



ADOPTION PROCEDURE

TELECOMMUNICATIONS INFRASTRUCTURE

FOR PRIVATE INFRASTRUCTURE DEVELOPERS



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ADOPTION PROCEDURE OF TELECOMMUNICATIONS SYSTEM TO BE CONSTRUCTED BY A PRIVATE INFRASTRUCTURE DEVELOPER

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ADOPTION PROCEDURE OF TELECOMMUNICATIONS SYSTEM TO BE CONSTRUCTED BY A PRIVATE INFRASTRUCTURE DEVELOPER

1.0 Introduction

The purpose of this procedure is to briefly describe the roadmap to be followed by the Private Infrastructure Developers in order to ensure that infrastructure projects are designed and constructed to adoptable standards and are efficient and safe with minimized maintenance costs.

This procedure for adoption shall be applied to all new telecommunications network projects within the Kingdom of Bahrain designed and constructed by the private sector starting from the planning stage until the handing over and adoption by the appointed Telecommunications Provider.

The following represents the minimum mandatory requirements to comply with the Standards –subject to change from time to time- and alternatives may be mutually agreed upon for exceptional circumstances.

The Developer is required to refer to standards, policies and legislation related to government infrastructure and Telecommunications Regulatory Authority.

2.0 Definitions

Telecommunications Regulatory Authority

The Telecommunications Regulatory Authority (TRA) was established in 2002 after promulgating the Telecommunications Law No. 48 of 2002 in the Kingdom of Bahrain.

Ever since its inception, TRA's focused on liberalizing and developing the telecommunications sector by promoting an effective and fair competition between established operators and new entrants while protecting the interest of consumers. In 2005, TRA carried out basic regulatory framework for strategic & retail market review and 2008 witnessed the commencement of the implementation of the regulatory procedures resulted from the strategic review.

TRA carries out its duties independently and in a transparent and non-discriminatory manner. The TRA is constantly reviewing its regulations and framework based on a number of principles including consumer protection and fostering competition.

Prior to the establishment of TRA, there was one semi-government telecommunications company which is Bahrain Telecommunications Company (Batelco) who owns and operates all land (fixed) telecommunications infrastructure in the kingdom.

BNET

BNET (Bahrain Network) established in 2019 with a vision to create a technologically-advanced digital communication infrastructure that enables safe, secured and smart Kingdom that will contribute to the consumer welfare and Bahrain's economic growth. BNET will provide the Bahrain's national broadband network connecting Kingdom of Bahrain through ultra-fast fibre optic infrastructure. As of 2019, BNET is the new entity who owns, manages and operates all the underground telecommunications infrastructure in the kingdom. All telecommunications underground infrastructure to be deployed by or under the supervision of BNET. For more information, visit BNET Web site www.bnet.bh

Telecommunications Service Providers

With the liberation of telecommunications market there are currently twenty-five (25) licensed telecommunications services providers most of whom are providing mobile and/or internet services. Due to the high cost of the construction of telecommunications infrastructure coupled with the fact that there are only one meter wide corridor for all telecommunications services is available within the public road reserves, all of the licensed fixed line providers opt to request BNET to deploy the underground required infrastructure in order to allow the licensed telecom providers to lay their fiber/copper cables. For more information, visit TRA.org.bh

Private Developers:

Developers can be any private organization that develops all or part of a private sector masterplan either as a main investor (masterplan owner) or as a sub-investor for part of the total masterplan. They also design and construct telecommunication network and facilities which will be adopted by a Telecommunications Service Provider after construction is complete and the defects liability period has expired. Developers are responsible for project initiation, project management, design (via consultants) and construction supervision of their development projects which may contain roads, highways and bridges, sewerage, water, electricity networks and telecommunication networks infrastructure. The Private Developers are responsible for ensuring that their Consultants and Contractors communicate with the Telecommunications Regulatory Authority as appropriate at all stages indicated in this procedure.

Communication and Correspondences

All matters and inquiries relevant to Telecom infrastructure distribution, planning, design, operation, maintenance and adoption should be addressed to the Director, Technical & Operations Directorate, TRA, PO Box 10353, Telephone: 17520000, email: TUI@tra.org.bh, Manama, Kingdom of Bahrain.

3.0 Adoption Procedure

3.1 Contact Telecommunications Regulatory Authority

The Private Infrastructure Developer that wish to construct telecommunication system serving his development shall consult TRA on the availability of telecommunications services near his development and obtain Bahrain telecommunications regulations regarding different telecommunications services like fixed land lines, mobile services and internet (broad band) for both residential and commercial landuse by applying a Pre-Planning Consultation (PPC) Application through Ministry of Works – Central Planning Office.

3.2 Select the Telecommunications Service Provider

After conducting a careful study of the TRA regulations, decide on the type of telecommunication services required for the private development and after negotiation with the telecommunication services providers, then the Developer shall decide on which Telecommunications Services Provider who will provide, operate and maintain the telecommunications services for the private development.

3.3 Commercial Agreement with Telecom Service Providers

Commercial Agreements related to the Underground Telecom Infrastructure shall be done with BNET whilst the Commercial Agreements for In-building solutions or infrastructure related to Telecommunication Towers shall be done with Mobile Telecommunications Operators. Then the Developer shall approach those provider(s) and negotiate the terms, conditions, and the technical and financial obligations until they reach to a mutual agreement which shall be concluded with the signing of the “Commercial Agreement”.

It is expected that the “commercial agreement” shall cover the following:

1. The party responsible for the planning and design of the telecommunications masterplan.
2. Process of masterplan and design approvals.
3. The design criteria of the network layout, associated structures and specifications to be followed.
4. Define the transmission technology that should be deployed for the proposed infrastructure.
5. Format and details of the basis of design report including telecoms service demand calculations.
6. Standards of telecommunications network design drawings in respect of format, specification and details requirement.
7. Transfer of Land ownership of exchanges and mobile telecommunications services associated buildings.

8. The party responsible for the submission and follow up of the necessary government authorities until all required approvals are obtained.
9. Decide on the liaison representative who shall act as an interface between the private developer and all concerned Government Services Authorities and Central Planning Office (CPO).
10. The party responsible for submitting and obtaining approvals of the required CPO permits i.e. planning permissions, wayleaves and other consultations.
11. Who is responsible for the construction of the network. Is all the construction works will be by one party or the work will be divided between the private developer and the service provider?
12. Materials and equipment's specification, approval and certification.
13. Scope of works, tendering and awarding.
14. Construction supervision and contract management.
15. Cost of design and construction and any other financial obligations.
16. Duration of Defect Liability Period.
17. Adoption requirements and final documents to be handed over.
18. Operation and maintenance policy.
19. Preparation of As-built documents, standards and formats.
20. Any guarantees and warranties.

4.0 Planning Permission Application

The Private Developer or his Telecommunications Provider shall comply with the following:

1. TRA adoptable standards which are:
 - a) "TRA Draft Positioning Paper ref TOD/0509/024 dated May 2009 and
 - b) Guidelines for In-Building Telecommunications Access Facilities
Link:https://tra-website-prod-01.s3-me-south-1.amazonaws.com/Media/Documents/Position_Papers_&_Guidelines/20200326152809369_2ttef2iu_fpq.pdf
 - c) The Guidelines for Telecommunications Infrastructure Deployment
Link: <https://www.tra.org.bh/en/category/01/01/1900>
2. The proposed telecommunications network will be subject to planning permission application (PP) as per CPO procedure.
3. All planning permissions and wayleave shall be submitted to TRA through CPO who will circulate to concerned operators as per normal practice.
4. The Planning Permission must be submitted at least 6 months before any network construction is due to be implemented. The Planning Permission Application is the tool for design approval of all infrastructure.

