018947 Deployment Rules for Telstra Antenna Support Structures (Access Seeker use only)

IT'S HOW WE CONNECT

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Summary

This deployment standard document is to plan, dimension and deploy Telstra's antenna support structures for site share purposes.

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01 Purpose

This document provides the deployment standards for all of Telstra's Antenna Support Structures and associated infrastructure for site share purposes, regardless of the technology that they may support.

02 Scope

This document shall be Telstra Standard for the design, certification, installation and all upgrades of antenna support structures and associated infrastructure that may be deployed on Telstra Structures for site share purposes and provides the guidelines for their use.

This document:

- Provide details for processes to be followed and approvals to be gained for deploying Antennas on Telstra structures
- Identifies the antenna support structure approved by Telstra and basic rules of engagement, including the approval process for the use of Telstra non approved structures.
- Details the roles and responsibilities of persons involved in the deployment of these structures within the Telstra Radio Networks.
- Details the Certification process, including structural design certification, 'As Built' (construction) certifications and 'As Built' Engineering & EME compliance certification.
- Highlights other issues that require consideration as part of the overall structure implementation process.

The requirements in this Deployment Standard apply from the date of issue. No retrospective action shall be taken unless specifically mentioned in the text of this Deployment Standard.

The content of this Deployment Standard is applicable for the site share purposes only for both carriers and non-carriers, collectively referred to as 'Access Seekers' throughout the contents of this document.

These deployment rules shall be complied with for all site share equipment installed on Telstra structures and infrastructure unless otherwise mandated by Telstra. These rules are a subset of 016159 Deployment Rules for Telstra Antenna Support Structures and as such, any inconsistencies shall defer to the Telstra Deployment Rules (016159).

03 Business Objectives

Deployment of all radio structures and associated Radio Frequency (RF) external plant must comply with the rules laid down in this deployment standard in order to ensure they are done so safely and economically and to ensure the following:

- Compliance to the Telecommunication Act 1997 (Schedule 1 – Part 6),
- Compliance with the Australian Standards ,
- Minimizing risk to people and property,
- Minimizing the risk of failure of antenna support structures.
- Establishing minimum requirements and clarify levels of accountability for design.
- Ensure future maintenance and operation of Telstra's infrastructure is not compromised due to the addition of third party installations.

04 Network Overview

Telstra's radio structures support antennas that are used by a vast range of radio technologies for the delivery of Telstra's Core Network, Wireless (Mobiles) Networks, Customer Access Networks (CAN), Wholesale – Site Share and other users.

Telstra's structures range from 9m high triads primarily used for customer radio services through to masts exceeding 150m supporting a range of technologies.

05 Functions and Responsibilities

This section provides a list of the functions that participate in the process and a summary of the accountabilities corresponding to the functions.

Functions	Description
Access Seekers	People or group seeking space on Telstra's antenna support structures. This can be a carrier or non-carrier. Carrier – Has a telecommunications license and governed by additional agreements. Non Carrier – Does not have a telecommunication license.
Telstra Site Share Coordinator (Carrier / Non Carrier)	Telstra Site Share Coordinator facilitates access to Telstra's antenna support structures
Telstra Approved Structural Consultant	Telstra Approved Structural Engineering Consultants undertakes structural analysis, design documentation and structural certification of the proposed infrastructure and structures for Telstra. These suppliers have contractual arrangements with Telstra and can be engaged by the Access seekers.
Accredited Site Share Structural Consultant	If the access seekers want to use a non-Telstra approved structural consultant then they are to be accredited by Telstra prior to any certification proceedings. These Accredited Site Share Structural Engineering Consultants can undertake structural analysis, design documentation and structural certification of structure and associated infrastructure for Site Share.
Construction Supplier	Access Seeker's Construction Supplier undertakes construction of the proposed site share installation on Telstra structure ensuring compliance with the certified and approved design. The Construction supplier is also responsible for ensuring correct procedure is followed to ensure any structural variations identified during construction are approved. Finally the construction supplier is responsible for marking up drawings to As Built at completion of construction.
Telstra Towers Infrastructure Management	Review the Site Share application and ensure that it complies with the requirement of Site Share Deployment Rules. Also Towers Infrastructure Management group ensures that the operation and future maintenance requirements of Telstra's infrastructure are not compromised due to the addition of third party installations. Undertake Inspection & maintenance of the existing structures. Refurbishment / replacement of structures that are approaching the end of their service life. Ensures the use of Telstra approved structures within the network, where non-Telstra approved structures are required, Towers Infrastructure Management review requirements and where justified provides approval.
Telstra Networks Delivery Program Office - Design	Manages the compliance with the Tower's Deployment Rules and any exception approval from these rules.
Telstra Wholesale	Arranges for the Lease of space on Telstra's structures to carriers.
Global Enterprise and Services	Arranges for the Lease of space on Telstra's structures to Non Carriers

5.1. Access Seekers

The access seekers are responsible for but not limited to:

- Design and construction of the installation in accordance with these Deployment Rules.
- Arranging Telstra approval for any variations from the approved design.
- Obtaining redesign and recertification where there is any deviation from the original certified design.
- Ensuring all applicable updated drawings/records are submitted to Telstra Site Share Coordinator to update and upload into CADlink.
- Completion of the 018947f01 Structural Design Certification
- Completion of 018947f02 'As Built' Construction Certification
- Completion of 018947f03 - Truncated Steel Pole Installation Record as required.
- Completion of the 018947f04 As Built Engineering and EME Compliance Certification.

5.2. Telstra Site Share Coordinator (Carrier / Non carrier)

Telstra Site Share Coordinator facilitates access to Telstra's antenna support structures. Telstra Site Share Coordinator is responsible for managing Site Share process and updating site share documents in Telstra DBoR.

5.3. Telstra Approved Structural Consultant

Structural design and certification of Telstra's Antenna Support Structures and associated infrastructure shall be undertaken by Telstra approved Structural Engineering Consultants given in Appendix – C of this document. These suppliers have contractual arrangements with Telstra and can be engaged to directly update Telstra's drawings. If a non-Telstra Approved structural consultant is to be used then they must be accredited by Telstra as per Appendix – C of the document.

The structural certifier must have qualifications acceptable to Engineers Australia and have the necessary registration to comply with the Building Code of Australia (E.g. the RPEQ number in Queensland) to practice as registered structural certifier.

They can be engaged by Access Seekers (or their delegates) to prepare structural designs and associated documentation. They shall provide as required:

- Structural design of the structure, footing system, headframe, antenna mounts and other ancillary mounting steel. The structural design shall be completed using Telstra's Structural Design Certification template, form 018947f01 (including the 018947f01 cover letter).
- The 018947f01 structural design certification shall include the summary of design analysis calculation results (refer 018947f01 Attachment A).

Note: The Design Certification 018947f01 is to be submitted to the Telstra Site Share Co-ordinator to upload into CADlink under Sheet Z1 of the Site Drawings in accordance with the Procedure 017866a06 CAD Standards Manual and Procedure 017866a03 CAD Drawing Matrix. Refer Appendix E for more details.

5.4. Accredited Site Share Structural Consultant

These deployment rules also permit the accreditation of additional structural consultants by Telstra, who are ONLY permitted to complete work for site share submissions. Prior to undertaking any certifications for Telstra structures the supplier must submit an application for accreditation as per Appendix-C of this document.

If the structural certification is completed by more than one company (for e.g. certification of structure & footing by one and headframe & antenna mounts by another); then each certifying company undertaking work must be accredited.

Once approved by the Stakeholders, Towers Infrastructure Management group will issue the formal accreditation approval and will maintain a list of the Accredited Site Share Structural Consultants.

5.5. Construction Supplier

The construction supplier of the access seeker is responsible for but not limited to:

- Build the installation in accordance with the Telstra approved design.
- Gain approval to vary the construction from the design
- Where approval has been gained from the Telstra Site Share Coordinator to deviate from the approved design, then they will be responsible for obtaining structural re-certification
- Ensuring the approved changes from original design are marked up in the drawings and all applicable drawings are updated to 'as built' status
- Completion of 018947f02 'As Built' Construction Certification.
- Completion of 018947f03 - Truncated Steel Pole Installation Record as required.
- Provide date stamped site build photo record

Note: Where a structural upgrade is required to support the Access seeker's infrastructure then details to confirm the completion of structural upgrade shall be included in the above documentation.

Note: These Certifications are to be submitted to the Site Share co-ordinator to upload into CADlink, in accordance with the Procedure 017866a06 CAD Standards Manual and Procedure 017866a03 CAD Drawing Matrix. See Appendix E for more details.

5.6. Telstra Towers Infrastructure Management

Towers Infrastructure Management group is responsible for ownership and ongoing maintenance of all of Telstra's structures. Once the project for new infrastructure has been granted practical completion and has been accepted by Telstra, Towers Infrastructure Management group becomes the owner of the structure.

The Towers Infrastructure Management group shall ensure:

- Any structures available on the Telstra approved list meet the requirements of the Product Sourcing Agreement (PSA).
- Review the Site Share application and ensure that it complies with the requirement of Site Share Deployment Rules and future maintenance as well as operation of Telstra's infrastructure is not compromised due to the addition of third party installations.
- Inspection & maintenance of the existing structures.
- Refurbishment / replacement of structures that are approaching the end of their service life.
- In the event that it is necessary to construct an Antenna Support Structure not on the Telstra approved structure's list, then it will be the role of the Towers Infrastructure Management to:

    - Assess the requirement for use of the particular structure,
    - Provide approval for the use of the structure, subject to full assessment by Telstra approved structural engineering consultant
    - Ensure that the proposed structure has been fully assessed and is fit for use within the Telstra network.

5.7. Telstra Networks Delivery Program Office - Design

Networks program Office Design manages the compliance with the Tower's Deployment Rules and any exception approval from these rules.

5.8. Telstra Wholesale (Replacement / Upgrade of Telstra Structures by another Carrier)

Telstra Wholesale has an obligation to provide space on Telstra's structures to other carriers. In the event another carrier elects to co-locate on an existing Telstra site and the existing structure is not of sufficient capacity, the replacement structure must be sourced from the Telstra Approved Structures list (see section 7 for more details).

If it can be established by the Structural Engineering Consultant that the proposed structure loadings cannot be covered by the existing Telstra Approved Structures then the new carrier will be able to propose the use of a relevant structure. In this event they must conform to Section 07.1 of this document and final approval on the construction of this structure shall be obtained from the Towers Infrastructure Management group.

The structural design prepared by another Carrier for all upgrades or structural modifications of existing Telstra structures (through co-location of another carrier etc.) must comply with the Telstra's structural certification requirements and shall be assessed, designed and certified by Telstra approved/accredited structural consultants only.

All upgrades or structural modifications shall require approval from Towers Infrastructure Management group.

Structure type/importance level and other design parameters used for the structural design of proposed structure shall be the same or more conservative than that of the existing structure.

5.9. Global Enterprise and Services

Arranges for the Lease of space on Telstra's structures to Non Carriers.

06 Existing Structures

6.1. Upgrade of Existing Structures

For all upgrades to Telstra structures by other Carriers, prior to proceeding with the upgrade checks and inspections shall be carried out on the existing structural elements to ensure they are in a satisfactory condition to accommodate the upgrade works. Corrosion on existing elements shall be rectified and surface preparation undertaken as part of the upgrade works.

All upgrades of existing Telstra structures for Site Share shall be assessed, designed and certified by a Telstra approved/accredited structural consultant.

