TENDER DOCUMENT

Rust Treatment and Refurbishment of Steel Lattice Communication Towers (total of 10)

TENDER NAME: Rust Treatment and Refurbishment of Communication Towers

TENDER No.: MR232/2017

Fiji Electricity Authority
2 Marlow Street
Private Mail Bag
Suva
Fiji Islands

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CONTENTS

Note: Tenderers are assumed to have in their position a copy of New Zealand Standard NZS 3910:2013 "Conditions of Contract for Building and Civil Engineering Construction" on which this Tender is based.

Fiji Electricity Department
2 Marlow Street
Private Mail Bag
Suva
Fiji Islands

PART I

INVITATION TO TENDER

TENDER NAME: Rust Treatment and Refurbishment of Communication Towers

TENDER No.: MR232/2017

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INVITATION INDEX

INTRODUCTION

INVITATION TO TENDER

The Fiji Electricity Authority ("FEA") invites tenders for the refurbishment of a total of Ten Steel Lattice Communication Towers, of which nine are on the Island of Viti Levu and one on the Island of Vanua Levu.

DATE

This invitation to tender ("Invitation") is dated **23/09/2017**

DOCUMENTS ENCLOSED

The following documents ("Tender Documents") form part of this invitation

Part 2	Scope and Programme of Works
Part 3	Tender Letter and Appendices
Part 4	General Conditions of Contract (Not included – see note below)
Part 5	Schedules to the General Conditions of Contract ("Special Conditions of Contract")
Part 6	Specification
Part 7	Drawings

ISSUE OF DOCUMENTS

Tender documents issued to each tenderer for use in the preparation of tenders shall remain the property of FEA at all times.

ACKNOWLEDGEMENT

Each Tenderer is required to acknowledge receipt of this invitation by completing the acknowledgement form annexed as Schedule 1 of the invitation and returning it to the address set out in the form within two working days of receipt of this invitation. Each Tenderer acknowledges that the FEA shall not be obliged to deal with any person(s) other than the person(s) so authorised and indicated in Schedule 1 of the invitation.

TENDER CLOSE DATE

Tenders will close at **16:00HRS on Wednesday 29th November, 2017** and must be electronically uploaded in TenderLink and received at the address given below and marked on the outside of the envelope with:

TENDER NAME: Rust Treatment and Refurbishment of Communication Towers

TENDER NUMBER: **MR232/2017**

DO NOT OPEN BEFORE: **16:00HRS on 29 / 11 / 2017**

Tenders are to be submitted in an original and *two (2)* copies and should remain valid for period of **90** days from the above closing date. *In addition to the paper copies of the Tender, bidders are requested to submit a copy of your Tender on computer optical disk (CD or DVD).*

Sealed Tenders shall be addressed to:

The Tender Box
Fiji Electricity Authority
Private Mail Bag
2 Marlow Street
Suva
FIJI ISLANDS

NOTE:

1. It is mandatory for Bidders to upload a copy of their bid in the TenderLink Electronic Tender Box no later than 4:00pm, on *{29/11/2017}.* The TenderLink Electronic Tender Box can be accessed on the following website: **https://www.tenderlink.com/fea**

2. The two (2) hard copies of the tender, one original and one copy must be timely dispatched by courier or registered post to the aforementioned address.

3. Hard copies of the Tender bid will only be accepted if it is dispatched before the closing date and time and a soft copy has been timely uploaded in the TenderLink.

4. All late tenders, unmarked envelopes and envelopes without bidder's name and address on the reverse will be returned to the Tenderers.

SCHEDULE 1

TENDER ACKNOWLEDGMENT FORM

TO.	**General Manager Commercial** **Fiji Electricity Department** **2 Marlow Street** **Private Mail Bag** **Suva** **Fiji Islands** **Attention: Unit Leader Transmission** **Email: TDelairewa@fea.com.fj**	**FROM.**	

Please return this form completed to the Fiji Electrical Authority representative given in the Invitation Letter.

We acknowledge receipt on ___ / ____ / ____ of the Tender Document for:

TENDER NO: MR232/2017
TENDER NAME: Rust Treatment and Refurbishment of Communication Towers

Please tick as appropriate and advise reasons(s) if you are not tendering;

	We accept this opportunity and our Tender will be submitted by the stipulated time. The contact person for any correspondence relating to this Tender is indicated below.
	We decline this opportunity to tender for the following reasons: _____ and we will destroy the INFORMATION directly.

With respect to the preparation of the Tender for the above contract, the contact person for correspondence is;

Name _____
Company_____
Address_____
Telephone_____
Facsimile _____
e-mail_____

Yours faithfully

Signature
Name _____

in the capacity of:_____

PART 2

SCOPE AND PROGRAMME OF WORKS

TENDER NAME: Rust Treatment and Refurbishment of Communication Towers

TENDER No.: MR232/2017

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SCOPE AND PROGRAMME OF WORKS

The scope of work, (the Works), is as described in Section 1.2, 2 and 3 of Part 6 – Technical Specification and incorporates the following:

1.0 The establishment, steel replacement, preparation and painting of selected Communication towers as detailed in the attached schedule (Appendix A)

1.1 Site establishment

1.2 Steel replacement including removal of redundant elements

1.3 Preparation and painting of designated structures

2.0 The delivery dates for the items to be provided by FEA are as follows:

2.1 To be determined, if deemed necessary.

3.0 The key scheduled dates are set out below and the Works are to be executed in the time frames given:

3.1 Anticipated award of Contract: January, 2018

3.2 Anticipated Contractor start date on site: March, 2018

3.3 Completion: 31/12/2018

3.4 Tenderers site visit date: Tuesday 31/10/2017 thru Friday 03/11/2017

A Site Visit for the tender shall be held as follows:

1. All interested bidders are to report to FEA Kinoya Depot at 09:00hrs on 31/10/2017 for discussion of Tender Document and for Site Visits to the following tower locations: Cunningham, Kinoya, and Nakobalevu.
2. All interested bidders are to report to FEA Kinoya Depot at 09:00hrs on 1/11/2017 for Site Visits to the following tower locations: Wailoa, and Taladrau
3. All interested bidders are to report to FEA Navutu Depot at 09:00hrs on 2/11/2017 for Site Visits to the following Tower Locations: Kavukavu, Lololo, Navutu, and Vuda
4. All interested Bidders are to report to FEA Team in Labasa Airport's Parking Lot at 09:30 Hrs on 3/11/2017 for site visit to the following tower location: Delaikoro

Note: Overseas Bidders are encouraged to secure prior flight bookings on the Fiji Airways website: www.fijiairways.com for flights to **Labasa Airport** (IATA Code: LBS / ICAO Code: NFNL) from **Nausori International Airport** (IATA Code: SUV / ICAO Code: NFNA) or from **Nadi International Airport** (IATA Code: NAN, ICAO Code: NFFN).

Location of FEA Kinoya Depot:
https://www.google.com.fj/maps/place/Fiji+Electricity+Authority+(FEA)+Kinoya+Depot/@-18.1124272,178.4782004,17z/data=!4m5!3m4!1s0x0:0xb89fcf00aca7a7a4!8m2!3d-18.1119168!4d178.4781153?hl=en

Location of FEA Navutu Depot:
https://www.google.com.fj/maps/place/Fiji+Electricity+Authority+-+Navutu+Depot+-+Lautoka/@-17.6278109,177.4286896,17z/data=!4m12!1m6!3m5!1s0x6e176712a626ac13:0xec45c17ac7885ca4!2sFiji+Electricity+Authority+-+Navutu+Depot+-+Lautoka!8m2!3d-17.6278109!4d177.4308783!3m4!1s0x6e176712a626ac13:0xec45c17ac7885ca4!8m2!3d-17.6278109!4d177.4308783?hl=en

Location of Labasa Airport Parking Lot:
https://www.google.com.fj/maps/place/Labasa+Airport+(LBS)/@-16.4656826,179.3367198,18z/data=!3m1!4b1!4m5!3m4!1s0x6e21d42324cc60bf:0x64e29d6de200352b!8m2!3d-16.4656826!4d179.3378141?hl=en

Appendix A:

Item #	Site Name	Island	Region	Direction - Summary	Co-ordinates		Estimated Tower Area	Estimated Abrasive blast area
					Latitude	Longitude	400	220
1	Delaikoro	Vanua Levu	Northern	20km south of Labasa Airport	16°35'22.45"S	179°19'0.88"E	60	20
2	Cunningham	Viti Levu	Central	Suva - 6km north of city centre	18° 6'16.00"S	178°27'26.09"E	175	85
3	Kinoya	Viti Levu	Central	Suva - power station	18° 6'43.32"S	178°28'40.90"E	525	485
4	Nakobalevu	Viti Levu	Central	8km west of Suva	18° 3'39.97"S	178°24'58.65"E	160	20
5	Kavukavu	Viti Levu	Western	On Mt. Kavukavu	17°58'8.84"S	177°17'52.09"E	525	20
6	Lololo	Viti Levu	Western	18km North East of Lautoka	17°33'52.94"S	177°36'47.06"E	85	10
7	Navutu	Viti Levu	Western	FEA depot Lautoka	17°37'41.90"S	177°25'52.67"E	250	10
8	Vuda	Viti Levu	Western	Vuda Power station - Lautoka	17°40'31.02"S	177°26'1.77"E	425	385
9	Taladrau	Viti Levu	Western	Near Monasavu Hydro	17°45'10.31"S	178° 4'21.77"E	160	20
10	Wailoa	Viti Levu	Western	Switchyard at Wailoa power station	17°44'27.87"S	178° 6'11.66"E	400	220


Delaikoro coms tower
Lololo Comms tower
Navutu Comms tower
Vuda Comms Tower
Wailoa Comms tower
Taladrau Comms tower
KavuKavu Comms tower
Nakobalevu Comms tower
Kinoya Comms Towers
Cunningham Rd Comms tower
Image Landsat / Copernicus
© 2017 Google
Data LDEO-Columbia, NSF, NOAA
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google Earth

PART 3

TENDER LETTER AND SUPPORTING INFORMATION

TENDER NAME: Rust Treatment and Refurbishment of Communication Towers

TENDER No.: MR232/2017

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TENDER LETTER AND SUPPORTING INFORMATION
INDEX

TENDER LETTER

Tenderers should submit a Tender Letter in the following format with all the appropriate supporting information attached in accordance with the requirements of the Tender Document

(COMPANY LETTERHEAD)

_____

In response to your Invitation to **Tender No. MR232/2017 – Rust Treatment and Refurbishment of Communication Towers,** dated ____23/09/2017_____ and having examined all parts of the Tender Document we the Undersigned, offer to execute, complete and remedy defects in the whole of the said Works in conformity with the General Conditions of Contract, the Special Conditions of Contract, Specification, Drawings attached to the Tender Document and the supplementary information attached hereto and to comply with the requirements of the Notices to Tenderers, for the sum of _____*(Contract Sum in words)* ($_____) excluding GST, or such other sums as may be ascertained in accordance with the said Conditions.

1. We hereby acknowledge that such sums specified as liquidated damages in the Schedule to the General Conditions are not a penalty but are a genuine and fair pre-estimate of the losses which The Fiji Electricity Authority will suffer in the event of the Contractor failing to complete the Works within the specified Time for Completion.

2. We undertake if our Tender is accepted to commence work on the Contract upon receipt of the Letter of Acceptance and to complete and deliver the whole of the Works comprised in the Contract within _____ weeks calculated from the date of the Letter of Acceptance.

3. We agree that this Tender shall constitute a binding offer for the period of 180 days from the date fixed for receiving the same and that it may be accepted at any time before the expiration of that period.

4. Unless and until a formal Contract Agreement is prepared and executed, this Tender, together with your written acceptance thereof, shall constitute a binding contract between us.

5. We understand that you are not bound to accept the lowest or any tender you may receive.

6. We undertake that we accept each and every term and condition contained in the General Conditions of Contract NZS 3910:2013, Special Conditions of Contract, Specification and Instructions to Tenderers and that our Tender conforms to the same except as listed in Form A – Exceptions and Departures.

7. We acknowledge that we have the latest edition of the General Conditions of Contract, NZS 3910:2013 and that we accept the terms and conditions of the same.

8. We acknowledge that we have inspected the site, examined the tender documents and any other information supplied in writing and we are satisfied with the sufficiency of the tender price.

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Attached and made a part of this proposal are all data required by the Tender Document.

Notices to Tenderers received and allowed for in this Tender are: _____

Tenderer: (Name) _____

Title:_____

Signature: _____

Duly authorised to sign Tenders for and on behalf of

Company:_____

Business Address:_____

Business Telephone: _____

Date: _____

APPENDIX TO THE TENDER LETTER

SUPPLEMENTARY INFORMATION

The following information shall be submitted with the Tender:

Form 1 - Exceptions and Departures

The Tenderer should detail each exception to or deviation from the Tender Document including Part 4 General Conditions of Contract

Form 2 - Contract Programme

The Tenderer should provide a programme for the Contract.

Form 3 - Sub-contractor Listing

The Tenderer should provide a full list of sub-contractors and suppliers proposed for involvement in the Works.

Form 4 – Contract Specific Systems Information

The Tenderer should answer questions on Form 4 detailing contract specific compliance with the safety, quality and environmental requirements of the Contract.

Form 5 - Labour, Plant and Equipment Rates

The Tenderer should provide a list of all labour, plant and equipment that will be utilised in executing the Works, indicating thereon the net hourly rates to apply in the format provided in Form 5.

Form 6 - Overheads and Profit

The Tenderer should indicate the percentage additions required to net rates and costs of labour, plant and equipment, sub-contractors and materials supplied, where used in formulation of prices to relate to variations and for day-works, in the format provided in Form 6.

Form 7– Works Implementation Outline

The Tenderer should provide a method statement in the format provided in Form 7.

Form 8 - Resource Listing

The Tenderer should provide details on its proposed resources and Contract structure in the format provided in Form 8.

Form 9 – Schedule of Prices

The Tenderer should complete the Schedule of Prices indicating the makeup of the Tender sum. The Schedule shall be completed in the format provided in Form I.

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FORM 1 - EXCEPTIONS AND DEPARTURES

Tenderer's
Name_____

List below any exceptions and departures proposed to any part of the Tender Document. Precise reference to appropriate clauses or sub-clauses is essential. No amendments to the Tender Document will be recognised unless expressly listed herein. If the Tenderer proposes no exceptions or deviations, **enter "None" below.**

If any modification to the original Tender is proposed after submission of the Tender, but before the closing date, a revised Form 1 should be submitted if appropriate.

FORM 2 - CONTRACT PROGRAMME

The Tenderer should submit with its Tender its proposed Programme for carrying out the Works, incorporating the required key dates indicated in Part II - Scope and Programme of Works and showing the activities necessary throughout the Contract period. The response required will depend upon the price tendered for the work.

The Programme should include a scheduled bar chart, individual structure identified, work force histogram and cost ‘S' curves.

Details should include-

- Scheduled start and finish
- Activity duration in days
- Activity description
- Manpower histogram
- Monthly and cumulative invoicing predictions
- Details of work and leave patterns.
- Any other information the Tenderer considers will assist in understanding the Tenderers proposal and methodology.
- Working hours

Note:
Time order of works (programme) will be dependent on the access track work

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FORM 3 - SUB-CONTRACTOR-SUPPLIER LISTING

TENDERER'S NAME……

Name and address of Sub-contractor (see note below)	Description of Sub-contractor's Work Scope	Comments and Quality Assurance Standard

Sub-contractor means suppliers of materials, equipment or services that the Tenderer intends to use if awarded the Contract.

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FORM 4 – CONTRACT SPECIFIC SYSTEMS INFORMATION

TENDERER'S NAME……

Tenderers should enter information on their safety and quality management systems that are specific to this particular Contract

SAFETY

1. Who will be the site representative responsible for local safety co-ordination?
2. What specific safety procedures will be implemented for working in a tropical environment?
3. What communication systems will be employed to ensure emergency response protocols will be maintained during the period of works?

QUALITY ASSURANCE

1. For this Contract, who has the overall responsibility for the quality of the work being carried out?
2. Who has the day-to-day on-site responsibility for the quality of work?
3. Who has the responsibility for controlling and issuing of all documents required for use in the inspection, checking, and carrying out of Site Works?
4. Who is responsible for preparation and issue of the Work Instructions to your staff on Site?
5. Who has responsibility for the determination and submission to the Engineer for approval of the necessary inspection plans for purchased materials, work in progress, and the finished work?
6. What specialist equipment will you be using to determine the finished quality of your work for this contract?

FORM 5 - LABOUR, PLANT AND EQUIPMENT RATES

TENDERER'S NAME……

GENERAL

The rates given below will be used in the evaluation of variation prices and when a portion of the Works is to be completed on a day- work basis during the Contract period.

PLANT AND EQUIPMENT RATES

The Tenderer should list below all plant, equipment and vehicles including sub-contractor's plant, equipment and vehicles to be used on the Site in carrying out the Works, together with net hourly rates required for use. The rates should be for the **NET** running costs inclusive of fuel, lubricants, repairs, parts and service, maintenance, labour and applicable local taxes, but **EXCLUSIVE** of overhead charges, profit and GST and/or VAT. If an operator is required, this labour rate shall be included in the hourly rate for the equipment.

NOTE 1 *– The Principal may possibly provide some plant and vehicles for use by the contractor, during the duration of the works, this may include 4x4 utility crew trucks and water tanker. Tenderers to indicate details of envisaged vehicles required for the works. Tenderers are also required to submit their costs for the envisaged vehicles required for the works, if FEA does not provide these vehicles.*

	Plant and Equipment Type (Indicate whether an operator is included)	**Net Hourly Rate for Operating Equipment**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

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LABOUR RATES

The Tenderer should indicate below the **NET** hourly rates for all trades to be engaged on the Works. These rates should be the **NET** cost to the Contractor of all labour, tradesmen, foreman, sub-contractors, design staff, and management and should **EXCLUDE** overhead charges, profit and GST/VAT.

NOTE 2 *– The Principal may possibly provide some ground based labour i.e. truck driver, support labour etc. The tenderer shall identify the envisaged crew size and indicate what roles cannot be locally sourced.*

	Trade - position	**Rate Per Hour**
1		
2		
3		
4		
5		
6		

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FORM 6 - OVERHEADS AND PROFIT

TENDERER'S NAME……

The Tenderer should indicate below, the following percentages which will be applied by the Engineer in evaluating variations in accordance with General Conditions Section 9

(a) The percentages to be added to the net Cost of labour, materials, plant and equipment and Sub-contractors for on-site and off-site overhead charges to derive the total costs

(b) The percentages to be added to the total Costs in respect of profit, to derive the prices applicable for the variation.

	(a) Overheads %	**(b) Profit %**
Labour (Site)	_____	_____
Materials	_____	_____
Plant and equipment	_____	_____
Sub-contractors	_____	_____

FORM 7 - WORKS IMPLEMENTATION OUTLINE

TENDERER'S NAME……

The Tenderer should list below an outline of the proposed execution methodology. The outline should include such items as:

1. A narrative of the proposed execution of the Works, including mobilisation and logistic support in Fiji.

2. An indication of number and type of plant required to be on site during the contract period.

3. The proposed coating system to be used. The tenderer may submit multiple options for the proposed coated systems for the FEA's consideration.

NOTE: Tenderers are encouraged to give as much detail as possible; this will assist in the evaluation of the Tender.

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FORM 8 - RESOURCE LISTING

TENDERER'S NAME……

The Tenderer should provide the following details:

1.0 Personnel

List the proposed key personnel, as follows:

- Project Manager
- Site Supervisor(s)
- Personnel holding ACA/NACE Coating Inspectors Certificates
- Personnel with line mechanic/steel replacement skills and experience
- Personnel holding live line competencies
- Any other persons identified in key roles within the Organisation for the Contract

2.0 Organisation

- Give details of your proposed organisation structure and an organisation chart.

3.0 Facilities

Gives details on the following:

- Specialist test equipment required for the Works
- Site installation, huts, offices, etc
- Any Specialist machinery or Equipment (HP water jetting etc)

FORM 9- SCHEDULE OF PRICES

NOTES TO THE SCHEDULE OF PRICES

TENDERER'S NAME……

1.0 The Tender is for a measure and value Contract

(a) The Schedule of Prices should be completed and will be used to assess payments due to the Contractor in accordance with the terms of the Contract and where appropriate, will be used in valuation of the variations.

(b) The quantities and items included in the Schedule of Prices are not warranted as complete or accurate.

(c) Detailed descriptions of works and materials required have not been repeated in the Schedule of Prices.

(d) Anything not specifically listed in the Schedule of Prices but necessary to complete the Works in accordance with the Contract, shall be deemed to be included in the rates and prices listed against the appropriate item of the Schedule of Prices.

(e) The Schedule of Prices will be read in conjunction with the remainder of the documents comprising the Contract.

(f) The rates and prices indicated in the Schedule of Prices should include for labour, materials, sub-contractors, constructional plant and equipment, preliminary and general items, including clearance of site during the Works and on completion and making good, for all on-site and off-site overheads, other costs of whatever nature and profit.

(g) A rate or price should be entered against each item within the Schedule of Prices.

In the event that a price is not entered against any item, the cost of that item is deemed to be included elsewhere in the Schedule of Prices.

(h) All rates and prices should be **exclusive of Goods and Services or Value added Tax.**

(i) Where Milestone payments are the method of payment, the Tenderer may propose an alternative list of milestones, provided it can demonstrate some advantage to FEA by way of lower Tender price or otherwise. However, the schedules below should be completed for Tender evaluation purposes.

(j) An electronic version of the pricing schedules, in Excel format will be provided.

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TENDERER'S NAME……

Schedule of Prices –

PER STRUCTURE RATES							
Item No	**Site Name**	**Management**	**Establishment**	**All Bolts Re-torque**	**Steel Replacement**	**Preparation & Apply Protective Coatings**	**Total {Currency}**
1.	Delaikoro	$	$	$	$	$	$
2.	Cunningham	$	$	$	$	$	$
3.	Kinoya	$	$	$	$	$	$
4.	Nakobalevu	$	$	$	$	$	$
5.	Kavukavu	$	$	$	$	$	$
6.	Lololo	$	$	$	$	$	$
7.	Navutu	$	$	$	$	$	$
8.	Vuda	$	$	$	$	$	$
9.	Taladrau	$	$	$	$	$	$
10.	Wailoa	$	$	$	$	$	$
11.							

NOTES:

1. **Price breakdown columns are provided as a minimum mandatory guideline for pricing. The bidders shall add columns as needed to provide additional price breakdown information wherever possible.**
2. **Bidders shall clearly separate the Labour and Services component of the Prices, on which 15% Withholding Tax (WHT) shall apply, as per Fiji's Taxation Laws, and as per Fiji's tax treaties with the bidder's home country.**
3. **Bidders shall clearly separate the Reimbursable components from within the services and labour component on which WHT typically does not apply, for example items such as Hotel Accommodations & Meals, Site Camp Accommodation, Airline Tickets, Transportation of Overseas personnel to provide complete Scope of works, etc.**
4. **Bidders shall consult Fiji Revenue and Customs Authority for further information relevant to taxation. Website: www.frca.org.fj**

Schedule of Unit Rates (Painting)

No	Description of Unit Rates	Per	Rate($) {Currency}
1.	Provide Management level contract support including such activities as preparation of and reporting progress, attendance at meetings, preparation of claims, implementation and any other high level management function – used for variation only	Structure	$
2.	Establish & dis-establish at tower site, including recording access condition and site preparation – used for variation only	Structure	$
3.	Wash down surfaces to remove salts and other loose contamination – used for variation only	Structure	$
4.	Carry out high pressure water jetting (primary preparation) – used for variation only	Per m²	$
5.	Carry out abrasive blast to "NACE VIS 9/SSPC-VIS 5 WAB-10L or WAB-10M " finish – used for variation only	Per m²	$
6.	"Sweep" abrasive blast to remove any suspect zinc corrosion products, poorly adherent coatings (previously applied) and/or alloy stain – used for variation only	Per m²	$
7.	Supply and apply zinc rich primer as per specification – used for variation only	Per m²	$
8.	Supply and apply undercoat paint as per specification – used for variation only	Per m²	$
9.	Supply and apply topcoat paint as per specification – used for variation only	Per m²	$

NOTES:

1. **Any item listed in the Schedule of Prices shall be used to determine the Unit rate, if the description and type is not included in the above schedule of unit rates.**
2. **Bidder shall provide additional rate breakdown, which may be useful for calculating bidder's perceived variations, if any.**

PART 4

GENERAL CONDITIONS OF CONTRACT

TENDER NAME: Rust Treatment and Refurbishment of Communication Towers

TENDER No.: MR232/2017

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Tenderers are assumed to have in their position a copy of New Zealand Standard NZS 3910:2013 “Conditions of Contract for Building and Civil Engineering Construction” on which this Tender is based.

PART 5

SPECIAL CONDITIONS OF CONTRACT

(SCHEDULES TO GENERAL CONDITIONS OF CONTRACT)

TENDER NAME: Rust Treatment and Refurbishment of Communication Towers

TENDER No.: MR232/2017

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INDEX TO
SCHEDULES TO GENERAL CONDITIONS OF CONTRACT

FIRST SCHEDULE

SPECIAL CONDITIONS OF CONTRACT
(Clause numbers refer to General Conditions)

PART A – SPECIFIC CONDITIONS OF CONTRACT

1.2

The Principal is The Fiji Electricity Authority

of 2 Marlow Street
Private Mail Bag
Suva
Fiji Islands

(b) There are no Separable Portions in this contract.

2.1.1

This contract is a:

(b) Measure and Value against an agreed set of rates.

2.5

This contract is:

(c) Neither a construction contract in public roads nor a term maintenance contract.

2.6.1

This contract is:

(b) Not a local authority contract.

2.6.3

Clauses B1 and B2 of Appendix B:

(a) Shall not apply to this contract;

2.6.4(a)

A safety plan for the Site:

(a) Is required, as set out in the following parts of the Contract Documents;
Part 6 – Specification 1.2(a)

2.6.4(b)

A traffic management plan:
(b) Is not required.

2.8.1

Sets of Contract Documents shall be supplied free of charge to the Contractor upon the acceptance of tender in addition to tender, consent, and Contract Agreement sets. 02

2.9.2

sets of Contract Documents shall be supplied free of charge to the Engineer upon the acceptance of tender in addition to tender, consent, and Contract Agreement sets.

3.1.1

A Contractor's bond:

(b) Is not required.
(Delete provision which does not apply.)

3.2.2

5.4.1

The Contractor shall be given possession of the Site on:

(a) On the day of issuing the purchase order;

5.6.6

(g) Risks specifically excepted are:

5.11.1

(b) There are no parts of the Contract Works to which Appendix D applies.

5.17.1

Quality management systems:

(a) Are required and details shall be submitted by five working days prior to site start date.

5.18.1 (a)

(a) As-built drawings, are required, as set out in the following parts of the Contract Documents:

(i) Part 6 - Specification 1.2 (g) if applicable, as per the finalised scope

(ii) Part 6 – Specification 1.8 item 9, if applicable, as per the finalised scope

5.18.1 (b)

(b) Operation and maintenance manuals are not required.

6.1.2

The Engineer and Project Manager is Unit Leader Transmission of the Fiji Electricity Authority, or a representative explicitly designated by the aforementioned

8.1 and **8.6**

(a) The Contractor shall insure as provided in 8.1;

8.1.2 or **8.6.1**

(To be completed irrespective of whether the Principal or the Contractor is insuring.)

The amount of the insurance to be effected in respect of the Contract Works and Materials shall be for not less than the sum of the following:

(a) The Contract Price, after the acceptance of the tender or other offer, excluding any additions or deductions which may be required to be made during the contract;

(b) For professional fees including the Cost of clerks of works and inspectors, the sum of:

(i) 5 % of the Contract Price as described in (a) above;

(c) The value of items incorporated, or to be incorporated, in the Contract Works, the Cost of which is not included in the Contract Price, the sum of $25,000

(d) For increased construction Costs not already provided for in the Contract Price during the period from the acceptance of the tender or other offer until the issue of the Defects Liability Certificate for the Contract Works, the sum of:

(ii) % of the Contract Price as described in (a) above;

8.2.1

Contractor's Plant insurance is required for each item of construction machinery on the Site owned by the Contractor that has a market value of more than:

$10,000;

8.3 and **8.7**

(a) The Contractor shall insure as provided in 8.3;

8.3.1 or **8.7.1**

(To be completed irrespective of whether the Principal or the Contractor is insuring.)
Public liability insurance shall be effected for an amount not less than $ 5,000,000

8.3.2

Motor vehicle third party liability insurance shall be effected for an amount not less than $1,000,000

8.6.2

The existing structures are:

(i) As detailed in Appendix A of Part 2 (Scope and Programme of Works)

10.4.5

Prior to the issue of the certificate of Practical Completion:

(a) A producer statement in the form of the Sixth Schedule is required;

10.5.1

Liquidated damages shall be applied as follows:

(a) In respect of the Contract Works $ 2000 per Day; or as deemed by the signed contract

11.1.1

The Period of Defects Liability shall be:

(a) In respect of the Contract Works Weeks; 52

12.3.1

The percentage to be retained from each progress payment and the limit of the total sums retained shall be:

(a) In respect of the Contract Works:
Total retention
10 % of the contract value

Defects liability retention
50 % of total retention

12.8.2

Cost fluctuation adjustments:

(a) Shall not be paid;

12.9.1

(c) There are no Provisional Sums.

12.10.1

(c) There are no Prime Cost Sums.

12.11.1

The contingency sum to be included in the contract is 10% Contract value

15.1.2

For the purpose of service of payment claims or notices, the postal address of:

(a) The Principal is:
The Unit Leader SCADA and Telecommunication
Fiji Electricity Authority
2 Marlow Street, Suva,
Fiji Islands

For the attention of: Mr Vuate Karawalevu
Email address: **VuateK@fea.com.fj**

(b) The Engineer is:
The designated project engineer nominated in writing by Unit Leader SCADA and Telecommunication.
Fiji Electricity Authority
2 Marlow Street, Suva,
Fiji Islands

For the attention of: Mr Vuate Karawalevu
Email address: **VuateK@fea.com.fj**

(c) The Contractor is _____

For the Attention of _____

Email: _____

Second Schedule

CONTRACT AGREEMENT

Contract for

THIS AGREEMENT is made on

BETWEEN
("the Contractor")

AND
("the Principal").

IT IS AGREED as follows:

1. **THE** Contractor shall carry out the obligations imposed on the Contractor by the Contract Documents.

2. **THE** Principal shall pay the Contractor the sum of $_____ or such greater or less sum as shall become payable under the Contract Documents together with Goods and Services Tax at the times and in the manner provided in the Contract Documents.

3. **EACH** party shall carry out and fulfil all other obligations imposed on that party by the Contract Documents.

4. **THE** Contract Documents are this Contract Agreement and the following which form part of this agreement:

(a) The Conditions of Tendering;

(b) Notices to Tenderers (give details with dates);

(c) The Contractor's tender; including duly completed Schedules 1-9

(d) The notification of acceptance of tender;

(e) The General Conditions of Contract, NZS 3910:2013;

(f) The Special Conditions of Contract;

(g) Specifications issued prior to the Date of Acceptance of Tender;

(h) Drawings issued prior to the Date of Acceptance of Tender;

(j) The following additional documents: (Identify any additional documents to be included for example agreed correspondence.)

WITNESS to the signature
of the Contractor:

.....
Contractor

WITNESS to the signature
of the Principal:

.....
Principal

PART B – OTHER CONDITIONS OF CONTRACT

(Include here other Special Conditions that modify the General Conditions)

Sixth Schedule

FORM OF PRODUCER STATEMENT - CONSTRUCTION

ISSUED BY:……..
(Contractor)

TO:……..
(Principal)

IN RESPECT OF:……
(Description of Contract Works)

AT:……..
(Address)
……

…….has contracted to…….
(Contractor) (Principal)

To carry out and complete certain building works in accordance with a contract titled Rust Treatment And Refurbishment of Communication Towers, TENDER NO: MR232/2017 ("The contract")

I …… a duly authorized representative of ……...
(Duly Authorized Agent) (Contractor)

believe on reasonable grounds that ……..has carried out
(Contractor)

☐ All ☐ Part only as specified in the attached particulars of the building works in accordance with the contract.

…… Date:……
(Signature of Authorized Agent on behalf of)

……
(Contractor)

……

……
(Address)

Seventh Schedule

INFORMATION AS TO CONTRACT WORKS INSURANCE

To Whom It May Concern:

From:

We confirm having effected contract works insurance for:

(The Contractor)

(The Principal)

In respect of:
(Project title)

8.1.2 The sums insured are:

(a)	Contract price	$		(Plus GST)
(b)	Costs of demolition	$		(Plus GST)
(c)	Professional fees	$		(Plus GST)
(d)	Value of items incorporated or to be incorporated	$		(Plus GST)
(e)	Increased construction costs	$		(Plus GST)
	TOTAL SUM INSURED	**$**	**0**	(Plus GST)

The policy deductibles are:

Non earthquake	(GST inclusive)	$
Earthquake	(GST inclusive)	$
Other:	(GST inclusive)	$

We advise the 'special' terms, copy attached, have been applied to this policy

8.5.3, 8.8.4 Policy cover terms included are:

(a) Automatic reinstatement
(b) No cancellation for non-payment without prior notification
(c) Severally insured
(d) No settlement delay due to exercise of subrogation

Project specific policy

8.1.3 Construction period
Defects liability period
(both subject to alteration under construction contract)
Annual run-off policy

8.1.5 Annual cut-off policy
Policy expiry date

We undertake that this policy will not be cancelled or amended by us within the period of insurance without written advice to the insured party which has arranged the insurances.

The insurance issued is subject to the terms and conditions of the policy. We do not warrant that this policy complies with the requirements of NZS 3910:2003.

Insurance Company Stamp ..... **Date** .....
(Or name of insurance broking company confirming cover)

SIGNED BY .....

SIGNATORY TITLE .....

(Clause numbers refer to NZS 3910:2003 and are for information only)

Eighth schedule

INFORMATION AS TO PUBLIC LIABILITY INSURANCE

To Whom It May Concern:

From:

We confirm having effected public liability insurance for:

(The Contractor)

(The Principal)

In respect of
(Project title)

Annual policy
Policy expiry date:

8.3.1	The limit of indemnity		$	(Plus GST)
	Sub limit insured for vibration, removal or weakening of support		$	(Plus GST)
	Deductible is	(GST inclusive)	$	
	Deductible for vibration, removal or weakening of support	(GST inclusive)	$	

We advise that “additional” terms, copy attached, have been specifically applied to this project

The policy covers liability arising out of:
- The ownership / use of construction machinery not required to be registered for road use
- The use of hired plant
- The ownership / use of watercraft up to 8 m
- The ownership / use of aircraft
- The use of explosives

8.5.3, 8.8.4 Policy cover terms included are:
- (a) Automatic reinstatement
- (b) No cancellation for non-payment without prior notification
- (c) Severally insured
- (d) No settlement delay due to exercise of subrogation

We undertake that this policy will not be cancelled or amended by us without written advice to the insured party which has arranged the insurances.

The insurance issued is subject to the terms and conditions of the policy. We do not warrant that this policy complies with the requirements of NZS 3910:2003.

Insurance Company Stamp ..... **Date** .....
(Or name of insurance broking company confirming cover)

SIGNED BY .....

SIGNATORY TITLE .....
(Clause numbers refer to NZS 3910:2003 and are for information only)

Ninth Schedule

INFORMATION AS TO THE CONTRACTOR'S CONSTRUCTION MACHINERY INSURANCE

To Whom It May Concern:

From

We confirm having effected construction machinery insurance for:

(The Contractor)

In respect of:
(Project title)

Annual policy
Policy expiry date:

8.2.1 The sums insured are:
Schedule of construction machinery attached $ (Plus GST)

The policy deductible is (GST inclusive) $

We advise that "special" terms, copy attached, have been applied to this policy

8.5.3 Policy cover terms included are:
(a) Automatic reinstatement
(b) No cancellation for non-payment without prior notification
(c) No settlement delay due to exercise of subrogation

We undertake that this policy will not be cancelled or amended by us within the period of insurance without written advice to the insured party which has arranged the insurances.

The insurance issued is subject to the terms and conditions of the policy. We do not warrant that this policy complies with the requirements of NZS 3910:2003.

Insurance Company Stamp ..... **Date** .....
(Or name of insurance broking company confirming cover)

SIGNED BY .....

SIGNATORY TITLE .....

(Clause numbers refer to NZS 3910:2003 and are for information only)

Tenth Schedule

INFORMATION AS TO THE CONTRACTOR'S MOTOR VEHICLE INSURANCE

To Whom It May Concern:

From:

We confirm having effected motor fleet insurance for:

In respect of:
(Project title)

Annual policy
Policy expiry date:

8.3.1 The sums insured are:

Section 2 - liability	$	(Plus GST/VAT)

The policy deductibles are:

Section 2	(GST/VAT inclusive)	$

We advise that "special" terms, copy attached, have been applied to this policy

8.5.3 Policy cover terms included are:
(a) Automatic reinstatement
(b) No cancellation for non-payment without prior notification
(c) No settlement delay due to exercise of subrogation

We undertake that this policy will not be cancelled or amended by us within the period of insurance without written advice to the insured party which has arranged the insurances.

The insurance issued is subject to the terms and conditions of the policy. We do not warrant that this policy complies with the requirements of NZS 3910:2003.

Insurance Company Stamp ..... **Date** .....
(Or name of insurance broking company confirming cover)

SIGNED BY .....

SIGNATORY TITLE .....
(Clause numbers refer to NZS 3910:2003 and are for information only)

Rust Treatment and Refurbishment of Communication Towers

PART 6

TECHNICAL SPECIFICATION

TENDER NAME: Rust Treatment and Refurbishment of Communication Towers

TENDER No.: MR232/2017

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SPECIFICATIONS INDEX

1.0 PRELIMINARY AND GENERAL

1.1 INTRODUCTION

The Fiji Electricity Authority have a number of communication towers across the country. A number of these communication towers require various levels of refurbishment as part of the asset management process.

This work includes steel and bolt replacement, removal of redundant hardware (as directed) rust removal, decontamination and painting works to be carried out.