5. The Developer/Service Provider shall obtain the concerned Services Authorities approval on the corridors and utilities cross-sections.
6. If the project area lies within the Airport Flight Zone, then The Developer shall seek the Civil Aviation Authority's approval on the height of communication tower within his project area.

The Planning Permission Application for the private infrastructure developers is a two stages application; Stage one is the Concept/Preliminary design approval which shall be submitted to all stakeholders and Stage two is the detailed design approval which shall be submitted to only the Utility concerned.

The Planning Permission (PP) Application must be submitted at least 6 months before the telecommunication network construction is due to be implemented. The Planning Permission Application is the tool for design approval of all infrastructures. The PP application must be submitted on line through the electronic "Tasareeh System" and the Developer is advised to consult CPO for access and for the drawings formats suitable for the automated application system.

A. Planning Permission Stage 1: Concept/Preliminary Design

Subject to the approval of the Masterplan, subdivision plan, Basis of Design Report and, the Developer must then submit the preliminary drawings under the Planning Permission Application Stage enclosing the following drawings (one set of 1:500 scale hard copy, 3 sets of A3 with reduced scale and CD containing PDF and soft copies in Microstation format): Version 7 or lower with (WGS-84 coordinate system in UTM format).

- **Asset/Development Master Plan** showing the land use.
- **Approved Subdivision Masterplan** with proper key/legend for different plots usage i.e. gardens, substations, schools, town, building heights and commercial centers etc.
- **Preliminary Design Drawings of telecommunication network**, which shall contain:
 - ✓ General layout plan.
 - ✓ Combined Utilities cross-sections at various locations and in particular where services cross each other which shall be approved by all other stakeholders. The Developer shall follow TRA Guidelines of the clearances require between telecommunications and electrical cables.
 - ✓ Combined Utilities layout plan.
 - ✓ Preliminary telecommunication network layout.
 - ✓ Typical chambers details.
 - ✓ Other typical design drawings as may be requested.

The PP Stage 1 will be commented upon by the CPO as well as other concerned stakeholders as per CPO procedure.

All comments from CPO and all other stakeholders shall also be incorporated in the design prior to the Granting the PP.

The outcome of this stage is the agreed combined utilities cross-section by all concerned stakeholders. Planning Permission Stage 2 for approval of the detail design shall be submitted to only the Service Provider/End User. However, if the detailed design entails changes in the agreed utilities cross sections, then this change must be recirculated to others for their approval. Refer to CPO procedure for further details.

Notes:

- i. If the design is to be done by the private developer, then he must appoint a qualified competent telecommunications design consultant and have the design approved by the appointed service provider/TRA.*
- ii. Design review meetings shall be between the Consultant Telecommunications Design Engineers and TRA Engineers/ Service provider design engineers.*
- iii. The Developer has to address all the comments and concerns raised by the Utilities from the first PP re-submission to avoid unnecessary repeated comments and avoiding resubmissions of the same PP several times.*
- iv. The telecommunications network shall be able to support a network of CCTV cameras for security and traffic control.*

B. Planning Permission Stage 2: Detailed Design

Following approval of the Preliminary design drawings and PP Form Stage 1 is fully signed by all concerned stakeholders, the Private Developer must submit detailed design drawings under Planning Permission Form Stage 2 incorporating any modifications requested under the Planning Permission stage 1 to TRA.

The drawings shall comprise the following:

- ✓ Approved Telecommunications network layout plan showing ducts, chambers, associated structures, etc.
- ✓ Approved combined Utilities cross-sections and combined Utilities plan.
- ✓ Construction details shall include cable ducts, joint boxes, ducts bedding, primary equipment housing, network operation center, towers, building heights, etc.
- ✓ Details of any structures including chambers, towers etc. The Design Consultant and the Design Checking Consultant shall endorse all the detailed design drawings.
- ✓ Miscellaneous structures details if any.

- ✓ Any other detail drawings that may have been requested by the end use.
- ✓ Design must account for unforeseen future requirements to avoid future additional civil works i.e. post construction excavations of roads and footpath.

It should be noted that the Developer and their Consultant Engineer or their designer shall be responsible for the correctness and soundness of all documents and drawings prepared by them in connection with the Development. Neither the approval by the TRA of such documents and drawings nor the failure of the TRA to discern any defect in or omission from such documents and drawings shall absolve or relieve the Developer and their Consultant Engineer or their designer of any of their design responsibilities or other duties and obligations pertaining to the Development.

5. Permits from Other Authorities

5.1 Wayleave Clearance

The Developer may proceed with construction only after obtaining:

- ✓ Granted Planning Permission by all concerned stakeholders, and
- ✓ TRA stamped and signed the telecommunications network design drawings as approved for construction, and
- ✓ A wayleave approved by all concerned stakeholders.

If the Planning Permission was granted with conditions then the Developer must ensure that these conditions are completely satisfied prior to the application for a wayleave.

The wayleave application is an on-line system which is not available to private developers at the present time. The Developer is required to apply to the CPO requesting submission of the wayleave for the works approved under the concerned Planning Permission. The CPO will then inform the Private Developer regarding which documents are required and their format to suit the electronic wayleave system.

5.2 Building Permit

Should the development project includes construction of houses, buildings, commercial centers, educational, medical, leisure or any other type of building (excluding underground infrastructure and roads), the Developer is required to obtain a building permit from the concerned Area Municipality in compliance with Bahrain Building Permit Law, the implementing Regulations and Municipality procedure prior to start any work on site. TRA role/Service Provider in this regard is to ensure that the development has a proper and adequate service.

Any telecommunications building above ground and outside road reservation i.e. mobile tower will also require a building permit.

Special Notes:

- a) *The telecommunications network shall be constructed by employing only Service Provider prequalified contractors and approved materials suppliers for the concerned categories of the works and as approved and agreed with the service provider.*
- b) *New connection applications for individual customer inside the development shall be submitted as per TRA / Service Provider specifications and procedure.*
- c) *For new service connection TRA/Service Provider shall be consulted for approval prior to installation to avoid redundant works.*
- d) *The final location of the individual customer connection shall also be approved by the Service Provider.*
- e) *There is a summer restriction period imposed by Electricity and Water Authority to disallow any excavation works near high voltage cables which extends from May to end of October. The construction implementation programme must account for this restriction period.*
- f) *One meter telecommunications corridor on the footpath/footway should be provided where possible as indicated on **The Guidelines for Telecommunications Infrastructure Deployment** (Chapter 4.0 C)*
- g) ***Breaking existing Asphalt:** In the event of breaking existing asphalt paving or trenching or excavating in an existing road, the reinstatement shall be of full road width as per the MOWMAUP's Code of Practice for Service Installation Chapter 9 issued in 1993 or based on mutual agreements with Roads Projects & Maintenance Directorate. The reinstatement will be inspected by the Roads Projects & Maintenance Directorate/ Damage Prevention Control Unit prior to adoption. It is advised that such works shall be included in the construction tender.*

6. Construction Stage

If the construction of the telecommunications network will be done by the Private Developer, then the following procedure shall be followed:

6.1 Pre-Construction Meeting

The Private Infrastructure Developer shall contact the concerned department of the Telecommunications Service Provider in writing prior to the commencement of construction of the telecommunications network and inform them of the works intended to be implemented and the construction programme in order to arrange for a supervising engineer who will be responsible for inspecting and approving pipes, bedding, materials, chambers and procurement sources.