07 New Structures

Whenever a new structure is required for use in the Telstra network, a structure shall be selected from the list of Telstra approved structures and suppliers available upon request from Telstra Site Share Coordinator.

7.1. Non – Telstra Approved Structures

In the event that a structure is required for use and is NOT listed on the Telstra approved structures list the following requirements shall be met, before approval for use will be granted from Towers Infrastructure Management group.

- Notification to the appropriate planning area of the proposal to use a non – Telstra approved structure and approval to proceed.
- The Site Share co-ordinator shall ensure that a full set of documents, including full set of structural drawings, structural analysis, design and certification from the Telstra Approved structural consultant is obtained for approval. The documents shall include (where relevant):
    - All structure details, including sections, materials, welds, connections and openings.
    - All mounting details, including head frames, ladders and tray fixings.
    - All bolt cage / base interface details, including size, grade, fixings etc.
    - Geotechnical report.
    - Footing foundation details, including concrete strength and reinforcing details.

- Risk assessment and safe work method statement for its installation and maintenance.
- Antenna details, including size, type, location, bearing, number etc.
- Feeder details including type, size, location etc.
- Certification of total installation, including structure, mounts and footings for the total antenna and ancillary loads.
- Evidence of manufactures compliance to ISO 9001.
- Design life of the structure.
- Warranty.

- Provision of structural design, documentation and certification documents for the proposed structure to the Networks Delivery Program Office - Design group.

Networks Delivery Program Office - Design group shall be the authority that determines if all the structural design requirements have been met (i.e. fully audit the documentation for quality, scope and content) and for Telstra to approve/accept the product.

08 Structural Design Considerations

All structures shall be designed in accordance with the relevant Australian Standards (AS), Building Code of Australia (BCA), applicable State/Territory and Local Authority regulations, Telstra requirements and site specific requirements. Designers must list all the standards that are complied with during the design and this may include (but is not limited to) any of the following Australian Standards for design corresponding to various structures and site conditions:

- AS 3995, Design of Lattice Towers and Masts,
- AS 1170, Structural Design Actions,
- AS 4676, Structural Design Requirement for Utility Services Poles,
- AS 4100, Steel Design,
- AS 3600, Concrete Design.

8.1. General Design Parameters

The design parameters used for a structure will vary depending on location, level of importance and also against what design standard these parameters have been obtained, e.g. AS 3995 and AS 1170. Refer Appendix A for more details. Structure type/importance level of proposed structure shall be the same or more conservative than the existing structure.

Under AS 3995, Telstra's structures shall be identified as Type I, II or III.

- **Type I: -** A structure shall be classified as Type I where:
  - The structure is designed to provide vital post-disaster communications services; or
  - The collapse of the structure and loss of the services provided causes unacceptable danger to life or extensive economic loss.
- **Type II: -** A structure shall be classified as Type II where:
  - The danger to life in case of collapse may be negligible and adequate warning arrangements are incorporated to ensure the general public is not unduly endangered; and
  - The loss of services provided is not critical or where alternative means of communication can be provided.
- **Type III: -** A structure may be classified as Type III where all consequences of failures are more tolerable than those specified above.

Under AS1170 and BCA, Telstra's structures shall be identified as Importance Level 1, 2, 3 or 4.

- **Importance Level 1:-** Structures presenting a low degree of hazard to life and other property in the case of failure.

- **Importance Level 2:-** Structures not included in Importance Level 1, 3 and 4.
- **Importance Level 3:-** Structures that as a whole may contain people in crowds or content high value to the community or pose risks to people in crowds.
- **Importance Level 4:-** Structures with special post disaster functions.

All new Telstra structures and antenna mounts shall be designed for a minimum design life of 50 years (maintenance may further extend this life). Antenna loading information for design shall be adopted from the corresponding Antenna manufacturer.

Following minimum standards shall apply for all design works:

- Future maintenance and operation of Telstra infrastructure shall not be compromised by the addition of any third party installations.
- When considering structure importance based on (remoteness) proximity to buildings and infrastructure, the structural certifier shall consider the changing landscape, increased road and housing development in making the most appropriate determination for the foreseeable future.
- Similarly, when assessing terrain categories, the existing and changing landscape shall be carefully considered.
- Structure type/importance level of proposed structure shall be the same or more conservative than the existing structure.
- For proposed additions to existing Telstra structure, it is not acceptable to lower the design parameters used in the original certification of that structure. A conservative compliant approach shall be followed in all structural designs & certifications.
- For continuity of accountability and to maximize due consideration of complete design history, consideration shall be made to engage the original Telstra Approved Structural Certifier for ongoing assessments.
- Structural Certifier shall include all Telstra reserved antenna and RRU loading for the structure design to meet the future loading requirement. The exception to this is where the increased load due to the proposed additions is 2.5% or less, the reservations may be ignored. Where there are reserve antennas and RRUs above the existing structure they are not to be included in the analysis unless the structure is to being extended to a level that is at or above the reservations. All Site Share proposed antennas must be loaded into CANRAD by the Site Share co-ordinator as per the CANRAD Business Rules.
- Future reservations included in assessment reports are not to be taken as approval authority to install them unless stated.
- Designs shall cater for material manufacture, handling, delivery and installation, fatigue strength as well as access and climbing loads, where applicable.
- Minimum sizes/requirements for structural galvanized steel shall be 5mm for plate, M12* for bolts, 6mm for guys and top caps for open sections.
  *(exception applies for the use of M10 U-bolts for pipe size <75mm overall diameter)
- All structural U-bolts and V-bolts must be hot bend at 900˚C then air cooled after bending and galvanising, in accordance with AS3679.1.2010.
- Structural Certifier shall ensure that the materials nominated during design are compatible and steps shall be taken to prevent any possible dissimilar metal corrosion.
- Mounting steelwork (or its installation) shall not unnecessarily damage the supporting structure.
- Chain mounts shall be avoided on galvanized steel surfaces.
- Mount interfaces on building rooftops and walls shall be fully sealed to prevent ingress of dirt and moisture.
- All steel work must be galvanized in accordance with AS 2312 – (Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings).
- Whenever grouting is required the structural certifier shall clearly specify the type, compressive strength and thickness of grout in the certified design drawings.
- Overloading of the structure is not permitted.
- Telstra's view is that the concept of antenna load shedding is subject to vagaries that are difficult to confidently quantify and may result in a higher risk of tower overloading and subsequent failure than is

acceptable. If load shedding is proposed in any structural design then it shall be demonstrated and subject to the pre-approval by exception obtained from the Networks Delivery Program Office - Design group and risk assessment.

- Where generic certification has been utilized all structures, mounting steelwork and footing designs, shall be separately certified for each application and site.
- The Structural design certifier of an antenna support structure shall endeavour to obtain all such information as is deemed necessary to ensure that all existing antenna and other ancillary loads are included in the assessment. This shall include (but not be limited to) reference to current photos, details obtained from Telstra Site share co-ordinator, existing drawings and antenna lists relevant to the current proposal etc.
- In cases where information such as geotech reports, previous assessment reports, footing details, CANRAD structure class and original design parameters is required by the Structural design certifier in order to complete certification the Access Seeker is to submit a request formally via Telstra Wholesale who will engage the Telstra Properties group to compile and send this info to the Structural design certifier.
- Temporary Installations (for specific tests, trials, short term or special events) shall be subject to the same certification requirements as any other installation.
- Site design shall include the earthing of structures in accordance with Telstra's 017866a07 Civil Design Manual – Earthing Standards.
- Designers shall make themselves aware of all loading situations that a structure on the specific site might be subject to, inclusive of snow and ice loads as necessary.
- Additionally, consideration shall be given for the need for any snow protective measures (ice shields/guards) from ice fall damage of antennas in the snow regions as defined in AS1170.3.
- Structure upgrade designs are not to include any welding on the existing Telstra structure.

8.2. Footing Design

Footing shall be designed to resist all load combinations applied to the structures in both vertical and horizontal directions combined with the bending moments as appropriate. Design of footing shall be in accordance with the standards specified in Section 08 of this document.

Footing design of a structure shall be determined by the type of structure, bearing capacity of soil, overall capacity of structure, wind loading and load combinations.

Note – As a minimum, footings for the structure shall be designed to match the capacity of the structure.

8.2.1 Geotech Report:

All footing designs shall be based on the specific geotechnical information for the site. Geotechnical investigations are required where new towers, masts or poles are proposed to be constructed.

A site specific geotechnical investigation shall be carried out by an experienced, competent geotechnical engineer. All laboratory testing shall be carried out by a NATA registered laboratory.

The test pit or borehole shall be excavated or drilled to adequate depth (in consultation with the structural engineer engaged in the footing design) below the base of the proposed footing in order to ascertain the condition of the existing soil layers supporting the proposed footing. The geotechnical engineer shall be present on site to instruct the machine operator on the location and depth of the exploration. When specified, soil resistivity tests shall be carried out.

Geotechnical tests and report shall be carried out in consultation with the structural design engineer engaged in the design and shall clearly list all geotechnical design parameters required to complete full footing design and certification. Geotechnical investigation shall consider the requirement to undertake an environmental soil testing and assessment where required by the appropriate State, Territory or Federal legislation.

The geotechnical report shall include, but not limited to, the following:

- Details of plant and equipment used method of investigation, assumptions made, map references, engineers present, and observations.
- Location of site and date of investigation and summary of scope carried out including any non-standard items such as checking for AASS (Actual Acid Sulphate Soil) or PASS (Potential Acid Sulphate Soil).
- Site location map, test location plan, borehole log, explanatory notes.
- Details of tests carried out.
- Soil properties, such as undrained or short term strength parameters c_u and $\phi_{u;}$ bulk unit weight; stiffness values (E); internal friction angle.
- Details of any disturbance to the virgin soil that may indicate potential issues with footings design and construction (e.g. past excavation, landfill etc).
- Allowable or ultimate end bearing pressures and skin friction (for monopole designs).
- Observations on water table levels, evidence of settlement or subsidence.
- Recommendations on suitable footing designs - suitable footing types with the design parameters tabulated and recommended founding level.
- The report shall advise on any precautions during construction (e.g. temporary lining) and limitations.

Geotech report shall be submitted to the Site Share Co-ordinator to upload into CADlink as per 017866a06 CAD Standards Manual. See Appendix – E for more details.

8.2.2 Footing Certification:

The footing certification section of 018947f01 structural design certification has two divisions:
(1) Full Certification of footing and (2) Conditional Design Acceptance of footing based on available data and assumptions. Refer Appendix – F for footing certification flow chart.

FOLLOWING ARE INCLUDED IN THE CERTIFICATION		CHECK BOX
Structure:		☐
Footing :	Full certification	☐
	Conditional Design Acceptance - See Assumptions Below	☐
Headframe:		☐
Antenna Mounts:		☐

(1) Full certification:

- <u>New Structures and structure swap out:</u>

For sites requiring new structures or a structure swap out, Telstra will not accept a structural certification without full certification of the footing. All sites where a new structure is to be built or sites where a structure swap out is planned, the full footing certification must be supported by a detailed geotechnical report.

- <u>Existing Structure:</u>

(a) For existing Telstra structures, footing assessment and full certification in accordance with this document are required.
(b) If footing details are not available in Telstra DBoRS (e.g. CADlink, Lotus Notes etc),then the Site Share Co-ordinator will investigate whether the information is available from alternative Telstra sources. Once all relevant details are obtained then proceed with full footing certification.
If the geotechnical report is not available and the structure is relatively new (less than 15 years old); then a new geotechnical report shall be obtained where this is feasible. Once the geotechnical information is obtained a full footing certification can be completed.