1.2 SCOPE OF WORK - GENERAL

The scope of work for this contract includes the supply of all labour, plant, materials, power, equipment and tools required to complete the Works as described below or implied in any of the Contract Documents:

(a) Preparation and submission of a project plan. The plan shall include detail of Health and safety, Quality Assurance and Project timeline schedule

(b) Establish on site and disestablish from site once the Works are complete.

(c) Requisition and collect any Principal supplied items from the Principal's store, including the checking of quality and quantity, loading, transport, documentation and storage and the return of surplus material supplied by the Principal to the Principal's store.

(d) Preparing all sites as to afford all protection necessary for the continued wellbeing of personnel, and property.

(e) Execution of the works, and preparation and painting as detailed elsewhere in this document (including tower steel replacement).

(f) Removal of all construction debris and temporary works, tidy all work sites and reinstate any damage caused during the Works.

(g) Return a set of “as-built” drawings to the Engineer, if applicable.

1.3 ACCESS TRACKS

Where required any major track formation will be carried out by other parties prior to the commencement of the works. The access tracks shall be suitable for 4x4 vehicles.

1.4 ACCOMMODATION – FACILITIES

The contractor shall arrange for his or her own accommodation and messing at a suitable location, within easy driving distance from the work sites, where possible.

1.5 COMMUNICATIONS

During the assessment survey, cell phone coverage was found to be good at most communication tower sites.

1.6 COMMUNICATION EQUIPMENT OUTAGES

No outages are envisaged

1.7 HEALTH AND SAFETY

The Contractor's safety programme submission [ref 1.2 (a)] shall also address:

(a) The health and safety requirements for pressure water cleaning and wet abrasive blast cleaning

(b) The requirement for persons working aloft to be attached at all times.

(c) Working in Tropical conditions

(d) The health and safety information available from the paint manufacturer.

(e) The requirements under Section 5.7 of the General Conditions of Contract

1.8 QUALITY RECORDS

Quality Records to be submitted to the Engineer and/or retained by the Contractor includes the following:

Item	Quality Record	Submit to Engineer	No of Copies to Engineer
1	Individual tower profile drawings with replaced members marked up	Yes	1
2	Completed material schedule indicating numbers of bolts relaced	Yes	1
3	Paint material batch inspection records (including supplier laboratory QA records)	Yes	1
4	Wet abrasive blast cleaned areas	Yes	1
5	Daily work records (Environmental data)	Prior to ITO	1
6	Final inspection & paint thickness test records	Prior to ITO	1
7	Notifiable non-conformance records and corrective actions	Within 48 hours of event	2
8	Pre-and post-Work photos	Yes	1
9	sets of "as built" drawings showing replaced/repaired steel	Yes	2

[ITO = Issue of Taking Over Certificate]

Note: Additional documentation as indicated under the Contractor's Quality Plan shall be made available to the Engineer as requested.

1.9 HOLD & WITNESS POINTS

(a) A hold point is a completed stage of the work at which the Engineer or his representative will inspect before commencement of the next stage of work on that structure.

(b) A witness point is a stage of the work at which the Engineer or his representative may observe, or receive evidence of compliance with the contract without impeding the progress of the work.

(c) Scheduled Hold and Witness points shall be required as follows, unless indicated otherwise by the Engineer

Item	Event	Witness or Hold Point
1	Approval of Project Plan/ Procedures	Hold
2	Approval of Contract Programme	Hold
3	Verification of necessary procedures	Witness
4	Verification of replacement member calculations and sign off by suitably qualified engineer	Witness
5	Verification and agreement of secondary preparation areas	Witness
6	Pressure water cleaning	Witness
7	Surveillance of initial soluble salt test procedure	Witness
8	Completion and Secondary Preparation of selective priming of a random of towers	Hold
9	Completion of undercoat painting of a minimum of 3 of towers.	Hold
10	Completion of finish coat painting of each tower	Witness
11	Non-conformance's	Witness
12	Completion of defect liability remedial works	Hold

1.10 ENVIRONMENTAL CONSIDERATIONS

(a) The Contractor shall clear or trim any bush and obstructions around the Communication towers in order to expose any hidden steelwork.

(b) The Contractor shall make good any damage caused during the execution of the work to the reasonable satisfaction of the Engineer.

(c) The Contractor shall take photographs of each tower site both before the work starts and at the completion of the work, for the purposes of verifying remedial measures.

(d) The water blast cleaning and painting procedures must prevent contaminants or paint from causing damage to transmitting equipment, buildings, vehicles and other third-party assets or to cause a risk to public safety. The Contractor shall install shields or other protective devices where appropriate.

1.11 MATERIALS

Principal Supplied Materials - Refer to Appendix II

Materials Supplied by the Contractor shall include, but is not limited to -

(a) Paint
(b) Abrasive media (garnet)
(c) Solvents

1.12 RETURN OF MATERIALS

Any unused Principal supplied materials shall be returned to the place of storage from which delivery by the Principal was made, for which a receipt shall be issued. The Contractor shall hand a copy of the receipt together with the Contactors materials return schedule. The Contractor shall provide lifting and transport equipment/vehicles as required for moving and unloading the materials.

1.13 REFERENCES

Except where they are modified by this Specification or the Drawings, the relevant requirements of the Standards and Codes of Practice contained in Appendix 1 and the Paint manufacturer's material safety data sheets (MSDS's) and product data sheets, shall form part of and be read in conjunction with this Specification.

2.0 SCOPE OF WORK - PAINTING

The Scope of Work shall include the supply of labour, plant, materials, equipment, tools etc. to complete the works as described below or implied in any of the Contract Document. The Scope of Work for this Contract shall comprise of:

(a) Prepare and document work, safety, environmental and quality assurance programmes. (This shall include inspection, testing/monitoring and include verification of compatibility of cleaning materials with paint systems used.)

(b) Carry out replacement of bolts that meet replacement criteria.

(c) Carry out replacement of steel members that have reached replacement criteria.

(d) Retorque all bolts to specification.

(e) Complete high-pressure water cleaning of all tower steel on structures.

(f) Effect secondary preparation (abrasive blasting) and priming of areas of rust, zinc corrosion products or alloy effect.

(g) Complete undercoat and topcoat painting of all tower steel including antennae brackets and fittings.

(h) Removal of all construction debris and temporary works

(i) Maintenance of the works, touching up defects as required or as specified by the Engineer or Engineer's Representative (This includes defect liability inspections and defect repair where applicable)

(j) The supply of quality records on the completion of milestones.

2.1 RE-INSPECTION

Should witness or hold point inspection result in the Engineer requiring remedial work or repairs to be completed by the Contractor, and subsequent repeat inspection be required, then the costs of the repeated inspection shall be borne by the Contractor.

2.2 DEFECT LIABILITY INSPECTION PROGRAMME

Where the Special Conditions of Contract stipulate a multi-year defect liability period, the commencement of that duration is calculated from the date of practical completion of the tower(s). The Engineer will have inspections carried out on a portion of the completed works after the 1st year's anniversary of the practical completion. The results of this inspection will determine the course of action for any defect work.

2.3 PRIMARY SURFACE PREPARATION

(a) Each entire tower surface including any replaced steel members, frames and anti-climb door shall be Pressure Water Cleaned (HP-WC) to NACE No 5/SSPC 12, WJ-4, performed at pressures of no less than 34 MPa (5000 psi) and at a flow rate of 30 litres per minute.

(b) Pressure water cleaning equipment shall be such that it will produce a consistent finish on all surfaces that is free of all visible oil, grease, dirt, dust, all soluble salts, any loosely adherent (previously applied) coatings, loose rust and loose zinc corrosion products (ZCP). Where any ZCP remains, this shall be removed by light wet abrasive (slurry) sweep blast cleaning.

(c) The equipment shall incorporate suitable water jetting (fan jet type) nozzle. Use of the secondary preparation style of wide bore gun (with abrasive disconnected) shall not be used for primary preparation, unless the required pressure and volumes as indicated in 3.4 (a) are maintained.

(d) Water used for pressure blast cleaning, wet abrasive blast cleaning and washing down shall be potable with a resistivity of not less than 1500 ohm-cm or equivalent maximum conductance of 667μS.

2.4 SECONDARY PREPARATION

(a) Where the pure zinc (Eta) layer is largely gone, but any underlying iron/zinc alloy (Zeta/Delta) layer remains, full abrasive blasting is not required. Those areas shall be "sweep blasted" using the abrasive entrained water blast cleaning system to obtain a profile height in the optimum range of 25-50μm.

(b) Where bulky zinc corrosion product encrustations remain after primary preparation, they shall be "sweep blasted" using the abrasive entrained water blast cleaning system, such that the treated surface is free from visible residues, staining or loose zinc corrosion products with profile height in the optimum range of 25-50μm.

(c) Where any previously applied coatings have not been fully removed by pressure water blast cleaning alone, abrasive entrained water blast cleaning shall be used to ensure full removal.

2.5 WASHING DOWN

(a) After any abrasive entrained water blast cleaning, all surfaces shall be washed to ensure removal of spent abrasive and/or residual contamination.

(b) If the tower steel surface remains unpainted, or the time delay between coats, exceeds 48 hours, the Contractor shall determine the existence of any contamination (i.e. soluble salts, foreign particles and flash rusting) and repeat preparation steps as necessary.

(c) Any area subject to abrasive entrained water blast cleaning, and showing bare steel, shall be patch primed as soon as the surface area is dry, and in any case this must occur within 4 hours. Re blasting shall be mandatory if this requirement is not met.

2.6 SOLUBLE SALTS

Immediately prior to the application of any coatings, the surface shall contain less than 10 µg/cm² of chloride contaminants.[1] The Contractor shall test for traces of non-visible contaminants using an approved proprietary testing method and sampling technique to perform quantitative tests for the presence of salt contamination.

2.7 CARE OF INSULATORS

The Contractor shall ensure water blast debris and paint droplets do not contaminate any transmitting equipment or cables/wave guides. The Contractor shall fit a suitable shield as a form of protection against paint contamination. Any contaminated equipment shall be cleaned to the satisfaction of the Engineer.

2.8 PAINTING

(a) The Contractor shall, in accordance with the paint manufacturer's product data sheets, apply:

(b) Primer - a patch coat of an approved zinc rich primer to all abrasive entrained water blast cleaned areas (including sweep blast areas) to achieve a minimum dry film thickness of 75µm.

(c) Undercoat - a full coat of an approved MI0 pigmented paint, coloured green, to the entire surface to achieve a minimum dry film thickness of 60 µm.

(d) Finish coat - a full coat of an approved MIO pigmented paint, coloured to a light grey NZS/BS 5252 00-A-07, to the entire surfaces at a minimum dry film thickness of 60 µm.

Note: Where the moisture curing urethane-coating system is selected, please refer to the manufacture's data sheet for the more exacting dry film thickness requirements

[1] *Ref: NACE No.5/SSPC-SP 12, Table A1 NV-2 with chloride adjusted up from 7 to 10µg/cm²*

(e) Each of the structures within the scope of work shall be painted with one of the optional systems. The use of more than one system shall only be used following consideration and approval by the Engineer. A list of approved products and their manufacturers is attached in Appendix III.

(f) All paint shall be received and stored by the Contractor in a well-ventilated building free from excessive heat and cold. The oldest paint shall be used first provided it is within the supplier's recommended shelf life.

(g) The paint shall be thoroughly mixed in accordance with the supplier's specific instructions. The Contractor may reduce the coating, utilising only the thinners documented by the paint manufacturer on their product data sheet, to achieve the optimum application consistency, provided that wet film deposition is such that the required minimum dry film thickness is obtained. Refer to AS.3894.3. Appendix VII

2.9 PAINT APPLICATION

Paint shall not be applied when any of the following environmental conditions apply, except in the case of moisture curing urethanes by reference to supplier's technical data sheets.

(i) The surface is less than 3.0C° above the dewpoint.
(ii) The surface temperature of the steel is below 5°C.
(iii) The relative humidity exceeds 85%
(iv) There is moisture or ice visible on the surface of the steel (Note that certain approved products are tolerant of residual moisture).

(a) Any condition stipulated by the paint manufacturer in their technical data, which is more restrictive than (i) to (iv) above.

(b) Paint application in marginal conditions shall proceed only if the assessed conditions are stable or improving. The Engineer may order painting to cease if, despite all the above conditions being met, there is, in the Engineer's opinion, another valid reason for so doing. This includes but is not limited to high wind, and or adverse temperatures.

(c) The curing times and re-coating intervals nominated by the paint manufacturer in their technical data sheets shall be strictly observed.

(d) The paint shall be applied to give a uniform coating to the dry film thickness specified over the complete tower structural steelwork from base plates upwards Each coat of paint shall be free from runs and sags. There shall be no holidays in any of the applied coats of paint. Care shall be taken to ensure the attainment of the specified paint thicknesses on the edges of angle steel members.

2.10 PAINT INSPECTION AND THICKNESS TESTING

(a) The wet film thickness of paint shall be measured by means of a suitable comb type wet film gauge on a regular basis, to ensure that the correct amount of paint is applied. Due to the existence of the weathered galvanising of variable thickness, non-destructive dry film thickness measurements may not give an accurate reading of how much new paint has been applied. Therefore, attention must be paid to the frequent utilisation of the combs by each of the Contractor's applicators.

(b) As part of the Contractor's Quality Control procedures, the total volume of each coat comprising a system applied to each structure shall be recorded, to allow for calculation of average film build.

(c) Where there is reasonable cause to suspect deficient film build, and the Contractor is unable to offer acceptable evidence of compliance, then the Engineer may instruct the Contractor to carry out a dry film thickness sampling procedure and provide an assurance that the minimum dry film thickness has been achieved. The location of the sampling positions shall be determined by an approved random sampling technique. No one single measurement shall be more than 20 percent below the specified minimum. Immediately following the measurements, repair of the paint system shall be carried out in accordance with clause 3.12 below.
Note: Acceptable test methods are: -
- Non-destructive for total dry film thickness only – AS/NZ 3894.3
- Destructive for dry film thickness of each layer, including remnants of galvanising under the paint film – AS/NZS 1580.108.2

2.11 REPAIR OF DAMAGED OR DEFECTIVE PAINTWORK

Areas of defective or damaged paint shall be prepared for remedial work by:

(a) Where the deterioration of the surface is confined to chalking and erosion of the topcoat, the surface shall be lightly cleaned, washed and dried.

(b) Where the coating is generally sound and adherent, but minor blistering and/or pinhead rusting has occurred, to the extent of not being worse than rust grade 6-G, 1% of SSPC-VIS 2 (03% to 1% of ASTM D610) or destructive testing has occurred, then the surface shall be scraped, wire brushed, washed and dried.

(c) Where the coating has deteriorated appreciably and has lost adhesion and visible rusting and/or blistering has occurred, the surface shall be abrasive entrained water blast cleaned as detailed in sub-clause TS7 (b) (i), washed and dried. If the method of preparation of the defective or damaged surface is as set out in sub-clause TS8 (d) (i), apply one coat of MIO pigmented undercoat followed by one coat of MIO pigmented topcoat.

(d) When the steel is to be scraped as per TS8 (d) (ii) It is important to ensure that the coating is fully removed prior to wire brushing and a standard of SP3/PWB or SP3/SD of SSPC –VIS 3 is achieved. Painting shall be in accordance with TS8 (a).

(e) The primer and undercoat re-paint shall overlap 25mm and the topcoat 50mm around the boundary of the defective or damaged area.

APPENDIX I - STANDARDS

NEW ZEALAND-AUSTRALIAN STANDARDS

BSEN 20273	Fasteners. Clearance holes for bolts and screws
NZS/AS 1112	ISO metric hexagon nuts, including thin nuts, slotted nuts and castle nuts.
NZS/AS 1161	Wrenches - Ring, double head
NZS/AS 1559	Fasteners - Bolts, nuts and washers for Tower Construction
NZS/AS 1580	Paints and related materials - methods of test for
(Part 108.2.)	Dry film thickness, Paint inspection gauge
(Part 481.0.)	Coatings - Guide to assessing paint systems exposed
(Part 481.2.)	Assessment of blistering of paint films
NZS/AS 1627	Metal finishing - Preparation and pre-treatment of surfaces.
(Part 1)	Degreasing of Metal Surfaces Using Solvent of Alkaline Solutions.
(Part 7)	Hand tool cleaning of metal surfaces
NZS/AS 4680	Hot dipped galvanised coatings on ferrous articles
NZS/AS 2312.1:2014	Guide to the protection of iron and steel against exterior atmospheric corrosion.
NZS/AS 4233.1 & 2	Australian/New Zealand Standard High Pressure water (hydro) jetting systems
NZS 3404 (Part 1)	Steel Structures Standard
BS 3481	Specification for flat lifting slings.
(Part 2)	Flat woven webbing lifting slings made of man-made fibre for general service
NZS/BS 5252	Colour Standards
NZS 5811	Industrial safety belts and harnesses
(Part 1)	Specification for industrial safety belts and harnesses
(Part 2)	Code of Practice for the selection, use, and maintenance of safety belts and harnesses
NZS 5812	Industrial protective gloves
NZS 5827	Industrial overalls
AS/NZS 2210.1	Occupational protective footwear: Guide to selection, care and use.
FJS AS/NZS-ISO 9002	Model for quality assurance in production, installation and servicing
AS/NZS 2310:	Glossary of Paint and Painting Terms

OTHER STANDARDS

ASTM A90	Methods of test for weight of coating on zinc-coated (Galvanised) iron and steel articles
ASTM D610	Standard test method for evaluating Degree of rusting on Painted Steel surfaces
ASTM D714	Standard test method for evaluating the degree of blistering of paints.
ASTM A123	Zinc (Hot-galvanised) coatings on products fabricated from rolled, pressed and forged steel shapes, plates, bars and strip
ASTM A143	Recommended practice for safeguarding against embrittlement of hot dipped galvanised structures, steel products and procedure for detecting embrittlement
NACE No.5/SSPC-SP 12	Joint Surface Preparation Standard – Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultra High-Pressure water cleaning Prior to Recoating.
AS3894.3	Site Testing of Protective Coatings Method 3 Determination of Dry Film Thickness
Appendix C	Wet film thickness by comb gauge (informative)
AS3894.4	Site Testing of Protective Coatings
Method 4:	Assessment of Degree of Cure
ISO8501-1	Preparation of Steel substrates before application of paints and related products – Visual assessment of surface cleanliness
SSPC – VIS 3	Visual Standard For Power And Hand Tool Cleaned Steel
SSPC-VIS 5/NACE VIS 9	Guide and Reference Photographs for Steel Surface Prepared by Wet Abrasive Blast Cleaning

APPENDIX II - PRINCIPAL SUPPLIED MATERIAL

(Provisional)

APPENDIX III - PERMITTED PRODUCTS (COATINGS)

The following paint systems have been used successfully in New Zealand and Australia

System No. 1	Primer	Undercoat	Topcoat
Product Supplier	1 Pack Zinc Rich	MIO Vinyl	MIO Vinyl
Protec Creative Coatings Ltd	Camovin ACZR1	Camovin HM MIO	Camovin TV MIO
Altex Coatings Ltd.	Zinkex 100	TP Vinyl Primer	TP Vinyl Topcoat

System No. 2	Primer	Undercoat	Topcoat
Product Supplier	2 Pack Epoxy Zinc Rich	MIO Vinyl	MIO Vinyl
Altex Coatings Ltd.	Ultra-Zinc 625	TP Vinyl Primer	TP Vinyl Topcoat

System No. 3	Primer	Undercoat	Topcoat
Product Supplier	1 Pack Moisture Cure Urethane Zinc Rich	MIO Moisture Cure Urethane	MIO Moisture Cure Urethane
PPG Protective & Marine Coatings	Wasser MC - Zinc	Wasser Ferrox B	Wasser Ferrox A

Notes:

- System No. 2 may be an advantage at secondary preparation stage where the primer is tolerant of residual moisture on prepared surfaces.

- System No. 3 combines the advantage of System No. 2 and allows for product application at relative humidity up to 99% provided weather conditions are not deteriorating. Where painting is required to be carried out on a piecemeal basis to reduce the risk of early chloride contamination – MCU products are the suggested preference.

Suppliers' Technical Data and MSDS sheets must be referred to for all optional product systems.

APPENDIX IV – MATERIAL SCHEDULE

(Provisional)

PART 7

DRAWINGS & SUPPORTING INFORMATION

TENDER NAME: Rust Treatment and Refurbishment of Communication Towers

TENDER No.: MR232/2017

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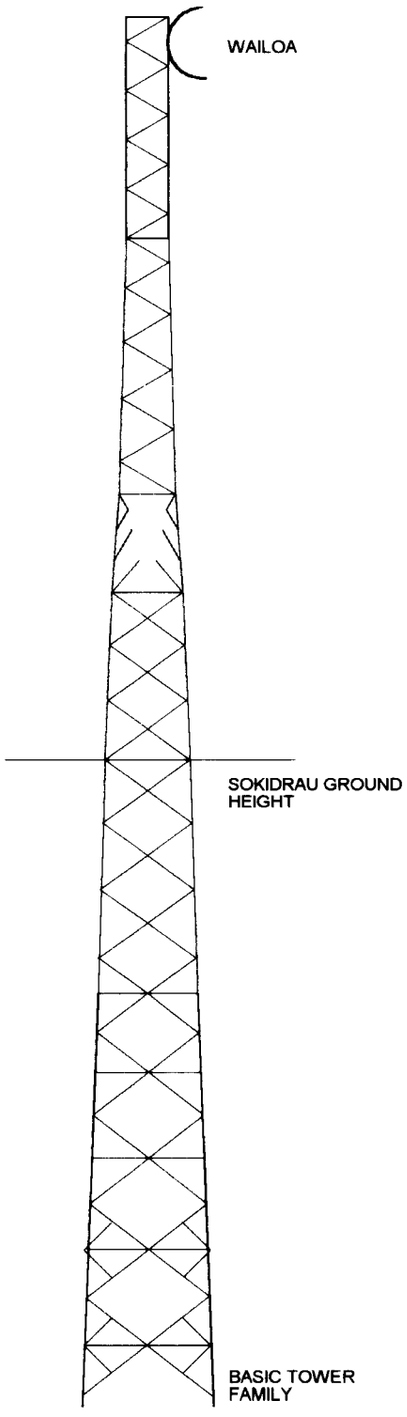

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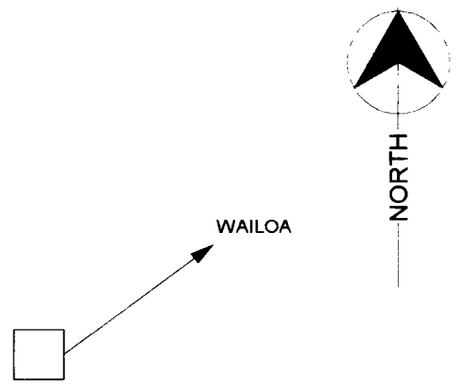


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
WAILOA	1.2M APPROX.	23M.	078 Degress

FIJI ELECTRICITY AUTHORITY

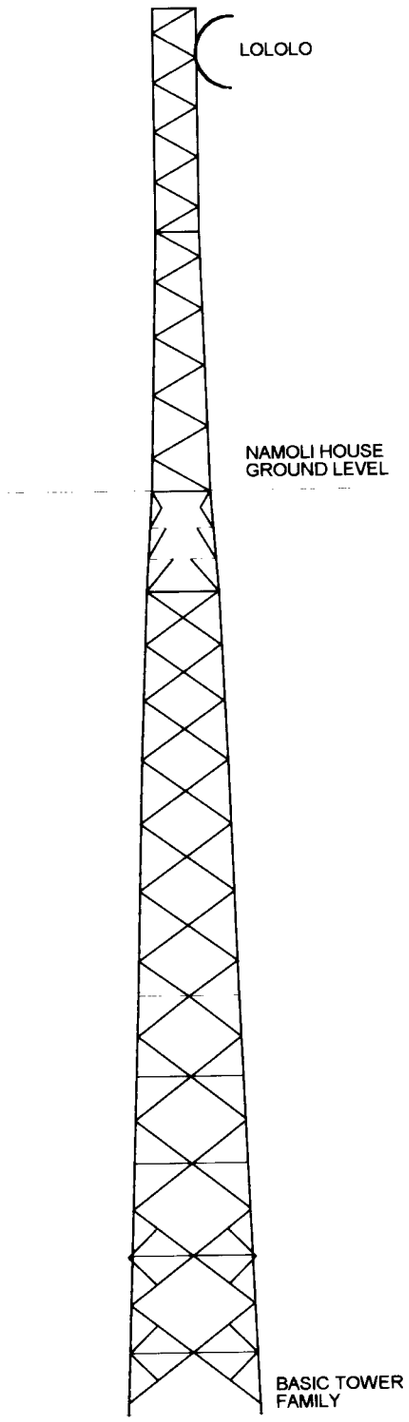
DRAWN	MO	13.10.2000
CHECKED	R.KUMAR	18:10:00
CHIEF DRAUGHTSMAN	RKL	18:10:00
APPROVED	O.GUCAKE	18:10:00

SITE TOWER LAYOUT
SOKIDRAU

DRAWING NUMBER

A4	60	T07	040	

SCALE: NTS



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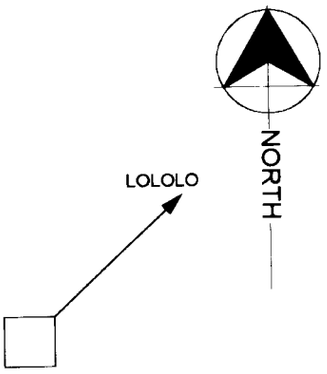


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
LOLOLO	2.0M APPROX.	20M.	76 DEGREES

FIJI ELECTRICITY AUTHORITY

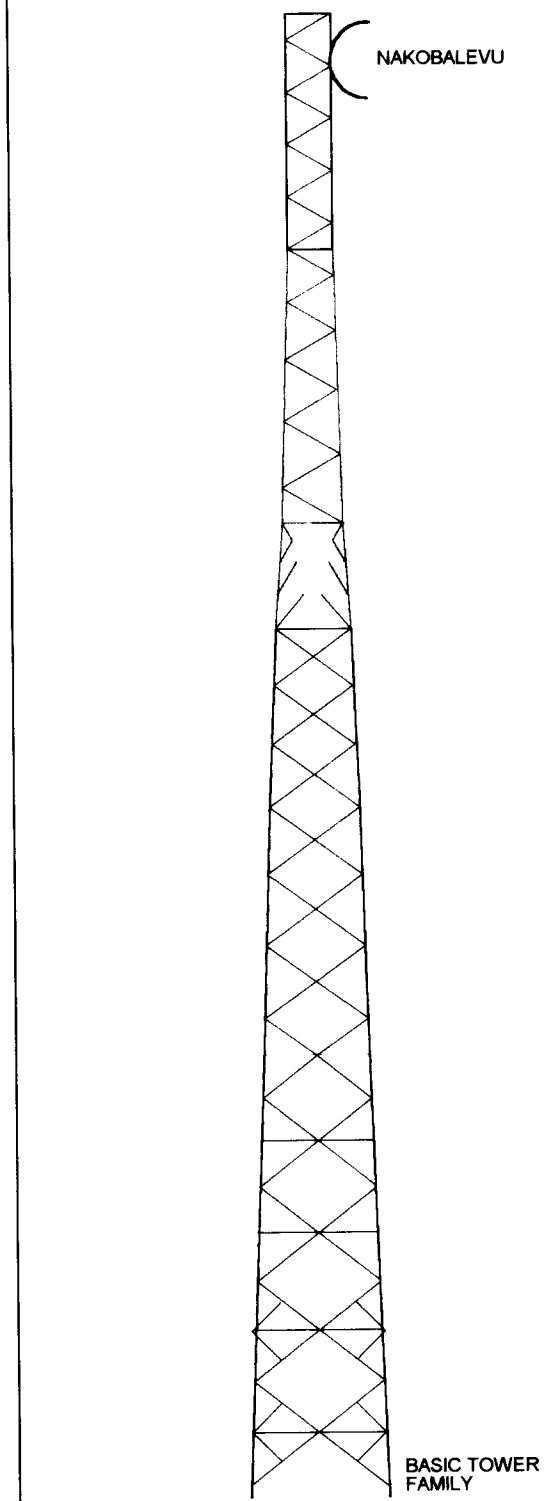
DRAWN	MO	13.10.2000
CHECKED	R.KUMAR	18:10:00
CHIEF DRAUGHTSMAN		18:10:00
APPROVED	O. GUCAKE	18:10:00

SITE TOWER LAYOUT
NAMOLI HOUSE

DRAWING NUMBER

A4	60	T07	041	

SCALE: NTS



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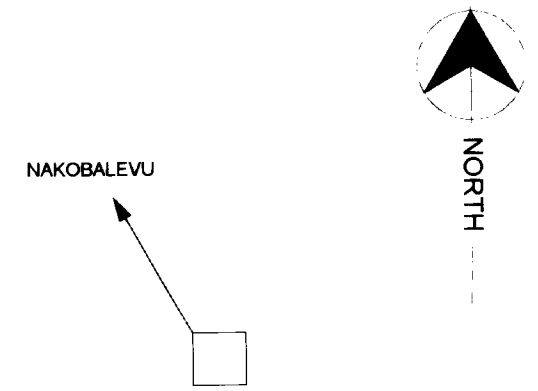


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
NAKOBALEVU	2.0M APPROX.	20M.	354 DEGREES

FIJI ELECTRICITY AUTHORITY

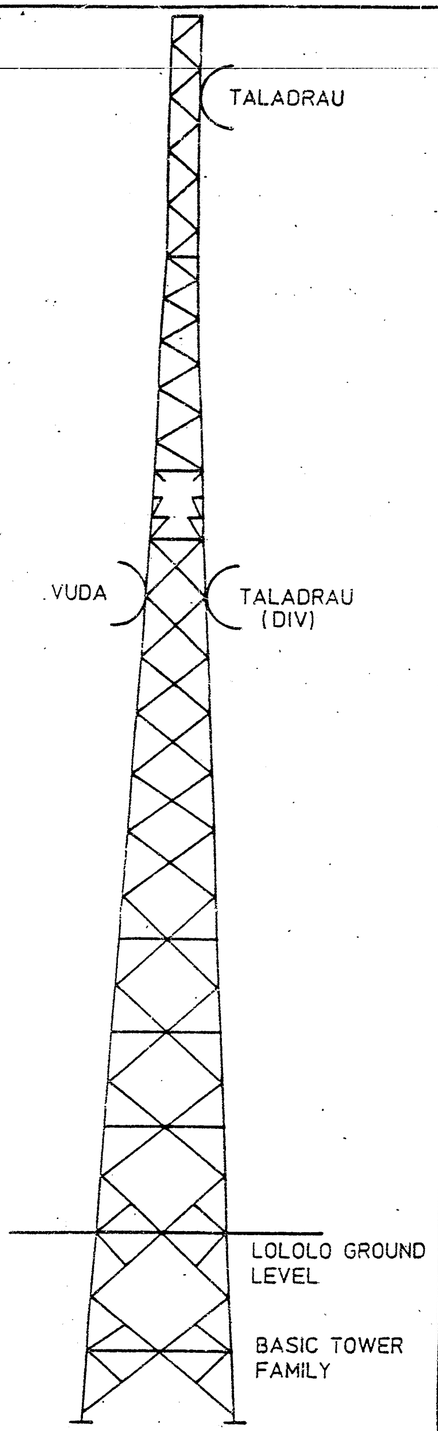
DRAWN	MO	13.10.2000
CHECKED	R.KUMAR	18:10:00
CHIEF DRAUGHTSMAN	RKL	18:10:00
APPROVED	O. GUCAKE	18:10:00

SITE TOWER LAYOUT
CENTRAL REGIONAL OFFICE

DRAWING NUMBER

A4	60	T07	042	

SCALE: NTS



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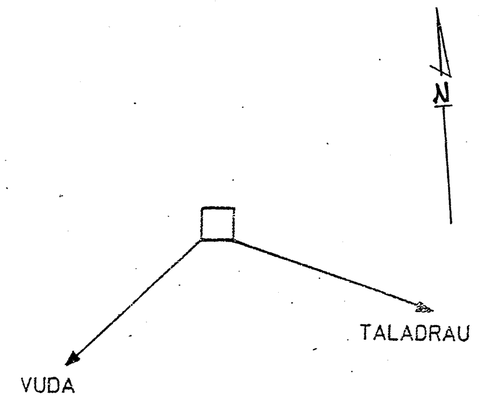

TABLE OF ANTENNA LOADS

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VUDA	3m APP	20m	237°
TALADRAU	3m APP	35m	114°
TALADRAU (DIV)	3m APP	20m	114°

DRAWN	R. MANI	25.3.91
CHECKED		17:11:91
Chief Draughtsman		17:11:91
APPROVED		17:11:91

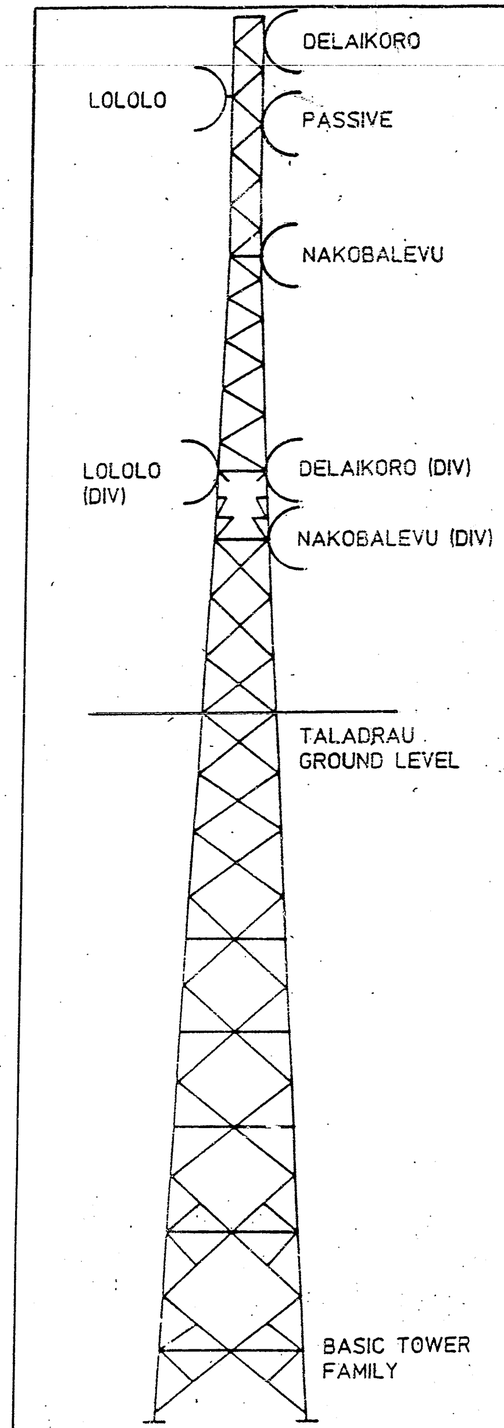
FIJI ELECTRICITY AUTHORITY

SITE TOWER LAYOUT

LOLOLO

DRAWING NUMBER: A4 | 60 | T07 | 018

SCALE: ——



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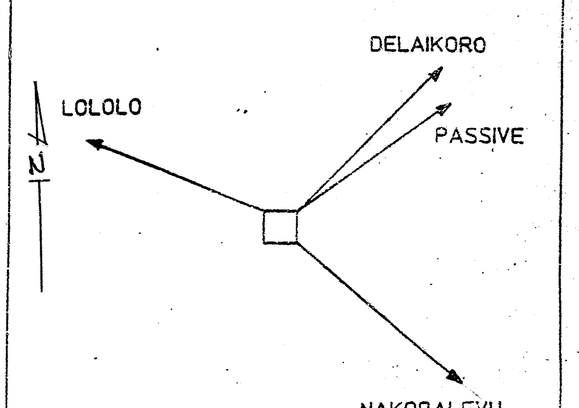


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
LOLOLO	3m APP.	20m	294°
LOLOLO (DIV)	3m APP.	8m	294°
DELAIKORO	3.6m APP.	22m	46°
DELAIKORO (DIV)	3.6m APP.	8m	46°
PASSIVE	3m APP.	20m	58°
NAKOBALEVU	3m APP.	15m	133°
NAKOBALEVU (DIV)	3m APP.	5m	133°

DRAWN	R. MANI	25.3.91
CHECKED		17:11:91
Chief Draughtsman		17:11:91
APPROVED		17:11:91

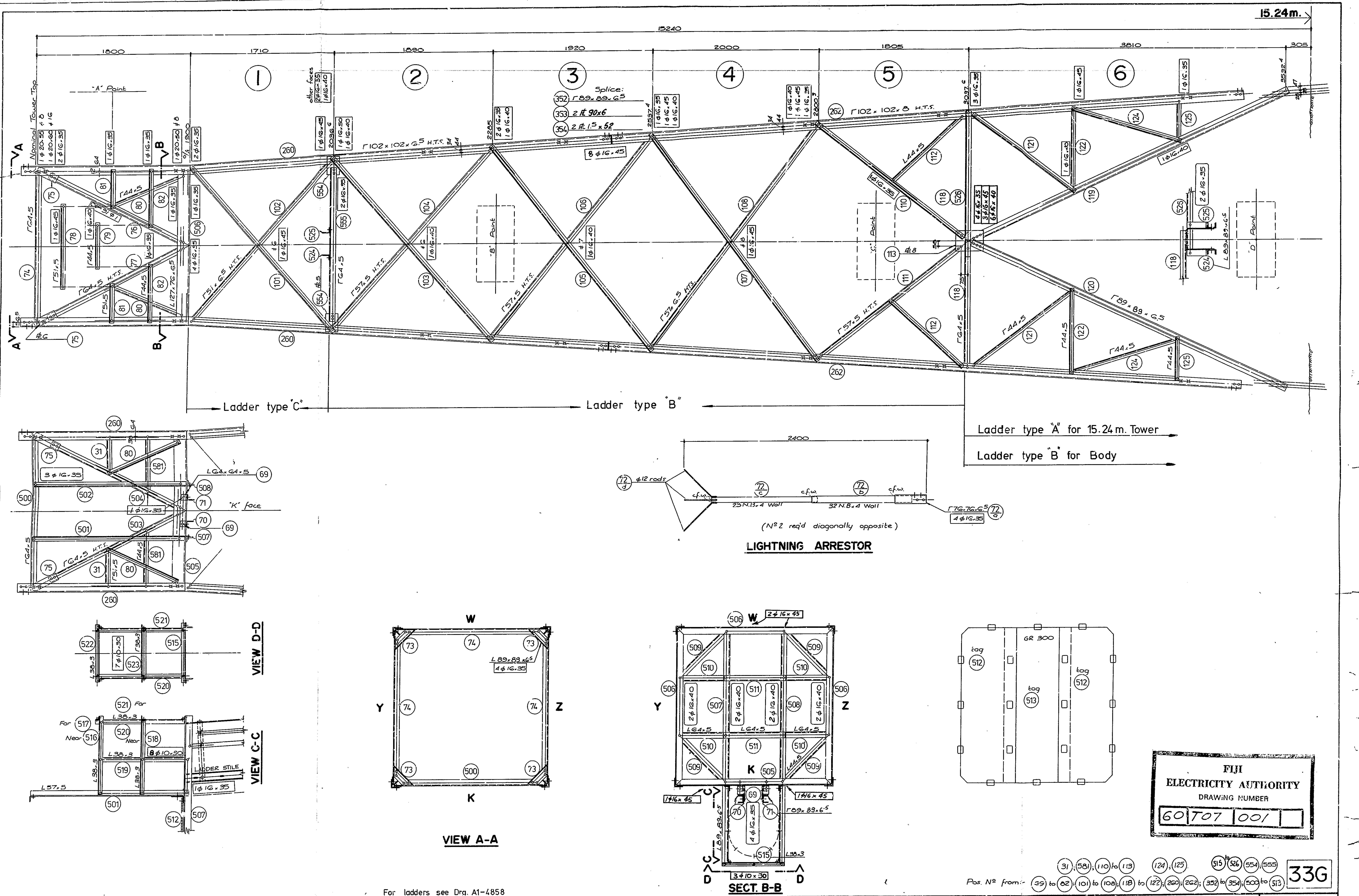
FIJI ELECTRICITY AUTHORITY

SITE TOWER LAYOUT

TALADRAU

DRAWING NUMBER: A4 | 60 | T07 | 019

SCALE: ——



THIS DRAWING IS THE PRIVATE PROPERTY OF EPT PTY LTD AUST AND WITHOUT THEIR CONSENT MUST UNDER NO CIRCUMSTANCES BE SHOWN OR GIVEN TO ANY COMPETITORS OR THIRD PARTIES — LEGAL RIGHTS RESERVED	TAN = 0.0657264 2 TAN = 0.1314528 SEC = 1.0021576 DIA. SEC = 1.0043106 COT = 15.214586	TOWER BOLTS ARE to AS1559 WITH SPR WASHERS ALL MATERIAL TO BE HOT DIP GALVANIZED indicates ⌀10mm bolt and ⌀11.5mm hole indicates ⌀16mm bolt and ⌀17.5mm hole ⌀20mm bolt and ⌀21.5mm hole ⌀24mm bolt and ⌀26 mm hole	• for clamping plates detail, see drg. P5608 • for position of mounting bar holes, see drwg. A1-4848 • For Stub see drg. A1-4867 • For Body 22.86m. see drg. A1-4850 • For Steel details see drgs. A1-11983 to A1-12009 & A1-12050

	Amendments	Dat	Drn	Ckd
G				
F				
E				
D				
C				
B				
A	W/SHOP REVISION	30.8.79	M.A	

ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

Drn. 21.9.78 F.V.
Ckd. G.J. 30.5.79
Ch D. OV 5.4.79
App.
JOB Nº 3653

AUSTRALIAN TELECOMMUNICATION COMMISSION

TYPE 133 RADIO TOWER

Superstructures & 15.24m. Tower

PCS FROM TO
SCALE 1:20
DRAWING NUMBER A1-4849 REV A

SPLICE

355 L 89×65 H.T.S.

356 2 ∠ 90×6

8 ϕ 16×45

7

8

Ladder Type 'A' for 22.86 m. TOWER
Ladder Type 'B' for Body

Ladder Type 'B'

3532.4

4033.3

4534.1

3810

3810

305

35.4

Γ127×127×8 H.T.S.