The most suitable time for this would be before the pre-construction meeting is held for the intended works.

Telecommunications Service Provider's representative may attend this meeting as necessary to receive the following:

- ✓ The name of the works' contractor and their contacts details,
- ✓ The name of the Developer's supervising engineer and contact details,
- ✓ Information on the telecommunications design, drawings and specifications and;
- ✓ The Works Implementation Programme.
- ✓ Witness any particular tests during construction.
- ✓ Agree on the adoption check list.
- ✓ The representative will determine if and when their staff should visit the site and observe the works when they are in progress.

All of the above shall be provided by the Developer.

The representative will provide their requirements to the pre-construction meeting regarding the required materials and construction testing and the documents to be prepared and submitted at the time of completion of the works, including the As-Built Drawings and their standards.

6.2 During Construction Stage

Once the works have commenced, it is the Developer's responsibility to complete the works to Telecommunications Service Provider's satisfaction within timescales in the agreed programme of works, and to make sure adoption takes place within a reasonable timescale to minimize any potential risks or inconvenience to residents.

The Developer must allow site access to Telecommunications Service Provider's representative to inspect the construction for a supervisory and quality check during the construction and installation on pre-agreed dates.

These visits do not free the Developer from their responsibilities for supervising the works and for making sure that it is carried out in a proper and safe manner and in line with approved design and specifications.

The Telecommunications Service Provider's representatives must be invited to Key meetings during Implementation stage. These are:

- Kick Off Meeting
- Design Review Meetings during construction. If design takes place during the construction phase -either Contractors design or Consultant design- or if unforeseen problems are encountered during construction and changes have to be made then a design review meeting should be held with the Telecommunications Service Provider and details of the design proposal should be forwarded to the Telecommunications Service Provider at least one week before the Design Review Meeting.

- Progress Meetings with at least one week's notice.
- Prior to taking-over certificate.

It is the Private Developer's responsibility to carry out the excavations, backfilling of trenches and necessary testing in accordance with the Code of Practice for Service Installation (Chapter 9 update 2009). More over the Private Developer is fully responsible for the correctness of the setting out of the telecommunications cable corridor and associated structures making sure that they will be built in their intended positions and to the intended profiles and dimensions. However, the mentioned setting out may be verified by BNET representative.

6.3 Taking-Over Certificate

The Taking-Over Certificate (Completion Certificate) confirms the completion of the construction works under the contract. It is necessary to notify TRA/Telecommunications Service Provider prior to the commencement of the process of handing over between the Developer's Project Manager and the Contractor to issue the Taking-Over Certificate to ensure there are no disagreements over the completion status of the works and to ensure that TRA/Telecommunications Service Provider is also satisfied that the works are satisfactorily completed.

The Taking-Over Certificate date will be the date of the start of the Defects Liability Period (DLP).

6.4 Pre-Commissioning & Trial Period

BNET is responsible for pulling the cables inside ducts and the commissioning of the network the date of which shall be agreed with the Developer. The normal practice of Telecommunications Service Providers dictates that the commissioning is done as and when the need arises for the services to avoid having the system sitting idle i.e. until the occupation of residential or commercial units. The commissioning date and the supply of service shall be agreed in advance between the Telecommunications Service Provider and the Developer to comply with the construction phasing of the Private Development.

The trial period, of not less than one month, is normally required to ensure correct and safe operation and identify and finalize defects. The Contractor is responsible for the safety, operation and maintenance of the network during the trial period, which is within the contract duration.

6.5 The Defects Liability Period

The Defects Liability Period (DLP) for the whole of the works, or for part of the works or as agreed with the Service Provider, will commence on the date of the completion /taking over of the works. The Service Provider will conduct another inspection of the site at the end of the DLP to observe any snags or faults that they will request the Developer to rectify.

During this period, inspection of all telecommunications installations will be carried out regularly to ensure that the system operate properly. Special attention should be paid to any signs of deterioration in the system both functionally and structurally. Any structural defect, faults detected at its early stage of formation would allow preventive remedial works to be carried out at lower cost. The frequency of inspection should be agreed between the Service Provider and the Developer at early stage of the implementation programme.

The Developer shall be responsible for the safety, operation and maintenance of the telecommunications network and associated structures during the DLP even if it is operational and until the network is formally adopted all in accordance with the signed commercial agreement.

The Developer is responsible to immediately notify any third party damages to the Damage Prevention Section/Maintenance and Operation Section of the Service Provider to agree on suitable remedial works and to take immediate action.

Note: The actual adoption and taking over of the works by the Service Provider occurs at the end of the DLP, which is when the Developer's contractor is no longer responsible for the maintenance of the works during the DLP.

7. Adoption Stage

7.1 Pre-Adoption Meeting

One month or more prior to the end of the DLP, it is the responsibility of the Developer to apply for formal adoption and arrange a pre-adoption meeting with the Service Provider. The purpose of the Pre-Adoption Meeting is to ensure that all documentation and as-built drawings have been provided and all condition and function tests have been completed with no defects outstanding. All agreed inspections and condition checklists should be signed off at this meeting.

In the event that as-built drawings are not available at the time of the handing over inspection, marked up prints of the working drawings showing the final amendments and the extent of works to be handed over should be provided. Records of material quality and acceptance tests should also be available for scrutiny.

7.2 Site Inspection prior to Adoption

The physical inspection will be conducted by the Service Provider. The works will be assessed visually and the quality of documents is assessed. If there are no observed faults or issues, or only minor faults or snags are noted, the Service Provider will usually approve the works, prepare their comments and will inform the Private Developer accordingly by letter and will advise that the works are suitable for adoption.

The Private Infrastructure Developer will also be requested in writing to rectify any minor faults or snags observed and shall demonstrate that the minor faults and snags have been rectified prior to formal adoption.

If a major fault or faults are observed in the works or if there are deficiencies in the documents submitted, for example if the as-built drawings do not meet the required standards, the Service Provider will inform the Private Developer accordingly and will advise that the works will not be adopted until the concerned major fault or faults are made good and document provided.

7.3 Issuance of Adoption Certificate

The Adoption date is the date upon which the Service Provider becomes fully responsible for the operation and maintenance of the telecommunications network and relevant facilities. Up until this date the contractor is responsible for the contract works which have not been handed over, even if they are fully operational.

If all of the inspections, tests, trial period and defects have been completed and documentation provided then the Adoption Date can be confirmed and the Adoption Certificate can be signed by all parties.

7.4 As Built Drawings

The final as-built drawings shall be submitted within one month of the Adoption date then the Service Provider/TRA will upload onto the Government GIS Portal. The specification and standards of the as-built drawings will be provided by TRA/appointed Service Provider at an early stage of the project.

Within three (3) months of issuing the completion certificate, the final operation and maintenance (O&M) manual for electrical and mechanical (E&M) works, as-built drawings and calculations (if requested) should be submitted.

As-Built coordinates of all items of telecommunications network must be checked and verified by third party survey professional from approved survey companies/consultants list by Survey and Land Registration Bureau (SLRB). The actual survey may be carried out by the Contractor himself or he may use the services of a professional survey firm. The contractor/surveyor shall be responsible for implementing full quality control and assurance procedures at each stage of work.