A geotechnical report and full certification is recommended for the below structure types and loading conditions:

- Structure Type I and Importance level 3, 4 - For proposals that increase the existing loading on a structure to 85% or over.
- Structure Type II, III and Importance level 1 and 2 - For proposals that increase the existing loading on a structure to 95% or over

(2) Conditional Design Acceptance

See Appendix – F for footing certification flow chart.

If footing documents are not available (and the appropriate searches have been completed) then the Telstra Approved / Accredited Structural Consultant is to proceed as follows:

- Footing drawings are not available:

In this case obtain generic footing drawing for that particular structure type from CADlink. Based on this generic drawing and the information gathered from DBoRs & site measurements (e.g. type of structure, foundation dimensions at surface, age and soil conditions), analyse the structure for existing and proposed loading conditions ensuring the analysis includes any assumptions made. Complete the Conditional Design Acceptance for the footing and ensure all assumptions made are clearly listed in the f01 structural certification. For example, the "footing is assumed to be built as per the generic drawing CADlink no/sheet no/issue no".

- Geotechnical report not available:

(a) If the structure is relatively new (less than 15 years old) and heavily loaded (see full certification section for allowable percentage loading) with no geotechnical report available, then a new geotechnical report and full certification of the footing shall be obtained.
(b) If the structure is old (more than 15 years old) and lightly loaded (see full certification section for allowable percentage loading) with geotechnical report not available, then certifier is to complete a best effort to analyse the structure based on the best knowledge of the soil type available in that locality. In this case all the assumptions the designer has made to analyse the footing shall be clearly stated in the f01 certification (e.g. assumed soil type, minimum bearing pressure required etc).
(c) If the structure is old (more than 15 years old) and heavily loaded (see full certification section for allowable percentage loading) with no geotechnical report available, then a new geotechnical report and full certification of the footing shall be obtained.

- Both footing drawing and geotechnical report are not available:

(a) Carryout footing assessment based on standard footing drawing for that structure and assume normal soil (Bearing Pressure: 150Kpa) condition / the best knowledge of the soil type available in that locality .
(b) If the structure is heavily loaded (see full certification section for allowable percentage loading) then further site investigation to determine the footing type, soil properties etc to complete the footing assessment shall be undertaken.
(c) If the structure is lightly loaded (see full certification section for allowable percentage loading) and the standard footing details for that particular structure type is not available then it is acceptable to assume in the certification that "existing footing is assumed to be originally designed to match the full capacity of the structure".

Important: In all the cases above the design shall satisfy the fact that existing footing can support full loading of the structure and if the certifier requires more information from site investigation then it shall be obtained (any final approval required shall be obtained from the Telstra Site Share prior to proceeding) and the work shall be carried out in accordance with the requirements of this document.

It is not acceptable to provide a conditional certification when the geotech report and footing drawings for a particular site are already available.

Inconclusive certifications including requests for exemptions will not be supported.

8.3. Antenna Mounts

All antenna mounts shall meet the following minimum criteria:

- Importance level (as per AS/NZS 1170.2) of antenna mounts shall be based on their function and location (e.g. Roof top mount in a populated area shall be importance level 3 and a yagi mount on a Triad, or a temporary mount on a remote location shall be importance level 1).
- 50 year minimum design life for all new mounts & upgrades.
- Both strength & fatigue must be considered during design.

8.4. Cantilever Mounts

Cantilever mounts are antenna/RRU mounts which are supported / fixed at one end only. Cantilever mounts (for antennas, RRUs etc) shall be used only when other mounting arrangements are not possible and a detailed fatigue analysis shall be incorporated into the design of all cantilever mounts.

Where cantilever mounts are considered, in addition to the criteria specified in Section 8.3 the design must comply with the Telstra's risk mitigation strategy for Cantilever Mounts design listed in the table below. Following descending hierarchy applies for the use of cantilever mounts:

New and existing installations	
1.	Avoid the use of cantilever designs. Use alternative design or location.
2.	If option 1 is not possible i.e. where cantilevers cannot be avoided, incorporate structural bracing to minimise the cantilever length.
3.	Sites with harmonic bracing: Where structural bracing (Option 2) is not possible to install on the cantilever antenna mount, the certifier may choose to incorporate harmonic bracing into the design provided that the bracing is detailed in the drawings. In this case it is permissible for the certifier to consider this bracing structural and the mounts shall be adequately designed for 50 year design life including fatigue. It is not permissible to incorporate the harmonic bracing into the design life calculations without documenting it into the drawings/certifications.

8.5. Recoveries

Recoveries can have significant negative structural loading and serviceability effects in some cases (for e.g. recovery of a solid parabolic dish antenna from a guyed mast). For all recoveries of equipment off a structure an assessment shall be made in consultation with the structural engineer to determine if structural certification is required or not.

- If structural analysis and certification is required a structural engineer must be engaged before recovering.
- If structural certification is not required a letter from the structural certifier shall be obtained for the same and shall be submitted for Towers Infrastructure Management's approval.

09 Structural Design Certification

A completed 018947f01 structural design certification is required for all structural works associated with Telstra infrastructure.

A design certification provides assurance that the work as designed will comply with relevant Australian Standards, BCA, applicable State/Territory and Local Authority regulations. The certification shall be signed off by a qualified civil/structural engineer (acceptable to Engineers Australia) and have the necessary registration to comply with the BCA.

Certification records of Telstra structures shall include assessment of the structure, headframe, antenna, RRU mounts and footings. The access seeker shall provide full structural design certification (structure, headframe, antenna mounts, RRU mounts, etc) prior to any external installation proceeding, including temporary antennas and mounts.

All design certification shall be provided using Telstra's Structural Design Certification template Form 018947f01. This form consists of covering letter and the actual certification. The 018947f01 form (both covering letter and certification) must be completed by the Telstra approved / accredited structural consultant who performs the structural design and certification. If the Telstra approved / accredited structural consultant engages additional third parties to undertake some or all of the certification, then the Telstra approved / accredited structural consultant must complete the covering letter section and f01 certifications for any of the certifications they completed and the third parties must complete the f01 certification for the certifications issued to them. If the third party certifier is not accredited by Telstra then they must be accredited prior to undertaking any certification (see Appendix – F for more details of accreditation process). It is acceptable to have more than one f01 form completed by each Telstra approved / accredited structural consultant engaged, but shall be attached along with the single covering letter as one pdf document when submitted to the Site Share Co-ordinator to upload into CADlink.

Note: The Certification is not complete without the covering letter and the completed f01 structural certification(s) for the proposed work.

Design certification shall be accompanied by design drawings certified by the Structural Certifier and shall clearly specify all the necessary information (e.g. dimensions, plan, elevation, connection details, structure member sizes, grade of steel, concrete, any site specific requirements etc) required for the constructor to complete on site construction. If existing structural design drawings are not available then steps shall be taken to complete the design that may include conducting a detailed site investigation which will enable the preparation of site specific structural drawings. In this case, certification shall clearly state any assumptions made (e.g. embedment depth of bolts, anchors, minimum reinforcement etc) to complete the design. All structural drawings and documents used to complete the structural analysis shall be listed in the f01 structural certification and must be submitted to the Telstra Site Share Co-ordinator to upload it into CADlink. See Appendix – E for more details.

Any additional 'for construction' drawings (e.g. equipment shelter details, earthing diagram, fencing, cable gantry details etc) which are not structural and are not listed in the 018947f01 structural design certification shall be listed in the additional for construction drawings reference section of the f01 cover letter. This section must not include any structural drawings, which are to be included in the 018947f01 structural certification reference section only.

018947f01 certification (including covering letter, attachment A etc) and certified drawings shall be submitted to the Telstra Site Share Co-ordinator to store in the CADlink DBoR as per Civil Design Manual - Procedure 017866a06 CAD Standards Manual and Procedure 017866a03 CAD Drawing Matrix. See Appendix E for more details.

*** 'Like for Like Antenna':** Defines an antenna replacement where the new antenna has the same physical dimensions, weight, alignment, mounting arrangement and Antenna Wind Survival Speed of the replaced antenna. The new antenna may have the same or different Model number.

Re–certification of the design is not required for 'like for like antenna'***** replacements where the existing installations has been installed in accordance with the original design certification which must be submitted to Towers Infrastructure Management for approval. Once approved the Site Share co-ordinator shall upload the original certification into CADlink for future reference. See Appendix E for more details.

Similarly, re-certification will not be required where changes to the site do not impact on the physical structure. For example, if two new feeders are to be installed and these feeders will be run internally to a monopole such that the external dimensions are not changed then the certification would not need to be re-issued.

Certification (018947f01) shall include the following minimum details:

- Details of structural certifying engineer: The certification shall be signed off by a qualified Civil/Structural Engineer (e.g. Professional member of Engineers Australia) and have the necessary

registration to comply with the BCA (e.g. the RPEQ number in Queensland). Certification shall include practitioner's name, company name, Qualification, Category of Registration and Registration Number.

- Site details: Certification shall include site name, site address, Node Manager Address ID, geographic coordinates (GDA94 Decimal Degrees to five decimal places), type of structure (e.g. tower, mast, pole etc) and footing type (e.g. grillage, pier etc).
- Brief description of work: The intent of the certification shall be clearly stated in this section. It shall cover the structural integrity of the foundations, structure and antenna supporting steelwork.
- Design parameters: Design parameters used for the analysis shall be listed in the certification as follows:
    - If AS 3995, Structure Type, e.g.: Type I, II or III
    - If AS 1770, Importance Level adopted for design e.g. Level 1, 2, 3 etc
    - Structure Height and extensions
    - Design Life
    - Basic Wind Speed
    - Wind Region
    - Terrain Category
    - Topographic Multiplier
    - Safe foundation bearing capacity
    - List of Standards Considered for Design

  This section shall also include any other design parameters considered for design (e.g. in relation to earthquake load, ice load, flood loads etc).
- **Inclusions to the certification:** A check-box to confirm that structure, footing, headframe, antenna mounts, RRU mounts and roof top structure attachments are included in the certification.
  Note: for installation on buildings and rooftops etc, the structural design certification shall include the building component to which structure is attached, attachment steelwork and any fixings to the building structure.
- **Other inclusions:** Any other inclusions to the certificate, other than listed in the previous section (e.g. equipment shelter footing, cable gantry, building floor/roof loading to support equipment etc) shall be listed in this section of the certification.
- **Exclusions:** Certifier shall clearly identify any exclusion to the certification and shall clearly specify it in the certificate.
  Note: Any structural components directly associated with the proposed work shall not be excluded from the structural certification.
- **Assumptions:** Any assumption made in design shall be clearly stated in the certification. Assumptions to the certification must be legible and shall not undermine the purpose of proposed certification.
- **Upgrades:** Details of all previous upgrades, proposed upgrades and the corresponding references shall be included in the assessment and certification.
- **Structure loading:** A list of existing, proposed, reserved and recovered antennas, their type, height of attachment and bearing, feeders, ancillary steelwork and additional loading due to any other attachments on the structure e.g. cable trays, platforms, etc considered in the assessment must be clearly listed in the structure loading section.
- Latest CANRAD data obtained from the Site Share Co-ordinator shall be used for the structural assessment and the date that the CANRAD data was provided for the structural analysis shall be listed clearly in the 018947f01 certification. Structure loading data shall be verified using latest site photos.
- **Percentage loading for maximum loads:** Percentage loading for structure and footing due to existing and proposed installation on the structure shall be listed in the certification. (Important: This value provided in the certification cannot be used for any future certifications or installations; it is only for the reference of planners for preliminary planning purposes)
- **Pole rotation:** Pole rotation at the height of the directional antenna(s) shall be listed in the certification for all monopole structures that support grid pack and solid parabolic antennas.
- **Documents references:** All relevant structural drawings, reports and attachments associated with the structural certification must be clearly listed in the document reference section of the structural

certification. This shall include but not limited to geotechnical report, structural drawings showing full details of the structure, its footing, headframe and antenna steelwork/mounts, upgrade drawings (if any), certified design drawings for the proposed installation, nominated design standards, structural design report including calculation summary attachment and any other documentation which may be relevant.