Γ44×44×5

Γ103×76×6 S

Γ64×64×5

L 102×76×6 S

Γ44×44×5

4 ϕ 16×40
1 ϕ 16×45

1 ϕ 16×35

1 ϕ 16×40

12 ϕ 16×40
3 ϕ 16×45

3 ϕ 16×35

1 ϕ 16×40

1 ϕ 16×35

E' POINT

127 128 129 125 126 264 528 529 134 130 135 138 137 136 139

SECT. D-D

543 544 545 528 542

2 ϕ 16×35 | 2 ϕ 16×35 | 2 ϕ 16×35

SECT. A-A

L 89×89×6 S

532 542 540 541 536

Γ57×5 | Γ44×5 | Γ51×5

4 ϕ 16×35 | 4 ϕ 16×35 | 4 ϕ 16×35

SECT. B-B

L 89×89×6 S

533 543 537

Γ57×5

2 ϕ 16×35

2 ϕ 16×35

VIEW C-C

3 ϕ 16×35 Γ64×5

537 538 539 532 536

Γ51×5 | Γ44×5 | L 89×89×6 S | LG4×5

3 ϕ 16×35

135 2 ϕ 16×35 134 W 131 131 135

L 51×51×5

Y 3 ϕ 16×35 531 2 ϕ 16×35 A B Γ57×57×5 Z

Γ51×51×5

530 1 ϕ 16×45 178 131 134

135 532 533 K

1 ϕ 16×40 176 2 ϕ 16×35

528 2 ϕ 16×35 GR 300 524 525 L 89×89×6 523

D D

2 ϕ 16×35 535 Tag

C C

534 A B

FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER
60 T07 002

Pos. Nº from 120 to 131; 264; 355, 356; 528 to 545 524 525 134 to 139

33G

TAN	0·0657264
2 TAN	0·1314528
SEC	1·0021576
DIA SEC	1·00431066
COT	15·214586

TOWER to AS1559 SPE.

For Ladder see dwg. A1- 4858
For position of mounting bar holes, see dwg. A1-4848
For Body 15.24m. see drg. A1-4849
For Body 30.48m. see drg. A1-4851
For stub see drg. A1-4859
For Steel details see drgs. A1-11983 to A1-12005 & A1-12050

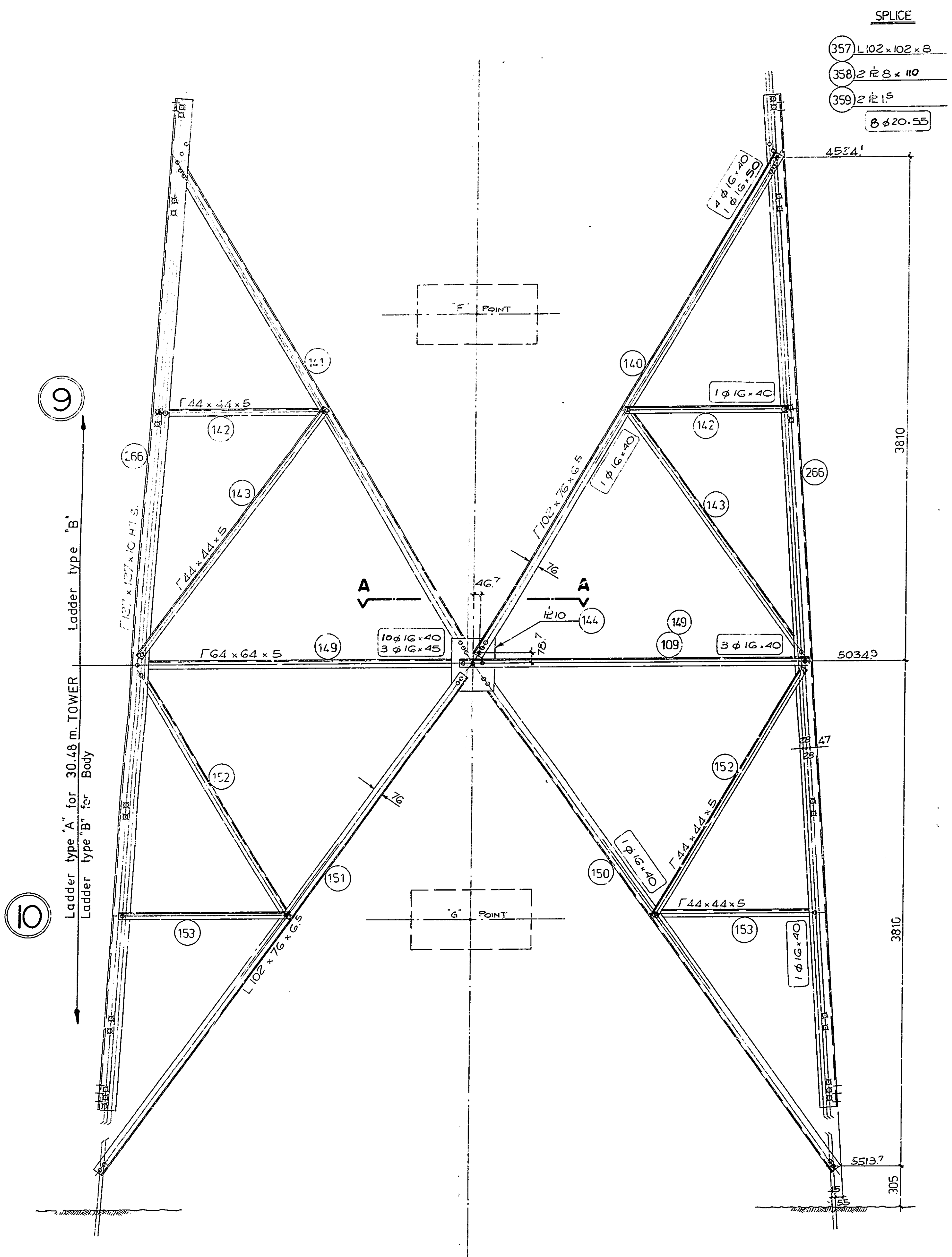
G
F
E
D
C
B
A W/SHOP REVISION 20·8·79 M.A

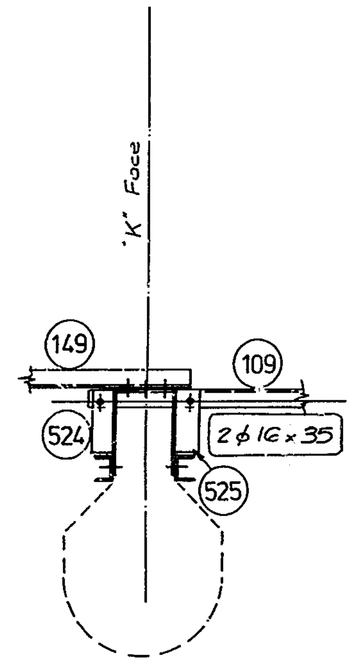
ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

DES	21·9·78	F.V.
TRACED	6·2·	
CHK	OV	10·4·79
APP		
DATE OF ISSUE	3653	

AUSTRALIAN TELECOMMUNICATION COMMISSION
TYPE 133 RADIO TOWER
BODY AND BASE 22·86 m. Tower

SCALE 1:20
DRAWING NO. A1-4850 A





SECT. A-A

FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER
60 | 707 | 003

Pos. Nº from 140 to 144, 266, 357 to 359, 109, 524, 525, 149 to 153

33G

TAN	0·0657264
2 TAN	0·1314528
SEC	1·0021576
DIA. SEC	1·00431066
COT	15·214586

TOWER BOLTS ARE to AS1559 WITH SPR WASHERS

For Ladder see dwg. AI-4858

For position of mounting bar holes, see drwg. AI-4848

For Body 22.86 m. see drg. AI-4850
For Body 38.10 m. see drg. AI-4852
For Stub see drg. AI-4860
For Steel details see drgs. AI-11983 to AI-12009 & AI-12050

C				
B				
A	W/SHOP REVISION	20.9.79	M.A	
	AMENDMENTS	DAT	DRN	CKD

ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

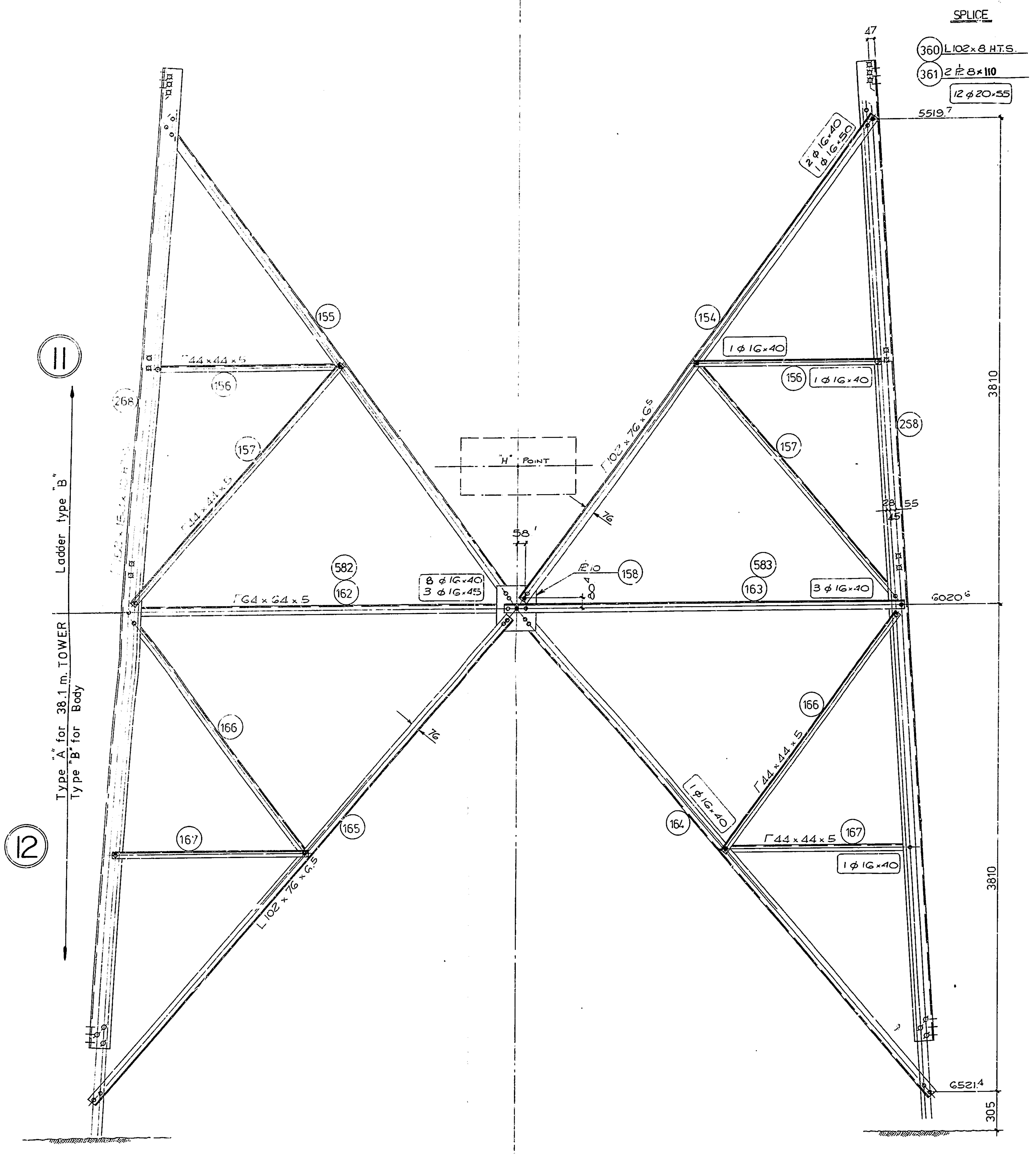
Drn	21-9-78	F.V.
Ckd	G.Z.	30.5.79
Ch	OV	5.4.79
App		

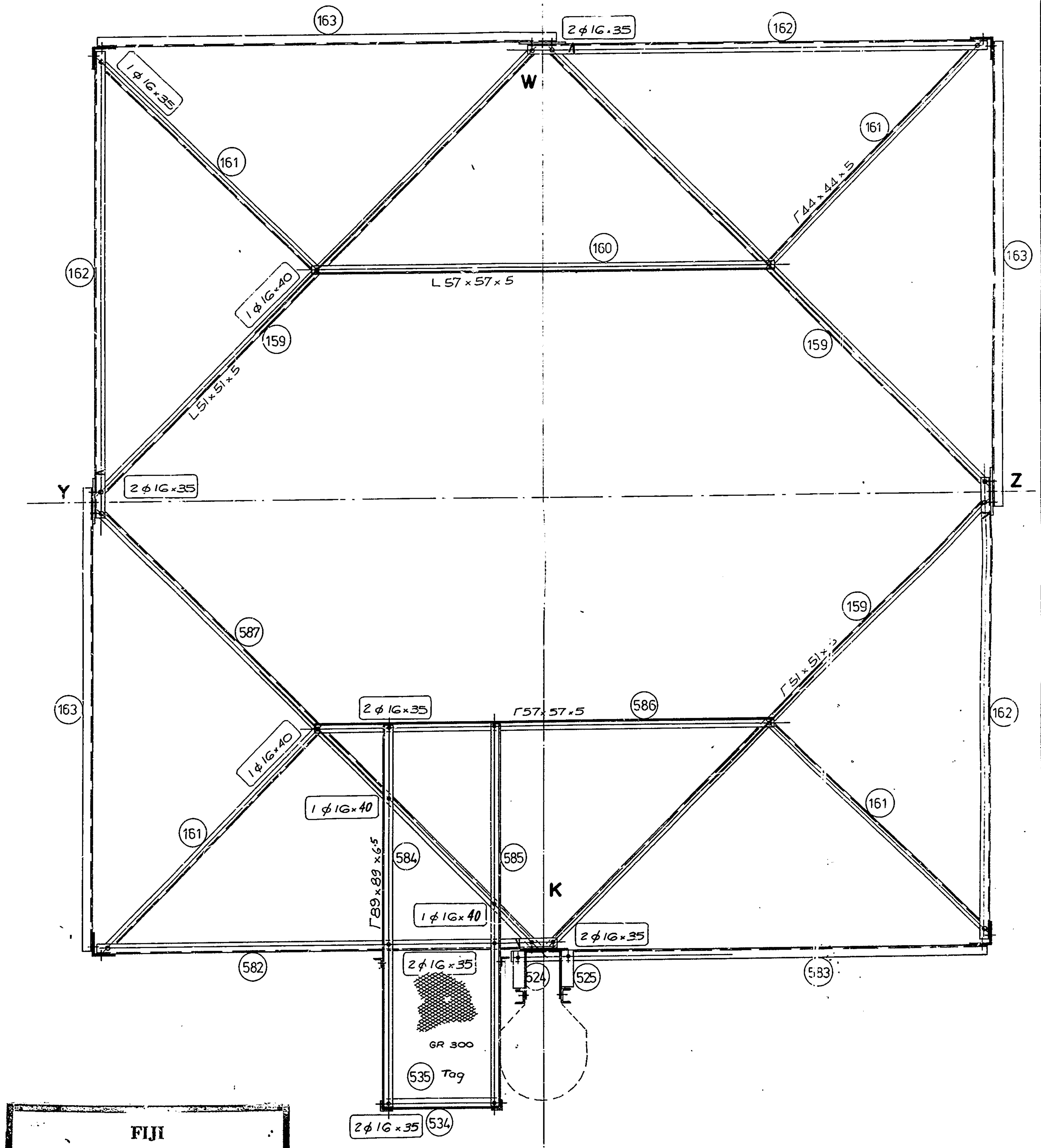
Nº 3653

AUSTRALIAN TELECOMMUNICATION COMMISSION
TYPE 133 RADIO TOWER

BODY & BASE 30·48m. Tower

AI-4851 A





FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER

60	T07	004	

Pos. Nº from: (154) to (167); (268); (361); (360); (582) to 587 (534) (535) (524) (525)

33G

TAN = 0·0657264	Tower bolts are to AS1559 with spr. washers. All material to be hot dip galvanized
2 TAN = 0·1314528	
SEC = 1·0021576	indicates ø16mm bolt and ø17.5mm hole; ø20mm – ø21.5mm; ø24mm – ø25 mm
DIA. SEC = 1·00431066	
COT = 15·214586	

For Ladder & Rest Platform details see dwg. A1-4858, A1-4850

For position of mounting bar holes, see drwg. A1-4848

For Body 30.48 m. see drg. A1-4851
For Body 45.72 m. see drg. A1-4853
For Stub see drg. A1-4861
For steel Details see drgs. A1-11983 to A1-12009 & A1-12050

A	W/SHOP REVISION	30-8-79	M.A
AMENDMENTS		DAT	DRN / CKD

ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

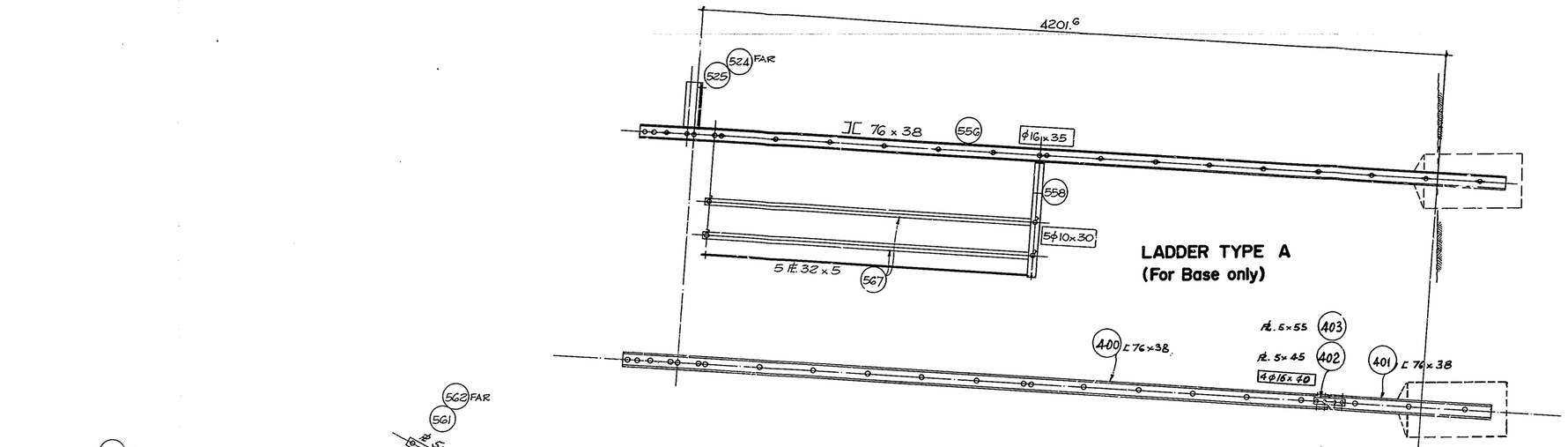
Drn. 21-9-78 F.V. — Ckd. G.Z. 30-5-79 — Ch.D. OV 5-4-79 — App.

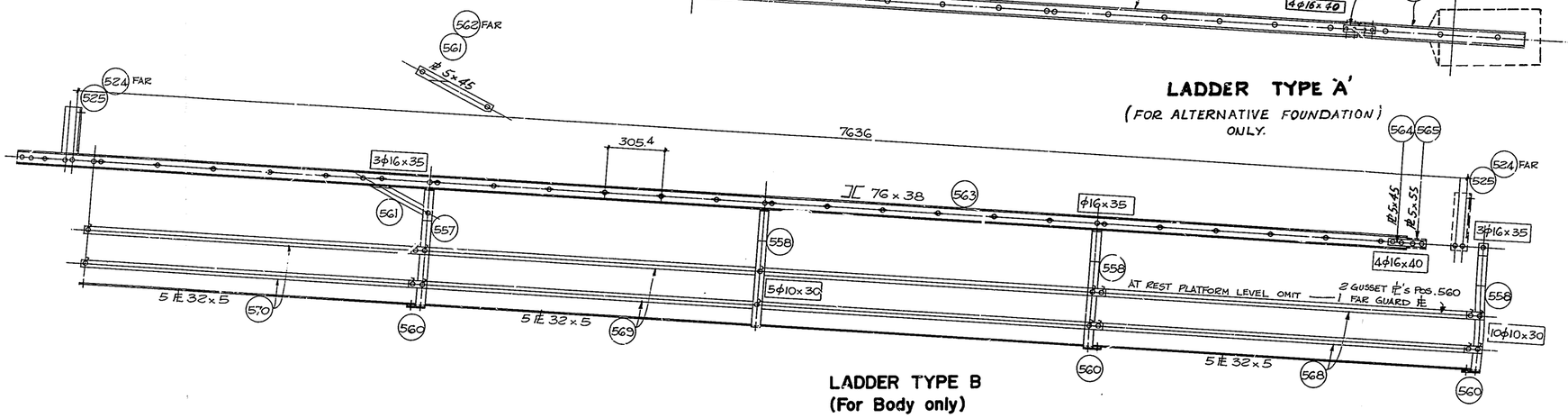
JOB Nº 3653

AUSTRALIAN TELECOMMUNICATION COMMISSION
TYPE 133 RADIO TOWER
BODY & BASE 38·10 m. Tower

SCALE 1:20

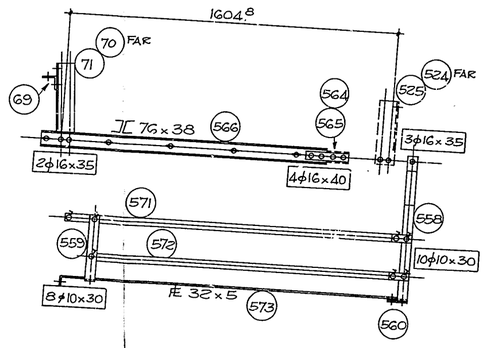
DRAWING NUMBER A1-4852 A



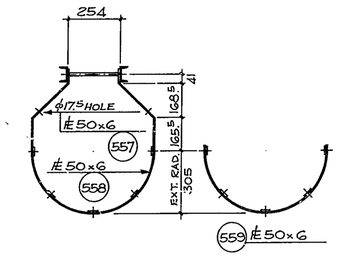


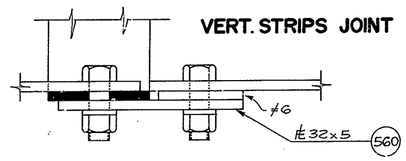
LADDER TYPE B
(For Body only)

LADDER TYPE A'
(FOR ALTERNATIVE FOUNDATION)
ONLY.



LADDER TYPE C





FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER
60 | T07 | 005 |

400 to 403

33G

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TAN . 0·0657264
2 TAN . 0·1314528
SEC . 1·0021576
DIA.SEC . 1·00431066
COT . 15·214586

ALL BOLTS ARE HTS COMPLETE WITH Spr. WASHERS
ALL MATERIAL TO BE HOT DIP GALVANIZED
◇ – indicates ϕ10mm. bolt and ϕ11.5mm. hole.
○ – indicates ø16mm bolt and 17.5mm hole
□ – ø20mm " " ø21.5mm "
▯ – ø24mm " " ø25.4mm

For Ladder Rung Detail see dwg. P5752
For steel details see dwgs. A1-11983 & A1-12009 & A1-12050

G							
F							
E							
D							
C							
B	W/SHOP REVISION	30-8-79	M.A				
A	ALTERNATIVE LADDER added posit. 400 to 403	10-5-79	J.N.	G.J.			
	AMENDMENTS	DAT	DRN	CKD			

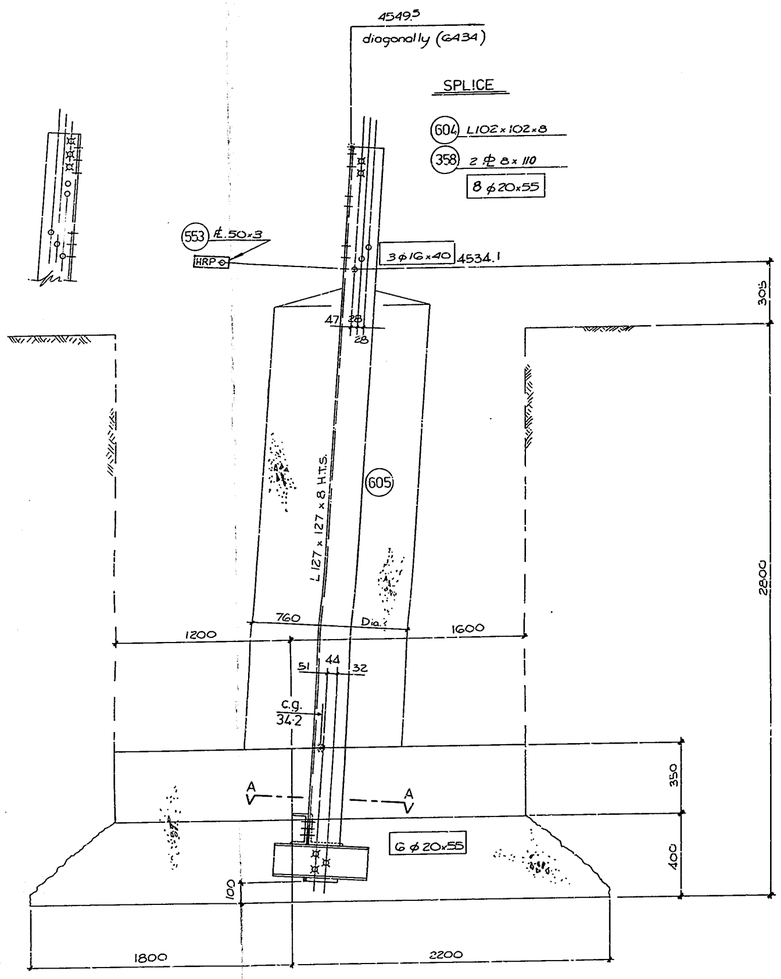
ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

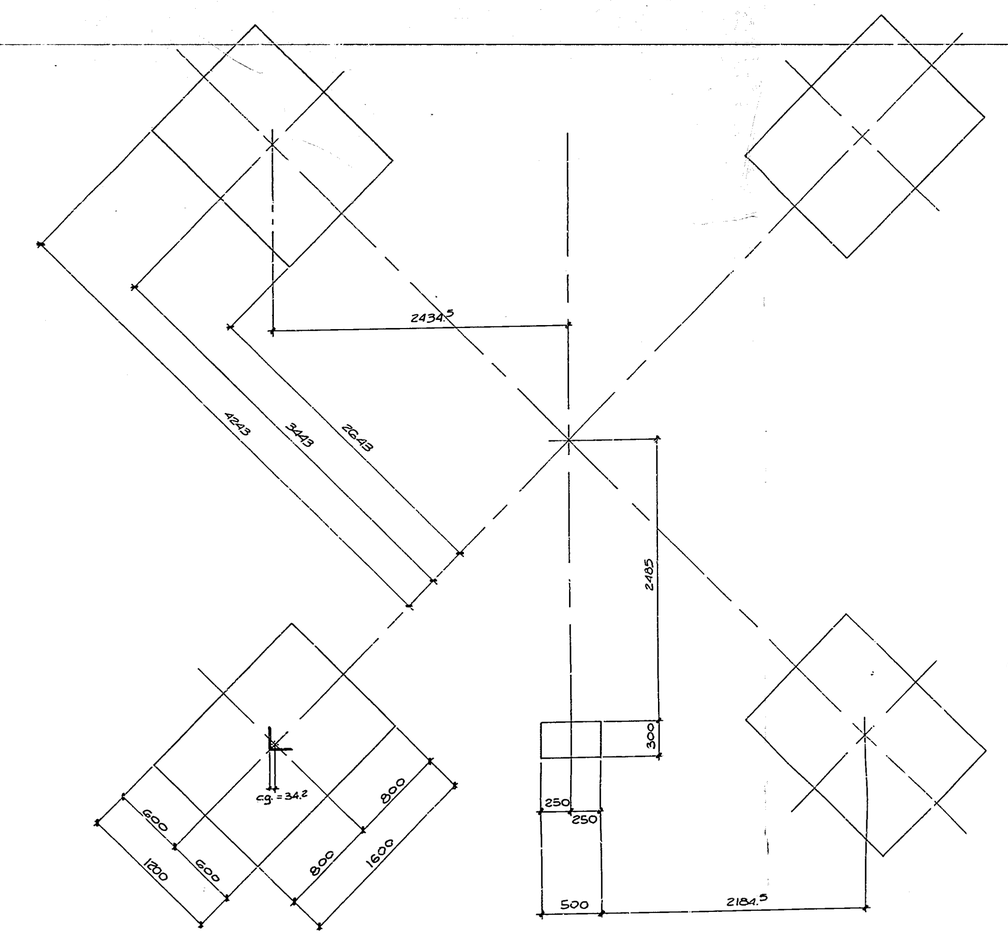
Dsn	2·4·78	F.V.
Ckd		
Chd	OV	5·4·79
App		

JOB № 3653

AUSTRALIAN TELECOMMUNICATION COMMISSION
TYPE 133 RADIO TOWER
LADDER ARRANGEMENT.

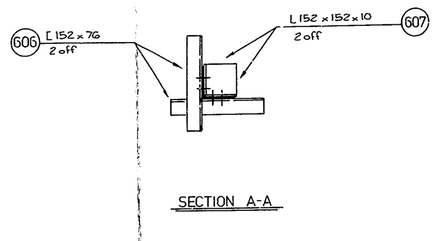
POS FROM 556 TO 573
SCALE 1:15 & 1:15
DRAWING NUMBER A1-4858 B



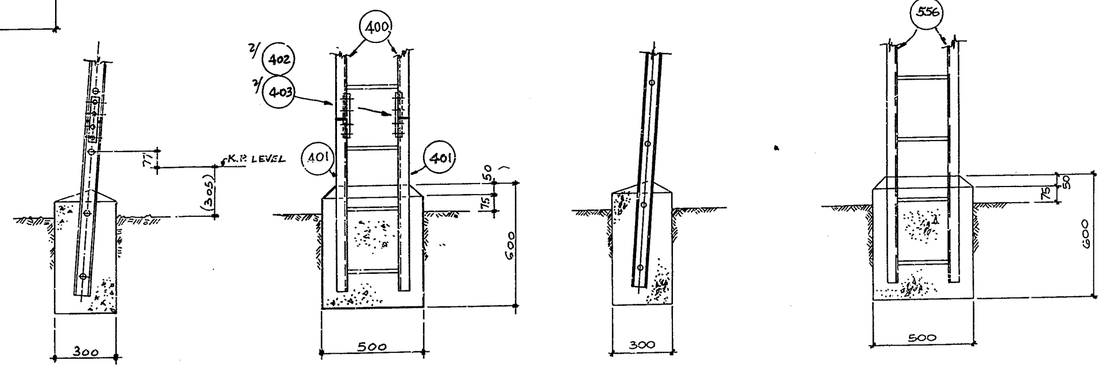


CONTROL PLATE AND SUPPORTING STEEL DIMS.	
A	400
B	3005
C	368.5
D	355?
E	4355.5
F	83
G	60.1
H	4628
H-ΔH	4588

REF. DRG: B 3655 - ONLY



SECTION A-A



ALTERNATIVE LADDER FOUNDATION

FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER
60 | 707 | 006 |

Pos. Nº from:- 358; 553; 604 to 607; 401 to 403; 556

33G

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TAN - 0·0657264	
2 TAN - 0·1314528	
SEC - 1·0021576	
DIA.SEC - 1·00431066	
COT - 15·214586	

TOWER BOLTS ARE to AS1559 WITH SPR. WASHERS
ALL MATERIAL TO BE HOT DIP GALVANIZED

C indicates ø16mm bolt and ø17.5mm hole
□ " ø20mm " ø21.5mm "
○ " ø24mm " ø25 mm "

For Base see drg. A1-4850
For Steel details see drgs A1-11983 to A1-12009 & A1-12050
For stub setting arrangement see drg. A1-1622
For Ladder see drwg A1-4858

G			C		
F			B		
E			A	ALTERNATIVE LADDER FOUNDATION ADDED & Pos. Nº 400 TO 403	16-5-79 J.N.
D				AMENDMENTS	DAT DRN CKD

ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

Drn	21-9-78	F.V.
Ckd		
Ch.D	ON	S.A. 79
App		
JOB Nº 3653		

AUSTRALIAN TELECOMMUNICATION COMMISSION
TYPE 133 RADIO TOWER
Stub, Concrete Foundation, Pegging
For 22·86 m. (75'-0") Tower

POS FROM ○ TO ○
SCALE 1:15
DRAWING NUMBER A1-4859 A

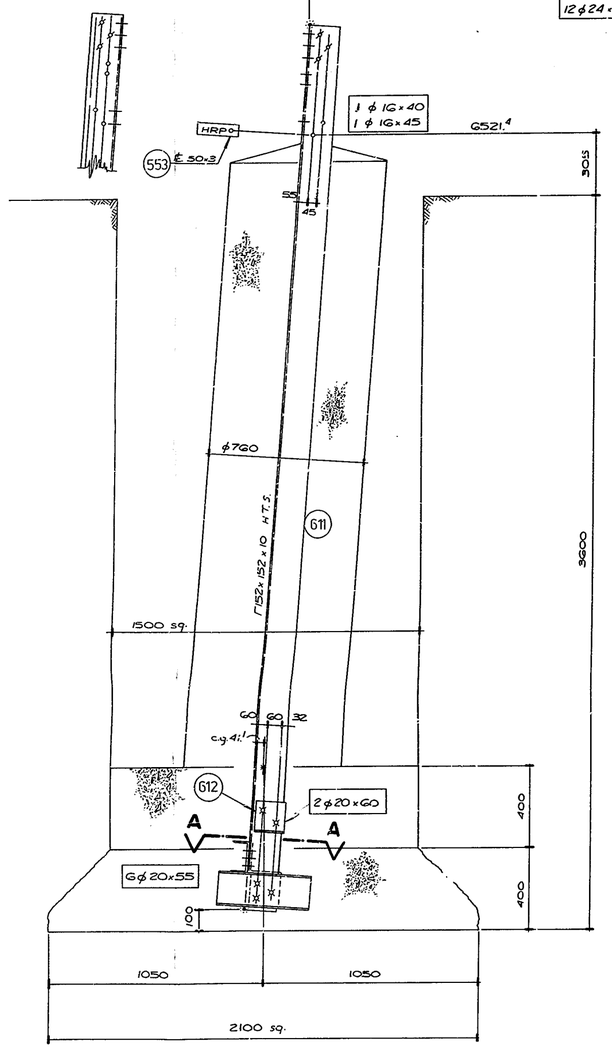
SPLICE

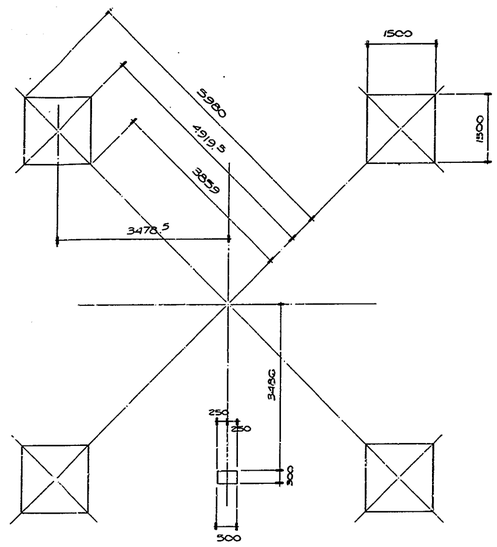
(362) L127×8 H.T.S.