Notes:

- (a) Simple stamping of design drawings as "As Built" is not acceptable.*
- (b) It is a requirement that the draft marked-up as-built drawings shall be prepared concurrently with construction activities and it is recommended that the draft as-built records are updated monthly along with the usual monthly progress reports*

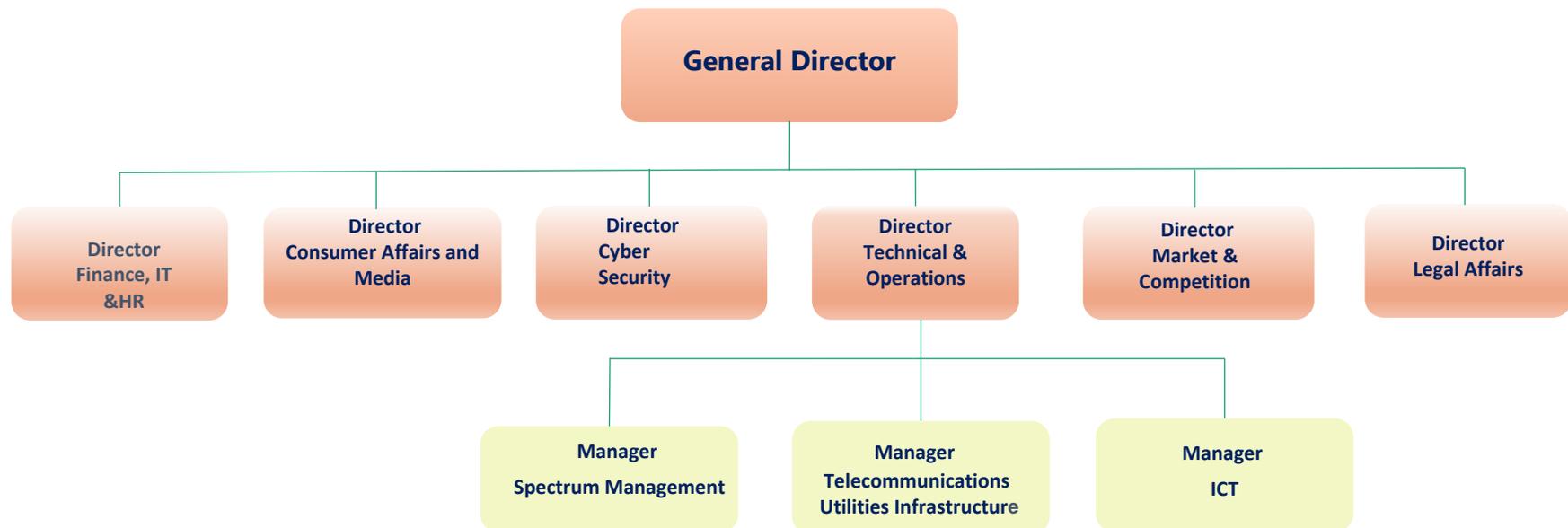
- (c) *It is best not to leave this task to the end of the construction period because it will probably be too difficult for the contractor to prepare and complete the As-Built Drawings in good time.*
- (d) *The as-built drawings data are to be captured on site and prepared by an approved Survey and Land Registration Bureau (SLRB) surveying firm, and to be prepared in accordance with TRA's specifications, bearing in mind that as-built drawings data are to be captured on site in accordance with the latest specifications & standards for data capture for as-built field survey of the SLRB. Information can be found on SLRB site <https://www.slr.gov.bh/AsBuilt/Default.aspx>.*
- (e) *The list of approved SLRB surveying firms can also be found under SLRB web site. Any request for clarifications should be addressed to Topographic Survey Directorate, Survey and Land Registration Bureau, PO Box 332, Manama, Kingdom of Bahrain or email: AsBuilt@slrb.gov.bh.*

8. APPENDICES

- Appendix A: TRA Organizational Chart including the web site, address and office location.
- Appendix B: Design Drawings Standard Requirements.
- Appendix C: Adoption Standard of Construction Details of telecommunications Network.
- Appendix D: Sample of Pre-Planning Consultation Form.

APPENDIX A

Telecommunications Regulatory Authority



<http://www.TRA.org.bh>
P.O. Box No. 10353, Manama
Kingdom of Bahrain

HQ Address: 5th Floor,
Building 852 432
Road 3618, Seef, Manama
Tel 1752000, Fax 17532125

APPENDIX B

REQUIREMENTS FOR DESIGN AND DRAWINGS APPROVAL FOR TELECOMMUNICATIONS PROJECTS DESIGNED AND BUILT BY A PRIVATE DEVELOPER

These instructions related to the preparation of drawings apply to any private infrastructure developer planning and preparing or procuring telecom network design drawings. These instructions have been prepared in order to create standardisation and uniformity for the preparation of drawings for Telecommunications network with the aim to ensure that all drawings depicting Telecom infrastructure are captured and stored on the Telecommunications Regulatory Authority's (TRA) Drawings Database. TRA can provide assistance with the provision of standard frames and cell libraries, and ensuring that drawings are in compliance with TRA's Drawings Database.

GENERAL REQUIREMENTS FOR DESIGN APPROVAL

- A Letter from the Developer confirming the appointment of the consultant for the design and or the construction supervision services of the intended infrastructure network.
- Copy of the Approved Development Masterplan (hardcopy & softcopy in Microstation version 7 or lower with UTM coordinates in WGS-84 system) with coloured zoning and a brief description including built up area and population.
- Copy of Approved Subdivision Plan of the area under design.
- Basis of Design Report for each respective infrastructure as applicable. The design report must be specific to the project not a general. TRA will advise on the report format and requirements wherever applicable.
- Full design drawings as per the respective Telecom Service Provider requirement.
- All Infrastructure works to be designed in accordance with each respective TRA/Telecom Service Provider standard specifications and design criteria and shall be constructed by employing only approved materials and approved contractors.
- The Planning Permission Application is the tool for design approval of all infrastructure. The Developer must consult CPO for submitting PP through the electronic "Tasareeh System".
- The Private Developer must consider the lead time required for the design approval and the granting of the Planning Permission in his programme. It is advisable to submit the planning permissions at least 6 months before the infrastructure construction is due to be implemented.

- In addition to the comments and approval by the Services Authorities of the Planning Permission, Central Planning Office (CPO) will check and comment on the same planning permission as per normal procedure to ensure quality, coordination of all infrastructure proposals and integration with the overall area masterplan.
- Additional requirements might be requested by TRA/Service Provider depending on the type and complexity of the project.

NOTE: Developers are advised to refer to the adoption procedure for details.

COMMON DESIGN DRAWINGS STANDARDS:

The infrastructure design drawings submitted to Authorities under Planning Permissions and/or for design approval must adhere to the following minimum requirements:

- All layout plans are based on NSD base maps (1:1000 scale) and must have cadastral Grids and Coordinates (Eastings & Northing) with correct direction of the North Arrow.
- Provide Drawings Index Plan and the associated Drawing Index Table.
- Datum and Bench Mark used for the specific Project to be marked on the plans and on the Legend for both design and as built drawings. All surveys carried out in Bahrain must be carried out on the national survey datum.
- Design Drawings must have the individual design Engineer signature in the approval Box and qualified registered engineer signature in the checker box.
- If too many drawings to be listed on the planning permission form, a covering List of drawings with the name and signature of the Designer and the Checker to be provided.
- Title Block must reflect the name of the project and the proposed works.
- Key plan and layout plan to have the same orientation, i.e. the same north arrow direction.
- Proper Legend and building heights must be added on the Key Plan, zoning plan, and all layout plans.
- Notation of the Services Networks lines and feature graphic symbols and text must be in compliance with each Authority standards i.e. shape of chamber, ducts, cables, pipes etc.
- Ensure the tie-in points between any two neighbouring areas, as well as between primary and secondary networks, are matched precisely horizontally and vertically. Drawings must show the number and the levels of the interfacing points (say chambers) and the coordinates of the interfacing line of cables for quick reference to ensure connectivity.
- Drawing scales should be accurate when drawings are printed such that the scale rulers can be used with reasonable accuracy for checking dimensions.