All the drawings and documents referenced in the structural certification must be submitted to the Telstra Siteshare Co-ordinator to upload into CADlink as per 017866a06 CAD Standards Manual. See Appendix E for more details. Document name, CADlink reference number and issue number of those reference documents shall be clearly stated in the certification. Specifying the document control sheet only for structural drawing reference is not acceptable.

Structural design report including a summary of design calculation results: A structural design report including summary of design calculation results shall be included as an attachment to the certification. Attachment A shall include sufficient detail that when combined with the completed 018947f01 would allow another certifier to get full understanding of the original design, this shall include but not be limited to:

- Summary of structural design calculations and results.
- Any assumptions/ conditions that could not be detailed on the certificate (The relevant area on the certificate shall refer to attachment A in this case).
- Any details that were not included on the certificate (e.g. proposed loads, the relevant area/s on the certificate shall refer to attachment A in this case).
- Guy details (where applicable), size, construction, location details, tensions etc.
- Any other known information that is not included or referenced on the certificate that influenced the structural design calculations/certification.
- Dynamic loading analysis considered in the design
- Fatigue analysis considered in the design

If all the required information pertaining to the structural certification are included within or referenced in the completed 018947f01 structural certification form, then Attachment A is not required. In this case, the structural certifier must confirm the above using the check box provided in the 'Document Reference' section of 018947f01 structural certification.

The Telstra Site Share co-ordinator shall be responsible for uploading the certified Structural Design Certification template Form 018947f01, associated design report (Attachment A) and structural drawings into CADlink as per Appendix E of this document.

010 Construction

Constructors engaged by the Access Seeker shall be competent and have a proven capability and capacity for the type of work they are engaged to undertake. Contractors shall have a quality assurance system in place that could achieve third party accreditation under ISO 9001.

10.1. Concrete Footings

- **Reinforcement**

  For all new structures photographs of structure footing excavations with reinforcing cage in situ shall be taken prior to concrete pour. Photos must provide sufficient details to verify that the footings comply with the certified design and the date stamped photos shall be submitted to the Telstra Site Share in the Site Build Photo Record to upload into CADlink. See Appendix – E for details.

- **Concrete Testing**

  Where concrete is supplied from an AS/ISO accredited batching plant that complies with AS 1379-2007 Specification and Supply of Concrete, no additional testing is required. A copy of the delivery docket specifying the concrete type and volume is to be scanned and submitted to the Site Share Co-ordinator to upload into CADlink.

Where the supplier is not accredited, or where concrete is batched on site, or the concrete solids are batched off site then water added on site, concrete is to be tested by an accredited concrete testing laboratory. This testing is to include both slump and 28 day strength testing of samples taken from site, in accordance with AS 1379:2007. Results of concrete testing are to be submitted to the Site Share Co-ordinator to upload into CADlink as per Procedure 017866a03. See Appendix E for more details.

10.2. Site Build Photo Record

Site Build Photo Record is to be provided for all construction works. The photos shall be submitted to the Site Share Co-ordinator as a report with date stamped photos, photo number and appropriate title to identify each photo.

The photos shall include, but not limited to for new construction:
- Photo showing foundation excavation with reinforcing cage installed (prior to concrete pour).
- Grillage footing open excavations.
- An overall photo of the new structure.
- Photo/s of the various faces of the structure best depicting the antenna arrangement.
- Close-up photos of antenna mounting arrangements.
- Photo at ground level (GL) depicting the general arrangement, e.g. Structure, gantry, building etc.
- Rooftop/cavity connections
- Photo which best identifies the type of structure, e.g. Manufacturer, model, etc.
- Photo of Structure ID plate.
- Any other photos as directed/requested, which document critical components of the installation.

These shall include, but not limited to, for the augmentation to existing structures:
- An overall photo of any augmentation to the structure.
- Photo/s of the various faces of the structure best depicting the antenna arrangement.
- Photo/s of the various faces clearly showing the upgrade / strengthening works installed.
- Close-up photos of augmentation including any antenna mounting arrangements.
- Photo at ground level (GL) depicting the general arrangement of any augmentation, e.g. Structure, gantry, building etc.
- Rooftop/cavity connections
- Photo which best identifies the type of augmentation, e.g. Manufacturer, model, etc.
- Photo of any new ID plates.
- Any other photos as directed/requested, which document critical components of the installation.

The Site Build Photo Record with all photographs is to be submitted in a MS Word document embedded with photos no less than 1024 x 768 – resolution. This Site Build Photo Record shall be submitted to the Site Share Co-ordinator as a report with date stamped photos, photo number and appropriate title to identify each photo. The Site Share Co-ordinator shall upload the Site Build Photo Record into CADlink; see Appendix – E for more details.

10.3. Truncated Steel Pole Installation Record 018947f03

For all new steel truncated pole installations the 018947f03 –Truncated Steel Pole Installation Record must be completed and submitted to Site Share Co-ordinator to load into CADlink. This form is used for the recording of pole slippage information for each of the pole sections at the time of installation. Slip distances must be in accordance with manufacturer's specifications.

10.4. As Built' Construction Records

'As Built' construction records include construction reports and 'As Built' drawings.
All 'As Built' construction records shall be prepared and submitted to Telstra Site Share for stake holder's approval. Once approved the Site Share Co-ordinator shall upload the documents into CADlink as per

Civil Design Manual – Procedure 017866a06 CAD Standards Manual and Procedure 017866a03 CAD Drawing Matrix. See Appendix E for more details.

- **Drawings**
  'As Built' drawings are the final set of drawings produced at the completion of the construction project. They include all the changes that have been made to the original construction drawings, including notes, modifications, and any other information that the Constructor decides shall be included.
  'As Built' construction drawings shall be submitted to the Site Share Co-ordinator and shall be stored in CADlink. See Appendix E for more details.
- **Reports**
  Construction reports must include (but not limited to):
  - Concrete delivery docket / strength test results – load into CADlink.
  - Truncated Steel Pole Slippage test results (see attachment 018947f03) – load into CADlink.
  - 018947f02 'As Built' Construction Certification – load into CADlink.

Note: Any deviation from the original certified design will require re-design, re-certification and all applicable drawings/records to be updated and supplied to Telstra Site Share to upload into CADlink. See Appendix E for more details.

10.5. 'As Built' Construction Certification 018947f02

The 'As Built' Construction Certificate (018947f02) will be completed by the Construction project manager engaged by the access seeker. All works listed in 018947f02 'as built' certification shall comply with the requirements of this Deployment Rules.

An 'as built' construction certification must be completed for all structural works. The Access Seeker's construction project manager must identify the drawings and Structural Design Certification that the site has been built to. Any deviation from the original certified design must be referred for the review and approval from original certifier before implementing in the field. If there are changes the drawings are to be marked up in red pen for update, any design certification changes that have been approved by the structural certifier shall be notated and the respective photos shall be taken.

The Access Seeker's construction project manager must complete and provide the 'As Built' Construction Certificate (018947f02) stating that:

1. the construction has been completed in accordance with the 'for construction' drawings (which includes structural design drawings, site elevation & plan drawings etc) referenced
2. any mark up's requested by the installer has been reviewed, structural engineers advice has been sort and structural design certification obtained (if required).
3. 'as built' drawings listed and any updated structural design certifications have been submitted to Telstra Site Share and
4. Site Build Photo Record referenced in the certification have been submitted to Telstra Site Share

* Note: When a minor structural change / mark up which do not impact the original f01 structural certification is required at site and it is approved by the structural certifier; then a formal approval letter shall be obtained from the original structural certifier confirming that the mark up's requested during build are structurally approved and the original structural certification is valid for the changes requested. This approval letter shall be attached to the f02 'as built' certification when uploaded into CADlink.

The Access Seeker's construction Project Manager is responsible for ensuring that the Design Certification changes are formalized, 'As Built' Construction Certification 018947f02 is completed, drawings updated and Site Build Photo Record are provided to Telstra Site Share.

10.6. 'As Built' Engineering & EME Compliance Certification 018947f04

The 018947f04 form is the final sign off that the completed site has not varied from the approved and certified design (and any approved changes) and that the EME compliance of the site has not been compromised. 018947f04 form shall be completed for all projects that involve completion of an f01 structural design certification.

The f04 form consists of two parts:

1. 'As Built' Engineering Compliance Certification. This section includes a requirement to reference all relevant design and 'as built' documentation. The section shall be signed off by a qualified civil/structural engineer and provides confirmation that any change from the original certified design has been approved and the 'as built' installation meets the requirements of the certified design.

2. 'As Built' EME Compliance. This section ensures that the EME compliance of the design has not been jeopardised during the construction and is to be completed by a person with appropriate EME compliance qualifications.

Section 1 above shall be completed by the same Telstra Approved/Accredited Structural Engineering Consultant who was engaged to complete the Structural Design certification. The structural engineer shall review the 'as built' drawings, details of any change requests received, construction records and the Site Build Photo Record to confirm that the 'as built' installation aligns with the requirements of the structural design certification (018947f01).

The Telstra Accredited Structural Engineering Consultant shall review the 'as built' information available and certify via the 018947f04 form stating that:

- Any change requests received from the construction project manager have been reviewed and revised structural design certification has been provided (if required).
- Based upon the evidence provided, the 'as-built' installation meets the requirements of the latest Structural Design Certification (018947f01) referenced on the 018947f04 form.

Section 2 is to be completed by the entity tasked with ensuring the EME compliance of the site. If there has been any changes to the designed antenna heights, bearings, location and in general, any structural issues that may have impacted on the design's original compliance with the Radio Frequency and Occupational Health and Safety requirements as per the document '005486 - Telstra Site EME Compliance and Safe Work Procedure' then corrective action must be undertaken prior to finalising the f04 form.

The person with suitable EME qualifications shall review the 'as built' information available and certify via the 018947f04 form stating that:

- As-built' installation meets the EME compliance requirements as per the document '005486 - Telstra Site EME Compliance and Safe Work Procedure'.

The Telstra Site Share Co-ordinator shall be responsible for uploading this final certification into CADlink. The f04 shall use the next available drawing position for certification documentation i.e. Z1-X (as per 017866a06 CAD Standards Manual). See Appendix E for more details.

011 Other Site / Structure Issues

This section details other issues relating to Telstra antenna support structures that need to be considered.

11.1. Structures Situated in Corrosive Environments

All new antenna support steelwork built in highly corrosive environments such as corrosion category "E" (as depicted in AS 2312 – Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings) shall have in addition to the hot dipped galvanized coating shall have an additional protective coating (paint system) applied over the new galvanized surface to ensure their long term service life in accordance with Schedule 203 protective paint system, refer Appendix B.

Ladders & feeder runway are required to be paint treated in accordance with the above.

All interface connections shall be masked* to ensure complete earth continuity on the erected structure. After construction all the exposed / damaged paint surfaces shall be touched up onsite using the same system and paint.
* Note: For more details on the masking requirements, contact Telstra Towers Infrastructure Management.