(363) 2 ℄ 8 = 130

12 ϕ 24 × 60

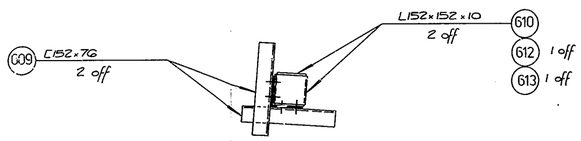
G562 diagonally (9280.3)



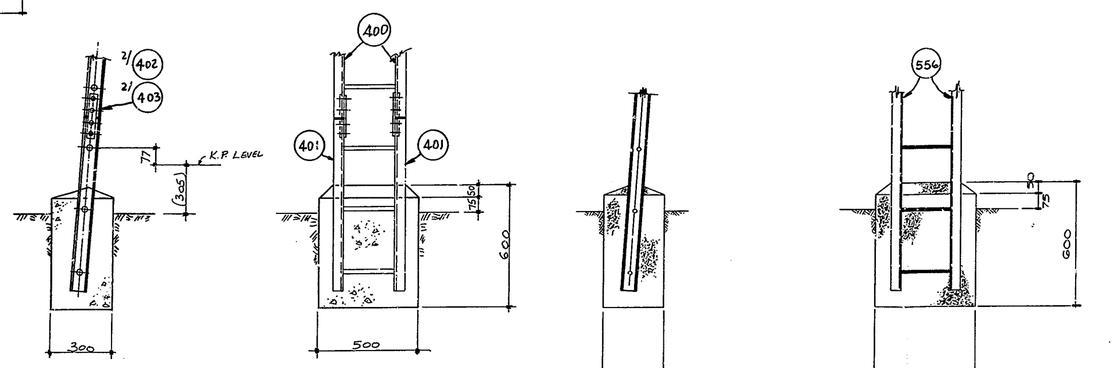


CONTROL PLATE & SUPPORTING STEEL DIMENSIONS	
A	400
B	3805
C	445
D	5043
E	G35G
F	10
G	60.1
H	GG31
H − ΔH	G591.5

REF. DRG: B3655 - only.



SECT. A-A



ALTERNATIVE LADDER FOUNDATION

FIJI ELECTRICITY AUTHORITY
DRAWING NUMBER
60 | T07 | 007

Pos. Nº from:- (362), (363), (553), (609) to (613), (554), (401) to (403)

33G

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TAN .0.0657264
2 TAN .0.1314528
SEC .1.0021576
DIA.SEC .1.00431066
COT .15.214585

TOWER BOLTS ARE to AS1559 WITH SPR. WASHERS
ALL MATERIAL TO BE HOT DIP GALVANIZED
○ – nominal ø16mm bolt and ø17.5mm hole
□ – " ø20mm " " ø21.5mm "
◻ – " ø24mm " " ø24.5mm "

For Base see drg. A1-4852
For steel details see drgs. A1-11983 to A1-12003 ϕ A1-12050
For stub setting arrangement see drg. A1-1622
For Ladder see drng A1-4858

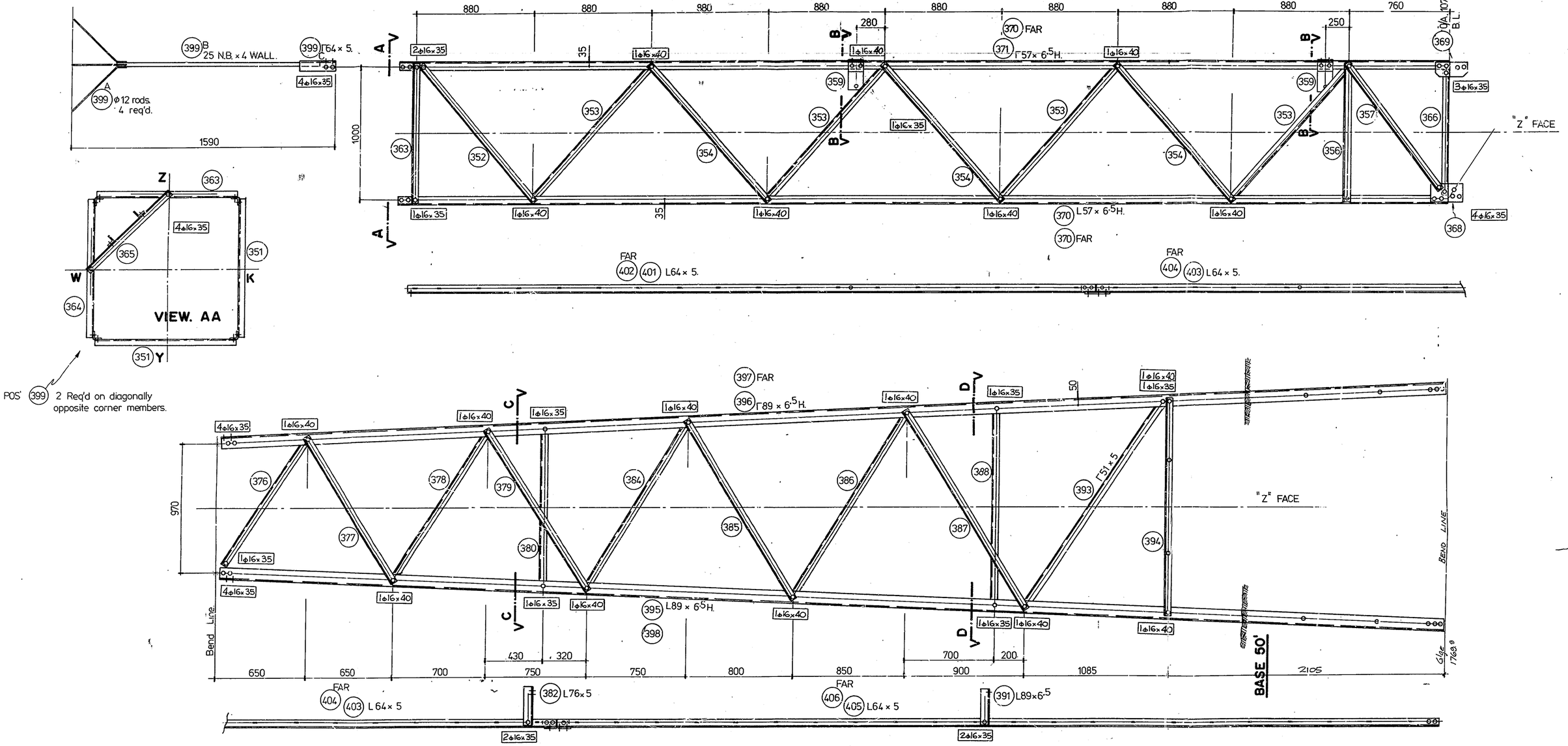
G				C		
F				B		
E				A	ALTERNATIVE LADDER FOUNDATION ADDED "POS. Nos 400 TO 403."	10.5.79 J.N.
D					AMENDMENTS	DAT DRN CKD

ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

Drn.	21-9-78	F.V.	
Ckd.			
Ch.D.	OV	6.4.79	
App.			
JOB Nº 3653			

AUSTRALIAN TELECOMMUNICATION COMMISSION
TYPE 133 RADIO TOWER
Stub, Concrete Foundation, & Pegging For 38.10m. (125'0") Tower

POS FROM ( ) TO ( )
SCALE 1:15
DRAWING NUMBER A1-4861 REV A



FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER
60 707 008

396

POS NOS 351 to 354, 356, 357, 359, 363 to 365, 368 to 371, 376 to 406.

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TAN . —
2 TAN . —
SEC . 1·0009366
DIA.SEC . 1·0018723
COT . 23·1

Tower BOLTS ARE to AS 1559 with Spring WASHERS
ALL MATERIAL TO BE HOT DIP GALVANIZED
♂ - " Φ 10mm. " " Φ 11·5mm. "
○ - indicates ø16mm bolt and ø17·5mm hole
□ - " ø20mm " " ø21·5mm "
□ - " ø24mm " " ø26 mm "

All members not specified are L44 x 5.
For Ladder Rung detail see dwg P-5752.
For Body 22·86m. see drg. A1-4678
For Stubs see drg. D-2248
For details see drgs. A1-11227 to A1-11238 & A2-2014

G				C			
F				B			
E				A			
D				AMENDMENTS	DAT	DRN	CKD

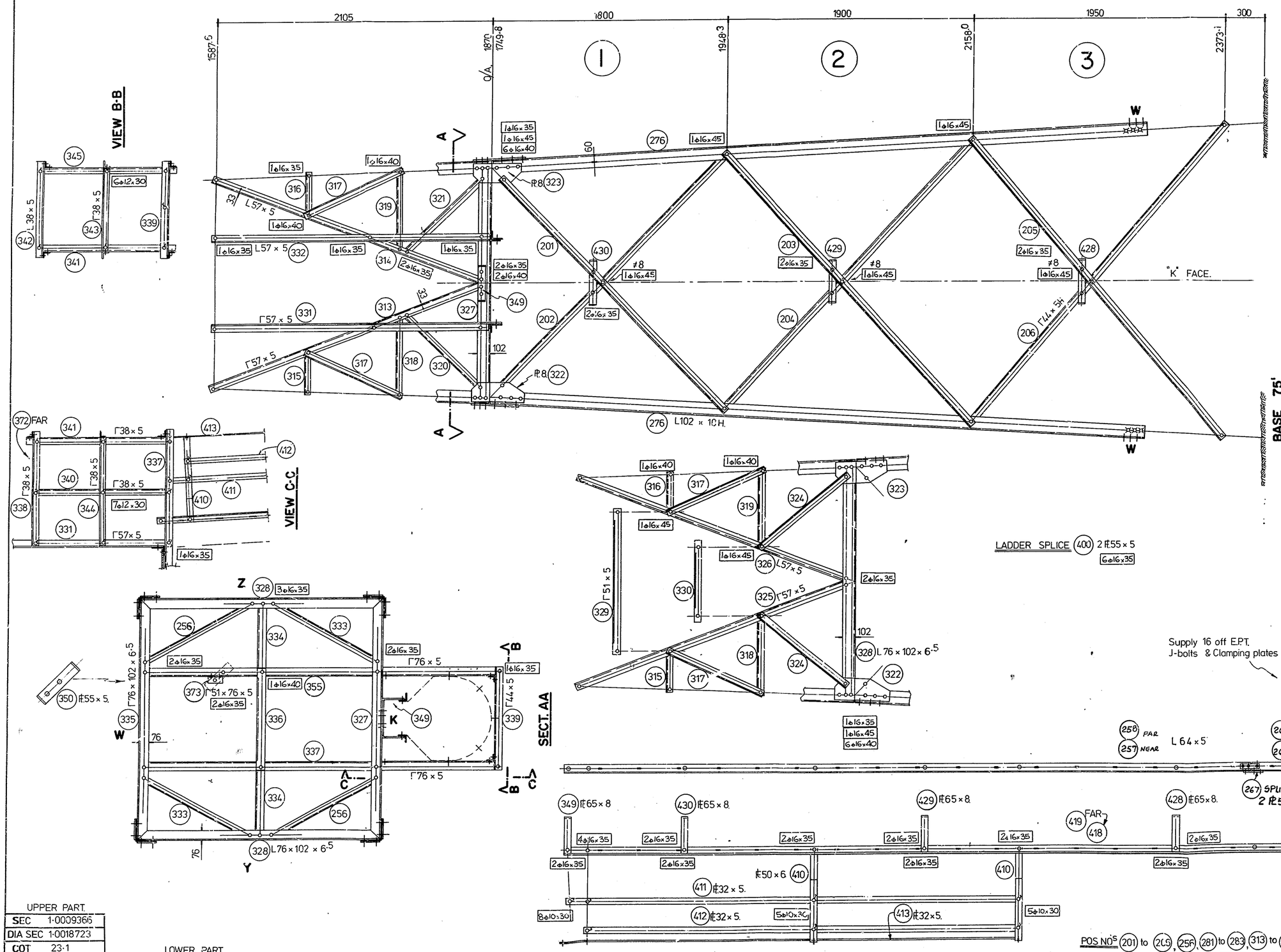
ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

Drn. JV-BM FV
Csd.
Ch'd
App
Issue DGH
Job No 3653

AUSTRALIAN TELECOMMUNICATION COMMISSION
TYPE 139 RADIO TOWER
SUPERSTRUCTURE and 15·24 m. (50'-0") BASE.

POS FROM / TO /
SCALE 1:15 N.T.S.
DRAWING NUMBER A1-4677 REV

396



FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER
60 T07 009

UPPER PART
SEC 1·0009366
DIA SEC 1·0018723
COT 23·1

LOWER PART
TAN -
2 TAN -
SEC - 1·00151984
DIA. SEC - 1·00303737
COT - 18·13099041

Tower BOLTS ARE to AS 1559 with Spring WASHERS
ALL MATERIAL TO BE HOT DIP GALVANIZED
o – " 12mm. " 13·5mm.
C – indicates ø16mm bolt and 17·5mm hole
□ - ø20mm - ø21·5mm
d - ϕ10 mm - ϕ11·5mm

- All members not specified are L44 x 5.
- For Ladder Rung detail see dwg P-5752
- For Body 15·24 m. see drg. A1-4677
- For Body 30·48 m. see drg. A1-4679
- For Stub see drg. A1-4682
- For details see drgs. A1-11227 to A1-11238 & A1-2014

G				C			
F				B			
E				A	Pos.Nos 257, 258, 265, 266 & 267 ADDED.	15.2.79	J.N.
D					AMENDMENTS	DAT	DRN	CKD

ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

Drn	30·8·78	F.K.
Ckd		
Ch'd		
App		

JOB No 3653

AUSTRALIAN TELECOMMUNICATION COMMISSION
TYPE 139 RADIO TOWER
BODY & BASE 22.86m. (75'-0")

SCALE 1:15
DRAWING NUMBER A1-4678 A

POS NOS (201) to (209), (256), (281) to (283), (313) to (350), (404), (400), (410) to (413), (418), (419), (428) to (430), (257), (258), (265), (266), (267)

396

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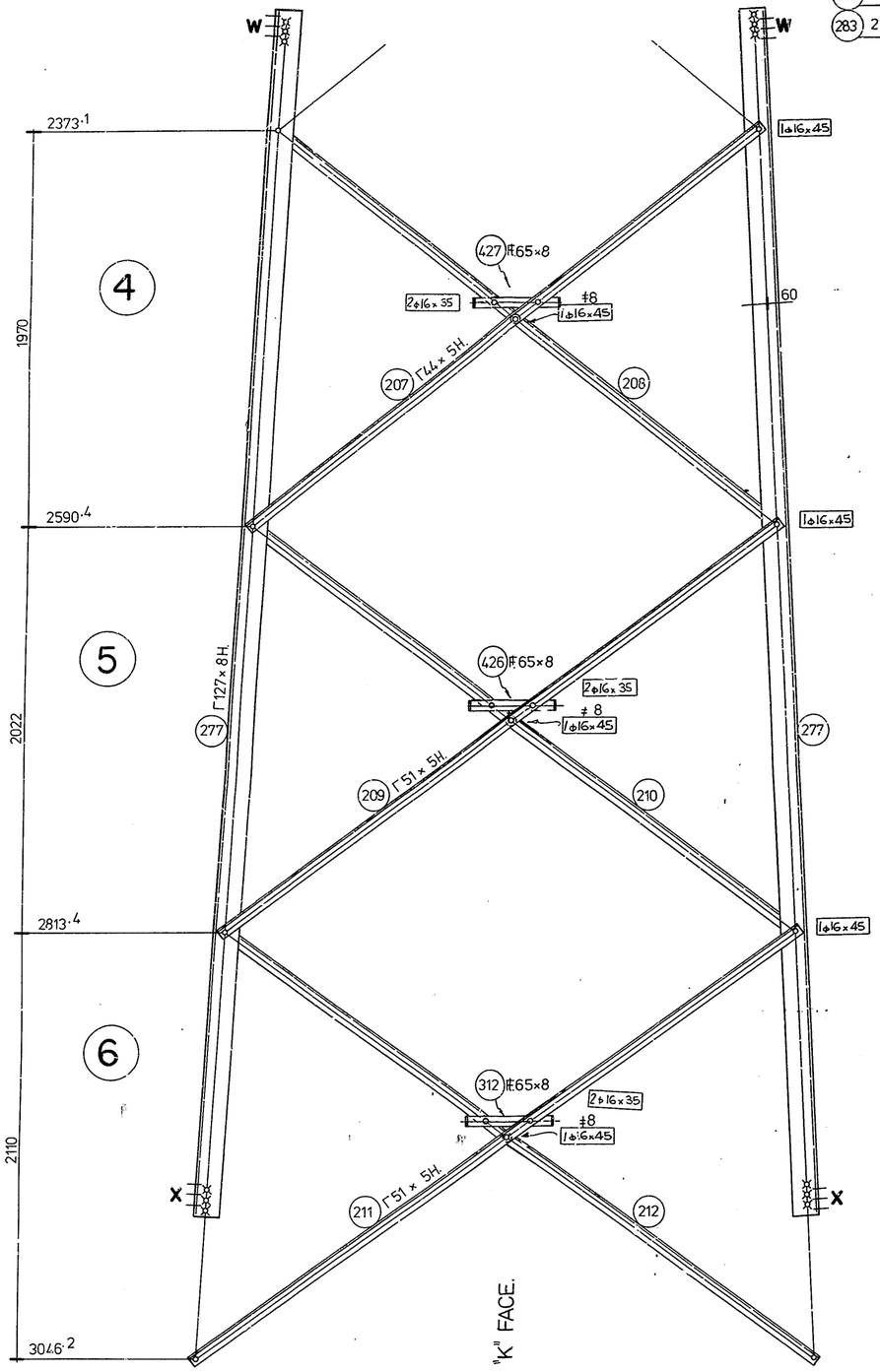
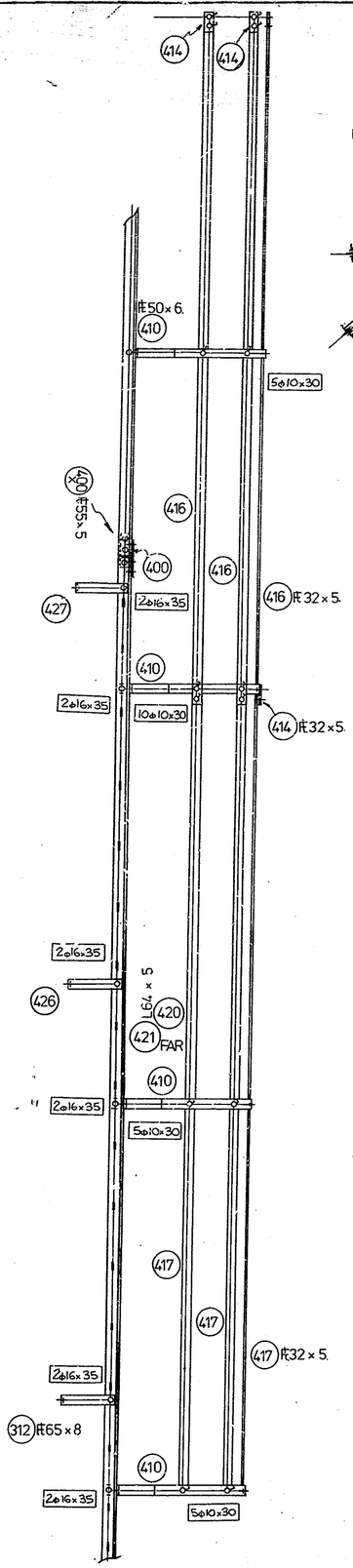
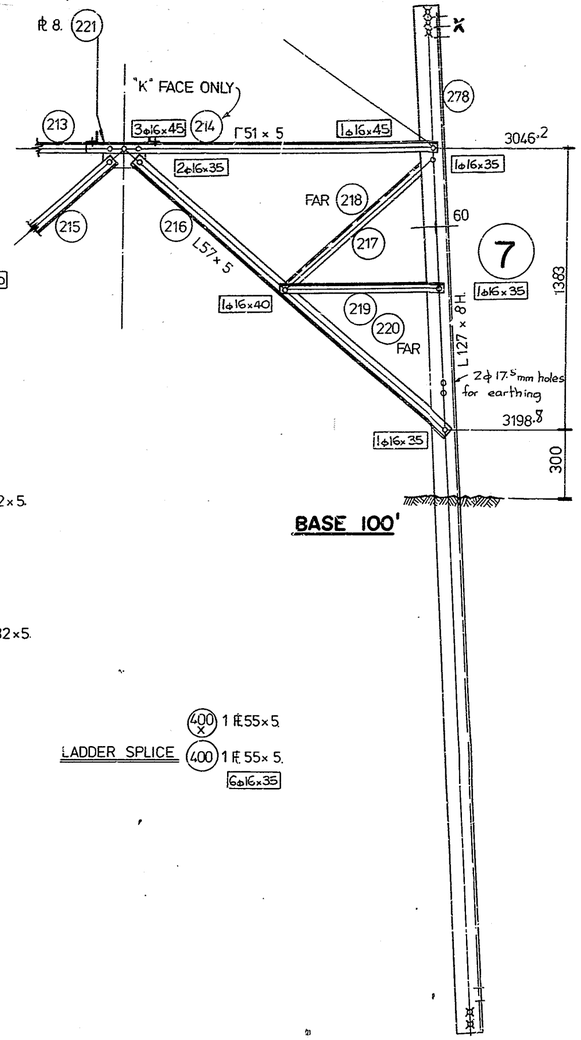


SPLICE W.

281 Γ89×6·5H.
282 2∠90×8.
283 2∠60×7·5
12⌀20.55

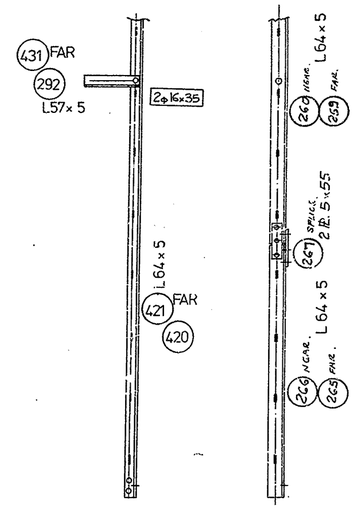




400 1 ∠55×5.
LADDER SPLICE 400 1 ∠55×5.
6⌀16×35

SPLICE X.

284 Γ102×8.
285 2∠110×8.
12⌀20.55



LADDER
(FOR ALTERNATIVE FOUNDATION ONLY)

FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER
60 T07 010

POS NOS 207 to 221, 277, 278, 281 to 285, 292, 420, 312, 400, 421, 410, 414, 416, 417, 259, 260, 265, 266, 267, 426, 427, 431.

396

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TAN.	—
2 TAN.	—
SEC.	1-00151984
DIA.SEC.	1-00303737
COT.	18-13099041

Tower BOLTS ARE to AS 1559 with Spring WASHERS
- ALL MATERIAL TO BE HOT DIP GALVANIZED

♂	ø10mm	ø11·5mm
○ indicates	ø16mm bolt and ø17·5mm hole	
☐ "	ø20mm "	ø21·5mm "
☐ "	ø24mm "	ø25mm "

- All members not specified are L44×5.
- For Ladder Rung detail see dwg P-5752
- For Body: 22.86 m. see drg. A1-4678
- For Body 38.10 m. see drg. A1-4680
- For Stub see drg. A1-4683
- For details see drgs. A1-11227 to A1-11238 & A2-2014.

G		C			
F		B			
E		A	POS NOS 259, 260, 265, 266 & 267 ADDED.	15/5/75	J.N. 13671 M.A
D			AMENDMENTS	DAT	DRN CKD

ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

Drn.	30.8.71	F.K.
Ckd.		
Ch.D.		
App.		
JOB No.	3653	

AUSTRALIAN TELECOMMUNICATION COMMISSION
TYPE 139 RADIO TOWER
BODY & BASE 30.48m. (100'-0")

POS FROM 10
SCALE 1:15
DRAWING NUMBER A1-4679 REV. A

SPLICE X
284 Γ102 × 8.
285 2 ℓ 110 × 8.
12ϕ20.55

"K FACE"

SPLICE Y
286 Γ102 × 8.
287 2 ℓ 110 × 8.
288 2 ℙ70 × 1·5
12ϕ20.55

BASE 125'

8	9	10	11	12	13
3046·2	3206·5	3366·8	3534·9	3703·0	3871·2	4039·3
1453·5	1453·5	1524	1524	1524	1524	300

279 L 127 × 8H.

LADDER
(FOR ALTERNATIVE FOUNDATION - ONLY)

261 NEAR
262 FAR
L64 × 5

267 SPACER
2 ℙ5 × 55

265 NEAR
266 FAR
L64 × 5

Use 415 on side of rest platform.

Supply 10 off EPT J-bolts & clamping plates.

SECT. AA

SECT B-B

SECT C-C

LADDER SPLICE 400 2 ℙ55 × 5.

FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER
60 T07 011

Excl 308 261 262 267 266 265 431 432

POS NOS 222 to 239, 279, 284 to 288, 292 to 310, 400, 410, 414 to 417, 422, 423.

396

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TAN - —
2 TAN - —
SEC - 1·00151984
DIA. SEC - 1·00303737
CUT - 18·13099041

Tower BOLTS ARE to AS 1559 with Spring WASHERS
ALL MATERIAL TO BE HOT DIP GALVANIZED
σ - " 12mm " - 13·5mm "
O - narrows ø16mm bolt and ø17·5mm hole
□ - " ø20mm " ø21·5mm "
⌂ - " ø10mm " ø11·5mm "

For Ladder Rung detail see dwg P-5752
For Body 30.48m. see dwg #4679
For Body 45.72m. see dwg: A1-4681
For stub see drg. A1-4884
For details see drg. A1-11227 to A1-11238 & A2-2014

G		C			
F		B			
E		A	Pos Nos 261, 262, 265, 266 & 267 added.	JAS	15·6·78 A1-A
D			AMENDMENTS	DAT	DRN CKD

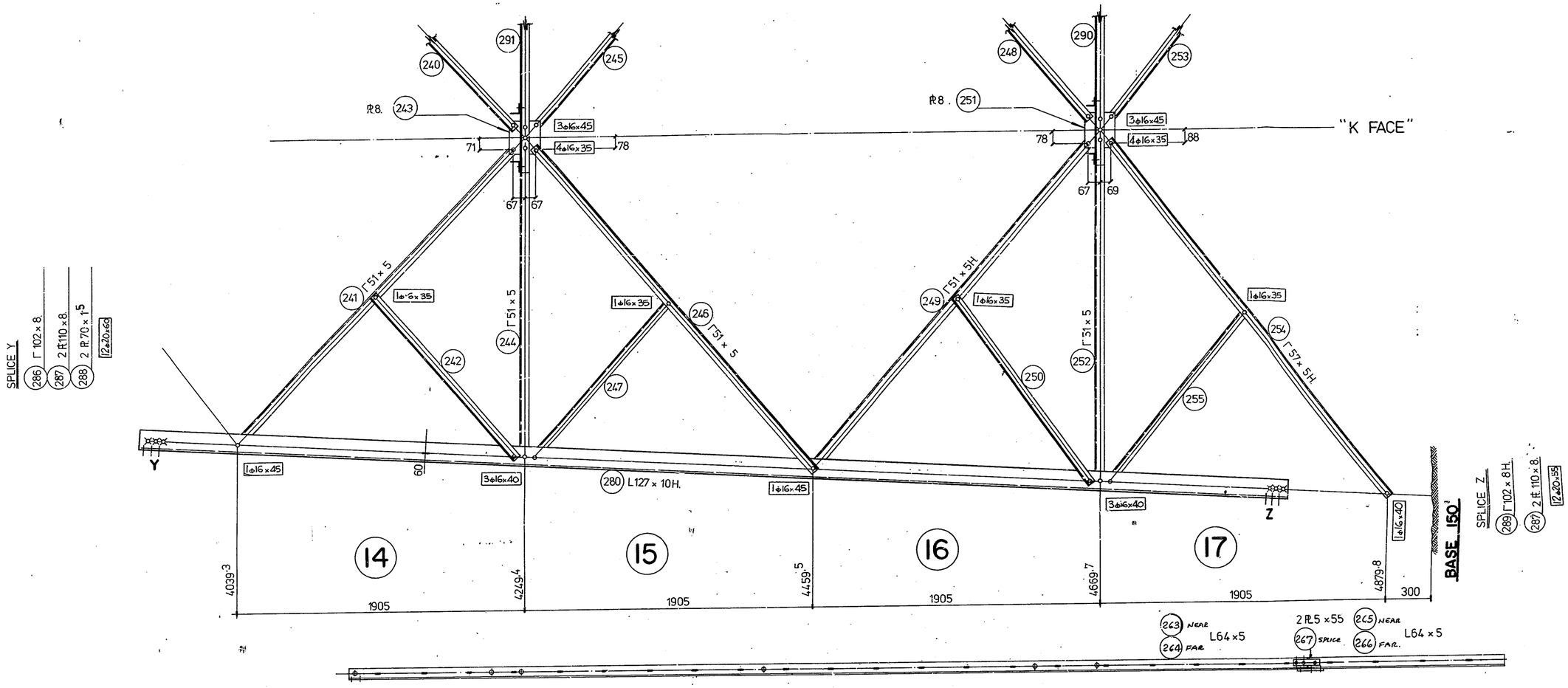
ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

Drn	30·8·78	F.V.
Ckd		
Ch D		
App		
DETAIL		

JOB No 3653

AUSTRALIAN TELECOMMUNICATION COMMISSION
TYPE 139 RADIO TOWER
BODY & BASE 38.10m. (125'-0")

POS FROM TO
SCALE 1 : 15
DRAWING NUMBER A1-4680 REV A



FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER
60 T07 012

POS NOS (263) (264) (265) (266) (267) (431) (240) to (255) (280) (286) to (292), (400), (424), (410), (414), (416), (417), (425).

39G

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TAN -	—
2 TAN -	—
SEC . 1·00151984	
DIA. SEC . 1·00303737	
COT . 18·13099041	

TowerBOLTS ARE to AS 1559 with Spring WASHERS
ALL MATERIAL TO BE HOT DIP GALVANIZED
♂ - · φ10mm. · φ11·5mm. ·
○ - naiccles φ16mm bolt and φ17·5mm hole
□ - · φ20mm · · φ21·5mm. ·
⌑ - · φ24mm · · φ25·5mm. ·

All members not specified are L44 x 5.
For Ladder Rung detail see dwg P-5752.
For Body 38.10m. see dwg. A1-4680
For Stub see dwg. A1-4685
For details see dwgs. A1-11227 to A1-11238 & A2-2018

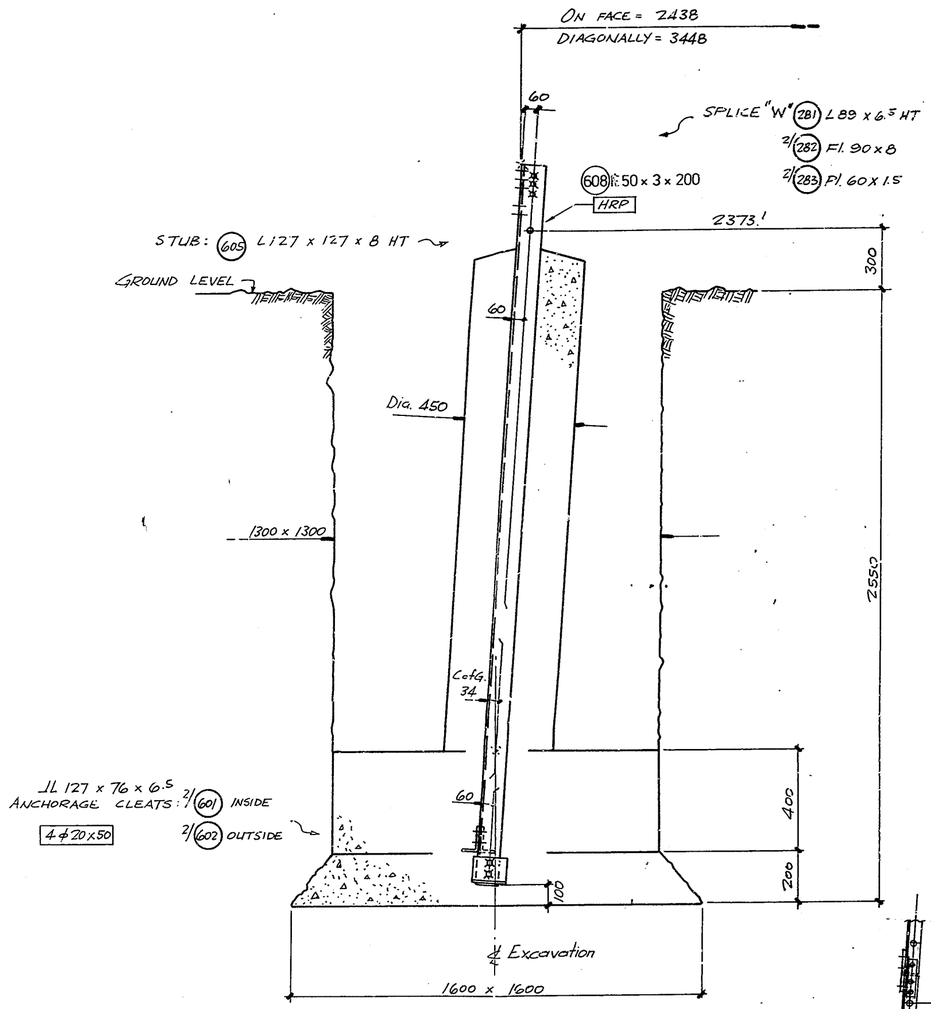
A	Pos. Nos 263, 264, 265, 266 & 267 ADDED	15·5·79	J.W.	15·5·79	M.A.
	AMENDMENTS	DAT	DRN	CKD	

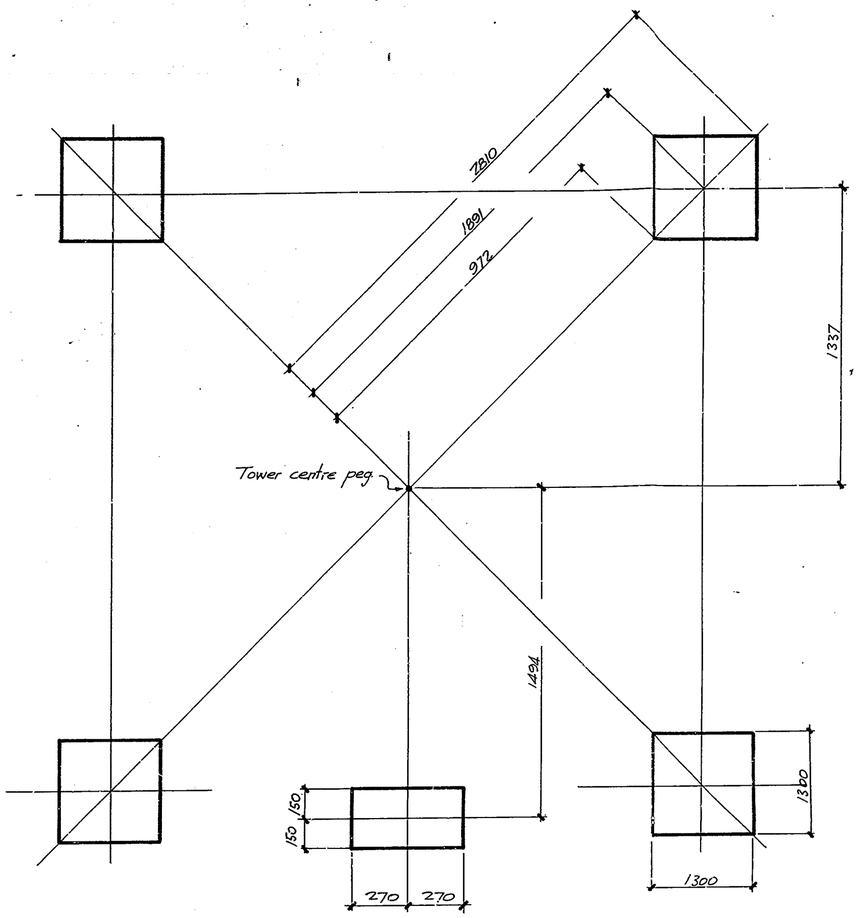
ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

Drn.	30·8·78	F.V.
Ckd.		
Ch.D.		
App.		
JOB No.	3659	

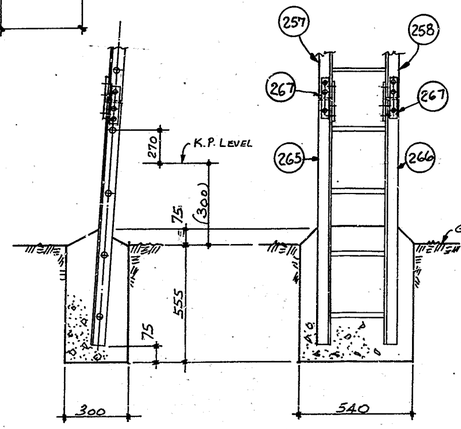
AUSTRALIAN TELECOMMUNICATION COMMISSION
TYPE 139 RADIO TOWER
BASE 45.72m. (150'-0")

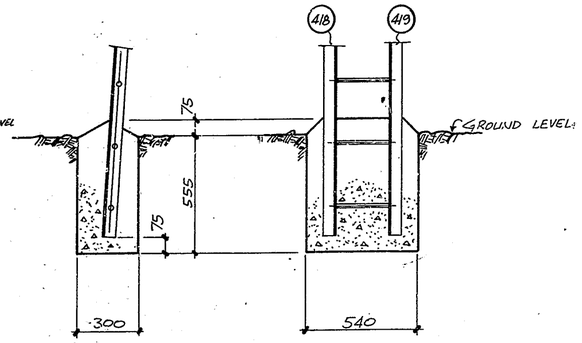
POS FROM ◯ TO ◯
SCALE 1 : 15
DRAWING NUMBER A1-4681
REV. A.