- Text font, size and line thickness used shall be suitable such that when drawings are printed in A3 size, the information is easily readable.
- Utilities Cross-sections at different locations on the proposed network and in particular where services changes locations which shall be approved by all concerned stakeholders.
- Additional utilities cross-sections where utilities cross each other showing protection provided (if any) and to ensure adequate vertical clearances are maintained and that there are no clashes between the services.
- Telecom corridors to be one-meter width in footpath/footway, in cases of corridor size limitation; the Developer shall coordinate with Ministry of Works – Central Planning Office on an encroachment solution for TRA/BNET review and approval.
- Combined Utilities Layout Plan of the whole network.
- For easy referencing, Road numbers must be written on the layout plan for all infrastructure drawings.
- For easy understanding of the plan contents, drawings must show the designated landuse of large plots i.e. Town Center, University, school, Mosque, commercial, Primary Substation, water station, petrol station etc. Use suitable text size to be readable in A3 size sheet.
- It is prudent to provide provisional services for vacant plots i.e. gardens, schools, mosque, community centers etc. to avoid future cutting of asphalt and footpath. However each Authority have their own regulations and criteria in regard to providing provisional connections for empty plots. This shall be agreed in advance.

TELECOMMUNICATIOIS REQUIREMENTS

In addition to the above requirements, the following submission and requirements must be adhered to:

- ✓ One hard copy of A1 size scale 1:500 and three sets of A3 size of reduced scale in addition to a two CD containing drawings in Microstation version 7 or lower or AutoCad 2007 or lower with UTM coordinates in WGS-84 system and pdf.
- ✓ All telecommunications infrastructures works shall be designed in accordance with the TRA Guidelines and the Telecom Service Provider technology, standard specifications, design criteria and shall be constructed by employing only approved materials and approved contractors.
- ✓ Copy of approved masterplan and approved land subdivision.
- ✓ List of drawings table.
- ✓ Drawings index plan.
- ✓ Telecom general layout plan showing the project limit of works.

- ✓ Anticipated construction phasing plan.
- ✓ Topo survey sheet index.
- ✓ Topo survey layout.
- ✓ Telecom layout planned showing road numbers, and road continuity with adjacent area in lighter lines.
- ✓ Key plan and layout plan to have the same orientation.
- ✓ Contingency ducts location must be identified on the plans including the number of ducts.
- ✓ Telecom longitudinal sections (profiles) must match the layout plan.
- ✓ Construction Details to include chambers, pipe bedding, joint boxes, towers, in-building solutions and associated telecoms buildings (if any).

GENERAL AS BUILTS STANDARDS & SPECIFICATIONS

- a) Geodetic Datum: All surveys carried out in Bahrain must be carried out on the national survey datum. The National Survey Datum (NSD) used is defined as follows:
 - i. Name: Ain Al-Abd
 - ii. Transformation Model: Bursa-Wolf all in accordance with the Survey & Land Registration Bureau.
- b) Simple stamping of design drawings as “As Built” is not acceptable.
- c) The Developer shall issue complete set of as-built drawings and other required documents i.e. inventories for the project in hard copies and soft copies (Microstation version 7 or lower or AutoCad 2007 or lower with UTM coordinates in WGS-84 system) within one month from the date of Taking-Over Certificate. Final as-built drawings and documents shall be submitted prior to adoption reflecting all the changes undertaken during the Defects Liability Period.
- d) As built drawings shall be created and delivered in accordance with the Survey and Land Registration Bureau (SLRB) Data Capture Standards for As Built Field Survey current at the time.
- e) The Developer must ensure that SLRB Standards & Specifications for the production of As Built are included in the construction Tenders and ensure that the surveys are done in a timely and correct manner.
- f) The actual survey may be carried out by the Contractor himself or he may use the services of a professional survey firm. The contractor/surveyor shall be responsible for implementing full quality control and assurance procedures at each stage of work.

**ADOPTION PROCEDURE OF TELECOMMUNICATIONS SYSTEM
TO BE CONSTRUCTED BY A PRIVATE DEVELOPER**

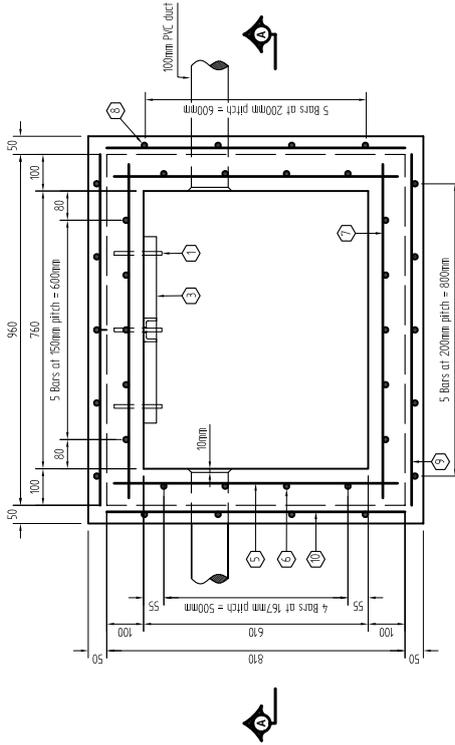
APPENDIX - C

**Adoption Construction Standards
For Telecommunications Network**

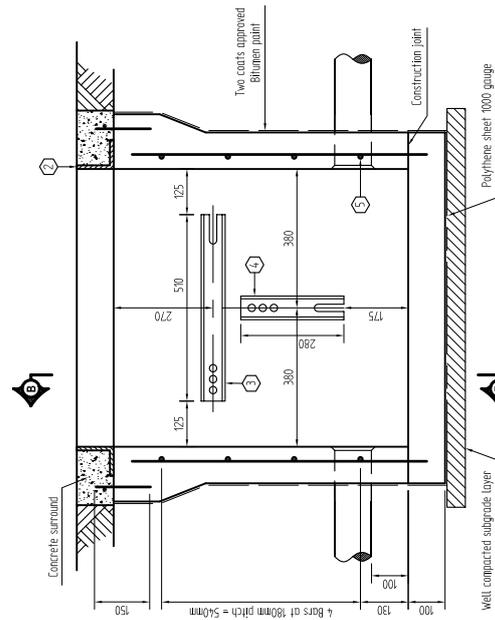
NOTES:

1. End ducts must be in line.
2. Reinforcement may be repositioned slightly to clear ducts or other accessories.
3. Minimum 40mm concrete cover on all reinforcement.
4. Poke out shall be provided as instructed by supervisor.
5. All concrete shall be quality "A" concrete (1 : 1 : 1/2 : 3).
6. All dimensions are in mm unless otherwise indicated.
7. Reinforcement measurements are approximate; contractor shall be responsible to cut bars to the exact dimensions.
8. Internal dimensions of boxes might be altered slightly to fit the inside dimensions of frame and cover.
9. Bolts to be mounted as per the bearer dimension.