The corrosion category classification of each Telstra site is available in CANRAD and this will determine the requirement for this duplex coating (i.e. paint over galvanizing).

NOTE: Typical locations include offshore islands and beachfront in regions of rough seas and surf beaches and may extend inland several hundred metres.

11.2. Structures Situated in Non-Corrosive Environments

All other antenna support steelwork NOT built in environments such as corrosion category "E" (as depicted in AS 2312 – Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings) and which is to be partially embedded in concrete (e.g. encased in footings) or buried in native soils shall have in addition to the hot dipped galvanized coating have an additional painted protective coating over the hot dip galvanized finish in accordance with Schedule 228 protective paint system, refer Appendix B.

This treatment shall cover all steelwork between a depth of 200mm below the FFL (Finished Floor Level) and 200mm above the FFL. The concrete footings of steel columns/posts shall be sloped above ground level to prevent moisture and other debris from gathering against the steelwork.

Ladders & feeder runway are required to be paint treated in accordance with the above.

All interface connections shall be masked* to ensure complete earth continuity on the erected structure. After construction all the exposed / damaged paint surfaces shall be touched up onsite using the same system and paint.
* Note: For more details on the masking requirements contact Towers Infrastructure.

The corrosion category classification of each Telstra site is available in CANRAD and this will determine the requirement for this duplex coating (i.e. paint over galvanizing).

NOTE: Typical locations include offshore islands and beachfront in regions of rough seas and surf beaches and may extend inland several hundred meters.

11.3. Aviation Authorities Requirements

For all new structures or for proposed extensions to existing structures with regards to Tall Structures and the aerodrome Obstacle Limitation Surface:

- Aviation Authority Notification – The Site Designer is to complete the CASA "Reporting of Tall Structures" notification and submit to the aviation and aerodrome authorities and where appropriate seek approval for the structure from those authorities in accordance with CASA Rules and Regulations and the Aerodrome Master Plan.
- Aviation Marking / Lighting - To determine if a structure must be lit or marked for aviation purposes and the associated requirements, refer CASA requirements. Marking (paint banding) in accordance with Schedule 202 protective paint system, refer Appendix B.

11.4. Structures Requiring Painting for Environmental or Aesthetic Reasons

Where a structure is required to be painted for environmental / aesthetic purposes then paint system Schedule 202 is to be employed, refer Appendix B.

11.5. Structure Security

The level or type of structure security will also need to be considered at the time of structure planning so that it can be incorporated at time of construction. This will ensure that the Duty of Care obligations are met.

11.6. EME Access Control

EME barriers and EME Signage shall be designed and installed in accordance with the document 005486 Site Compliance and Safe Work Procedure Documents - A03 and A04.

11.7. Ancillary Steel

All ancillary steelwork, such as building roof top antenna mounts must comply with this deployment standard.

11.8. Earthing of the Structure

All earthing shall be done in accordance with Telstra earthing standard document 017866a07 Civil Design Manual – Earthing Standards.
Test of earthing shall be done in accordance with the document 017866w01 – Civil Design Manual, Lightning Protection Earth Testing – Mobile Sites.

012 Exemptions

018947 Deployment Rules for Telstra Antenna Support Structures must be complied with at all times.

013

References

DOCUMENT NUMBER	TITLE
016159	Deployment Rule for Telstra Antenna Support Structures
005486 A04	EME Site Signage and Access Restriction
017866w01	Civil Design Manual - Lightning Protection Earth Testing – Mobile Sites
017866a03	Civil Design Manual – CAD Drawing Matrix
017866a06	Civil Design Manual – CAD Standards
017866a07	Civil Design Manual – Earthing Standards.
AS 1170	Structural Design Actions series
AS 1379-2007	Specification and supply of concrete
AS 1627.1 2003	Metal Finishing – Preparation and pre-treatment of surfaces – removal of oil, grease and related contamination
AS 1627.4 2005	Metal finishing - Preparation and pre-treatment of surfaces - Abrasive blast cleaning of steel
AS 2312	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS 3600	Concrete Design
AS 3995-1994	Design of steel lattice towers and masts
AS 4100	Steel Design
AS 4676	Structural Design Requirement for Utility Services Poles,
AS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS3679.1.2010	Structural steel - Hot-rolled bars and sections

014Definitions

TERM	DEFINITION
AS	Australian Standard
BCA	Building Code of Australia
CAN	Customer Access Network
CANRAD	Customer and Network Radio Database
DBoR	Data Base of Records
EME	Electromagnetic Energy
FFL	Finished Floor level
ISO	International Standards Organisation
LCR	Life Cycle Refurbishment/Replacement
"Like for Like Antenna"	Defines an antenna replacement where the new antenna has the same physical dimensions, weight, alignment and mounting arrangement of the replaced antenna. The new antenna may have the same or different Model number.

MIE Aust	Member of the Institution of Engineers, Australia
PSA	Product Sourcing Agreement
RF	Radio Frequency
RPEQ	Registered Professional Engineer of Queensland

015 Attachments

DOCUMENT NUMBER	TITLE	ISSUE
018947f01	Structural Design Certification	1
018947f02	'As Built' Construction Certification	1
018947f03	Truncated Pole Installation Record	1
018947f04	Structural certifier 'as built' certification	1

016 Stakeholders:

Following Stakeholders shall be consulted for any update to the contents of this document before issue:

NAME	TITLE
JIM WILLIAMS	National Design Manager, Networks Delivery PO -Design
GAYIKA VASANTHA KUMARI	Technology Specialist – Towers, Networks Delivery PO -Design

017 Appendices

Appendix A – General Design Parameters

The following design parameters are to be used by any Structural Engineering Consultants engaged to carryout Structural Design and/or Structural Design Certification.

ANALYSIS AND DESIGN OF STEEL LATTICE TOWERS AND MASTS

AS 3995-1994

	Wind Region			
Design Wind Speeds	**A**	**B**	**C**	**D**
Structure Type I	50 m/s	60 m/s	70 m/s	85 m/s
Then apply gamma W load factors 1.0, 0.85 or 0.7 for structural assessment.				
Structure Type II	46 m/s	56 m/s	65 m/s	78m/s
Structure Type III	42 m/s	50 m/s	59 m/s	71m/s

Note for Type I, II and III structures it would be acceptable to use a revised V1000 value of 46m/s in wind region A.

Alternatively…….

ANALYSIS AND DESIGN OF COMMUNICATION STRUCTURES, STEEL LATTICE TOWERS AND MASTS, POLES

AS 1170.0:2002 **Importance Level 3**
AS 1170.2:2011 **Wind Regions:**
Recurrence Int. / Design Wind (Structure Design Life - 1:100)

A	**B**	**C**	**D**
V1000 / 46m/s	V1000 / 60m/s	V1000 / 73.5m/s	V1000 / 93.5m/s

AS 1170.0:2002 **Importance Level 2**
AS 1170.2:2011 **Wind Regions:**
Recurrence Int. / Design Wind (Structure Design Life - 1:50)

A	**B**	**C**	**D**
V500 / 45m/s	V500 / 57m/s	V500 / 69.3m/s	V500 / 88m/s

AS 1170.0:2002 **Importance level b/w 2 and 1**
AS 1170.2:2011 **Wind Regions:**
Recurrence Int. / Design Wind (Structure Design Life – 1:50)

A	**B**	**C**	**D**
V200 / 43m/s	V200 / 49m/s	V250 / 62m/s	V250 / 81 m/s

AS 1170.0:2002 **Importance level 1**
AS 1170.2:2011 **Wind Regions:**
Recurrence Int. / Design Wind (Structure Design Life – 1:25)

A	**B**	**C**	**D**
V50 / 39m/s	V50 / 45m/s	V250 / 62m/s	V250 / 81m/s

AS 1170.0:2002 **Importance level 1**
AS 1170.2:2011 **Wind Regions:**
Recurrence Int. / Design Wind (Structure Design Life A – 1:5-20)

A	**B**	**C**	**D**
V25 / 37m/s	V25 / 43m/s	V100 / 59m/s	V100 / 73m/s

Note the above design wind speeds include factors Fc and Fd in wind regions C or D but do not included any other multipliers.
Serviceability limit states for Telstra radio communications structures shall be based on Vs = 27m/s or other wind data where wind speed is not exceeded for more than 1 in 10^6 of the time.

Antenna and Ancillary Loading

Many antenna manufacturers quote antenna data including effective areas and or design wind loadings. Some of this data is based on wind-tunnel testing, other based on calculations in accordance with Australian and or other overseas codes, standards and practices.

As a minimum the effective area quoted by the antenna manufacturer shall be used; however if in doubt as to the integrity of the data it is recommended that conservative values be used. For wind loading on panel type antenna wind loads are often quoted as being from the front, i.e. rounded surface of the antenna; the worst case may be from the back or sharp edged part of the antenna or even some other wind direction. Conservative approaches shall use AS1170.2:2011 "sharp edge" shape values for calculation of antenna loading.

The application of "shielding" affects to lower loading on a group of antenna shall not be used unless proper justification can be shown, e.g. the results of wind tunnel tests, industry approved standards etc). If the shielding effects are included (with proper justification) in the assessment then 018947f01 structural design certification shall clearly provide full details of the design considerations made in the structural analysis.

Appendix B - Protective Paint Coating System Schedules

Schedule 202 – Duplex Paint System for Aesthetic Purposes. Eg. To meet environmental or aesthetic reasons or to meet CASA Obstruction Marking requirements.

PROJECT:	Telstra Radio Structures
ITEM:	Shop painting of new galvanizing that is to be atmospherically exposed and where a coloured polyurethane finish is required. E.g. For environmental or aesthetic reasons or to meet CASA obstruction marking requirements.
SERVICE CONDITIONS:	Moderate, Tropical, Marine or Severe Marine atmospheric exposure, i.e. high sunlight intensity, with high levels of salt.
PRE-TREATMENT:	Remove any dirt and grease from surfaces to be coated as per AS 1627.1.
SURFACE PREPARATION:	Sweep (Brush) abrasive blast the new galvanizing as per AS4680 Appendix I to provide a uniformly roughened surface using a non-metallic abrasive. Avoid causing excessive damage to the galvanizing. All surfaces are to be clean and dry before coating and between coats. Refer to full specification.

Approved Coating System:

Dulux	Product	DFT/WFT (µm)		Recoat (Min/Max)		Solvent
PRIMER:	Durepon P14	75	145	12 hrs	30 days	Epoxy
INTERMEDIATE:	Durebild STE	150	180	24 hrs	30 days	Epoxy
FINISH COAT	Weathermax HBR	75	110	24 hrs	Unlim	DuThin 040

Notes:

A stripe coat of epoxy is to be applied after the primer to all edges, corners, welds, etc.
More than one application of each coat may be required to achieve the nominated DFT.
Total minimum DFT is to be 300 microns, measured in accordance with AS 3894.3.
This Specification must be read in conjunction with the latest Product Data Sheets and MSDSs.
The use of thinners other than those specified by the manufacturer is not permitted.

Schedule 203 – Duplex Paint System for Protection Against Corrosion

PROJECT:	Telstra Radio Structures
ITEM:	Shop painting of new galvanizing that is to be atmospherically exposed and where a specific finish colour is not required, i.e., where an epoxy finish is acceptable. A coating system for very severe duty, e.g., in exposures that are both Tropical and Severe Marine.
SERVICE CONDITIONS:	Tropical, Marine or Severe Marine atmospheric exposure, i.e. high sunlight intensity, high humidity and with extremely high levels of salt.
PRE-TREATMENT:	Remove any dirt and grease from surfaces to be coated as per AS 1627.1.
SURFACE PREPARATION:	Sweep (Brush) abrasive blast the new galvanizing as per AS4680 Appendix I to provide a uniformly roughened surface using a non-metallic abrasive. Avoid causing excessive damage to the galvanizing. All surfaces are to be clean and dry before coating and between coats. Refer to full specification.