"K"-SIDE.





ALTERNATIVE LADDER FOUNDATION

CONTROL PLATE & SUPPORTING STEEL DIMENSIONS.	
A	400
B	2748
C	298
D	1977
E	2228
F	7
G	71
H	2493
H − ΔH	2459

REF. DRG: B 3655 - ONLY.

FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER
60 | T07 | 013 |

TOWER BASE REF. DWG - A1-4678

39G

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TAN	—
2 TAN	—
SEC	1.00151984
DIA. SEC	1.00303737
COT	18.1309041

- TOWER BOLTS TO AS 1559 WITH SPRG WASHER
- ALL MATERIAL TO BE HOT DIP GALVANIZED

○ — nominates ø16mm bolt and ø17.5mm hole
□ — " ø20mm " " ø21.5mm "
◻ — " ø24mm " " ø26 mm "

- For details see drg. A1-1227 to A1-1238 & A2-2014
- For stub setting Arrangement see drg. A1-1622

A	ALTERNATIVE LADDER FOUNDATION ADDED	15/5/79	J.N.	1867	MA
	AMENDMENTS	DAT	DRN	CKD	

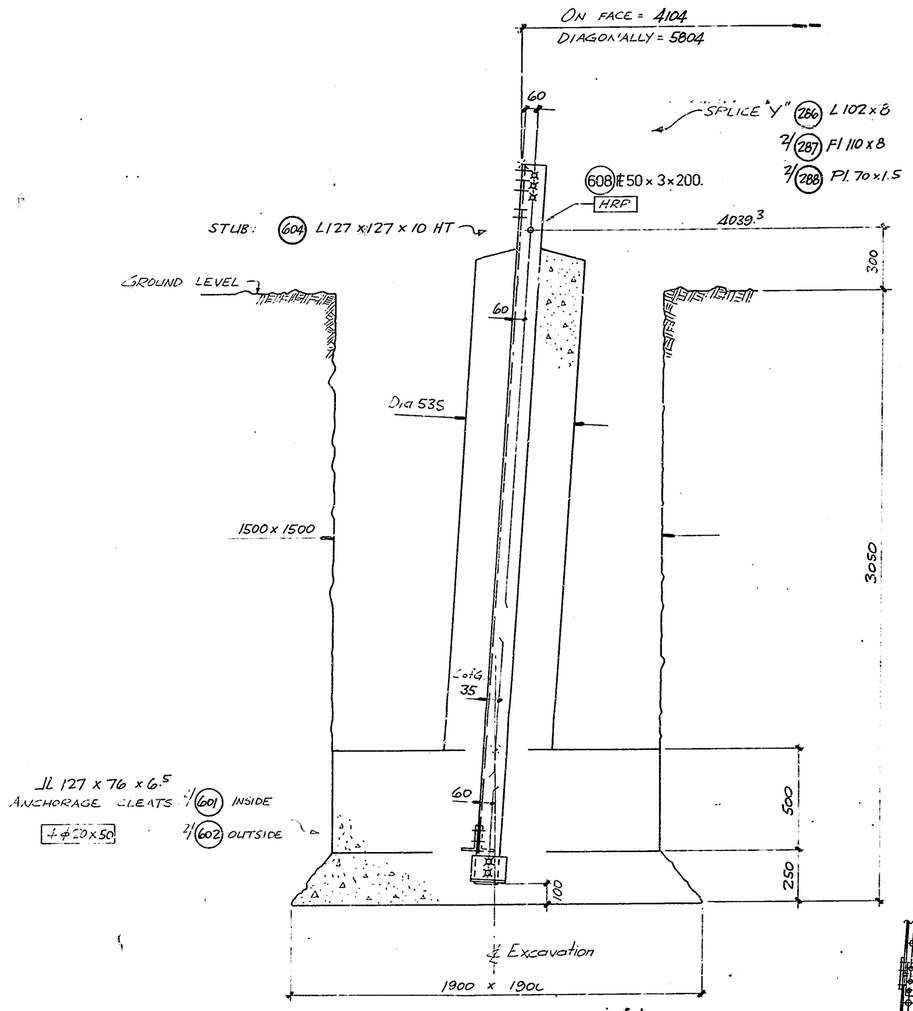
ELECTRIC POWER TRANSMISSION PTY. LTD.
SYDNEY

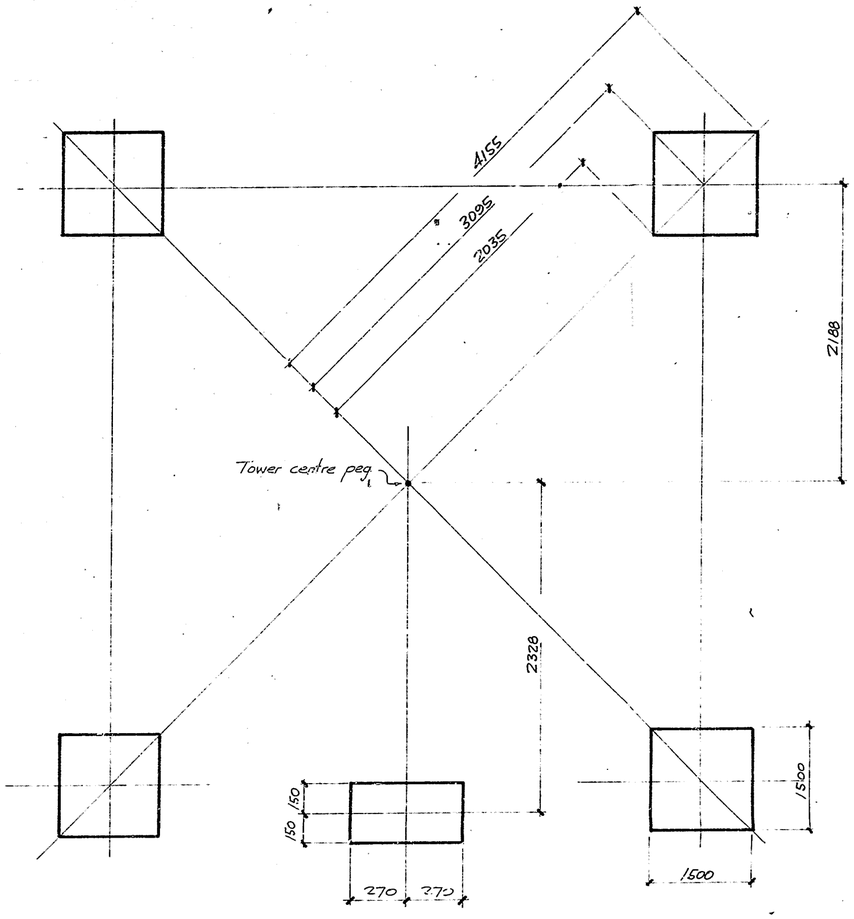
Drn.	30-8-78	F.V.
Ckd.		
Ch.D		
App.		

JOB № 3653

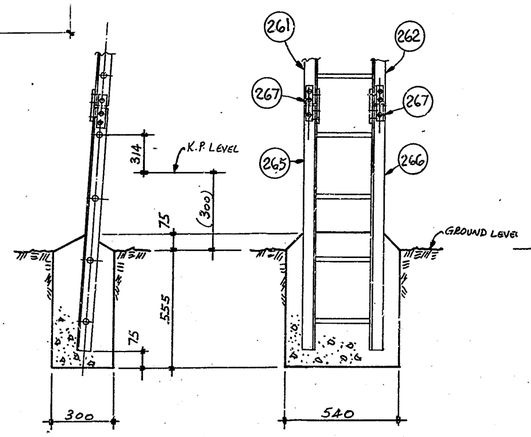
AUSTRALIAN TELECOMMUNICATION COMMISSION.
TYPE 139 RADIO TOWER.
Stub, Concrete foundation & Pegging.
BASE 22·86 m (75'-0")

FCS FROM ○ TO ○
SCALE N.T.S
DRAWING NUMBER A1-4682 REV. A

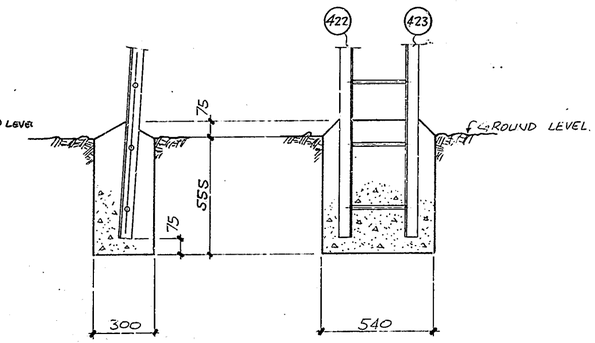




"K"-SIDE



ALTERNATIVE LADDER FOUNDATION



CONTROL PLATE & SUPPORTING STEEL DIMENSIONS.	
A	320
B	3248
C	333
D	3195
E	3900
F	7
G	71
H	4159
H − ΔH	4126

REF. DRG: B 3655 - ONLY.

FIJI
ELECTRICITY AUTHORITY
DRAWING NUMBER
60 | T07 | C14 |

TOWER BASE REF. DWG - A1-4680

396

TAN - —
2 TAN - —
SEC - 1.00151984
DIA.SEC - 1.00303737
COT - 18 13099041

- TOWER BOLTS TO AS 1559 WITH SPRG WASHERS
- ALL MATERIAL TO BE HOT DIP GALVANIZED.

For details see drgs. A1-11227 to A1-11238 & A2-2014
for stub setting Arrangement see drg. A1-1622

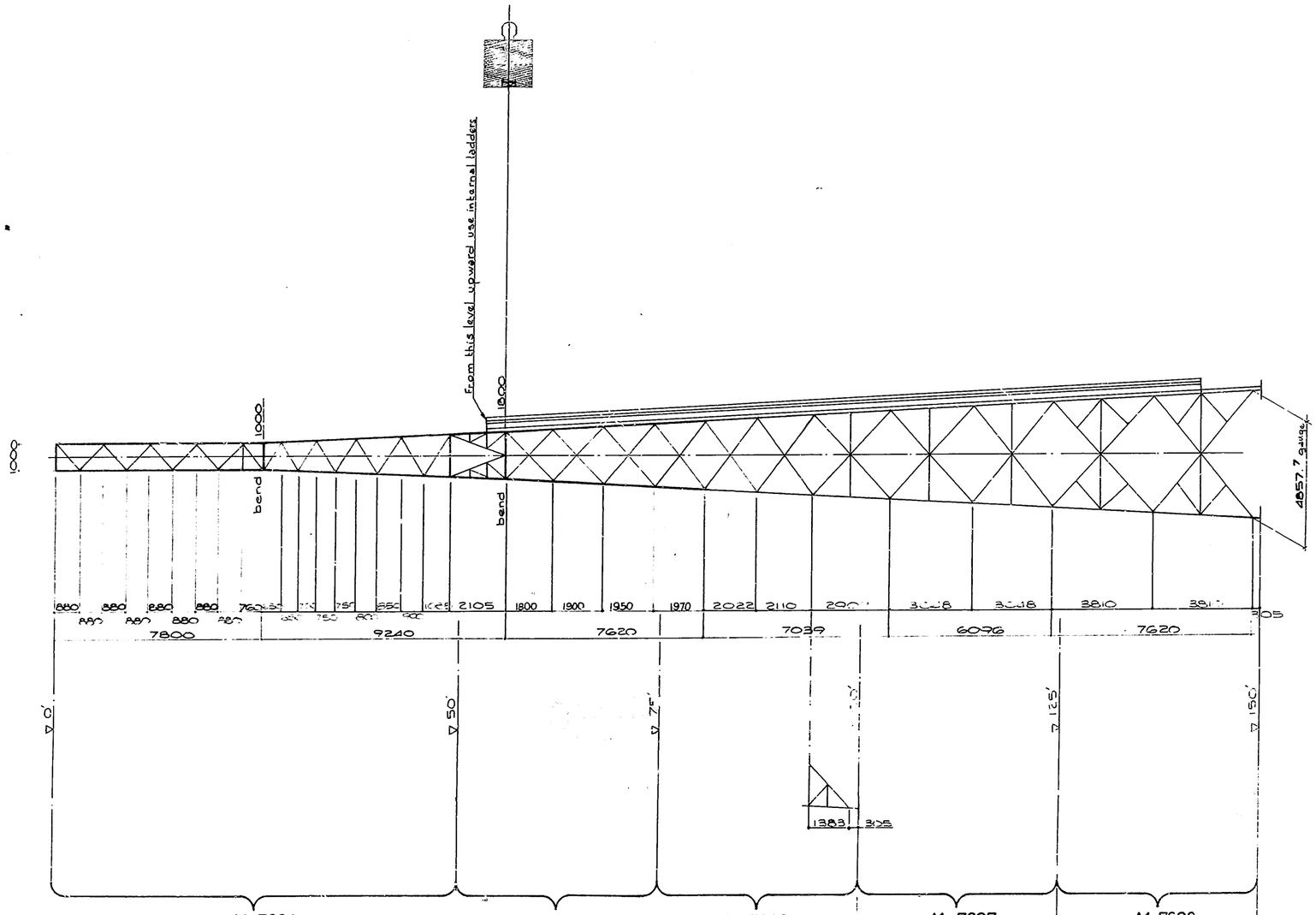
C					
B					
A	ALTERNATIVE LADDER FOUNDATION ADDED	15 Sep	J.W.	15&17 M.A.	
	AMENDMENTS	DAT.	DRN	CKD	

ELECTRIC POWER TRANSMISSION PTY. LTD. SYDNEY

Drn 30.8.78 F.V.
Ckd
Ch'd
App
Job No 3653

AUSTRALIAN TELECOMMUNICATION COMMISSION.
TYPE 139 RADIO TOWER.
Stub, Concrete foundation & Pegging.
BASE 38·10m (125'-0")

PLS FROM TO
SCALE NTS
DRAWING NUMBER A1-4684 A



Panel Nº.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Wind Pressure (kPa)	2.49									2.4										2.317				2.188			2.04			2.04		
Fax = [illegible] x pressure Fdy = Fax : force for diag wind (kN)	7.42									11.6										10.9				11.25			10.2			13.65		
Fn = force for norm. wind = [illegible] (kN)	10.0									15.5										14.3				14.6			13.4			17.8		
Total area = Ea x 1.75 + 0.183H = Ta (m²)	3.97									6.41										6.17				6.69			6.52			8.72		
Exposed area of one face = Ea (m²)	1.45									2.7										2.74				3.1			3.09			4.19		

FEA DRG 60-T07-015.

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TAN=
? TAN=
SEC=
DIA SEC=
COT=

—— INDICATES FLANGE PROJECTS FROM PLANE
– – INDICATES FLANGE PROJECTS INTO PLANE
INDICATES FLANGE UP.
INDICATES FLANGE DOWN.

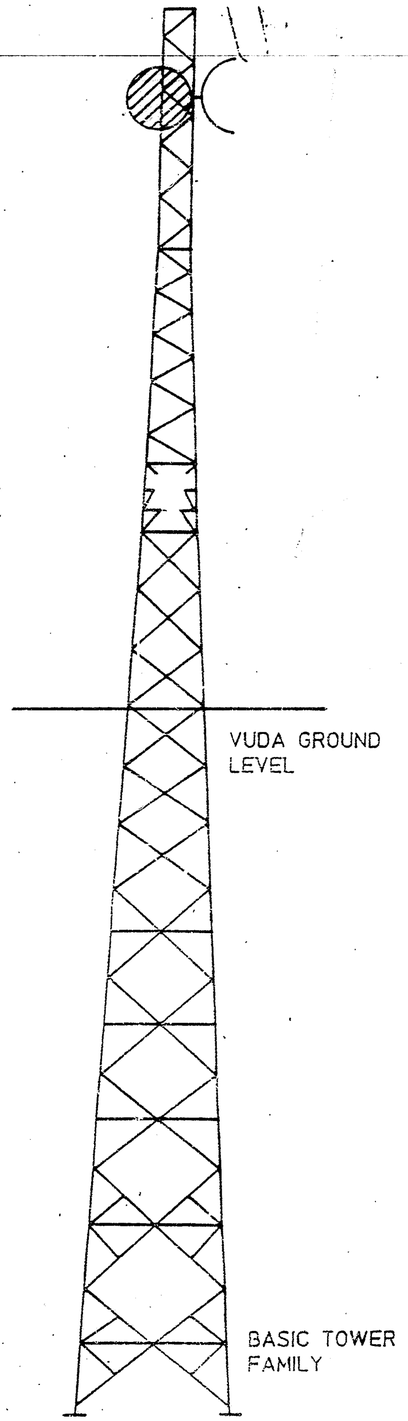
	AMENDMENTS	DAT	DRN	CKD
G				
F				
E				
D				
C				
B				
A				

ELECTRIC POWER TRANSMISSION PTY LTD
SYDNEY

Drn 6-4-83 J.V.
Chd
Cal
App
Job No 1067

Australian Telecom
Tower Type '149'

FROM TO
SCALE 1/100
A1-7623



DIRECTION OF FIRE

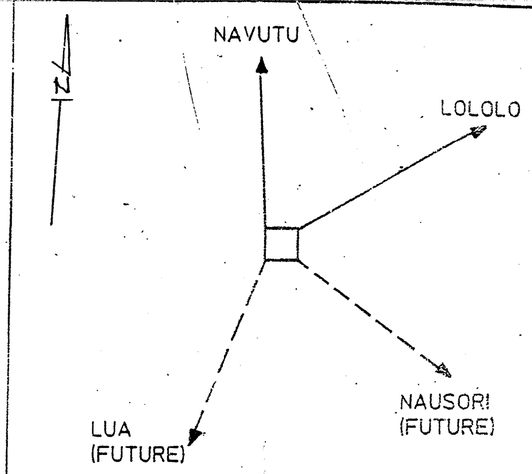


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
NAVUTU	2m APP	20m	356°
LOLOLO	3m APP	20m	57°

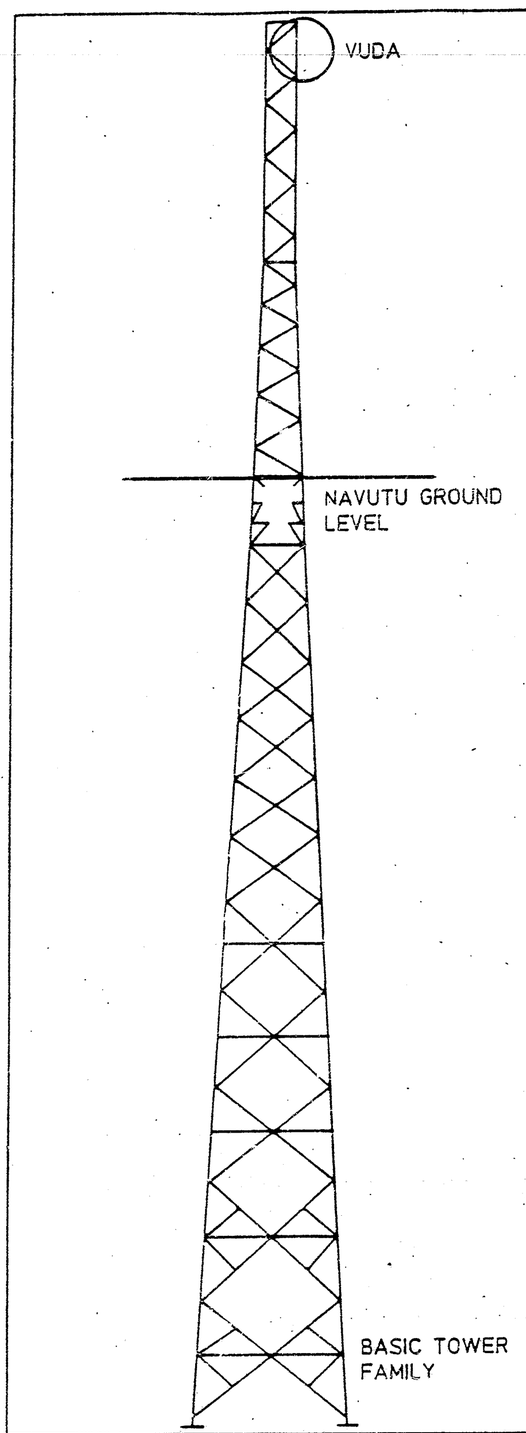
DRAWN	G JOHNS	25-3-91
CHECKED		17:11:91
Chief Draughtsman		17:11:91
APPROVED		17:11:91

FIJI ELECTRICITY AUTHORITY

SITE TOWER LAYOUT
VUDA RADIO STATION

DRAWING NUMBER: A4 | 60 | T07 | 016

SCALE: ——



DIRECTION OF FIRE

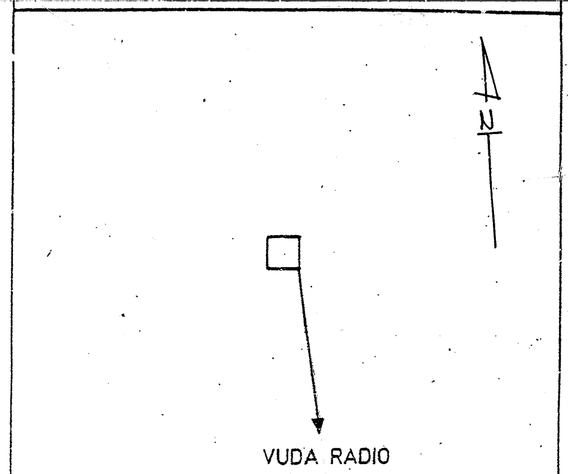


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
VUDA	2m APP	15m	176°

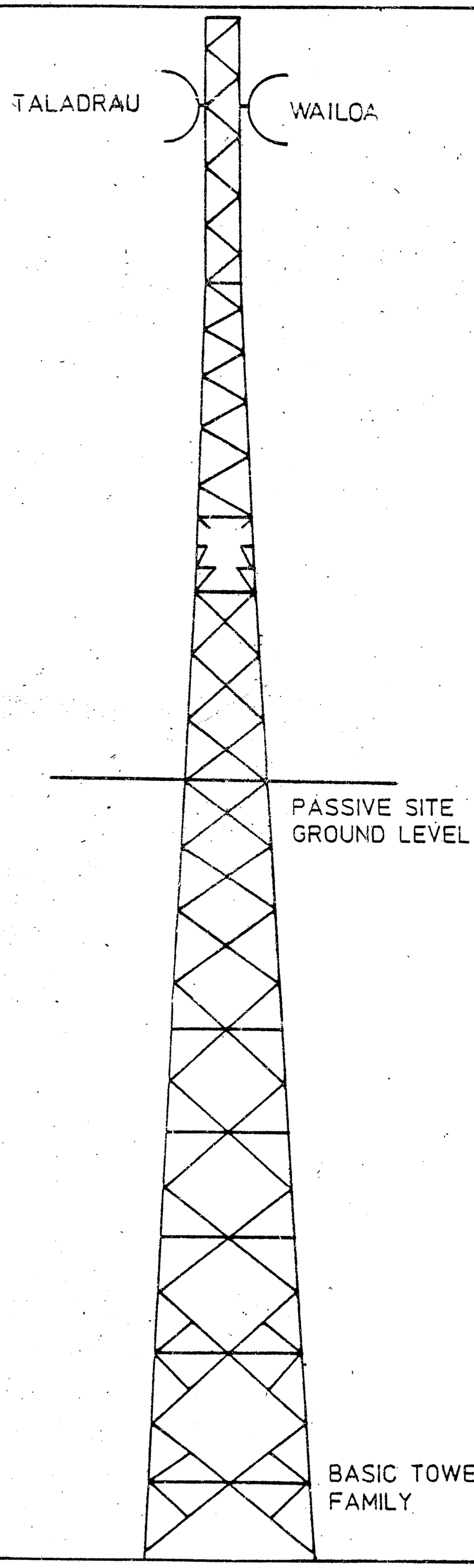
DRAWN	G. JOHNS	25-03-91
CHECKED		17:11:91
Chief Draughtsman		17:11:91
APPROVED		17:11:91

FIJI ELECTRICITY AUTHORITY

SITE TOWER LAYOUT
NAVUTU

DRAWING NUMBER: A4 | 60 | T07 | 017

SCALE: ——



BASIC TOWER
FAMILY

DIRECTION OF FIRE

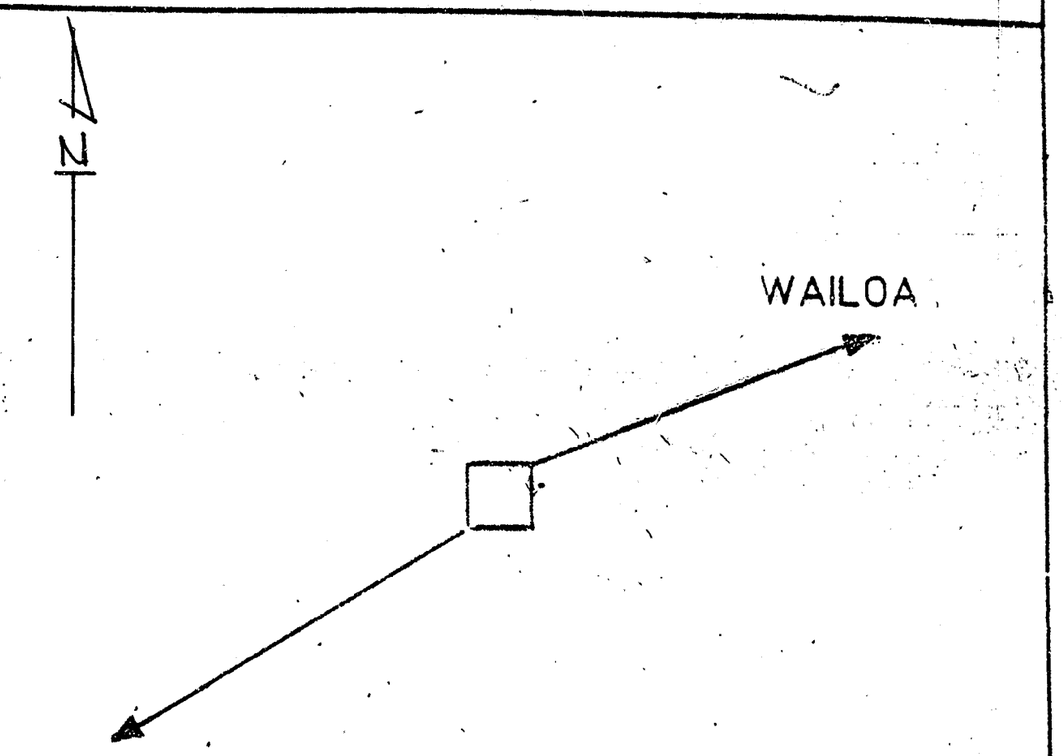


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
TALADRAU	3.6m APP.	20m	238°
WAILOA	3.6m APP.	20m	70°

FIJI ELECTRICITY AUTHORITY

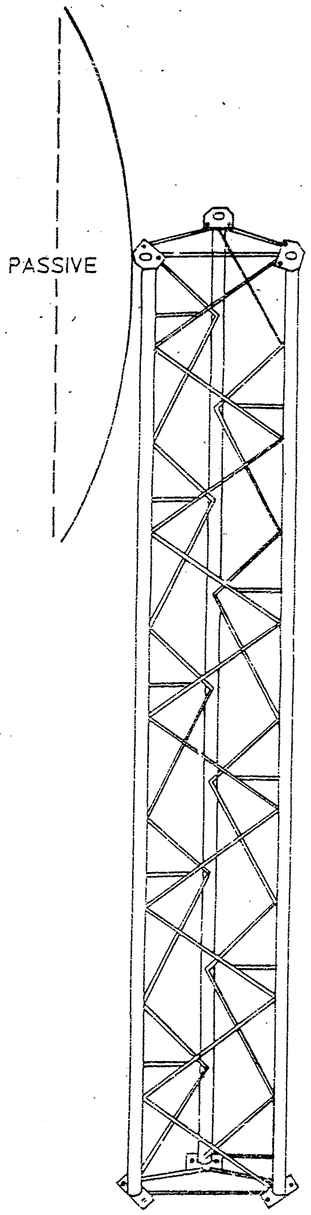
DRAWN	R MANI	25.3.91
CHECKED		17:11:91
Chief Draughtsman	RW	17:11:91
APPROVED		17:11:91

SITE TOWER LAYOUT
PASSIVE
TALADRAU

DRAWING NUMBER

A4	60	T07	020	

SCALE: ——



DIRECTION OF FIRE

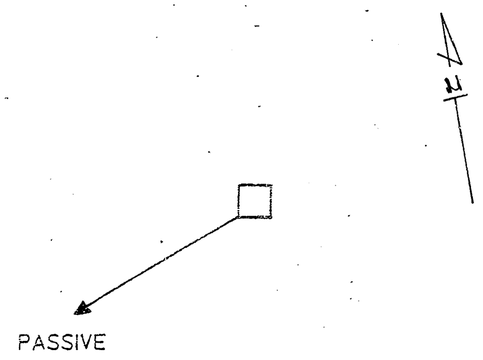


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
PASSIVE	2.4m APP	23m	250°

FIJI ELECTRICITY AUTHORITY

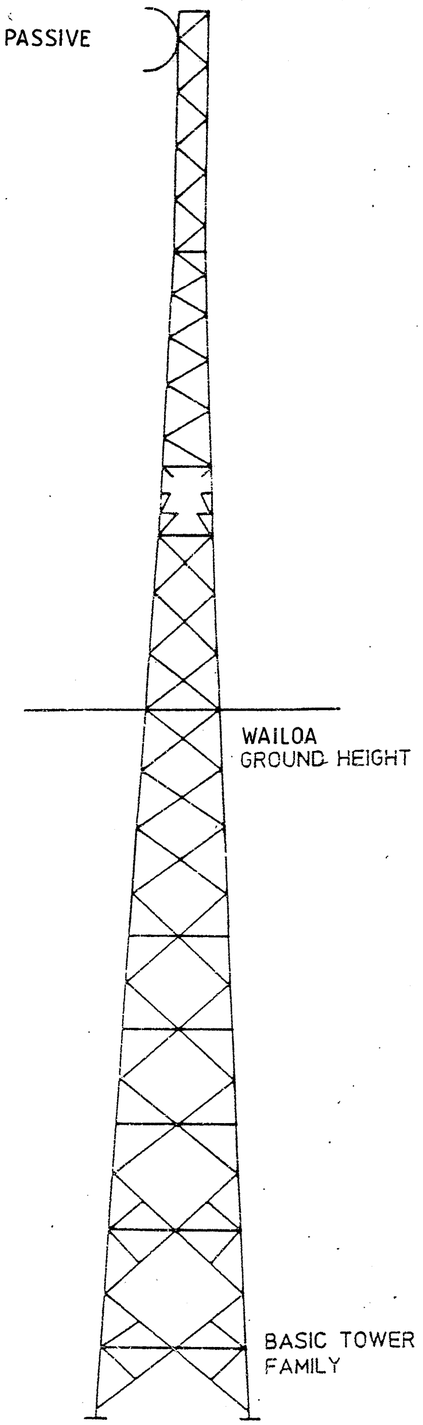
DRAWN	G. JOHNS	20/03/91
CHECKED		17:11:91
Chief Draughtsman		17:11:91
APPROVED		17:11:91

SITE TOWER LAYOUT

WAILOA

DRAWING NUMBER: A4 | 60 | T07 | 021

SCALE: ——



DIRECTION OF FIRE

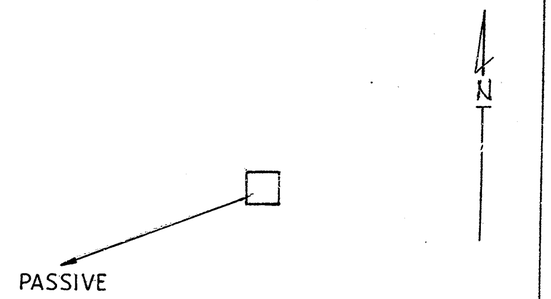


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
PASSIVE	2.4m APP	23m	250°

FIJI ELECTRICITY AUTHORITY

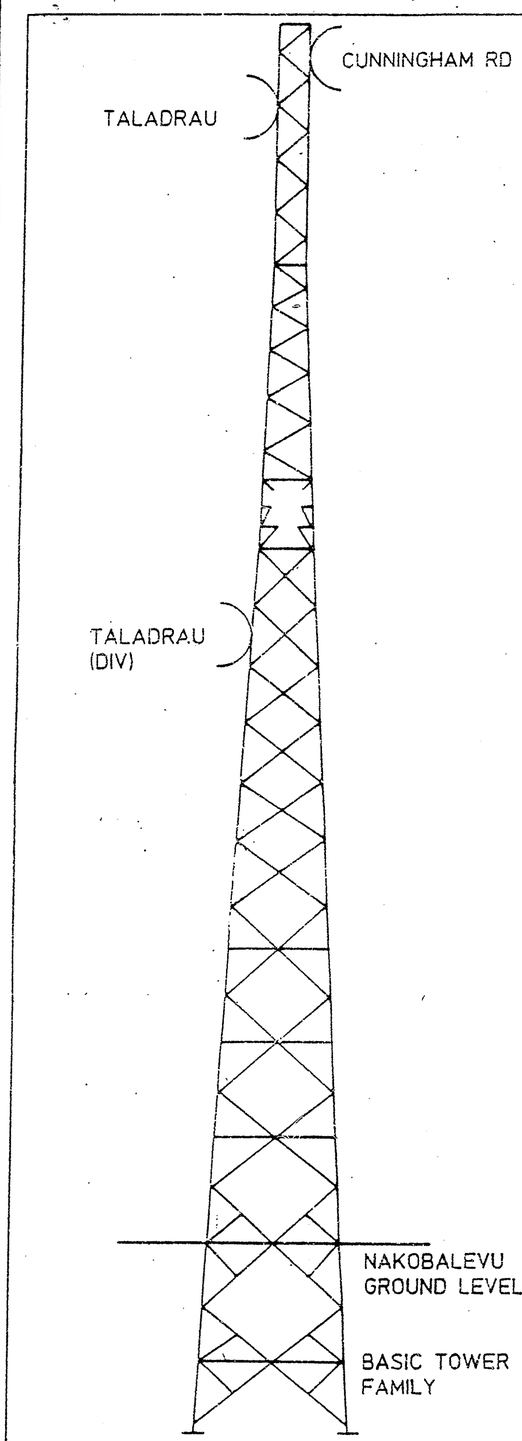
DRAWN	G. JOHNS	22/3/91
CHECKED		17:11:91
Chief Draughtsman		17:11:91
APPROVED		17:11:91

SITE TOWER LAYOUT

WAILOA

DRAWING NUMBER: A4 | 60 | T07 | 021

SCALE: ——



DIRECTION OF FIRE

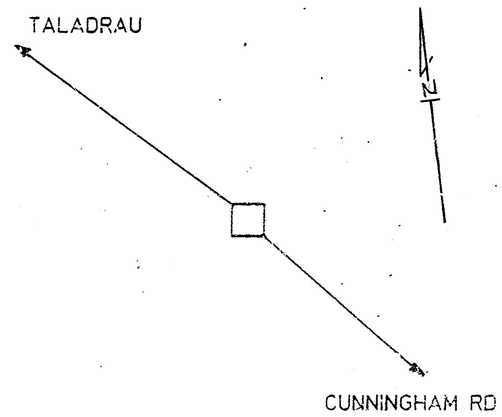


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
TALADRAU	3m APP.	35m	313°
TALADRAU (DIV)	3m APP.	20m	313°
KINOYA	2.4m APP.	37m	138°

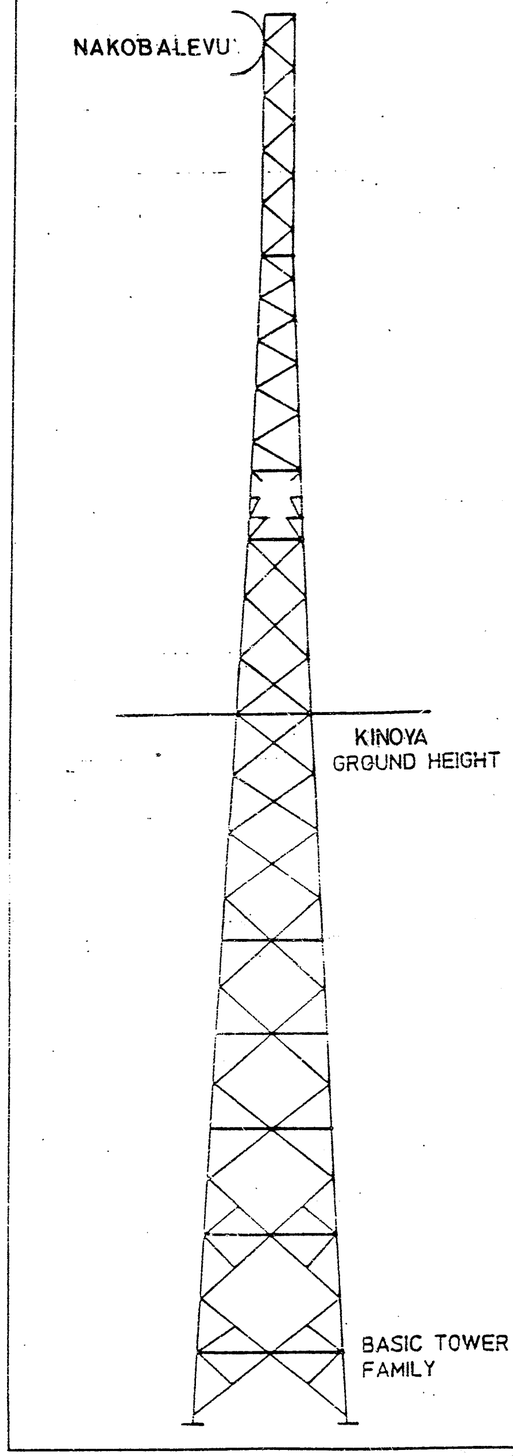
DRAWN	R.MANI	25.3.91
CHECKED		17:11:91
Chief Draughtsman		17:11:91
APPROVED		17:11:91