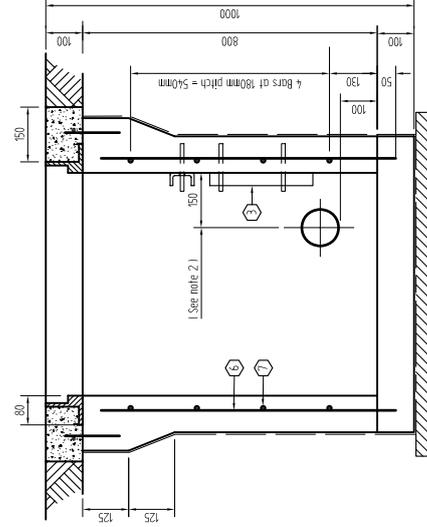
ITEM	DESCRIPTION	DRG.	NO.OF
1.	BOLTS: FOUNDATION, INTENDED NO. 2.		4
2.	FRAME & COVER, JRC 4 (E3027 100/4308).		1
3.	CABLE BEARER WALL TYPE NO. 3 (100/4244).		1
4.	CABLE BEARER WALL TYPE NO. 2 (100/4243).		1
5.	REINFORCEMENT BAR 10 DIA x 730mm.		8
6.	REINFORCEMENT BAR 10 DIA x 800mm.		18
7.	REINFORCEMENT BAR 10 DIA x 880mm.		8
8.	REINFORCEMENT BAR 10 DIA x 150mm.		18
9.	REINFORCEMENT BAR 10 DIA x 960mm.		2
10.	REINFORCEMENT BAR 10 DIA x 810mm.		2



PLAN



**SECTION A-A
FOR REFERENCE PURPOSES**



SECTION B-B

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DATE	BY	APPD	REVISIONS
05 09 05	XA2		Update
03 06 04	XA2		Update
02 04 03	NA4		Original design

Batelco 

TITLE:

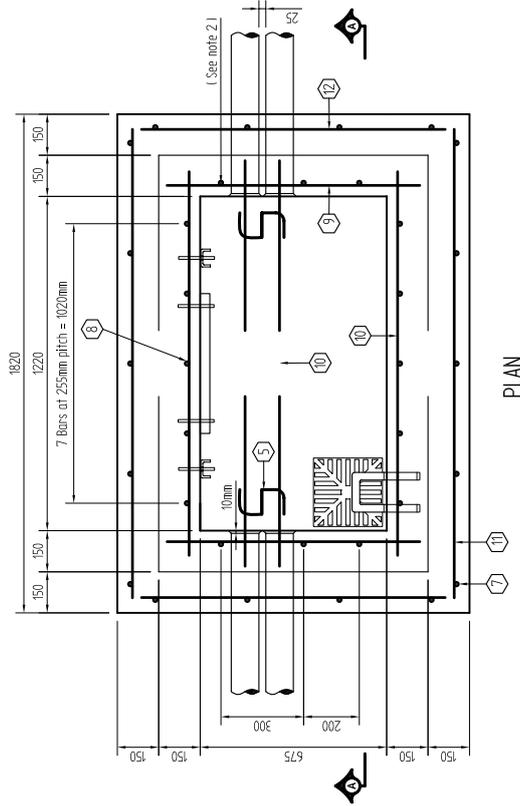
JOINT BOX JRC4

DRN. Amer	DATE: 02 04 03	SCALE: 1:15mm
APPD. S. Zuhair	SHEET. 1 of 1	DRG.NO: CC 1.32

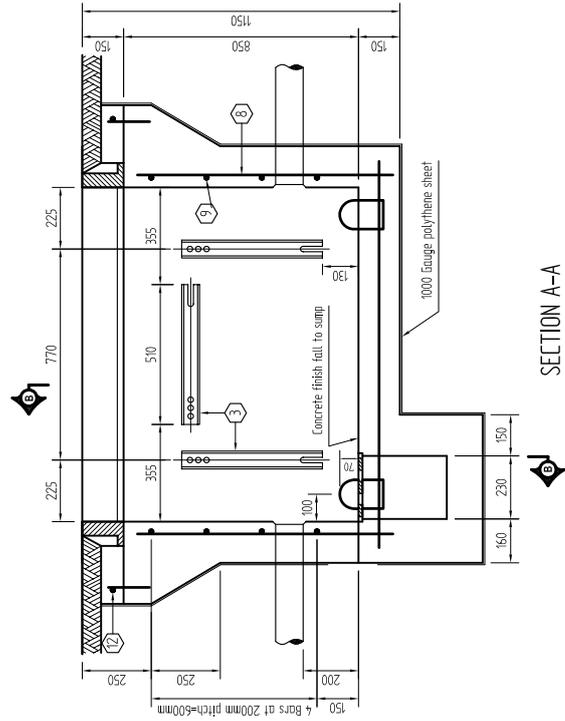
NOTES:

- End ducts must be in line.
- Reinforcement may be repositioned slightly to clear ducts or other accessories.
- Minimum 40mm concrete cover on all reinforcement.
- Poke out shall be provided as instructed by supervisor.
- All concrete shall be quality "A" concrete (1 : 1 : 1/2 : 3).
- All dimensions are in mm unless otherwise indicated.
- Reinforcement measurements are approximate; contractor shall be responsible to cut bars to the exact dimensions.
- Internal dimensions of boxes might be altered slightly to fit the inside dimensions of frame and cover.
- Bolts to be mounted as per the bearer dimension.

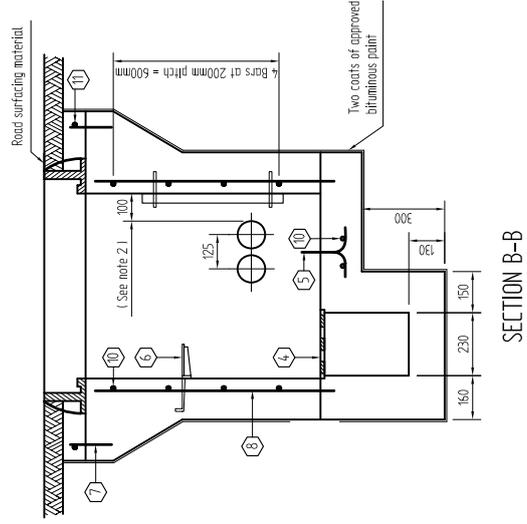
ITEM	DESCRIPTION	DRG.	NO.OF
1	BOLTS FOUNDATION INDENTED NO. 2		6
2	FRAME & COVER, JRC12 SILENTKNIGHT CJB4/AP		1
3	CABLE BEARERS WALL TYPE NO. 3		3
4	GRATING SUMP NO. 2		1
5	ANCHOR IRONS NO. 4		2
6	STEP MANHOLE NO. 1		1
7	REINFORCEMENT BAR 12mm DIA. x 150mm		18
8	REINFORCEMENT BAR 12mm DIA. x 850mm		20
9	REINFORCEMENT BAR 12mm DIA. x 870mm		8
10	REINFORCEMENT BAR 12mm DIA. x 1400mm		10
11	REINFORCEMENT BAR 12mm DIA. x 1700mm		2
12	REINFORCEMENT BAR 12mm DIA. x 1100mm		2



PLAN



SECTION A-A



SECTION B-B

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DATE	BY	APPD	REVISIONS
05 09 05	XA2		Update
03 06 04	XA2		Update
02 04 03	NA4		Original design

Batelico

TITLE:

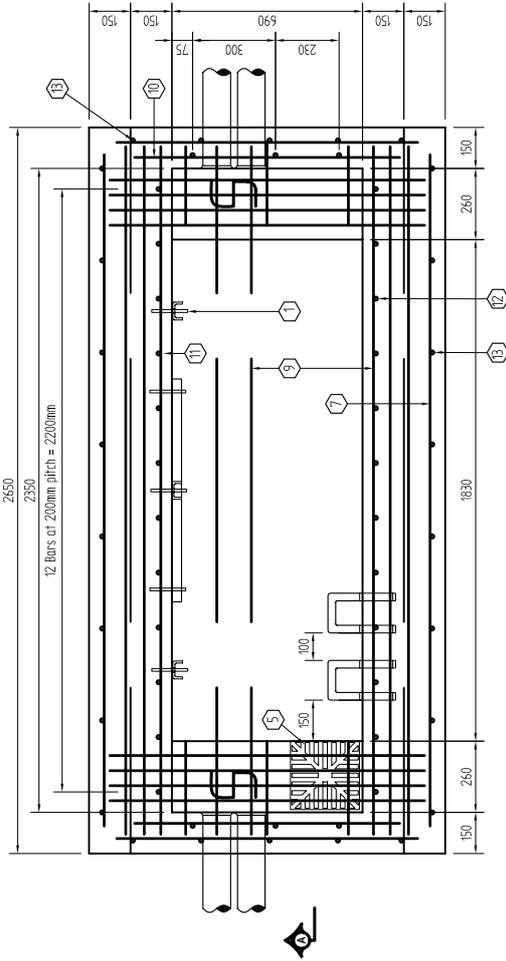
JOINT BOX JRC12

DRN. Amer	DATE: 02 04 03	SCALE: 1:20mm
APPD. S. Zuhair	SHEET. 1 of 1	DRG.NO: CC 133

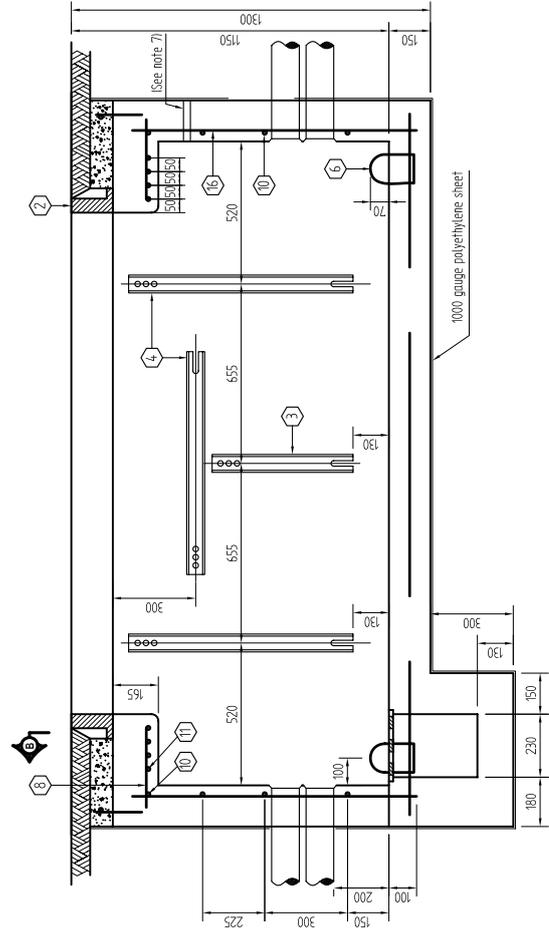
NOTES:

- End ducts must be in line.
- Reinforcement may be repositioned slightly to clear ducts or other accessories.
- Minimum 40mm concrete cover on all reinforcement.
- Poke out shall be provided as instructed by supervisor.
- All concrete shall be quality "A" concrete (1 : 1 : 1/2 : 3).
- All dimensions are in mm unless otherwise indicated.
- Reinforcement measurements are approximate; contractor shall be responsible to cut bars to the exact dimensions.
- Internal dimensions of boxes might be altered slightly to fit the inside dimensions of frame and cover.
- Bolts to be mounted as per the bearer dimension.
- For addition 2 way box depth to be increased by 15mm.

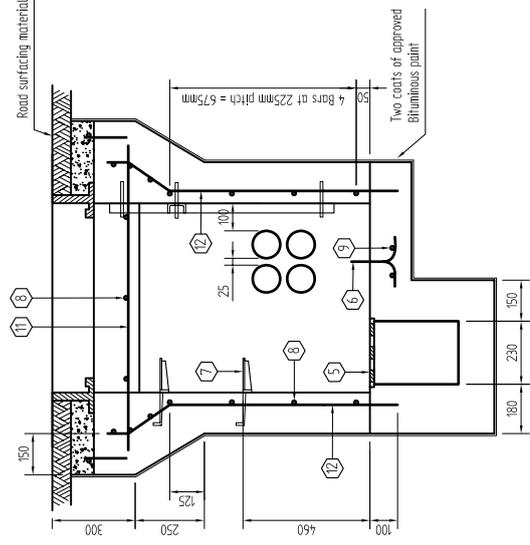
ITEM	DESCRIPTION	DRG.	NO.OF
1.	BOLT FOUNDATION INVENTED, NO: 2		8
2.	FRAME & COVER, JRC14, SIENTKNIGHT C144/VAP		1
3.	BEARER CABLE, NO: 3, 508MM, WALL TYPE		1
4.	BEARER CABLE, NO: 5, 508MM, WALL TYPE		3
5.	GRATING SUMP, NO: 2A		1
6.	ANCHOR IRON, NO: 4		2
7.	STEP MANHOLE, NO: 1		2
8.	REINFORCEMENT BAR 12mm DIA. x 300mm		6
9.	REINFORCEMENT BAR 12mm DIA. x 2500mm		10
10.	REINFORCEMENT BAR 12mm DIA. x 890mm		8
11.	REINFORCEMENT BAR 12mm DIA. x 1100mm		8
12.	REINFORCEMENT BAR 12mm DIA. x 1125mm		24
13.	REINFORCEMENT BAR 12mm DIA. x 150mm		26
14.	REINFORCEMENT BAR 12mm DIA. x 24500mm		2
15.	REINFORCEMENT BAR 12mm DIA. x 790mm		2
16.	REINFORCEMENT BAR 12mm DIA. x 1000mm		6



PLAN



SECTION A-A



SECTION B-B

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DATE	BY	APPD	REVISIONS
05 09 05	XA2		Update
03 06 04	XA2		Update
02 04 03	N/A4		Original design

Batelco

TITLE: **JOINT BOX JRC14**

DRN.	Amer	DATE:	02 04 03	SCALE:	1:20mm
APPD.	S. Zuhair	SHEET:	1 of 1	DRG.NO:	CC 134

Main Equipment Room

- 4 to 6 Cabinets of 600mm W x 600mm D x 2200mm H (with front access)
- 63A 3-Phase 220VAC Power is needed for the rectifier
- Clean Earth is required / Building Ground
- Temperature should be maintained at least 22 degrees Celsius
- Secure but Accessible for all Operators
- Fiber Optic routing to Remote Radio Unit (RRU) Locations

Remote Radio Unit (RRU Location) for DAS

- 3 to 4 units of RRU per location including jumpers and other accessories
- Space differ from each location (sample installation shown on next pages)
- 32A 220VAC Single Phase Circuit Breaker / Isolator Power Supply (should be on essential power source – generator on UPS)
- 4 to 8 Pairs Fiber Optic Single Mode (SM) from Main room
- Temperature should be maintained at least 28 degrees Celsius or good air circulation
- Secured but Accessible for all Operators
- Connection to Building Grounding / Earth

Microwave Radio (Rooftop)

- 0.6 to 1.2 Meter Microwave Dish to be installed
- Should be around 100M away (IF cable Run) from Main Equipment
- 1 to 2 antenna to be installed for redundancy
- Line-of-Sight (LOS) Survey is needed to point the location
- Connection to Building Grounding / Earth