Approved Coating Systems:

Dulux	Product	DFT/WFT (µm)		Recoat (Min/Max)		Solvent
PRIMER:	Durepon P14	75	145	12 hrs	30 days	Epoxy
INTERMEDIATE:	Durebild STE Cold Cure	150	180	24 hrs	30 days	Epoxy
FINISH COAT:	Durebild STE Cold Cure	150	180	24 hrs	30 days	Epoxy

Notes:

A stripe coat of epoxy is to be applied after the primer to all edges, corners, welds, etc.
More than one application of each coat may be required to achieve the nominated DFT.
Total minimum DFT is to be 375 microns, measured in accordance with AS 3894.3.
Alternate coats of epoxy shall be of a different shade.
The finish colour is to be Light Grey (N35 as per AS 2700) unless noted otherwise.
This Specification must be read in conjunction with the latest Product Data Sheets and MSDSs.
The use of thinners other than those specified by the manufacturer is not permitted.

Schedule 228 – Duplex Paint System for Steelwork partly embedded in concrete or buried in native soils

PROJECT:	Telstra Radio Structures
ITEM:	Site coating of new galvanized items that are to be encased in concrete, e.g. Footings or buried in native soils
SERVICE CONDITIONS:	Partly atmospheric or wet service exposure (above the concrete line); and embedded into site-poured concrete or buried in native soils.
PRE-TREATMENT:	Remove any dirt and salt from surfaces to be coated as per AS 1627.1, preferably using hot water and a small amount of detergent. Rinse thoroughly with fresh clean water.
SURFACE PREPARATION:	Either Sweep (Brush) abrasive blast the new or existing galvanizing as per AS4680 Appendix I using a non-metallic abrasive or sand to provide a uniformly roughened surface or wet scrub with a scotchbrite pad and sugar soap. Avoid causing excessive damage to the galvanizing. All surfaces are to be clean and dry before coating and between coats.

Approved Coating System:

Dulux	Product	DFT/WFT (µm)		Recoat (Min/Max)		Solvent
PRIMER:	Durebild STE Cold Cure	80	95	4 hrs	30 days	Epoxy
INTERMEDIATE:	Durebild STE Cold Cure	80	95	4 hrs	30 days	Epoxy
FINISH COAT:	Durebild STE Cold Cure	80	95	4 hrs	30 days	Epoxy

Notes:

More than one application of each coat may be required to achieve the nominated DFT particularly if applying by brush or roller.
Total minimum DFT is to be 240 microns, measured in accordance with AS 3894.3.
Use this system from 200mm above to 200mm below the upper level of the concrete. If there is no concrete, paint all of the underground steelwork and up to 200mm above the finished ground level.
Provide the longest possible time for curing before replacing the item underground or covering over.
This Schedule must be read in conjunction with the latest Product Data Sheets and MSDSs.
The use of thinners other than those specified by the manufacturer is not permitted.

Appendix C - Telstra's Approved Site SHARE STRUCTURAL Engineering Consultants

Structural design and certification of Telstra structures shall be undertaken by an external Telstra approved Structural Engineering Consultant approved by the Telstra superintendent / Telstra representative as defined under the applicable form of contract.

It is highly recommended to use Telstra Approved structural consultant (listed below) for the structural assessment of Telstra structure, footing, any upgrade requirement etc and the Site Share application will be assessed on its merits in accordance with 018947.

The current approved Structural Engineering Consultants are:

Aurecon Group Pty. Ltd.

Kordia Solutions Australia Pty. Ltd

Service Stream Mobile Communications

Structel Pty Ltd

Accredited Site Share Structural Consultants:

If the Site Share applicant decides to use a non-Telstra approved structural consultant for the structural assessment of Telstra structures, then prior to proceeding with new certification the selected consultant shall be accredited by Telstra.

- The Site Share applicant (e.g. carrier, non-carrier) or their nominated agent shall submit the list of structural suppliers that they want to use, along with documentation listed below to demonstrate their ability to meet Telstra's requirements:
  - Company Profile
  - Experience in completing structural certification for Telecommunication industry, supported with few a sample design certification undertaken for various Telecommunications structure types (e.g. Towers, masts, monopoles, roof tops etc) in the past, based on Australian Standards.
  - Details of the structural certifying engineer(s) completing the analysis and signing off on the 018947f01 form. This shall include but not limited to their qualification (must have qualifications acceptable to Engineers Australia), Registration (must have necessary registration to comply with the Building Code of Australia e.g. the RPEQ number in Queensland)
  - Understanding of Telstra Structures.
  - Written confirmation stating that they have read and understood Telstra 018947 Deployment Rules and associated forms and will fully comply with the requirements.
- Telstra will review the submitted documentation and if the proposed company meets Telstra's expectation a 'Formal Accreditation Letter' will be issued, so that the Site Share applicant(s) can use them to complete the new 018947f01 Structural Design Certifications.

A list of Telstra Accredited Site Share Structural Consultants will be managed by Towers Infrastructure Management Group.

The following requirements will apply regardless of which consultant (and whether Telstra approved or accredited) is engaged to provide the certification function:

- The various submissions (e.g. 018947f01, 018947f02) shall include the Site Share number in the Reference Documentation section.

- The 018947f01 structural design certification shall include an Attachment A – 'Structural Design Report Including a summary of design calculation results'
- All works (design & construction) shall be carried as per the requirements of 018947 Deployment Rules. For example: 018947f01 Structural Design Certification, f02 'As-Built' Construction Certification, f04 'As Built' Structural and EME Compliance Certification shall be completed along with proper structural drawings, 'as built' drawings, site build photo record, any other documentation required by Telstra etc
- Gaining approval from Telstra where required prior to altering any existing design parameters.
- fully certifying all the structural components (e.g. structure, footing, headframe, antenna mounts, RRU mounts etc) providing all the structural drawings,
- Any upgrade to the structure that is required as part of the certification shall be clearly identified in the certification. In addition, any structure upgrades will require agreement that:
    - It is the responsibility of Site Share applicant (carrier or non-carrier) to ensure that the structure upgrade must be installed on the structure prior to or at the time of installation of the proposed antennas (i.e. no later than proposed antenna installation).
    - The upgrade must be properly documented.

APPENDIX D – TELSTRA SITE SHARE ASSESSMENT GUIDELINES

I. Assessment of Level 2 Applications

a. Documents Required for Level 2 Assessment

- Email request from Site Share to undertake the Level 2 assessment.
- Drawings clearly detailing the proposed work e.g. site layout drawing clearly showing the entire site and location of proposed cabinets, elevation drawings showing location of proposed antenna locations etc uploaded into CANRAD.
- Photos showing the proposed cabinet locations, site layout, structure etc in CANRAD (if feasible).
- CANRAD data and CADlink documents.

b. Level 2 Assessment Steps

Each step in the Level 2 assessment flowchart is explained below.

1. Any outstanding existing major structural issues

   - Any existing hazard notification on CANRAD.
   - Any known major structural issue.
   - Any other known issue with the site.

2. Any access restriction to Telstra structure/compound

   - The proposed Site Share facilities do not cause any access restriction to the existing Telstra structure/ facilities at all.
   - The Telstra structure can be easily accessed using EWP and maintain safe distance from power lines.
   - At least 2 sides (if possible) of the structure shall have free staging / working area to undertake any future major maintenance activities.
   - Proposal shall not block access to the Telstra compound access gates.
   - The proposal shall not obstruct any future maintenance activities.

3. Any EME access issues

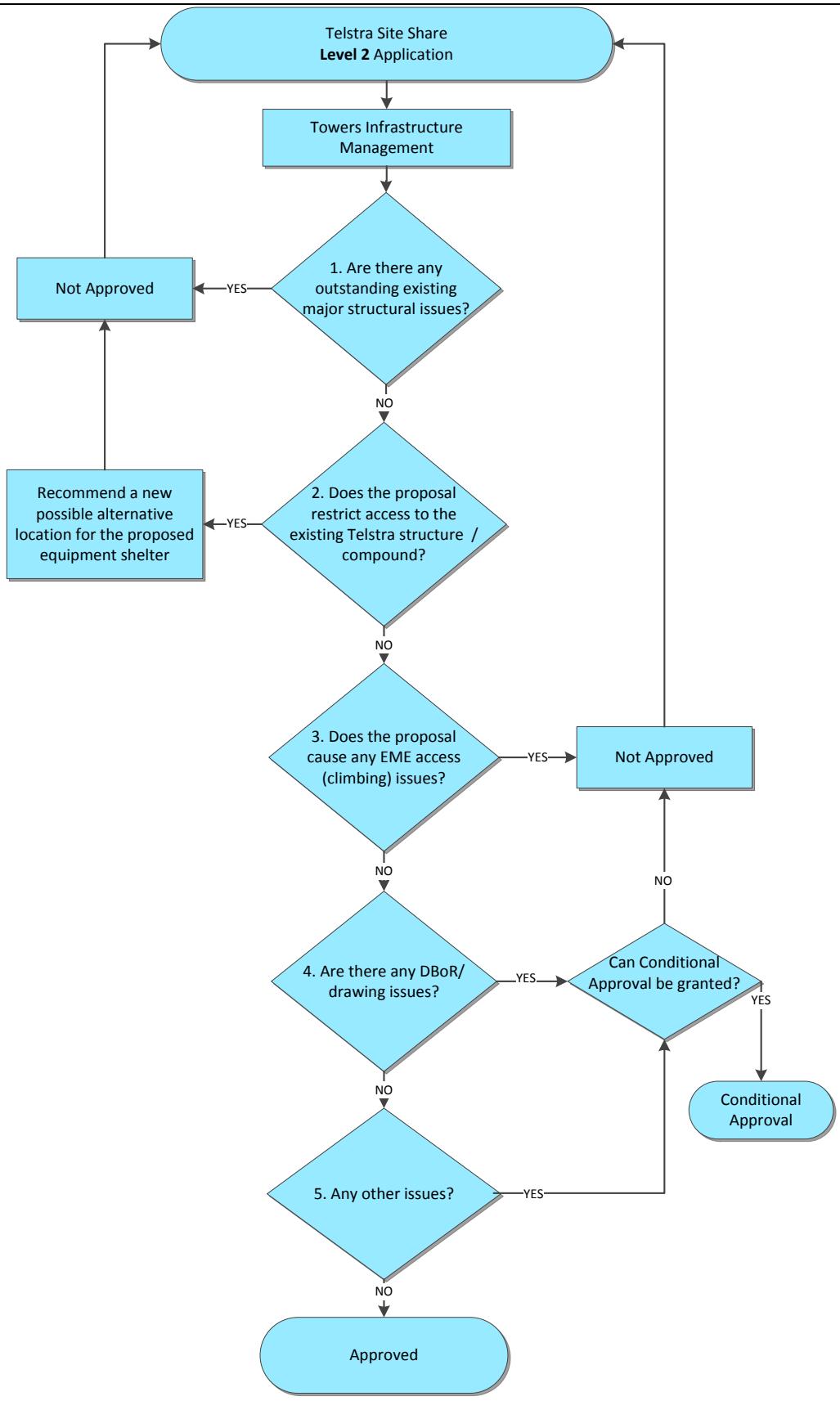
   - Proposed antenna mounting arrangement shall not restrict safe climbing of the structure due to EME. Antennas shall be outrigged far enough for safe climbing past the proposed antenna without an outage.
   - For e.g.: For a 250mm FW mast the proposed antennas cannot be mounted directly on 3 faces of the structure without any outrigging.
   - In case if the cables are proposed to run internally through a mast/tower there shall be sufficient space available to undertake unrestricted internal climbing of the structure.