FIJI ELECTRICITY AUTHORITY

SITE TOWER LAYOUT
NAKOBALEVU

DRAWING NUMBER: A4 | 60 | T07 | 022

SCALE: ——



DIRECTION OF FIRE

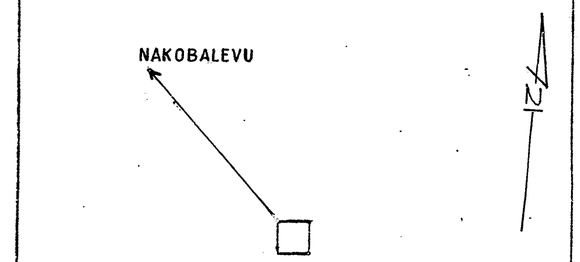


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
NAKOBALEVU.	2.4m APP	23m	314°

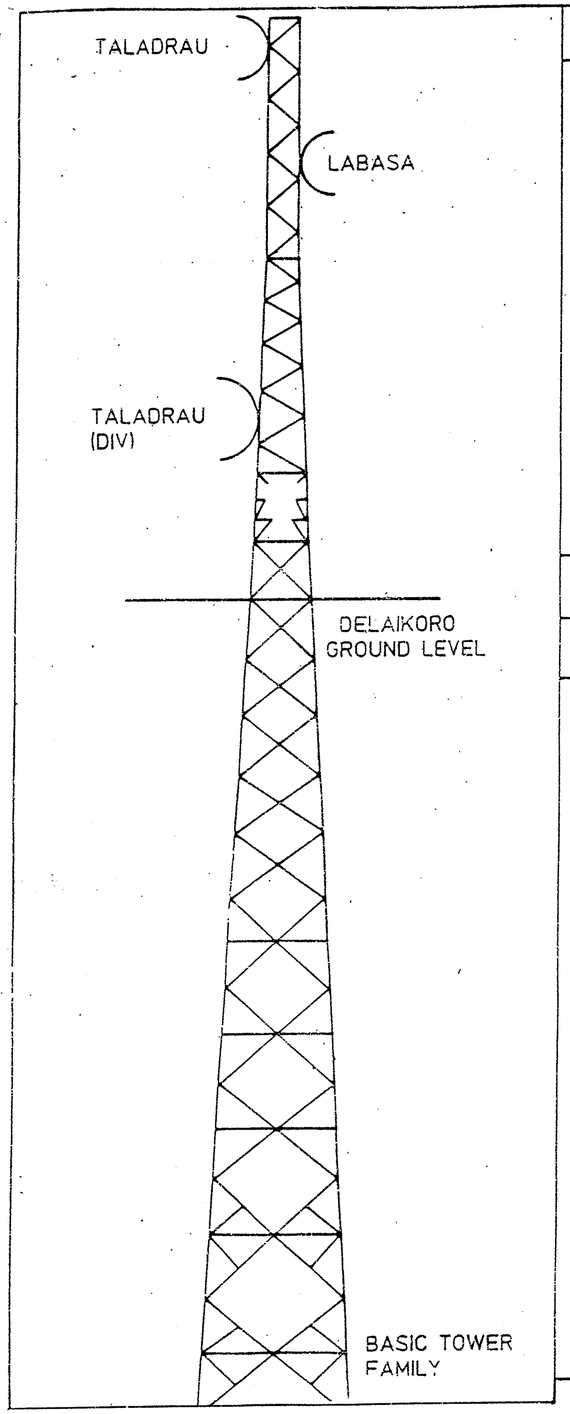
DRAWN	G. JOHNS	22/3/91
CHECKED		17:11:91
Chief Draughtsman		17:11:91
APPROVED		17:11:91

FIJI ELECTRICITY AUTHORITY

SITE TOWER LAYOUT
KINOYA

DRAWING NUMBER: A4 | 60 | T07 | 023

SCALE: ——



DIRECTION OF FIRE

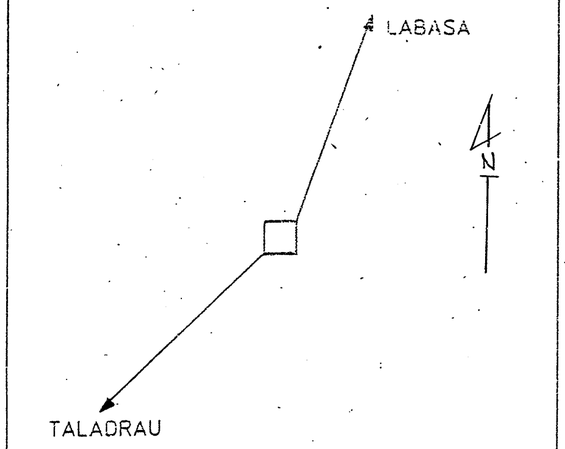


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
TALADRAU	3.6m APP	18m	226°
TALADRAU (DIV)	3.6m APP	7m	226°
LABASA	2.4m APP	15m	20°

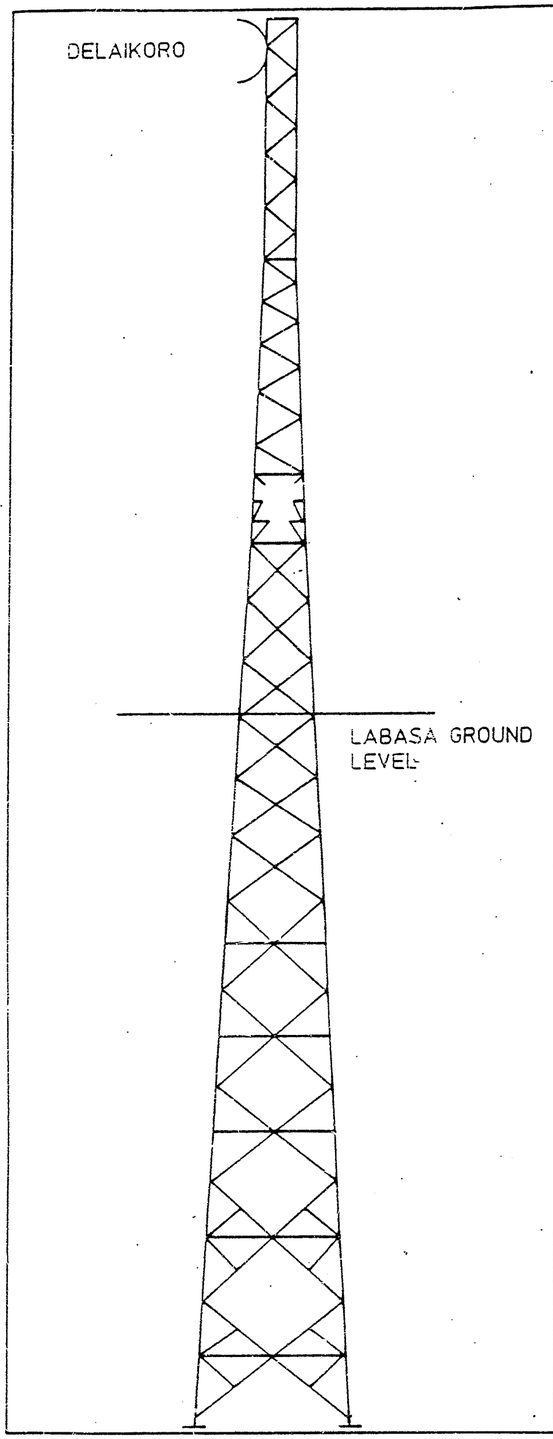
DRAWN	R.MANI	21-03-91
CHECKED		17:11:91
Chief Draughtsman		17:11:91
APPROVED		17:11:91

FIJI ELECTRICITY AUTHORITY

SITE TOWER LAYOUT
DELAIKORO

DRAWING NUMBER: A4 | 60 | T07 | 024

SCALE: ——



DIRECTION OF FIRE

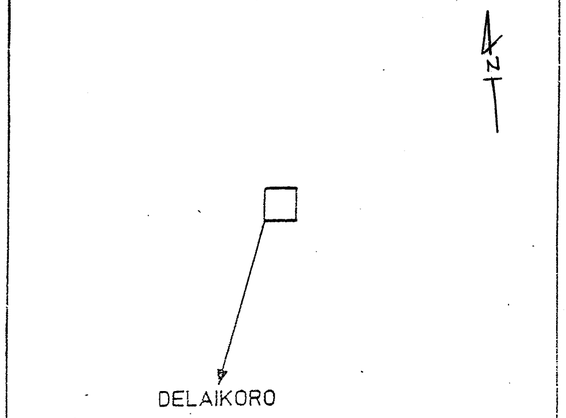


TABLE OF ANTENNA LOADS

ANTENNA	ANTENNA DIAMETER	ANTENNA HEIGHT	BEARING E OF N
DELAIKORO	2.4m APP	22m	200°

DRAWN	G.JOHNS	25-03-91
CHECKED		17:11:91
Chief Draughtsman		17:11:91
APPROVED		17:11:91

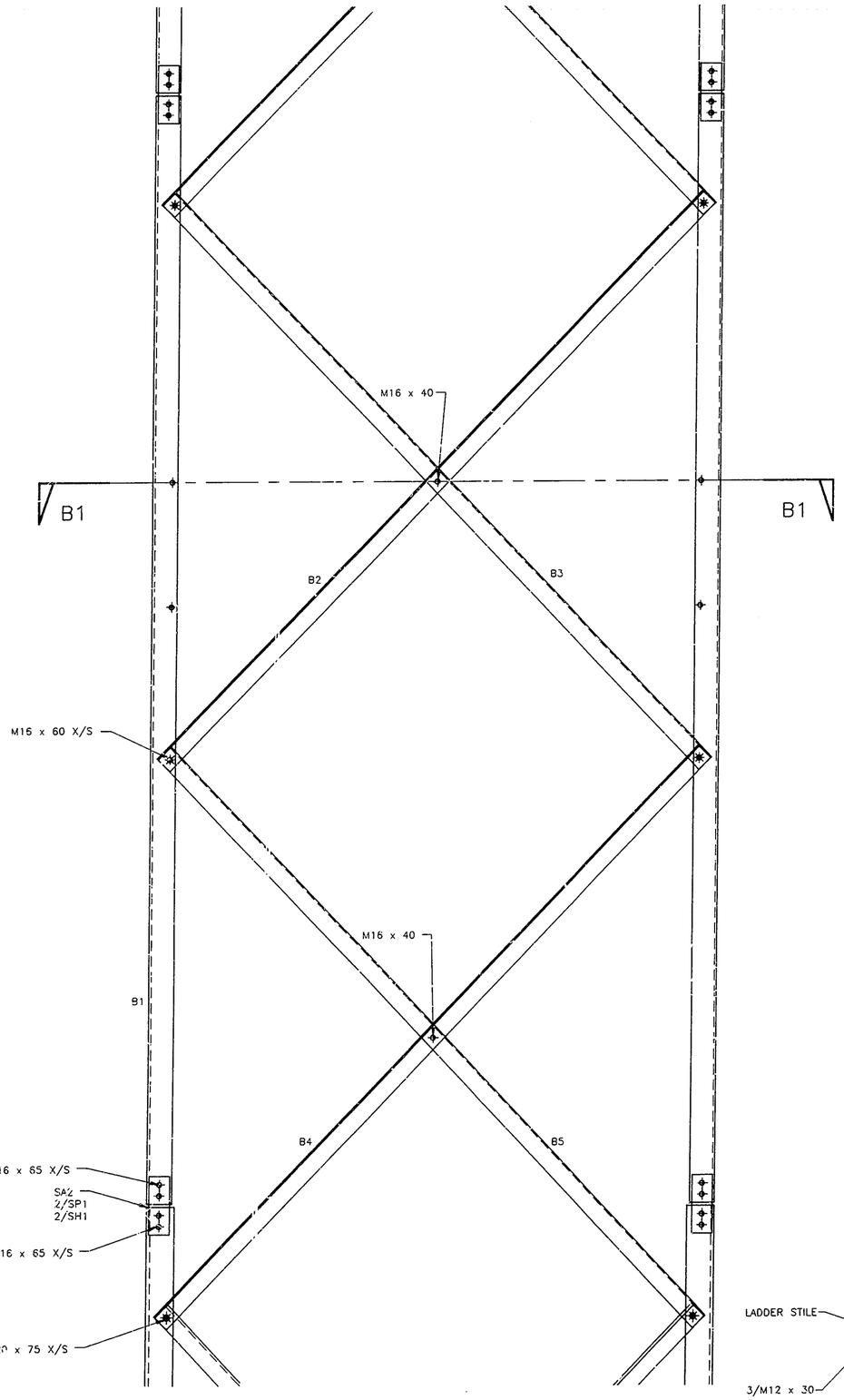
FIJI ELECTRICITY AUTHORITY

SITE TOWER LAYOUT
LABASA

DRAWING NUMBER: A4 | 60 | T07 | 025

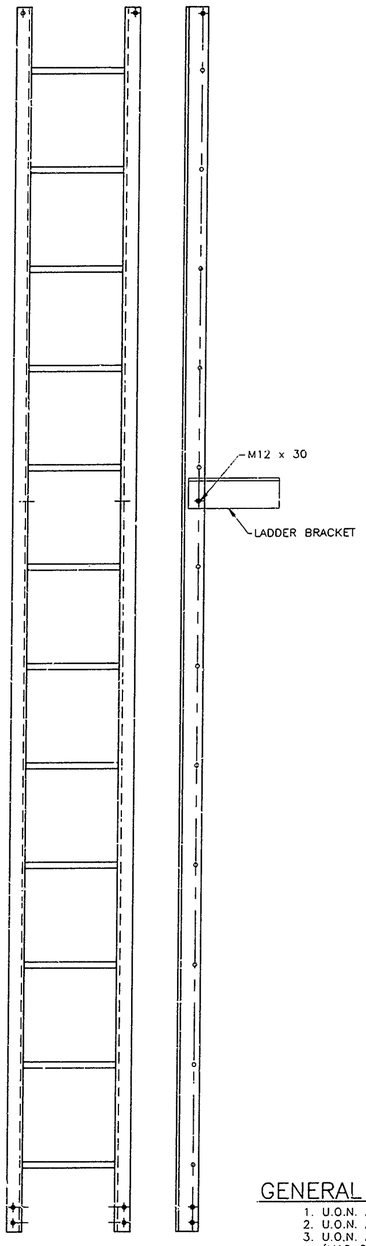
SCALE: ——

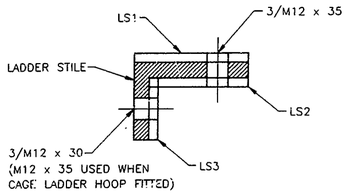
BOLT SCHEDULE				
SIZE	QUANTITY NO LDR	QUANTITY LADDER	DESCRIPTION	REMARKS
M12 x 30		12	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 4.6
M12 x 35		6	—— " ——	—— " ——
M16 x 40	8	6	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR 8.8
M16 x 45		2	—— " ——	—— " ——
M16 x 50		2	—— " ——	—— " ——
M16 x 60	8	8	—— " ——	—— " ——
M16 x 65	32	32	—— " ——	—— " ——
M20 x 75	8	8	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 8.8



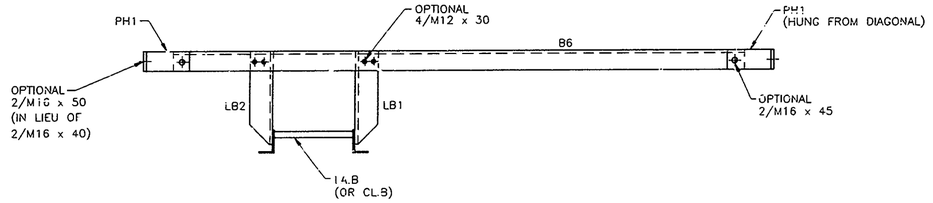
ELEVATION

OPTIONAL LADDER LA.B
(OR CAGED LADDER CL.B)





TYPICAL LADDER SPLICE



GENERAL NOTES

1. U.O.N. ALL STEEL TO BE GR.250.
2. U.O.N. ALL STEEL TO BE HOT DIP GALVANISED.
3. U.O.N. ALL BOLTS TO BE HEX. HD. GALVANISED, GR.8.8 (M12 GR4.6) c/w NUT AND SPRING WASHER.
4. BOLTS MARKED X/S HAVE THE SCREW THREAD OUT OF THE SHEAR PLANE.

SECTION B1–B1

OPTIONAL MEMBERS
B4
LB1
LB2
PH1 (2)
LA.B

F.E.A. DRG. Nº 60-T07-026

MK No.	ITEM No.	No. OFF	DESCRIPTION	CUT LENGTH

MATERIALS LIST

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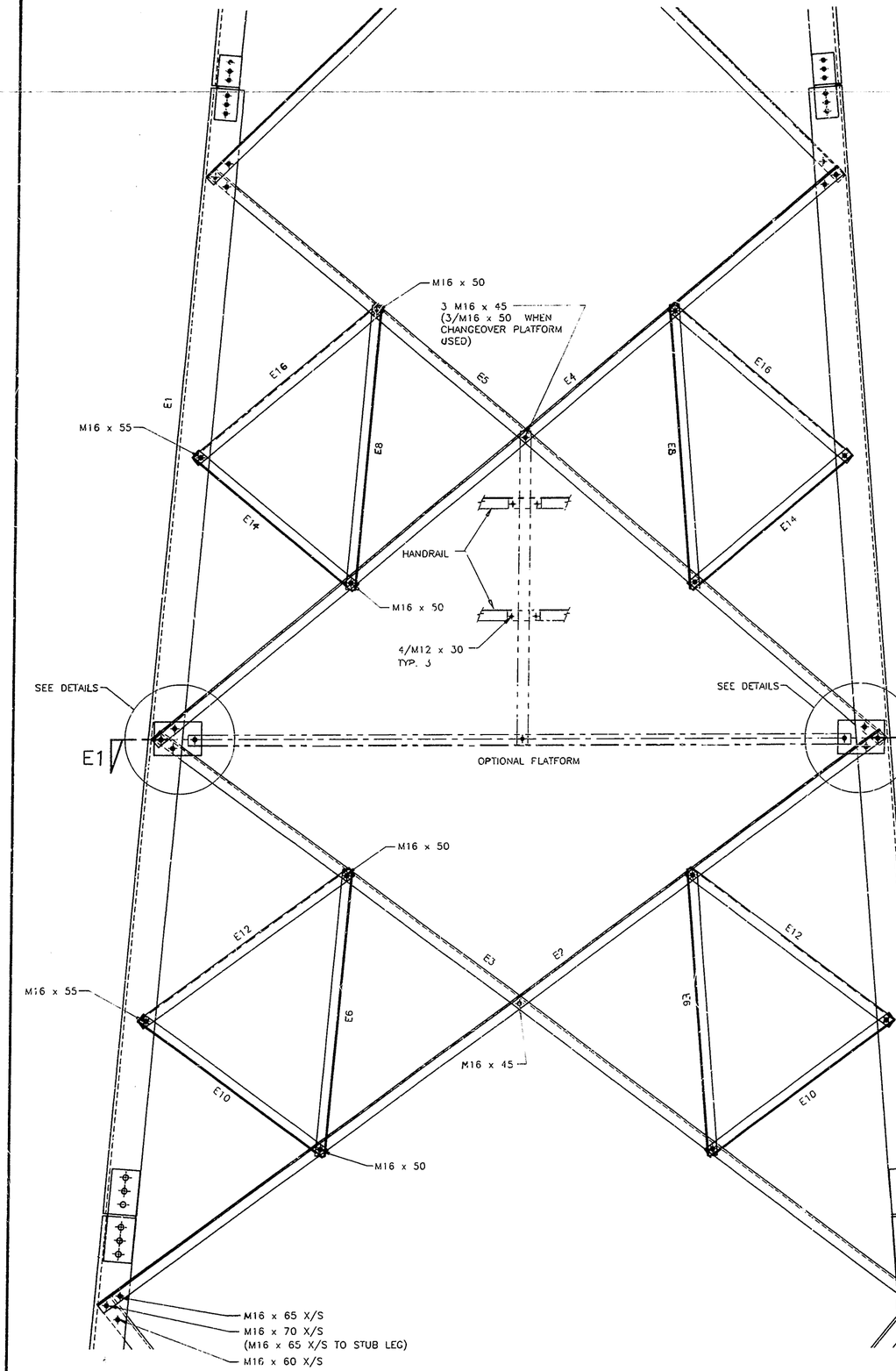
JENNIS & LeBLANC COMMUNICATIONS PTY.LTD.
32 REDCLIFFE ROAD REDCLIFFE W.A. 6104
Telephone 277 8866 Telex AA95003

JL2000C S.S. TOWER (CYCLONIC)
STANDARD MODULE 'B'
ERECTION DETAILS

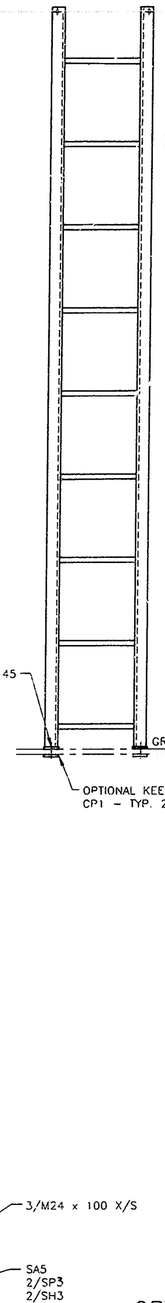
DRAWN	CHECKED	SCALE	DRG. No.	REV.
TJH		1:10	JL111/2/2	
TRACED	APPROVED PKK	DATE 22-12-89		

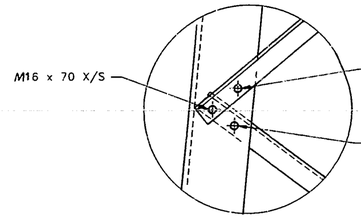
REFERENCE DRAWINGS	REF	REVISION	DATE	APP.

BOLT SCHEDULE				
SIZE	QUANTITY NO LADR.	QUANTITY LADDER	DESCRIPTION	REMARKS
M12 x 30		34	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 4.6
M12 x 35		14	"	"
M12 x 45		2	"	"
M16 x 40		9	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 8.8
M16 x 45	8	9	"	"
M16 x 50	32	38	"	"
M16 x 55	16	16	"	"
M16 x 60	24	8	"	"
M16 x 65	8	8	"	"
M16 x 70	16	24	"	"
M16 x 80		8	"	"
M24 x 100	48	48	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 8.8

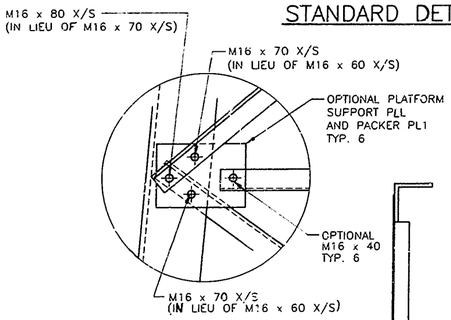


OPTIONAL LADDER LA.EV
(OR CAGED LADDER CL.EV)

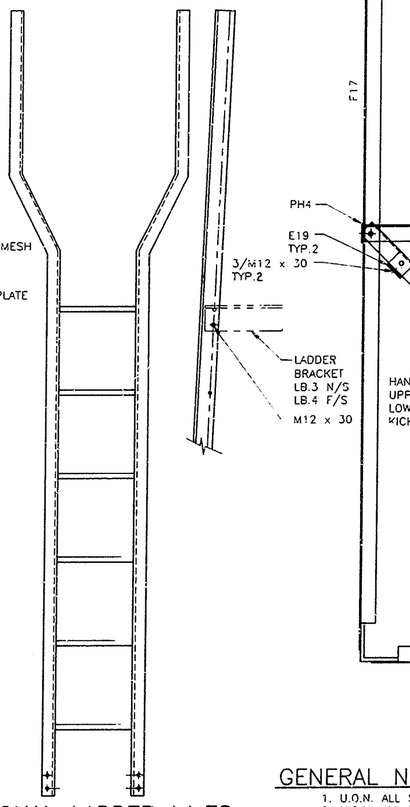




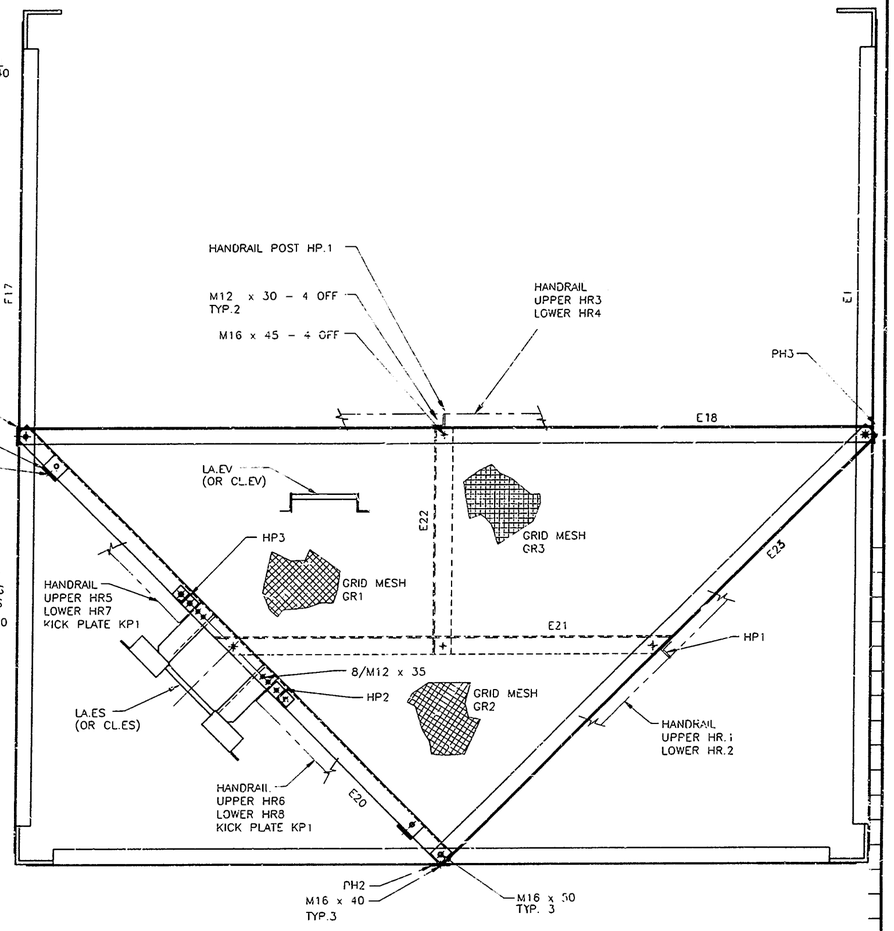
STANDARD DETAIL



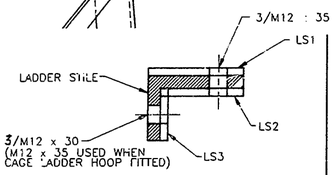
DETAIL FOR PLATFORM



OPTIONAL LADDER LA.ES
(OR CAGED LADDER CL.ES)



SECTION E1–E1 (CHANGEOVER PLATFORM)
ALL MEMBERS ARE OPTIONAL



TYPICAL LADDER SPLICE

GENERAL NOTES

1. U.O.N. ALL STEEL TO BE GR.250.
2. U.O.N. ALL STEEL TO BE HOT DIP GALVANISED.
3. U.O.N. ALL BOLTS TO BE HEX. HD. GALVANISED, GR.8.8 c/w NUT AND SPRING WASHER.
4. BOLTS MARKED X/S HAVE THE SCREW THREAD OUT OF THE SHEAR PLANE.

F.E.A. DRG. Nº 60-T07-027

MK No.	ITEM No.	No. OFF	DESCRIPTION	CUT LENGTH

MATERIALS LIST

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JENNIS & LeBLANC COMMUNICATIONS PTY.LTD.
32 REDCLIFFE ROAD REDCLIFFE W.A. 6104
Telephone 277 8866 Telex AA95003

JL2000C S.S. TOWER (CYCLONIC)
STANDARD MODULE 'E'
ERECTION DETAIL

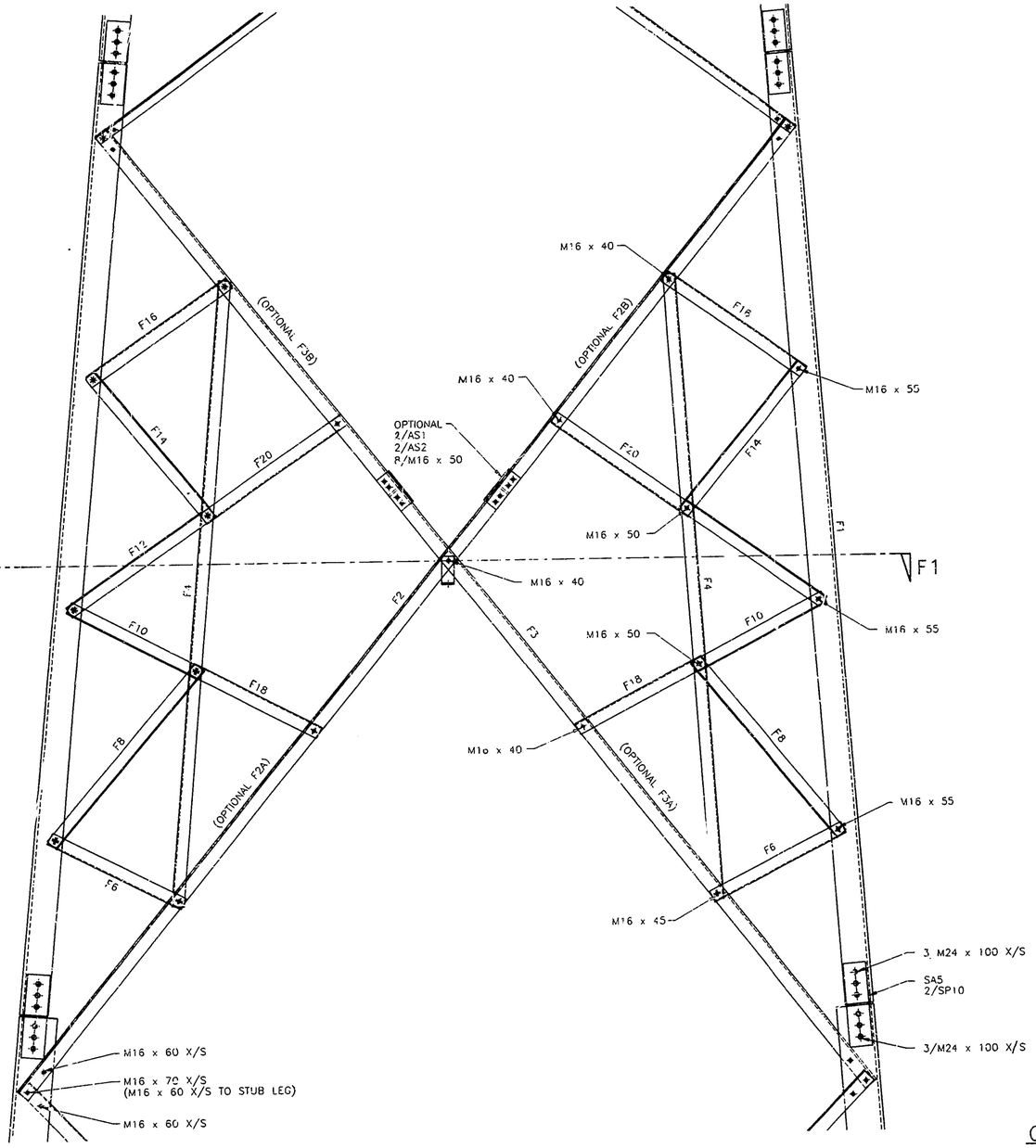
DRAWN TJH	CHECKED	SCALE 1:12 U.O.N.	DRG. No. JL111/2/5	REV.
TRACED	APPROVED PKK	DATE 15-12-89		

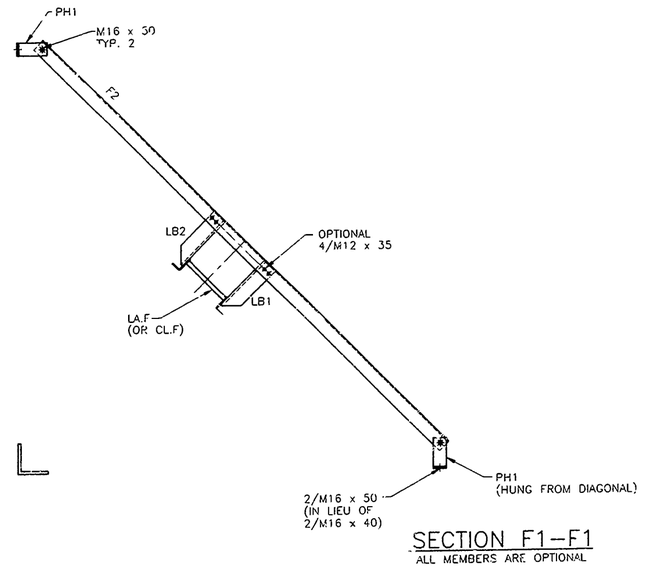
REFERENCE DRAWINGS: JL111/1/1 GENERAL ARRANGEMENT

REF	REVISION	DATE	APP.

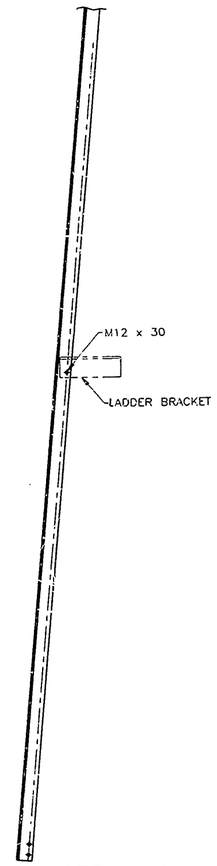
BOLT SCHEDULE

SIZE	QUANTITY NO LDR.	QUANTITY LADDER	DESCRIPTION	REMARKS
M12 x 30		8	HEX HD c/w NUT & SPRING WASHER	GALV. GR. 4.6
M12 x 35		10	"	"
M16 x 40	20	18	HEX HD c/w NUT & SPRING WASHER	GALV. GR. 8.8
M16 x 45	16	16	"	"
M16 x 50	16	20	"	"
M16 x 55	24	24	"	"
M16 x 60	16	16	"	"
M16 x 70	8	8	"	"
M24 x 100	48	48	HEX. HD. c/w NUT & SPRING WASHER	GALV GR. 8.8





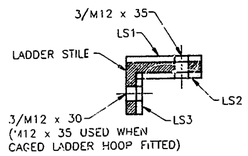
SECTION F1–F1
ALL MEMBERS ARE OPTIONAL



OPTIONAL LADDER LA.F
(OR CAGED LADDER CL.F)

GENERAL NOTES

1. U.O.N. ALL STEEL TO BE GR.250.
2. U.O.N. ALL STEEL TO BE HOT DIP GALVANISED.
3. U.O.N. ALL BOLTS TO BE HEX. HD. GALVANISED, GR.8.8 c/w NUT AND SPRING WASHER.
4. BOLTS MARKED X/S HAVE THE SCREW THREAD OUT OF THE SHEAR PLANE.



TYPICAL LADDER SPLICE

F.E.A. DRG. No. 60-T07-C28

MK No.	ITEM No	No. OFF	DESCRIPTION	CUT LENGTH

MATERIALS LIST

REFERENCE DRAWINGS	REF	REVISION	DATE	APP.