Outdoor RF Antenna with RRU (Rooftop)

- For continuity between indoor ← → outdoor and other site
- Will be discussed separately as it differs from operator to operator

Distributed Antenna System (DAS) Criteria

- MIMO Distributed Antenna System
- DAS Passive Components at least 790MHz – 2700MHz ready
- Multiple Sectors (minimum as possible)
- 2G O/P BCCH of +43dBm -75dB RSL @900MHz / -80dB RSL @1800MHz
- 3G O/P CPICH of +33dBm -85dB RSL @2100MHz
- 4G O/P RSRP of +18dBm -95dB RSL @1800MHz
- All RSL are at 98% of the building (including service halls)
- Multi-operator Ready (up to 4 operators) –using MCM 4x4 minimum 200Watts per input and all output ports used (no dummy loads)
- 4 to 8 pairs Fiber Optic Single Mode for each operator from Main Room to each Remote Rooms for each operator
- *Antenna inside rooms below the ceiling should be considered in apartments, residences, suites and hotel rooms as certain power is only allowed on antenna

Main Room Units



Eitek Rectifier FlatPack2

Other Specifications

Isolation	3.0 KVAC – input and output 1.5 KVAC – input earth 0.5 KVDC – output earth
Operating temp.	-40 to +60°C (-40 to +140°F)
Storage temp.	-40 to +85°C (-40 to +185°F)
Dimensions (Ref. ETSI std)	600 x 600 x 1800mm (wxdxh) (23.6 x 23.6 x 70.9")
Weight /2.0m	Approx. 90kg (199lbs) excl. rectifiers

Remote Radio Units



RRUS12

518mm H x 470mm W x 191mm D



Triplexer



42U Cabinet Rack

600mm W x 600mm D x 2000mm H



MU units inside 42U Cabinet

482mm W x 350mm D x 66mm H

Distributed Antenna System (DAS) Units



Brand: Laird
 Diameter 218.7 mm x Height 43.5 mm



Brand: Laird
 Dimensions 295 x 295 x 82 mm
 Weight 1.46 kg

1/2" Superflexible Foam Dielectric,
 FSJ Series – 50-ohm



7/8" Foam Dielectric,
 LDF Series – 50-ohm



Brand: i-Flex

MCM 4x4 –Operator Combiner



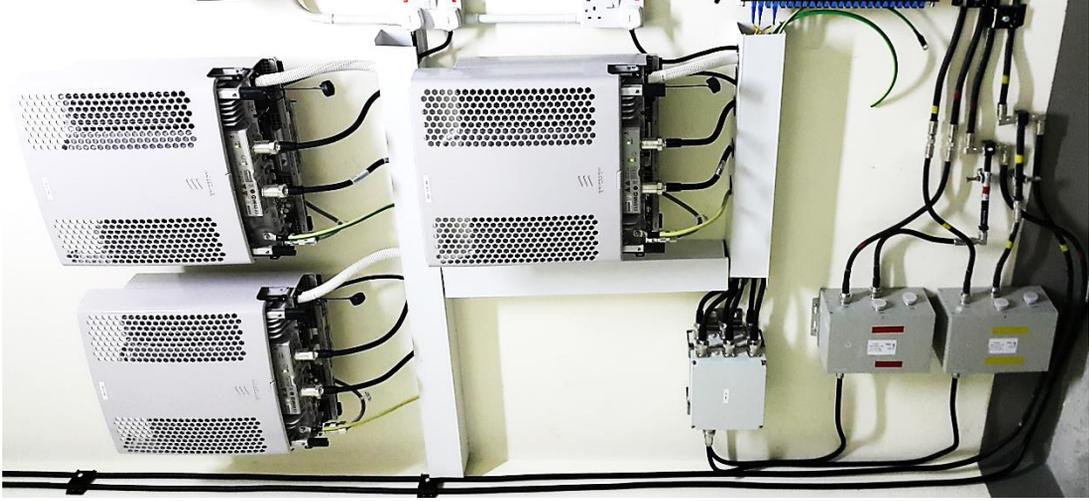
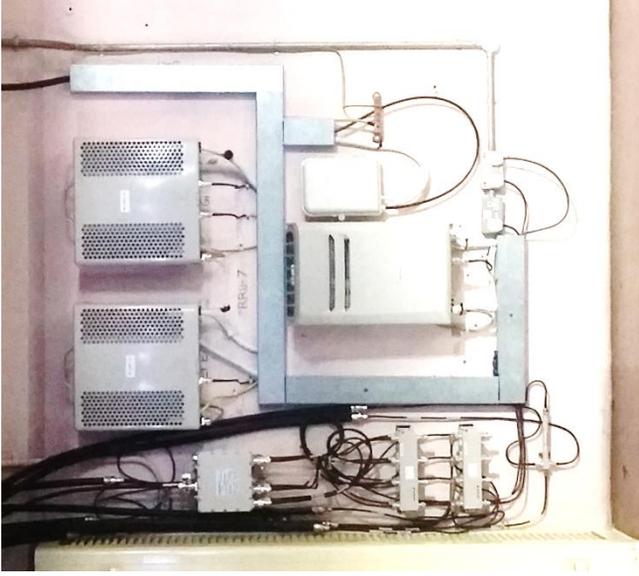
Triplexer



Splitters / Tappers

*Dimensions and Appearance might vary depending on vendor

Remote Radio Units Sample Installations



City Center Bahrain Carpark

Gulf Hotel Complex

Four Seasons Hotel
* during implementation

Main Room Sample Installations



ART Rotana Amwaj Island



City Center Bahrain



City Center Bahrain



Gulf Hotel Complex

Microwave Sample Installations



Bahrain World Trade Center –
Moda Mall Carpark



Bahrain International Circuit–
Main Grandstand



Domain Hotel

**ADOPTION PROCEDURE OF TELECOMMUNICATIONS SYSTEM
TO BE CONSTRUCTED BY A PRIVATE DEVELOPER**

APPENDIX - D

**Sample of
Pre Planning Consultation Form**

PRE PLANNING CONSULTATION

The proposed process is as follows:

1. Name: Pre Planning Consultation.
2. Index: PPC/...../..... (PPC/Serial No./Applying Utility e.g. PPC/001/PSD(E).
3. Form: The format of the application is as enclosed:
Form CPO-F-018/April 2012.
4. Completion of form:
 - (i) Applicant Name with description of the future project to be designed plus tick the destination boxes.
 - (ii) Attach the geographical description of the area which is subject of the investigation either **as a route** with a clear description of the width of area each side of the route for which data is required.
 - (iii) Or **an area within a boundary** within which all data should be shown.
 - (iv) Or **any other description** of the data required e.g. request details of a particular network (say telecoms).
5. **RETURN** of the information.

Part 1: The response from each of the agencies consulted regarding existing as built infrastructure data. This return should also include any special conditions to be adhered to when designing work in, over, above or close to the installations identified.

Part 2: The response from each of the agencies regarding future or under construction projects should also include:

- (a). Any existing planning permission for projects **to be** implemented :P.P. No.
- (b). Anticipated date of implementation:.....
- (c). Any **ongoing project**: Include reference to PP & W/L No.....
- (d). Any **recently completed project** where as built data has not yet been submitted:
.....
- (e). Any **concept proposals** which have not yet gone to design or planning permission stage.

The data supplied can be hard or soft copy (preferably soft copy) with a specification of the digital format and degree of accuracy. CAD files should be clearly identified.