4. Any DBoR/Drawing issues

   - No site layout drawings to check the location of proposed equipment shelter.
   - No elevation drawing to determine whether there is any climbing issues due to EME.

5. Any other issues

   - Any other issues which are not identified above.



LEVEL – 2 SITESHARE ASSESSMENT FLOW CHART

II. Assessment of Level 3 Applications

a. Documents Required for Level 3 Assessment

- Email request from Site Share to undertake the Level 3 assessment.
- Relevant documents (e.g. drawings, level 2 assessment details etc) for level 3 in CANRAD.
- 018947f01 Structural Certification.
- CANRAD data and CADlink documents

b. Level 2 Assessment Steps

See page 6 for the flowchart showing Level 2 assessment. Each step in the flowchart is explained below.

1. ANY outstanding level 2 issues:

All outstanding level 2 issues addressed by Towers Infrastructure Management have been fixed and approval obtained from Towers Infrastructure Management prior to the Level 3 submission.

2. For step 2 see the guidelines for level 2 above

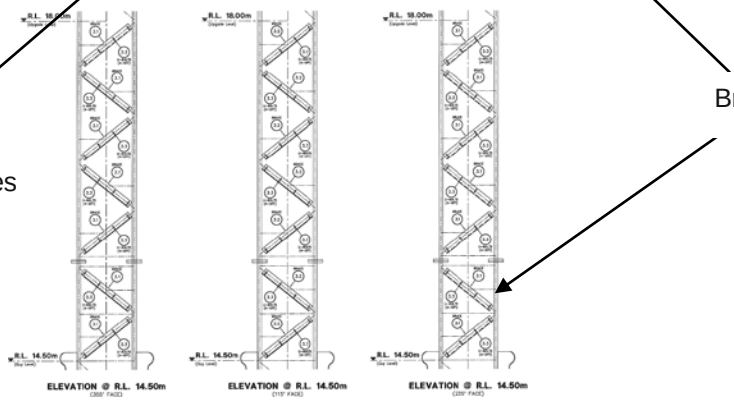
3. Structural certification is provided and DBoRs are updated

- Structural certification and the proposed works shall be in accordance with the requirement of 018947 Deployment Rules for Telstra Antenna Support Structures.
- DBoRs shall be updated accordingly.

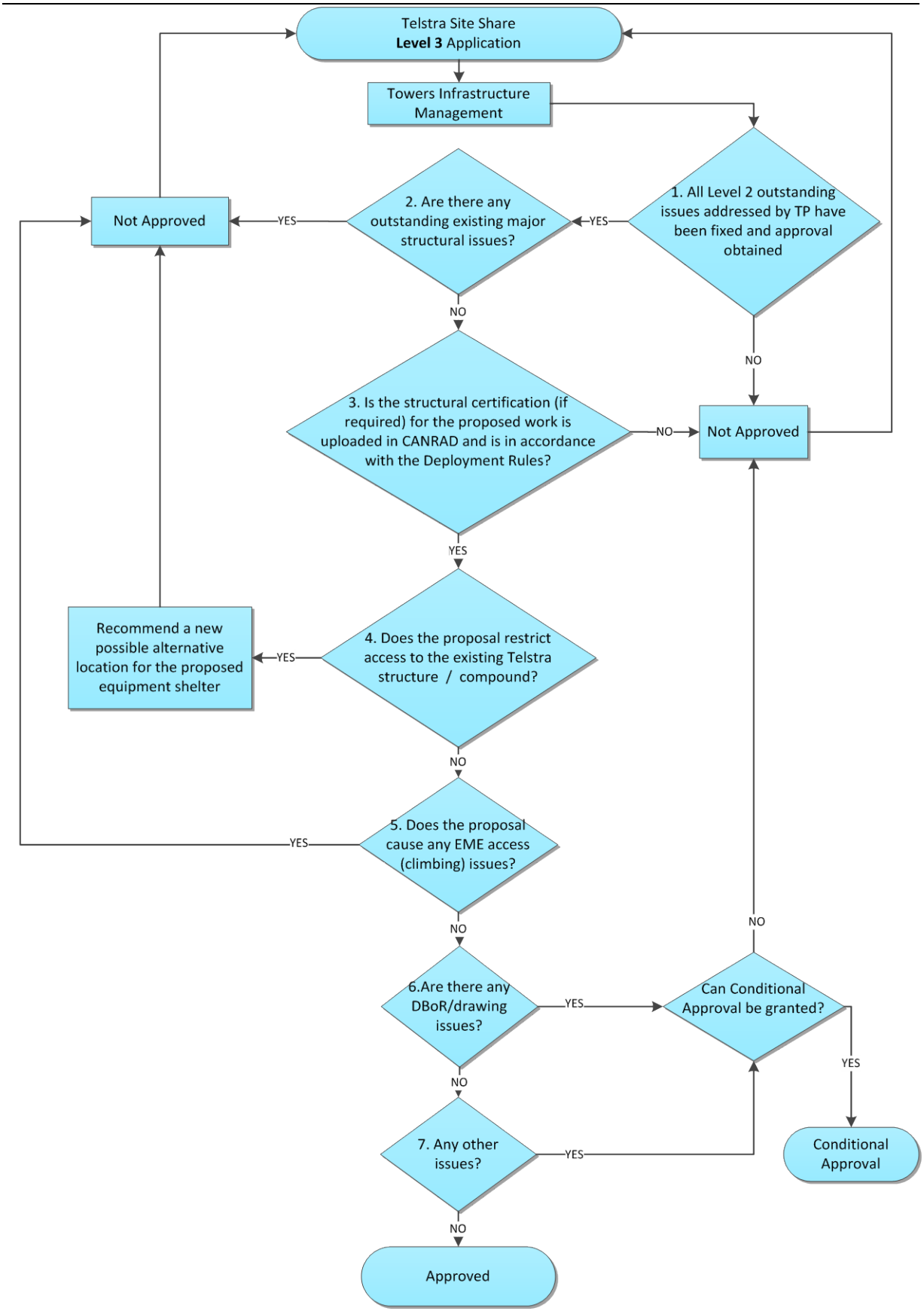
4, 5, 6. For steps 4-6 see the guidelines for level 2 above

7. Any other issues

- Does the proposed installation require excessive amounts of strengthening in order to upgrade the existing structure?
  For e.g. see photos of Augusta CMTS site below, the massive structure strengthening for a Site Share addition created difficulties for Towers Infrastructure Management to carryout future maintenance of the structure. In this case instead of a massive structure strengthening Towers Infrastructure Management would have recommended the inadequate lighter structure be replaced with a new fit for purpose heavier structure.



- Will the proposed installation cause any future dissimilar metals corrosion issues?
- Any other issues which are not identified above



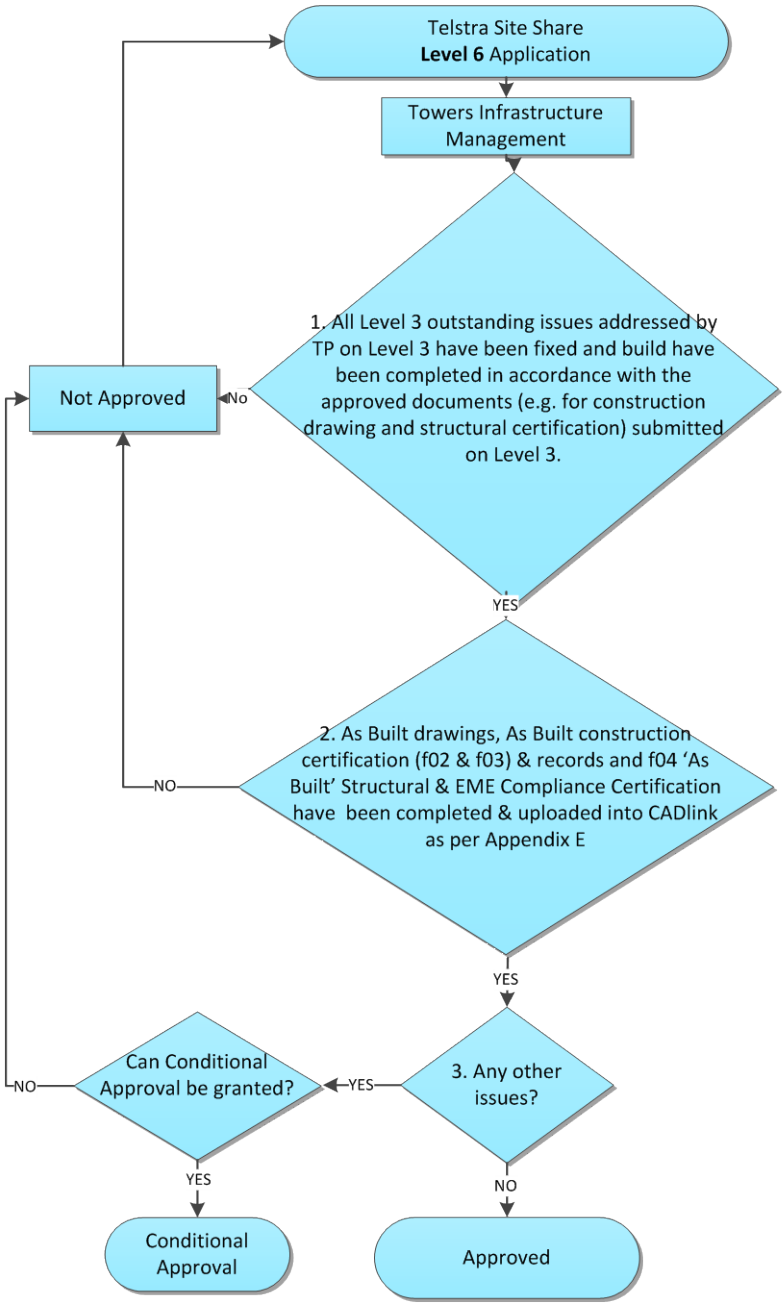
LEVEL – 3 SITESHARE ASSESSMENT FLOW CHART

