCAD 2016

ESRI GDB V10

ASCII, binary and partial drawing interchange files (.dxf) that comply with DXF standards.

6.4 Map Orientation

All drawings shall be delivered in a non-rotated orientation (North facing up).

6.5 2D versus 3D drawings

All drawings are to be submitted as two dimensional (2D) graphic files. Three-dimensional drawings are not acceptable except if specified by DEWA.

Appendix 1: Sample CSV/CAD file template



Appendix 1-
Digital Drawing
Sample CSV &
CAD File