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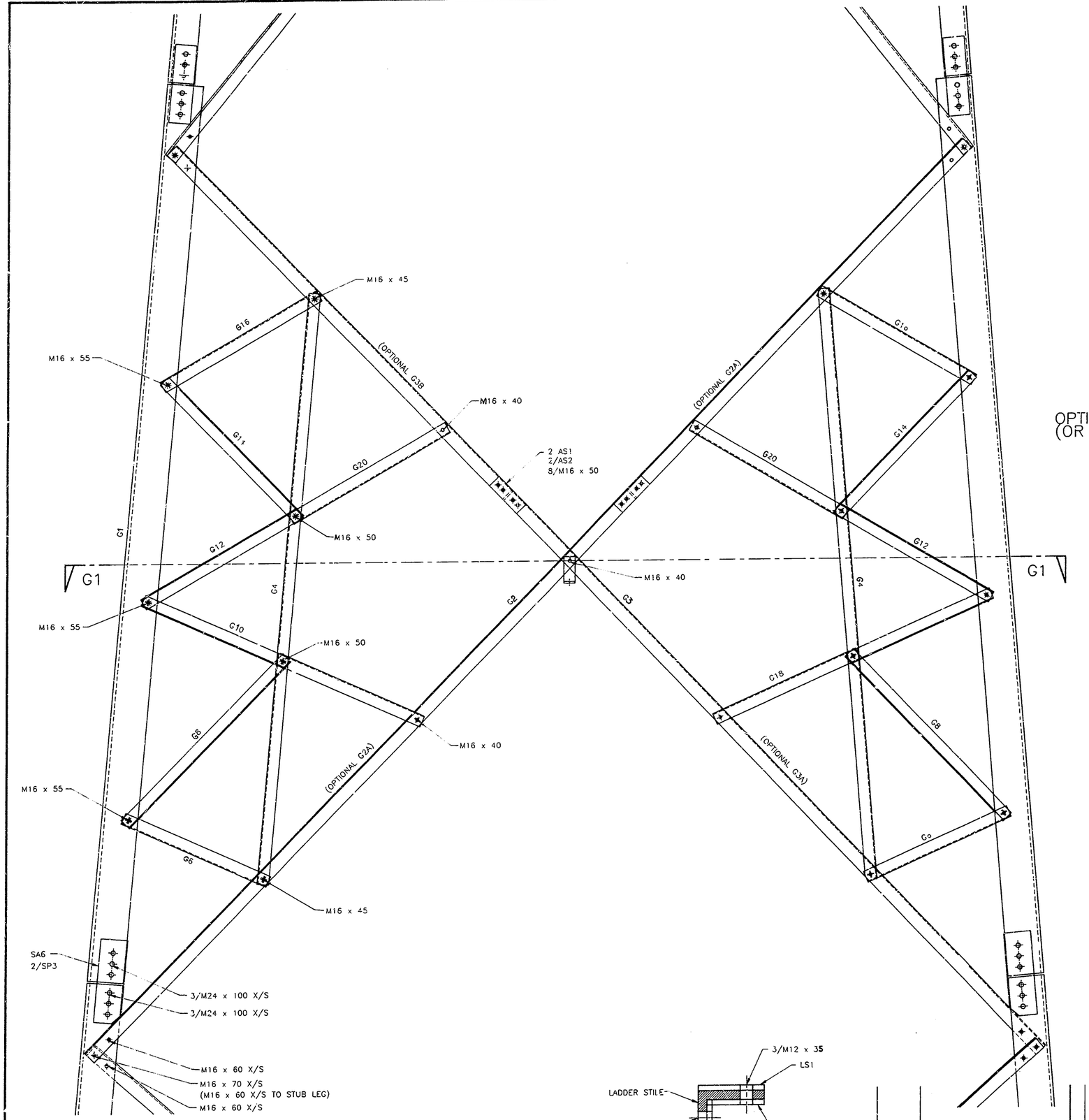
DRAWN	CHECKED
TJH	
TRACED	APPROVED PKK
	DATE 18-12-89

JL2000C S.S. TOWER (CYCLONIC)
STANDARD MODULE 'F'
ERECTION DETAIL

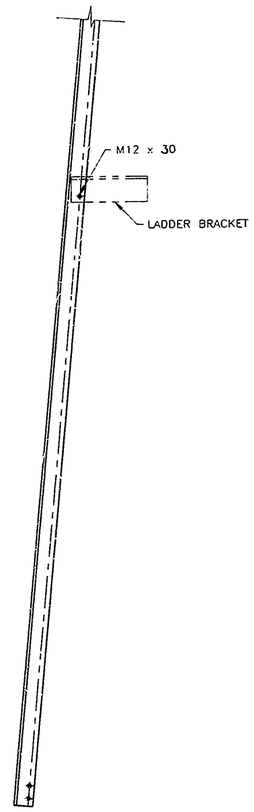
SCALE 1:15 | DRG. No. JL111/2/6 | REV.

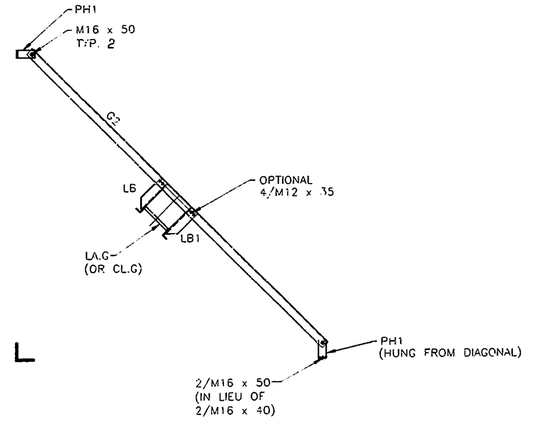
BOLT SCHEDULE

SIZE	QUANTITY NO LADR.	QUANTITY LADDER	DESCRIPTION	REMARKS
M12 x 30		8	HEX HD c/w NUT & SPRING WASHER	GALV. GR 4.6
M12 x 35		10	"	"
M16 x 40	20	18	HEX HD c/w NUT & SPRING WASHER	GALV. GR. 8.8
M16 x 45	16	16	"	"
M16 x 50	16	20	"	"
M16 x 55	2	24	"	"
M16 x 60	16	16	"	"
M16 x 70	8	8	"	"
M24 x 100	48	48	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 8.8



OPTIONAL LADDER LA.G
(OR CAGED LADDER CL.G)





SECTION G1–G1
ALL MEMBERS ARE OPTIONAL

TYPICAL LADDER SPLICE

GENERAL NOTES

1. U.O.N. ALL STEEL TO BE GR.250.
2. U.O.N. ALL STEEL TO BE HOT DIP GALVANISED.
3. U.O.N. ALL BOLTS TO BE HEX. HD. GALVANISED GR.8.8 c/w NUT AND SPRING WASHER.
4. BOLTS MARKED X/S HAVE THE SCREW THREAD OUT OF THE SHEAR PLANE.

F.E.A. DRG. No. 60-T07-029

MK No.	ITEM No.	No. OFF	DESCRIPTION	CUT LENGTH

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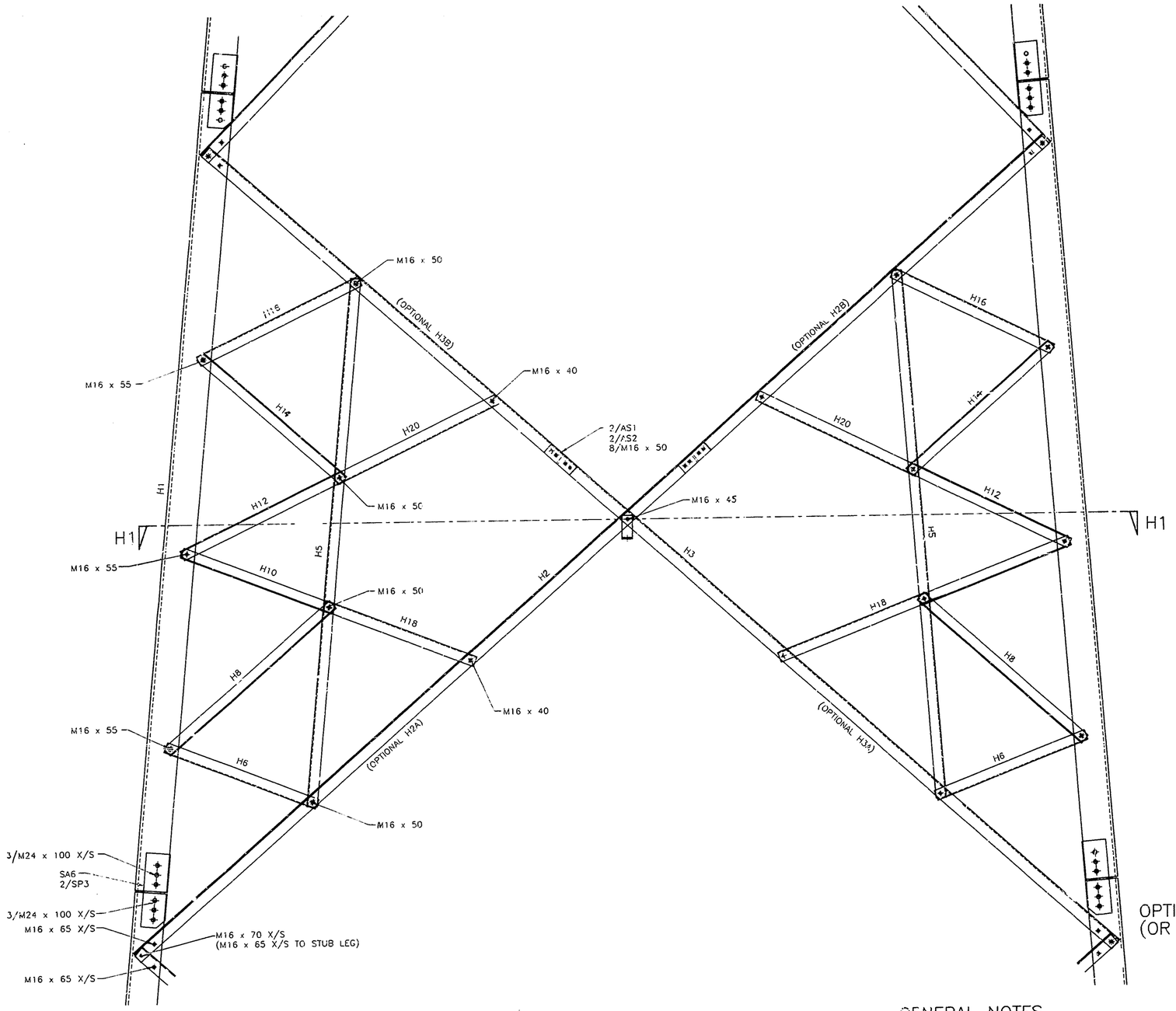
JL200CC S.S. TOWER (CYCLONIC)
STANDARD MODULE 'G'
ERECTION DETAIL

DRAWN TJH	CHECKED		
TRACED	APPROVED KK		
	DATE 18-12-89	SCALE 1:12 U.O.N.	DRG. No. JL111/2/7 REV.

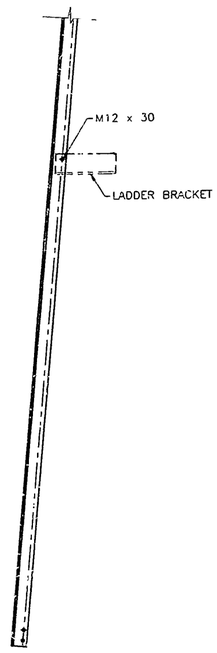
REFERENCE DRAWINGS	REF	REVISION	DATE	APP.

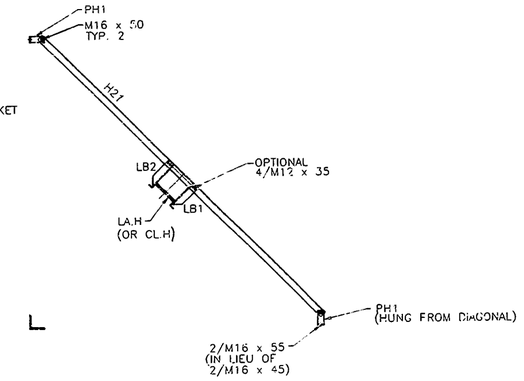
BOLT SCHEDULE

SIZE	QUANTITY NO LDR.	QUANTITY LADDER	DESCRIPTION	REMARKS
M12 x 30		8	HEX HD c/w NUT & SPRING WASHER	GALV. GR. 4.6
M12 x 35		10	"	"
M16 x 40	16	18	HEX HD c/w NUT & SPRING WASHER	GALV GR 8.8
M16 x 45	4	2	"	"
M16 x 50	32	34	"	"
M16 x 55	24	26	"	"
M16 x 65	16	16	"	"
M16 x 70	8	8	"	"
M24 x 100	48	48	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 8.8



OPTIONAL LADDER LA.H
(OR CAGED LADDER CL.H)

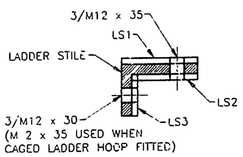




SECTION H1–H1
ALL MEMBERS ARE OPTIONAL

GENERAL NOTES

1. U.O.N. ALL STEEL TO BE GR.250.
2. U.O.N. ALL STEEL TO BE HOT DIP GALVANISED.
3. U.O.N. ALL BOLTS TO BE HEX. HD. GALVANISED, GR.8.8 c/w NUT AND SPRING WASHER.
4. BOLTS MARKED X/S HAVE THE SCREW THREAD OUT OF THE SHEAR PLANE.



TYPICAL LADDER SPLICE

F.E.A. DRG. No 60-T07-030

MK No.	ITEM No.	No. OFF	DESCRIPTION	CUT LENGTH

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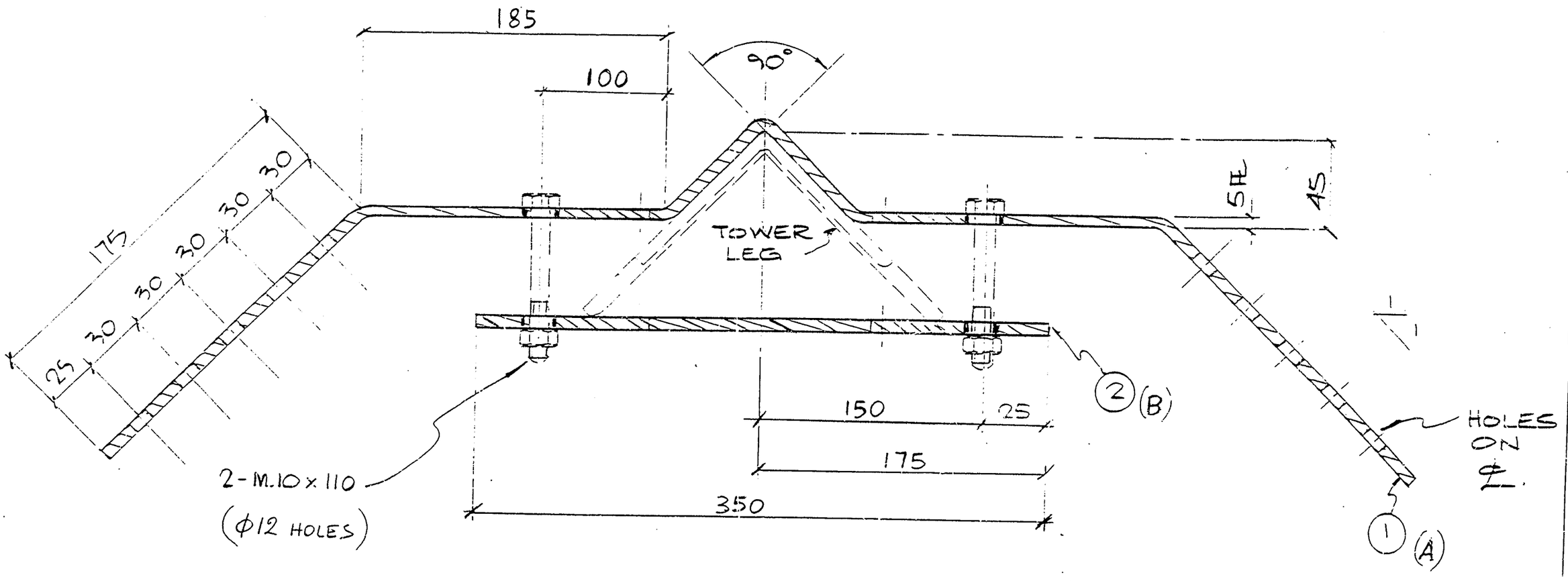
JL2000C S.S. TOWER (CYCLONIC)
STANDARD MODULE 'H'
ERECTION DETAIL

DRAWN	CHECKED
TJH	
TRACED	APPROVED PKK
	DATE 8-12-89

SCALE 1:15 | DRG. No JL111/2/8 | REV.

REFERENCE DRAWINGS	REF.	REVISION	DATE	APP.



TO BE USED FOR ⌐ 200 x 200 LEGS

— BOLTS M.10 COMPLETE WITH NUT + SPRING WASHER. ALL GALVANISED

F.E.A. DRG. Nº 60-T07-031

MEMBER SIZE & TYPE: (A) (1) 75 x 5 FE 850 LG BEND.
(B) (2) 75 x 5 FE 350 LG

MARK Nº CB.2A - CB2B Nº REQD. AS DRAWN ●
(2·55 KG) - (1·05 KG) Nº REQD. OPP. HAND

Notes:
1. ALL STEEL TO BE H.D. GALV'D. U.O.N.
2. ALL HOLES TO BE 12 φ U.O.N.

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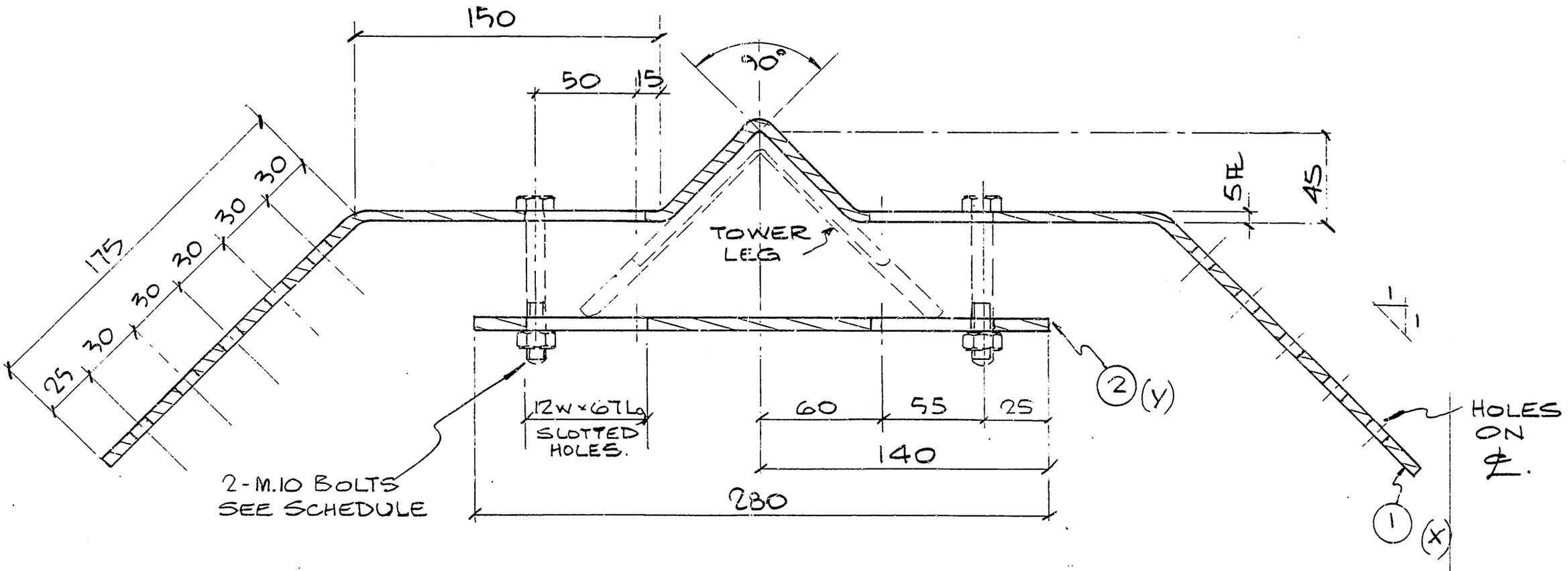
CLIENT: STANDARD
PROJECT: CABLE BRACKET 'CB.2' (FOR RT. ANGLE LEG) ⌐ 200 x 200

SCALE:	DATE:	DRAWN:	DRG. Nº:	REV.
1:2	22.2.89.	B.W.	JL.08/CB2AB	



BOLT SCHEDULE

LEG SIZE	BOLT LENGTH.
90 x 90	45
100 x 100	55
125 x 125	75
150 x 150	85

ALL BOLTS M.10 COMPLETE WITH NUT + SPRING WASHER. ALL GALVANISED

F.E.A. DRG. Nº 60-T07-032

MEMBER SIZE & TYPE: X (1) 75 x 5 FE x 780 BEND.
Y (2) 75 x 5 FE x 280

MARK Nº CB.2X - CB2Y Nº REQD. AS DRAWN ●
(2·34 KG) - (0·84 KG) Nº REQD. OPP. HAND

Notes:
1. ALL STEEL TO BE H.D. GALV'D. U.O.N.
2. ALL HOLES TO BE 12 φ U.O.N.

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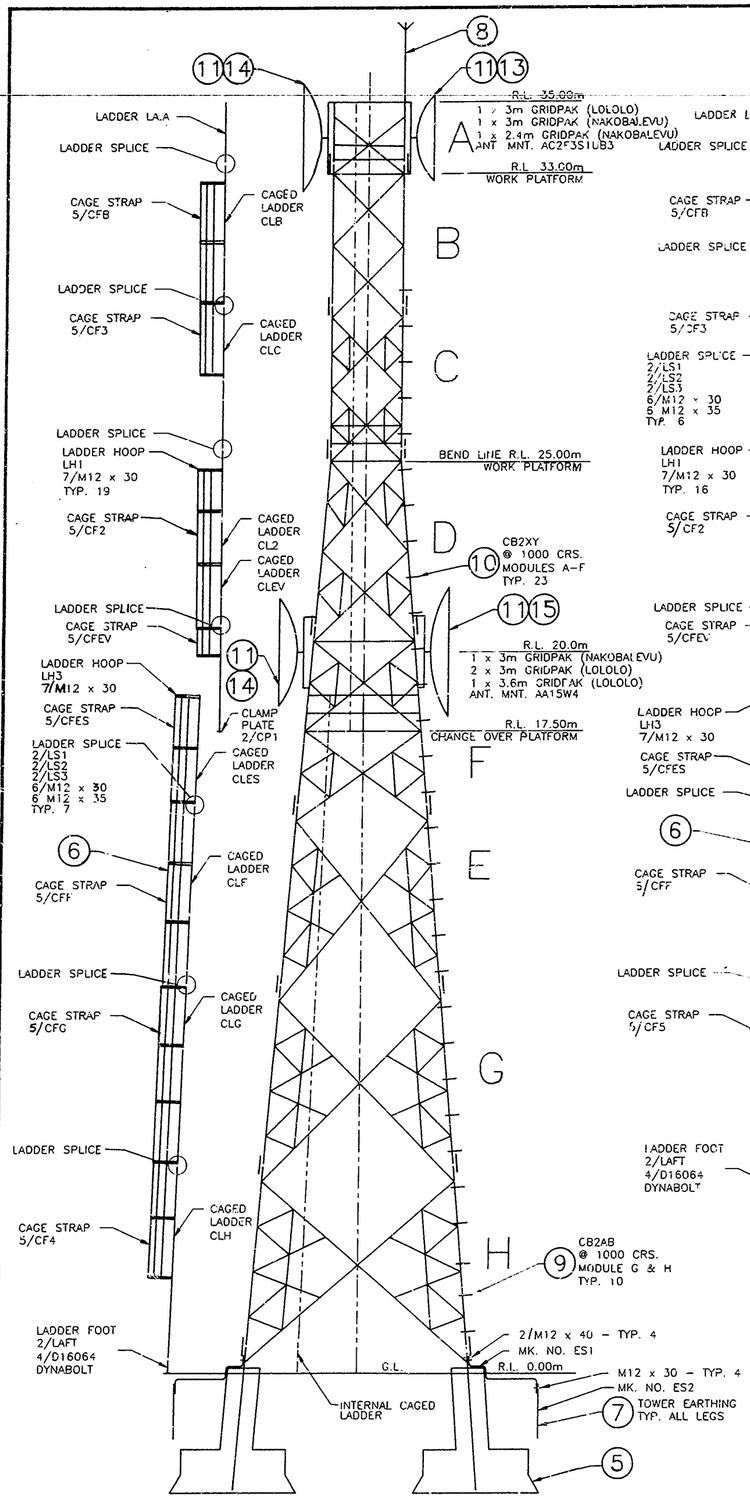
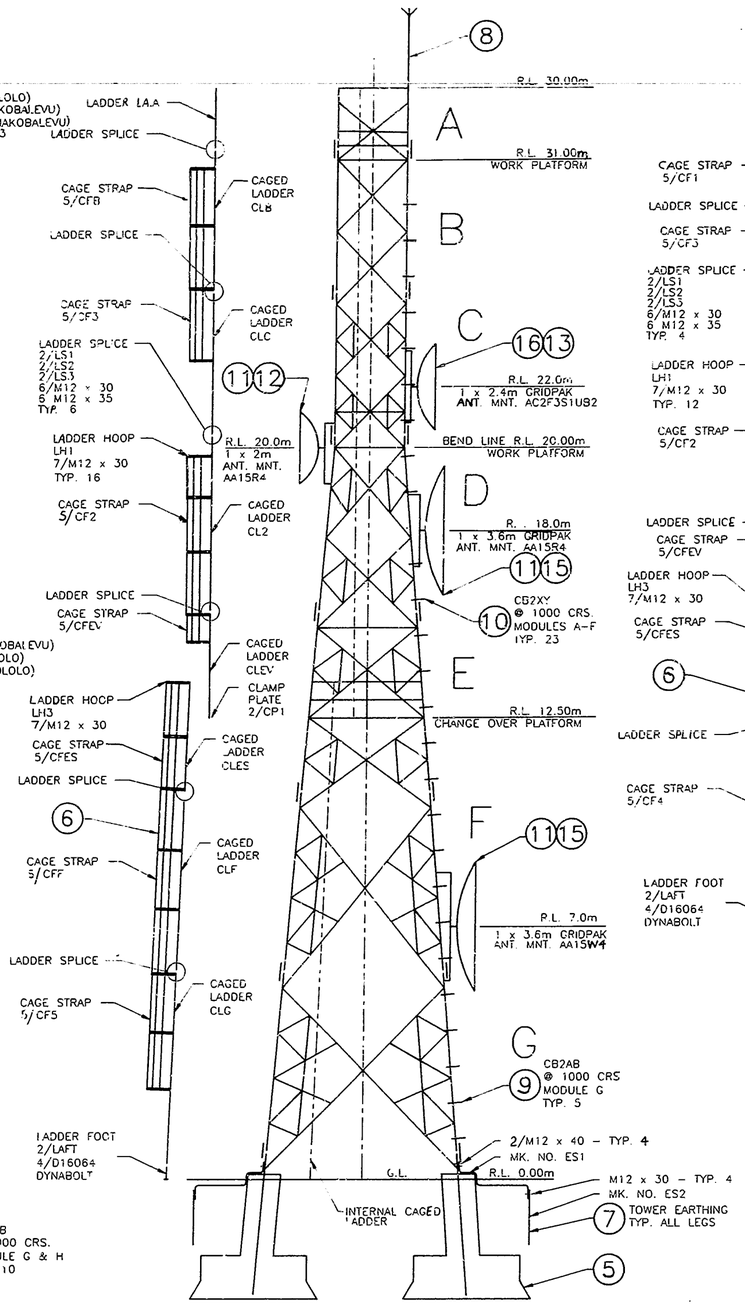
32, REDCLIFFE ROAD, REDCLIFFE, W.A. 6104 Ph. 2778866

CLIENT: STANDARD
PROJECT: CABLE BRACKET 'CB.2' (FOR RT. ANGLE LEG)

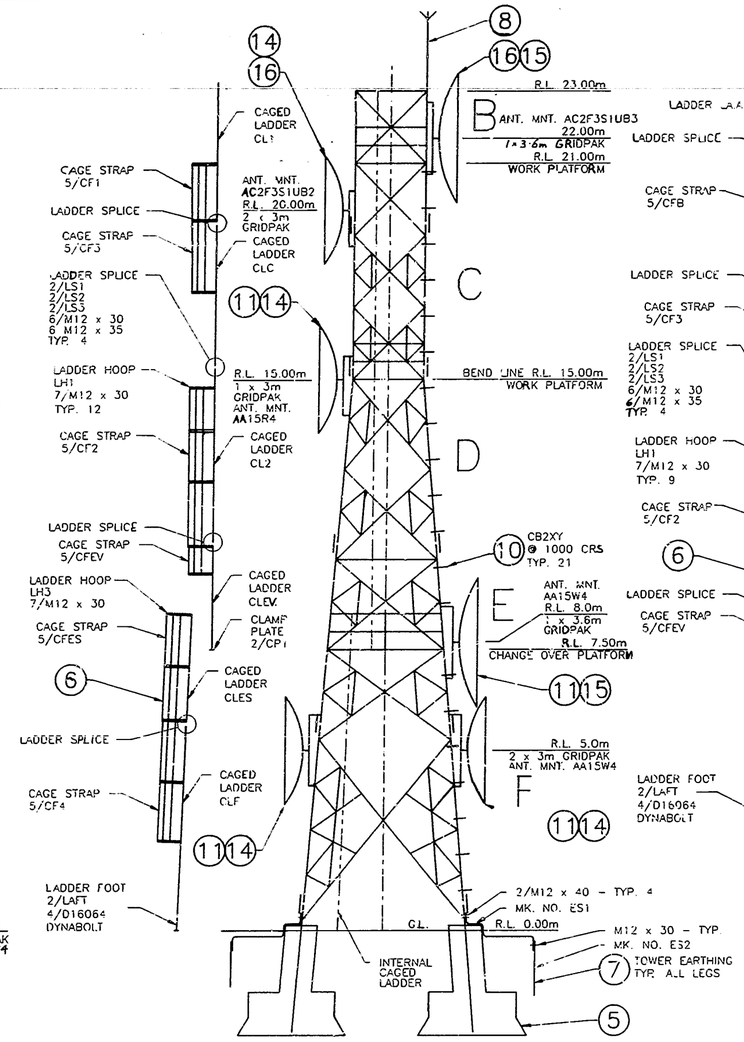
SCALE:	DATE:	DRAWN:	DRG. Nº:	REV.
1:2	22.2.89.	B.W.	JL.08/CB.2XY	



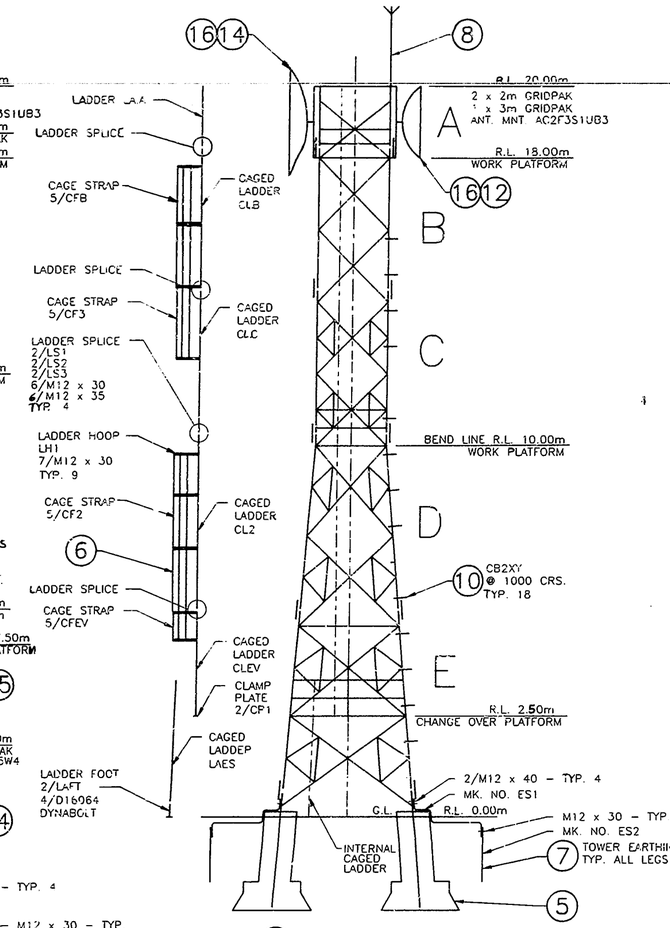
① LOLOLO & NAKOBALEVU



② DELAIKORO



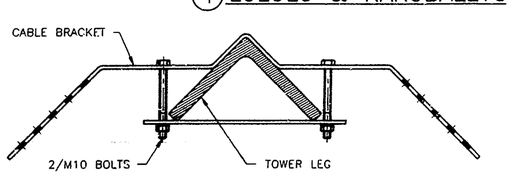
③ TALADRAU



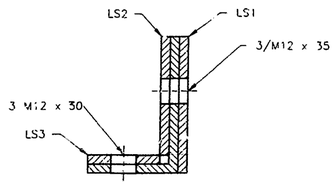
④ VUDA RADIO

GENERAL NOTES

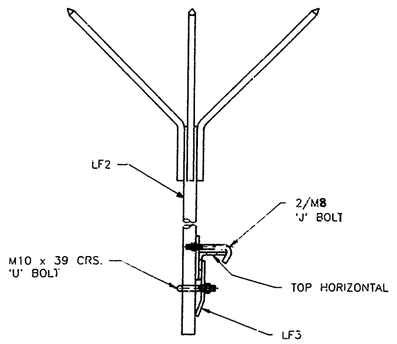
1. U.O.N. ALL STEEL TO BE GR.250.
2. U.O.N. ALL STEEL TO BE HOT DIP GALVANISED.
3. U.O.N. ALL BOLTS TO BE HEX. HD. GALVANISED, GR.8.8 c/w NUT AND SPRING WASHER.



TYPICAL CABLE BRACKET DETAILS



TYPICAL LADDER SPLICE



LIGHTNING FINIAL DETAILS

16	10	ANTENNA MOUNT – STD. G.P. ON FACE		DRG J441/2/5
15	5	3.6m GRIDPAK		BY OTHERS
14	11	3.0m GRIDPAK		BY OTHERS
13	2	2.4m GRIDPAK		BY OTHERS
12	3	2.0m GRIDPAK		BY OTHERS
11	11	ANTENNA MOUNT – STD. G.P. ON LEG		DRG J441/2/6
10	108	CABLE BRACKET – CB2XY		DRG JL08/CB2XY
9	25	CABLE BRACKET – CB2AB		DRG JL08/CB2AB
8	5	LIGHTNING FINIAL		DRG JL102/LF2–3
7	20	MAST EARTHING – 4/MAST		DRG JL113
6	5	INTERNAL CAGED LADDER		
5	5	TOWER FOUNDATION		DRG JL111/3/1
4	1	20m JL2000C S.S. TOWER		DRG JL111 SERIES
3	1	23m JL2000C S.S. TOWER		DRG JL111 SERIES
2	1	30m JL2000C S.S. TOWER		DRG JL111 SERIES
1	2	35m JL2000C S.S. TOWER		JL111 SERIES

MK. No.	ITEM No.	No. OFF	DESCRIPTION	CUT LENGTH	

JL08/CB2AB CABLE BRACKET
JL08/CB2XY CABLE BRACKET
J441/2/6 ANTENNA MOUNT – STD. ON LEG
J441/2/5 ANTENNA MOUNT – STD. ON FACE
JL111/2/8 MODULE 'H' DETAILS – STANDARD
JL111/2/7 MODULE 'G' DETAILS – STANDARD
JL111/2/6 MODULE 'F' DETAILS – STANDARD
JL111/2/5 MODULE 'E' DETAILS – STANDARD
J441/2/4 MODULE 'D' DEATILS – NON STD.
J441/2/3 MODULE 'C' DETAILS – NON STD.
J441/2/2 MODULE 'B' DETAILS – TOP
JL111/3/2 MODULE 'B'DETAILS – STANDARD
J441/2/1 MODULE 'A' DETAILS – NON STD.
JL111/3/1 FOUNDATION DETAILS

REFERENCE DRAWINGS	REF	REVISION	DATE	APP.

E.E.A. № 60-707-033 MATERIALS LIST

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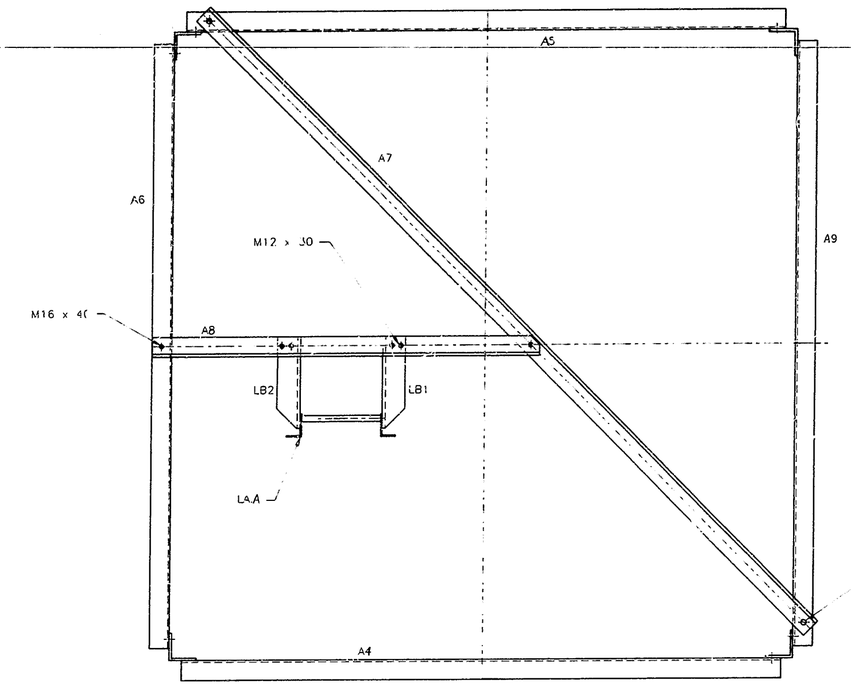
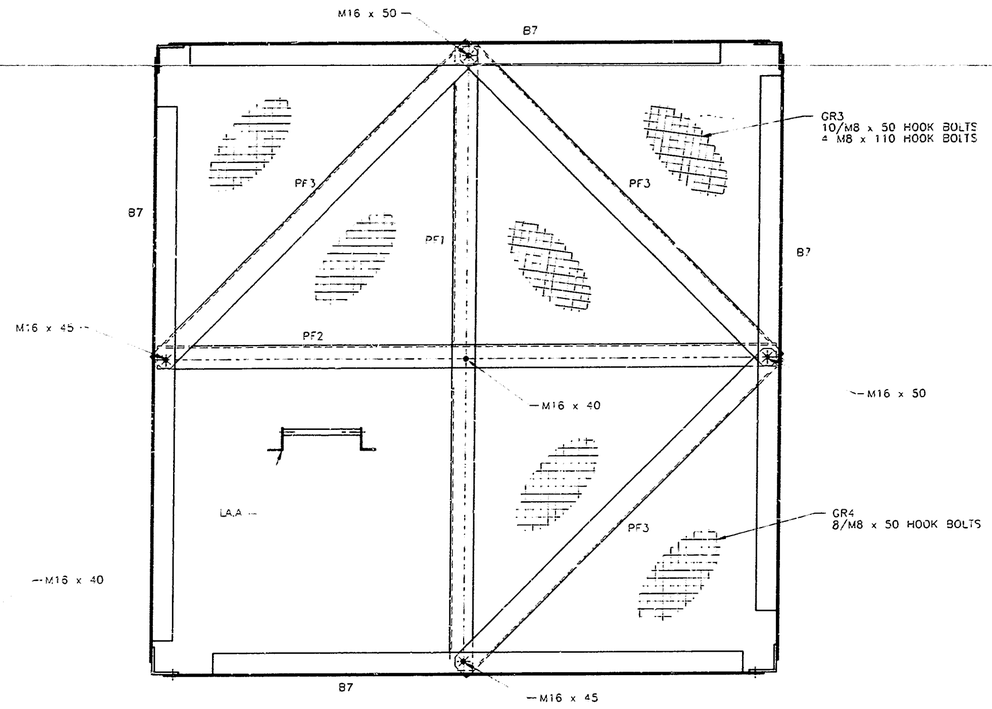
FIJI ELECTRICITY COMPANY
5 x JL2000C S.S. TOWERS
GENERAL ARRANGEMENTS

DRAWN	TJH	CHECKED	
TRACED		APPROVED	KW
		DATE	22-12-89
SCALE	NTS	DRG. No.	J441/1/1
REV.			