III. Assessment of Level 6 Applications

a. Documents Required for Level 6 Assessment

- Email request from Site Share to undertake the Level 6 assessment.
- As Built Drawings
- As Built Certifications (018947f02, f03 and other construction records if applicable e.g. concrete delivery docket, strength test results etc)
- Site Build Photo Record
- 018947f04 'As Built' Engineering and EME Compliance Certification

b. Level 6 Assessment Steps



LEVEL – 6 SITESHARE ASSESSMENT FLOW CHART

APPENDIX E – TELSTRA SITE SHARE SUBMISSION DBOR COMPLIANCE REQUIREMENTS

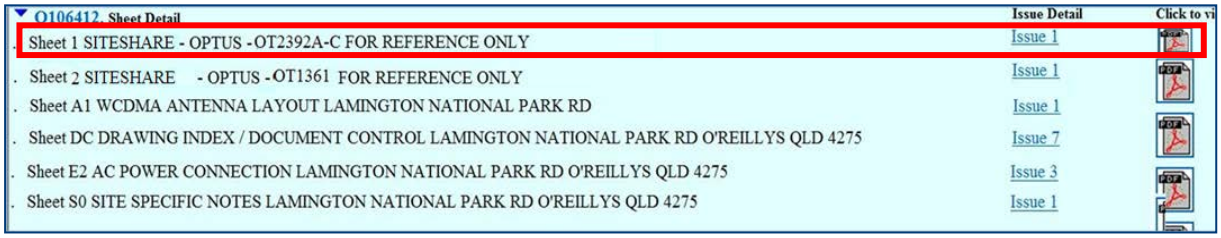
Stage	CANRAD	CADlink
Level 2 (Preliminary Stage)	1. Details of new equipments updated as **'Reserved'**	1. -
	2. **Preliminary drawings** showing the proposal which includes but not limited to a. **Site layout** drawing showing the proposed equipment shelter location b. **Site Elevation** drawing showing the proposed antenna location	2. -
Level 3-4 (Detailed Design Stage)	1. Details updated to '**Proposed Create'**	1. -
	2. Completed **'For Construction' drawings** which includes but not limited to: a. **Site layout** drawing showing the proposed equipment location b. **Site Elevation** drawing c. **Structural drawings** for the proposed work (e.g. proposed headframe, antenna mount drawings, structure upgrade drawings etc)	2. Zip all the 'for construction 'drawings **(CAD file & Pdf) & 018947 f01 certification. Upload the Zip file in CADlink under the existing drawing number, as a new sheet number starting from 1 with the following naming convention e.g. Sheet 1 SITE SHARE – OPTUS – OT1234 FOR REFERENCE ONLY Issue 1.** When next Site Share 'for construction' drawing is ready upload in a similar way under sheet 2 Issue 1 and so on.
	3. Completed **018947 Structural design certification including cover letter**	3. A copy of **018947 f01 Structural Design Certification** shall be uploaded into CADlink under Z1-X* issue 1 as per the CAD standards Manual. -
Level 6 ('As Built' Stage)	1. Details updated to '**Existing**'	1. -
	2. Completed **'as built' drawings** and certifications	2. **Zip all the 'As built' drawings (CAD file & Pdf) & certifications (f02, f03 and f04). Upload the Zip file in CADlink under the existing drawing and sheet number for the same project as Issue 2, where for construction drawings are uploaded e.g. Sheet 1 SITE SHARE – OPTUS –OT1234 FOR REFERENCE ONLY Issue 2.** When next Site Share 'as built' is ready upload in a similar way under sheet 2 Issue 2 and so on.
	3. If there is any **structural change** happened during build then **updated 018947f01 structural certification**	3. If there has been any **structural change** happened during build then **updated 018947f01 structural certification** must be obtained and uploaded into CADlink into CADlink under Z1-X* issue 2.
	4. Completed **018947f02 'As-Built' certification**	4. Completed **018947f02 'As-Built' certification uploaded into CADlink under** Z1-Y* issue 1 as per the CAD standards Manual.
	5. **'As Built' photos -** Site build Photo Record	5. Site build Photo Record As per current standards
	6. Completed **018947f04 'As Built' structural and EME Compliance certification**	6. Completed **018947f04 'As Built' structural and EME Compliance certification uploaded into CADlink under** Z1-Z* issue 1 as per the CAD standards Manual. *X, Y, Z – next available number in CADlink

Examples

Level 3-4: Detailed Design Stage

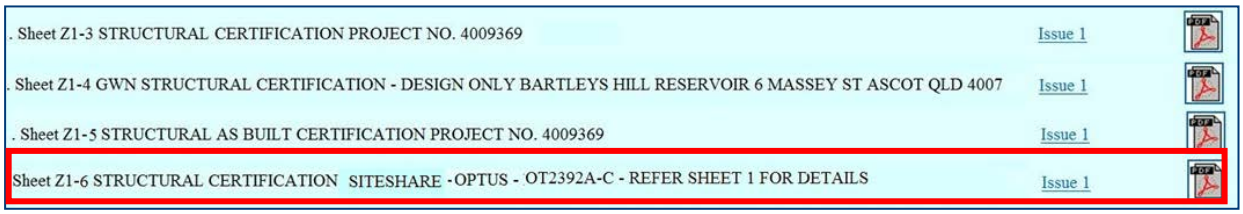
1. Sheet 1 SITE SHARE – OPTUS - OT2392A-C FOR REFERENCE ONLY Issue 1

This sheet will be a zip file which includes 'for- construction' details for project OT2392A-C and shall include drawings and documents listed below:
1. All 'for- construction' drawings (including detailed structural drawing showing proposed upgrades to existing structure, structural drawings showing proposed installation (e.g. headframe, antenna mounts etc), site elevation and plan drawings etc) related to the project in CAD file
2. All 'for- construction' drawings (including detailed structural drawing showing proposed upgrades to existing structure, structural drawings showing proposed installation (e.g. headframe, antenna mounts etc), site elevation and plan drawings etc) related to the project in Pdf file
3. 018947f01 Structural Design Certification completed for the project



2. Sheet Z1-6 STRUCTURAL DESIGN CERTIFICATION – SITE SHARE - OPTUS - OT2392A-C – REFER SHEET 1 FOR DETAILS ISSUE 1

1. A copy of the 018947f01 Structural Design Certification completed for the project shall be uploaded into CADlink with the next available Z1 sheet number.
2. Any recertification obtained for the same project due to the approved structural changes during construction shall be uploaded into CADlink as the issue 2 of the certification



Level 6: 'As-Built' Stage

1. Sheet 1 SITE SHARE – OPTUS - OT2392A-C FOR REFERENCE ONLY Issue 2
Completed **'as built' drawings** and certifications shall be uploaded into CADlink as a zip file under Issue-2 of Sheet 1

1. Sheet Z1-7 STRUCTURAL 'AS BUILT' CERTIFICATION – SITE SHARE - OPTUS - OT2392A-C – REFER SHEET 1 FOR DETAILS ISSUE 1

018947f02 'As Built' Construction Certification completed for the project (e.g. Z1-7)

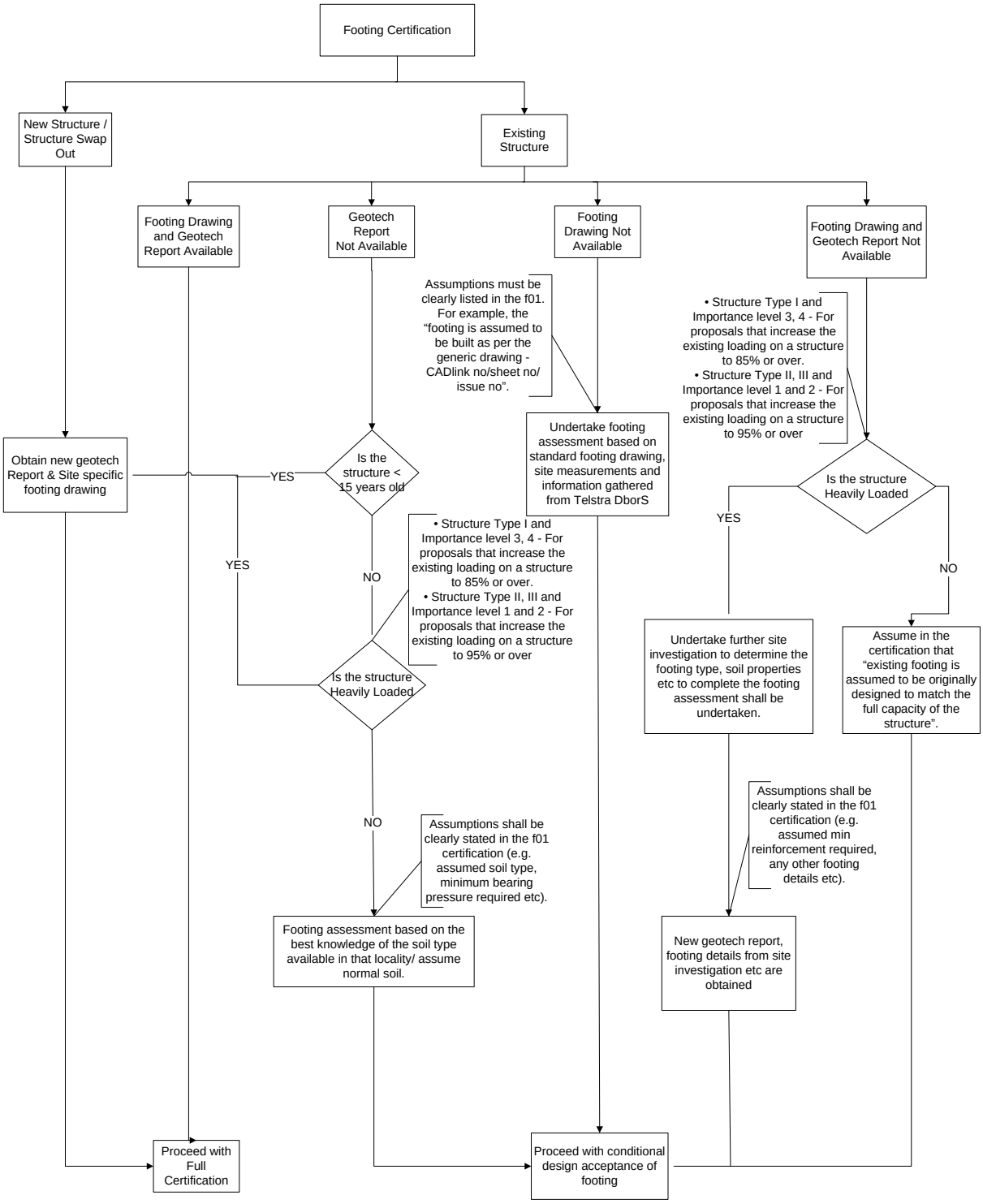
2. Sheet Z1-X' TRUNCATED STEEL POLE INSTALLATION RECORD – SITE SHARE - OPTUS - OT2392A-C – REFER SHEET 1 FOR DETAILS ISSUE 1

018947f03 Truncated Steel Pole Installation Record. This document shall be completed for new steel pole installation only. (X' – next available Z1 number)

3. Sheet Z1-8 AS BUILT ENGINEERING & EME COMPLIANCE CERTIFICATION – SITE SHARE - OPTUS - OT2392A-C – REFER SHEET 1 FOR DETAILS ISSUE 1

018947f04 'As Built' Engineering and EME Compliance certification completed for the project (e.g. Z1-8)

APPENDIX F – FOOTING CERTIFICATION FLOW CHART



In all the cases above the design shall satisfy the fact that existing footing can support full loading of the structure and if the certifier requires more information from site investigation then it shall be obtained (any final approval required shall be obtained from the Telstra project manager prior to proceeding) and the work shall be carried out in accordance with the requirements of 016159 document.
It is not acceptable to provide a conditional certification when the geotech report and footing drawings for a particular site are already available.
Inconclusive certifications including requests for exemptions will not be supported

018Document Control Sheet

Contact for Enquiries and Proposed Changes

If you have any questions regarding this document contact:

NAME:	ALEC DIANOS
DESIGNATION:	GENERAL MANAGER
PHONE:	(08) 8433 4785
EMAIL:	alec.dianos@team.telstra.com

If you have a suggestion for improving this document, please contact the person listed above.

ISSUE NO	ISSUE DATE	NATURE OF AMENDMENT
1	4/09/2014	Document Release
2	6/11/2014	Title changed Site Share removed from title "Access seeker use only" added