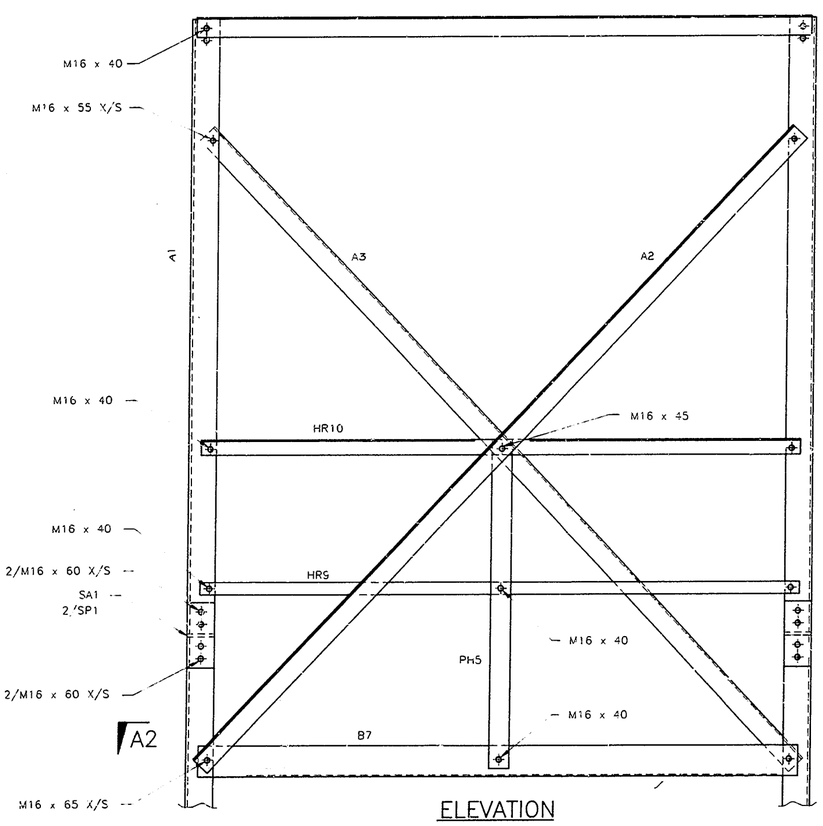
PLAN A1–A1



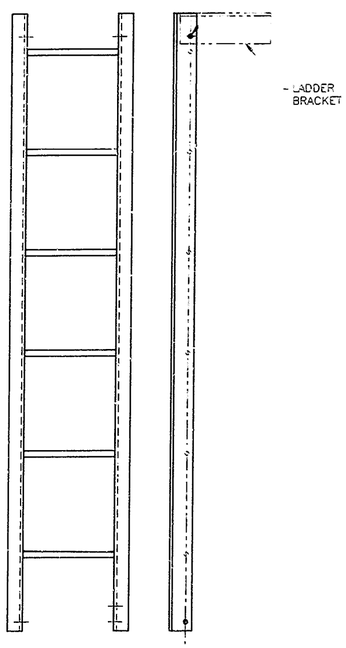
PLAN A2–A2

BOLT SCHEDULE

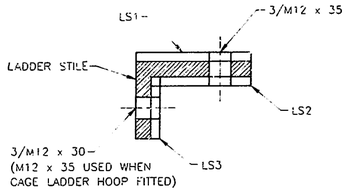
SIZE	QTY.	DESCRIPTION	REMARKS
M12 x 30	12	HEX. HD c/w NUT AND SPRING WASHER	GALV. GR.4.6
M12 x 35	6	" " "	" "
M16 x 40	41	HEX. HD c/w NUT AND SPRING WASHER	GALV. GR.8.8
M16 x 45	6	" " "	" "
M16 x 50	2	" " "	" "
M16 x 55	8	" " "	" "
M16 x 60	32	" " "	" "
M16 x 65	6	" " "	" "
M8 x 50	18	HOOK BOLT c/w NUT & SPRING WASH.	MK. NO GCA
M8 x 110	4	" " "	MK. NO GCB4



ELEVATION



LADDER LA.A



TYPICAL LADDER SPLICE

GENERAL NOTES

1. U.O.N. ALL STEEL TO BE GR.250.
2. U.O.N. ALL STEEL TO BE HOT DIP GALVANISED.
3. U.O.N. ALL BOLTS TO BE HEX. HD. GALVANISED, GR.8.8 (M12 GR4.6) c/w NUT AND SPRING WASHER.
4. BOLTS MARKED X/S HAVE THE SCREW THREAD OUT OF THE SHEAR PLANE.

MK No	ITEM No.	No. OFF	DESCRIPTION	CUT LENGTH

F.E.A. DRG. Nº 60-707-034 MATERIALS LIST

J441/1/1 GENERAL ARRANGEMENT

REFERENCE DRAWINGS

REF	REVISION	DATE	APP.

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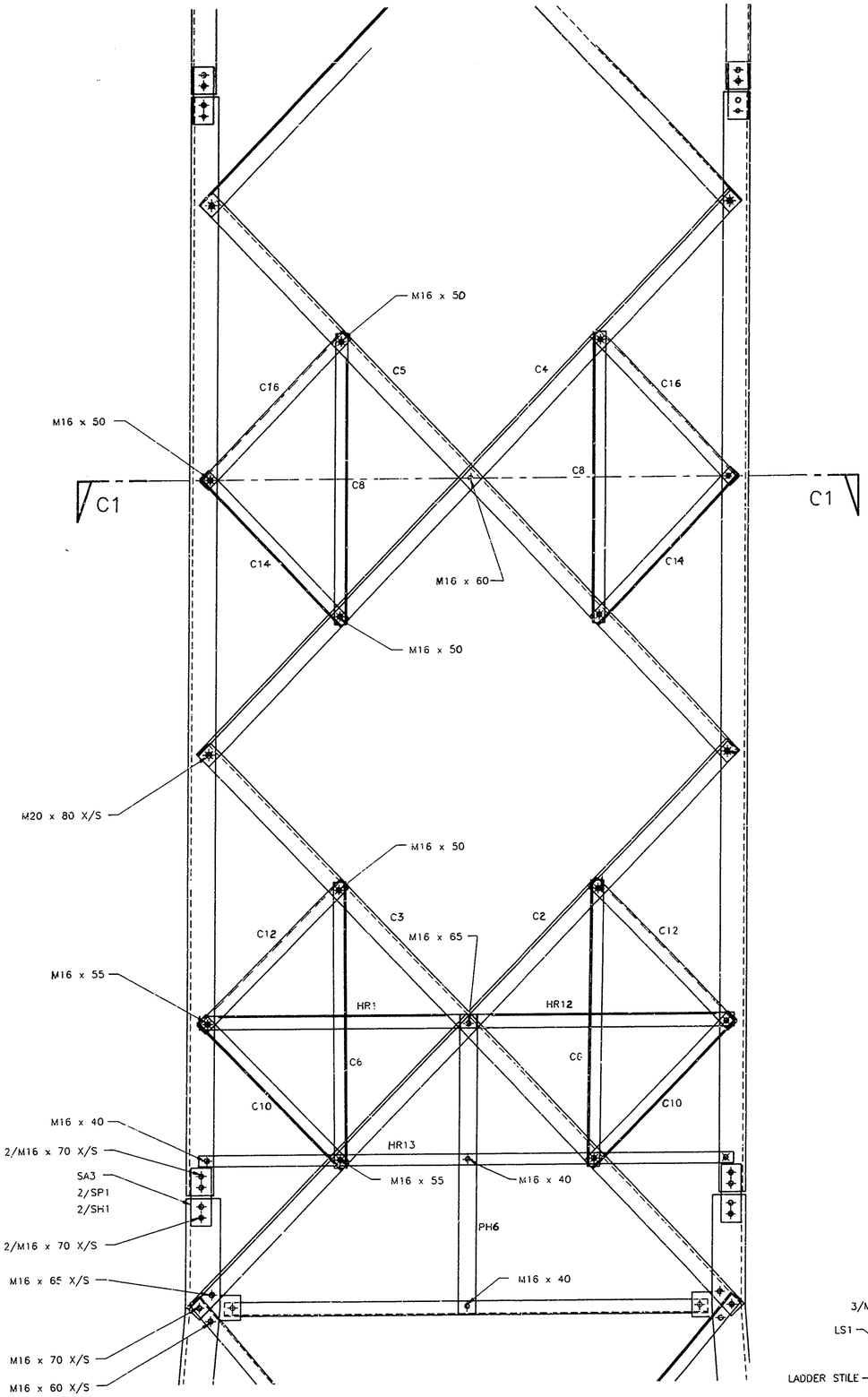
DRAWN	CHECKED
TJH	
TRACED	APPROVED KJW
	DATE 13–12–89

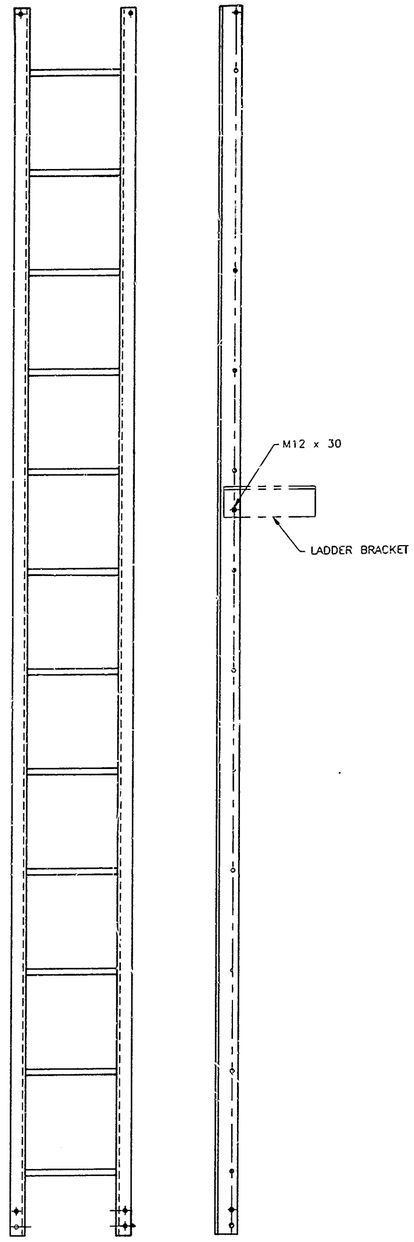
FIJI ELECTRICITY AUTHORITY JL2000C S.S. TOWER MODULE 'A' ERECTION DETAILS

SCALE	DRG. No.	REV.
1:10	J441/2/1	

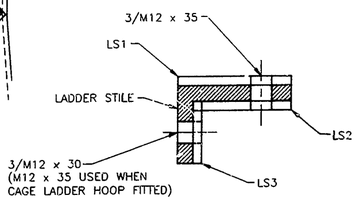
BOLT SCHEDULE

SIZE	QTY.	DESCRIPTION	REMARKS
M12 x 30	12	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 4.6
M12 x 35	6	"	"
M16 x 40	16	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 8.8
M16 x 45	2	"	"
M16 x 50	34	"	"
M16 x 55	16	"	"
M16 x 60	10	"	"
M16 x 65	12	"	"
M16 x 70	40	"	"
M20 x 80	8	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 8.8

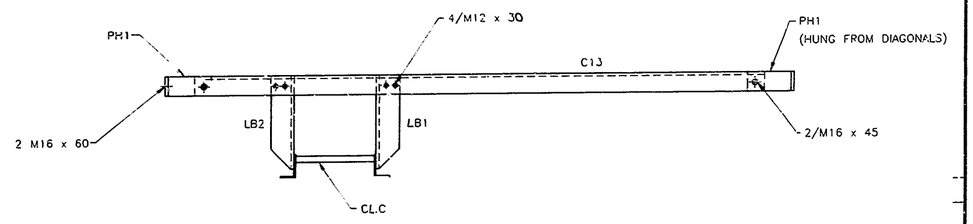




LADDER CL.C



TYPICAL LADDER SPLICE



SECTION C1–C1

GENERAL NOTES

1. U.O.N. ALL STEEL TO BE GR.250.
2. U.O.N. ALL STEEL TO BE HOT DIP GALVANISED.
3. U.O.N. ALL BOLTS TO BE HEX. HD. GALVANISED, GR.8.8 c/w NUT AND SPRING WASHER.
4. BOLTS MARKED X/S HAVE THE SCREW THREAD OUT OF THE SHEAR PLANE.

MK No.	ITEM No	No. OFF	DESCRIPTION	CUT LENGTH

F.E.A. DRG. No. 60-707-036 MATERIALS LIST

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Telephone 277 8866 Telex AA95003

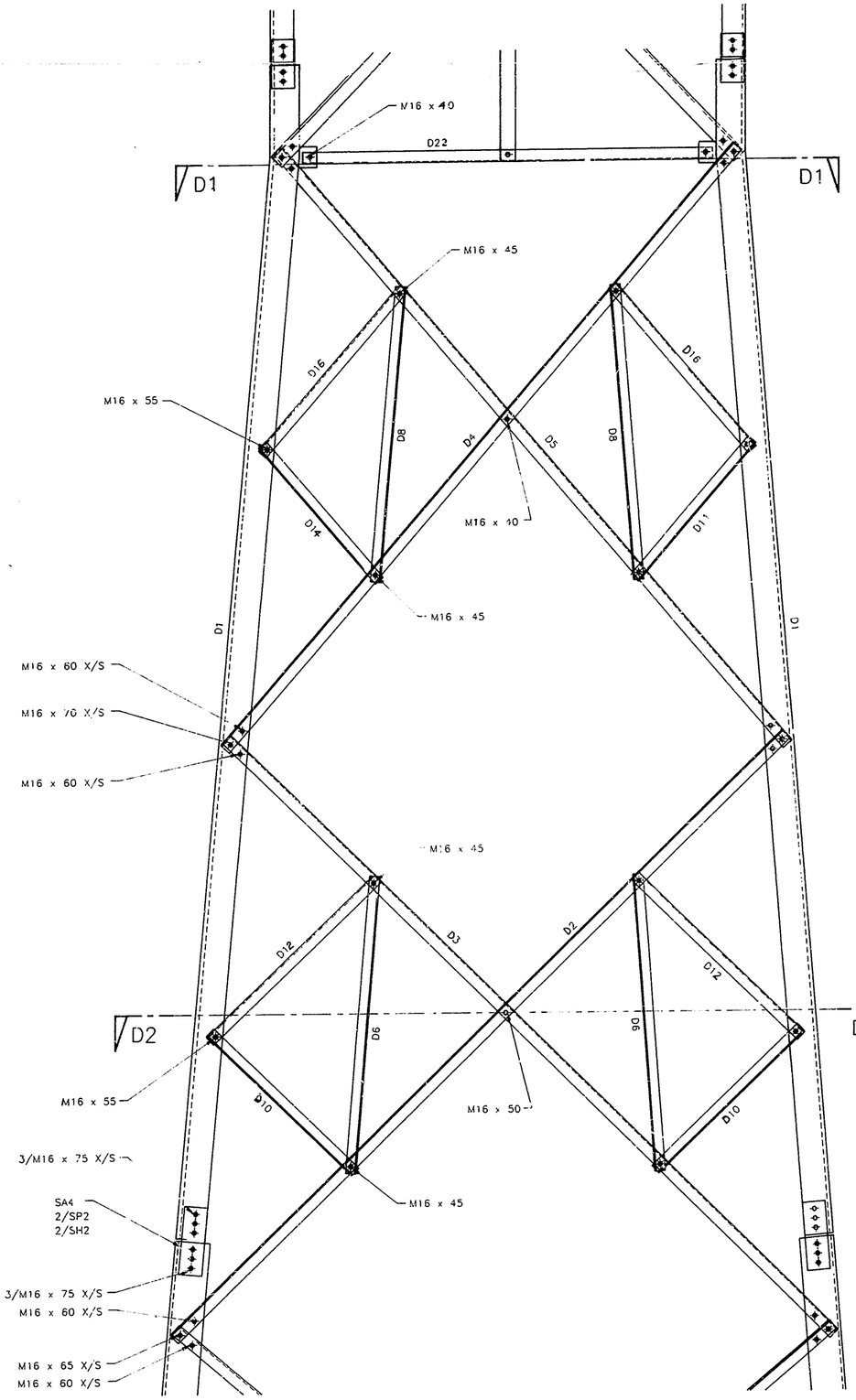
FIJI ELECTRICITY AUTHORITY
JL2000C S.S. TOWER
MODULE 'C' ERECTION DETAILS

DRAWN	CHECKED
TJH	
TRACED	APPROVED K.W
	DATE 15-12-89

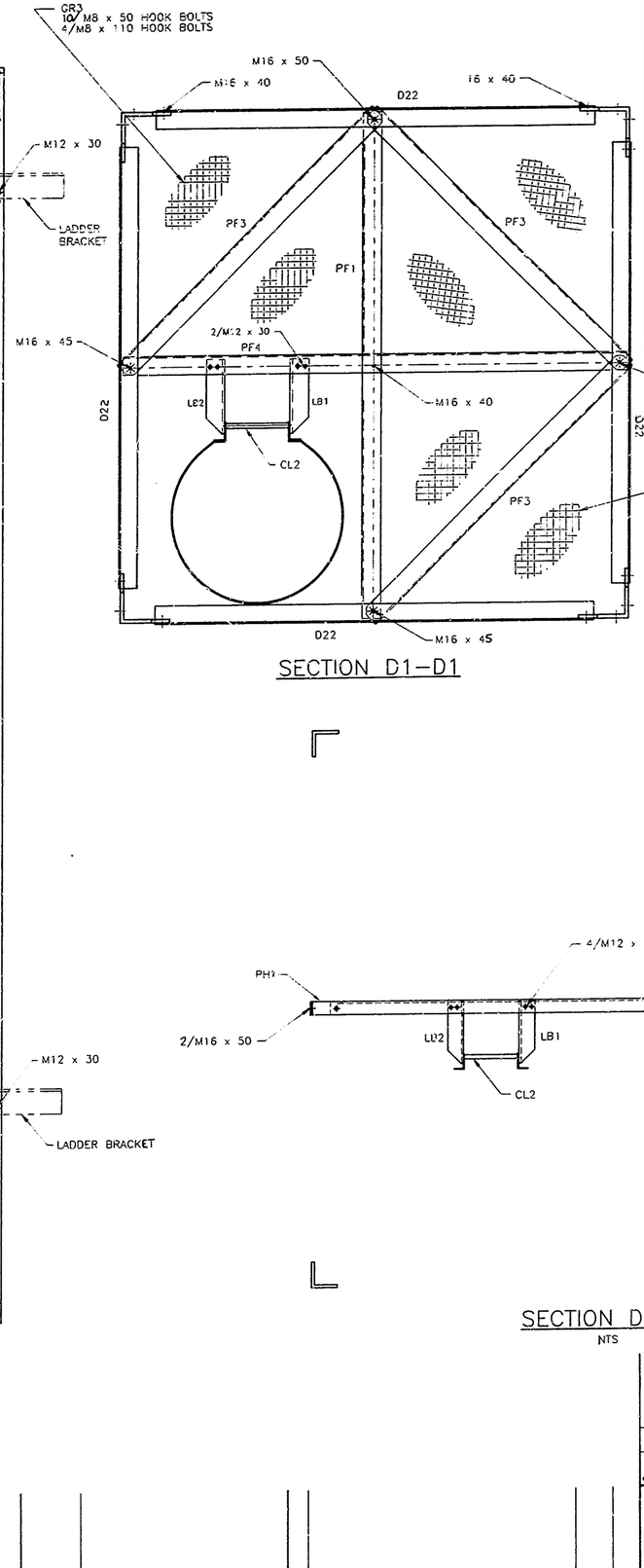
SCALE 1:10 DRG. No. J441/2/3 REV.

J441/1/1 GENERAL ARRANGEMENT

REFERENCE DRAWINGS	REF	REVISION	DATE	APP.



LADDER CL2



SECTION D1–D1

BOLT SCHEDULE

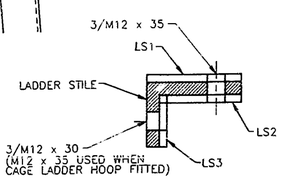
SIZE	QTY.	DESCRIPTION	REMARKS
M12 x 30	14	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 4.6
M12 x 35	10	"	"
M16 x 40	13	HEX. HD. c/w NUT & SPRING WASHER	GALV. GR. 8.8
M16 x 45	40	"	"
M16 x 50	4	"	"
M16 x 55	16	"	"
M16 x 60	32	"	"
M16 x 65	8	"	"
M16 x 70	8	"	"
M16 x 75	48	"	"
M8 x 50	18	HOOK BOLT c/w NUT & SPRING WASHER	MK. NO. GCA
M8 x 110	4	"	MK. NO. GCB4

GENERAL NOTES

1. U.O.N. ALL STEEL TO BE GR.250.
2. U.O.N. ALL STEEL TO BE HOT DIP GALVANISED.
3. U.O.N. ALL BOLTS TO BE HEX. HD. GALVANISED, GR.8.8 c/w NUT AND SPRING WASHER.
4. BOLTS MARKED X/S HAVE THE SCREW THREAD OUT OF THE SHEAR PLANE.

SECTION D2–D2

NTS



TYPICAL LADDER SPLICE

MK No.	ITEM No.	No. OFF	DESCRIPTION	CUT LENGTH

F.E.A. DRG. No. 60-T07-037 MATERIALS LIST

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FIJI ELECTRICITY AUTHORITY
JL2000C S.S. TOWER
MODULE 'D' ERECTION DETAIL

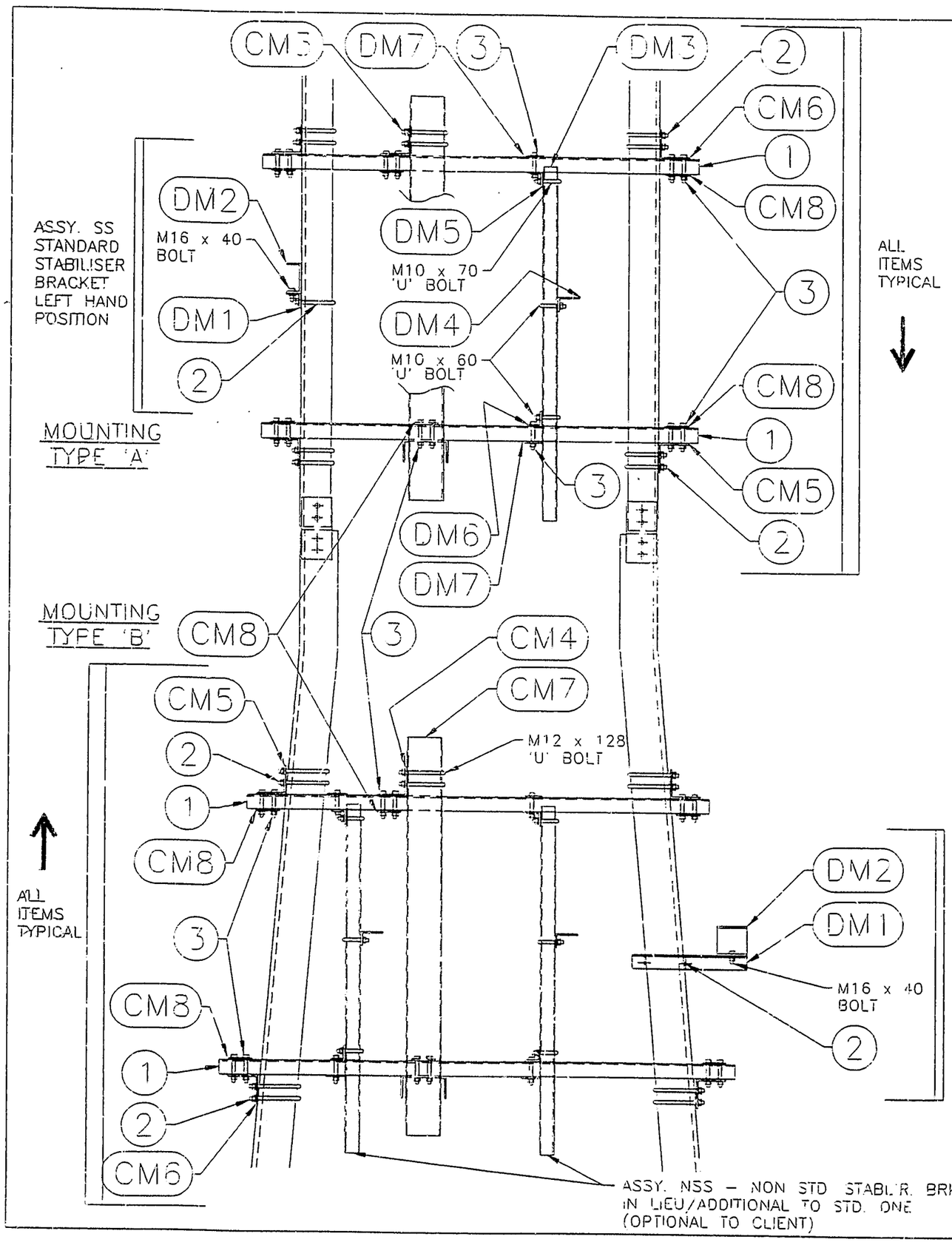
DRAWN	CHECKED
TJH	
TRACED	APPROVED KJW
	DATE 15–12–89

SCALE 1:12 U.O.N. DRG. No. J441/2/4 REV.

J441/1/1 GENERAL ARRANGEMENT

REFERENCE DRAWINGS

REF	REVISION	DATE	APP.



ANTENNA TYPE	AC2F3S1UB3	AC2F3S1UB2		
ITEM NO	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION
1 (PFC)	CM1F	CM1F		
2 ('U' BOLT)	M12 x 110	M12 x 120		
3 (BOLT)	M12 x 110	M12 x 110		
STABILISER	SS	SS		
MOUNTING TYPE	A	A		

F.E.A. DRG. Nº 60-T07-038

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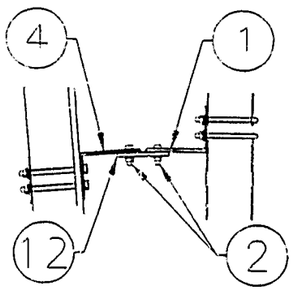
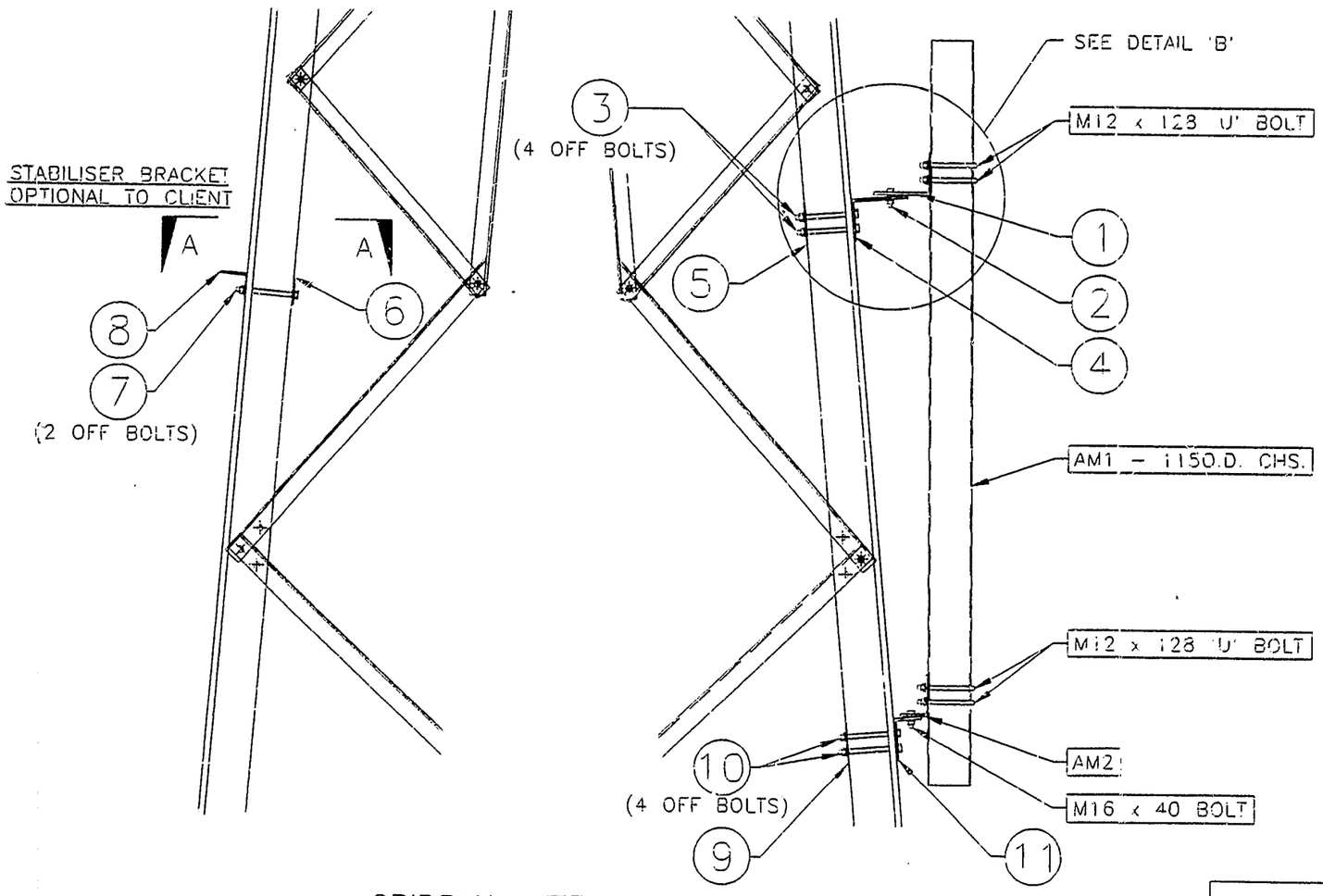
FIJI ELECTRICITY AUTHORITY
JL2000C S.S. TOWER
ANTENNA MOUNT ON FACE
GENERAL ARRANGEMENT

DRAWN TJH	CHECKED			
TRACED	APPROVED PKK			
	DATE 27-12-89	SCALE NTS	DRG. NO. J441/2/5	REV.

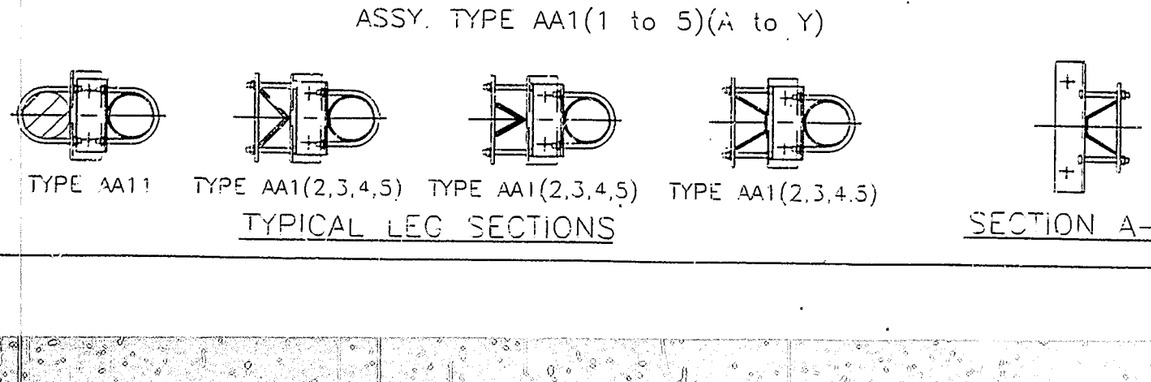


DETAIL 'B' FOR TYPE AA15(A to Y)



GRIDPAK ANTENNA MOUNT
ASSY. TYPE AA1(1 to 5)(A to Y)

ANTENNA TYPE	AA15R4	AA15W4		
ITEM NO	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION
1	AM8	AM8		
2	M16 x 50 (4 OFF)	M16 x 50 (4 OFF)		
3	M12 x 140	M12 x 160		
4	AM7R	AM7W		
5	AM4R	AM4W		
6	BM2R	BM2W		
7	M12 x 140	M12 x 160		
8	BM1R	BM1W		
9	AM4R	AM4W		
10	M12 x 140	M12 x 160		
11	AM5R	AM5W		
12	AM78	AM78		



TYPICAL LEG SECTIONS

SECTION A–A

F.E.A. DRG Nº 60-T07-039

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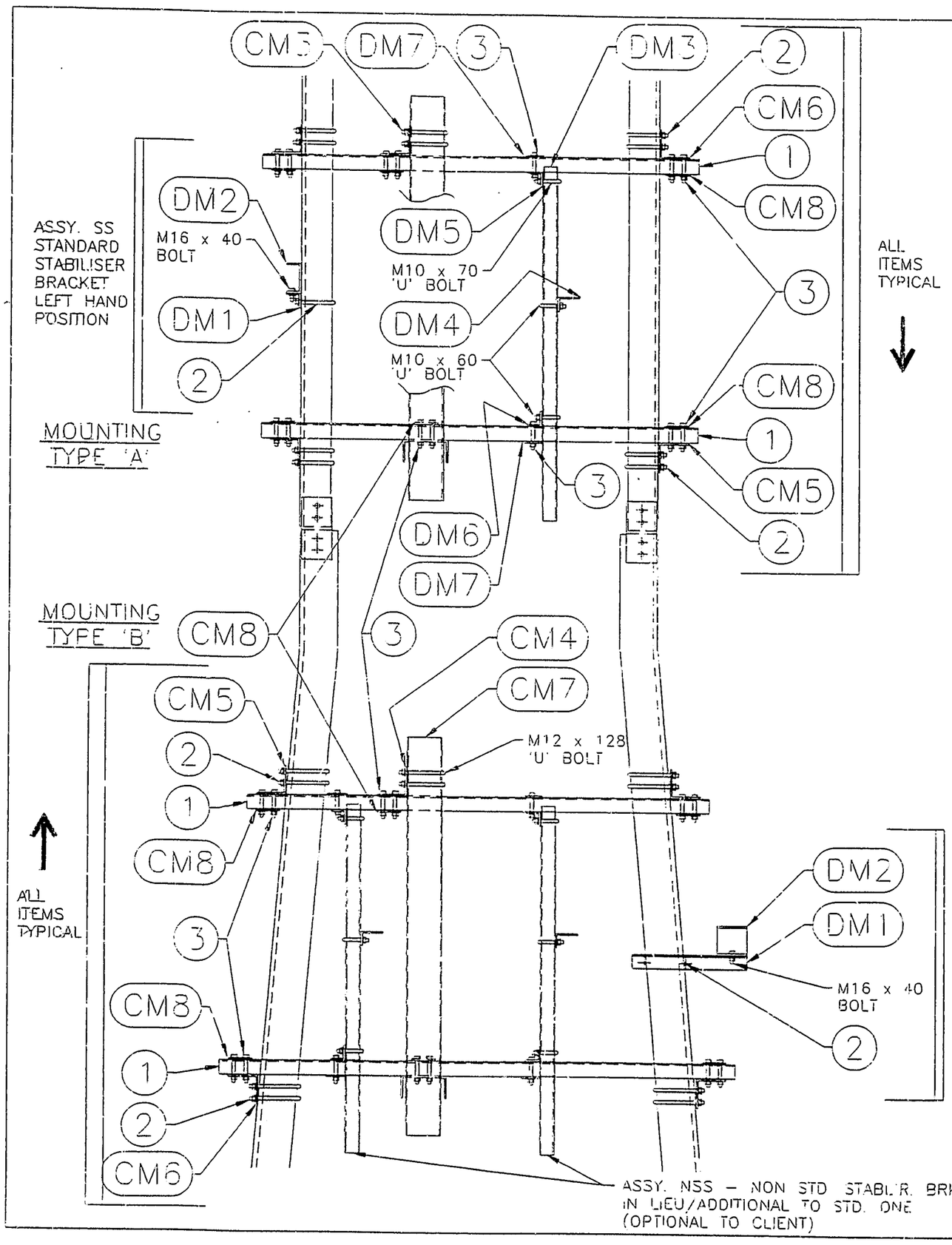
FIJI ELECTRICITY AUTHORITY
JL2000C S.S TOWER
ANTENNA MOUNT ON LEG
GENERAL ARRANGEMENT

DRAWN TJH	CHECKED			
TRACED	APPROVED PKK			
	DATE 27-12-89	SCALE NTS	DRG. NO. J441/2/6	REV.



ANTENNA TYPE	AC2F3S1UB3	AC2F3S1UB2		
ITEM NO	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION
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3 (BOLT)	M12 x 110	M12 x 110		
STABILISER	SS	SS		
MOUNTING TYPE	A	A		

F.E.A. DRG. Nº 60-T07-038

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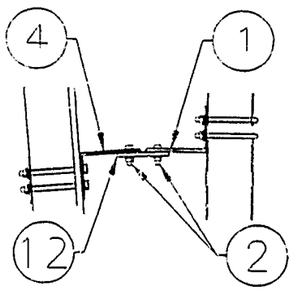
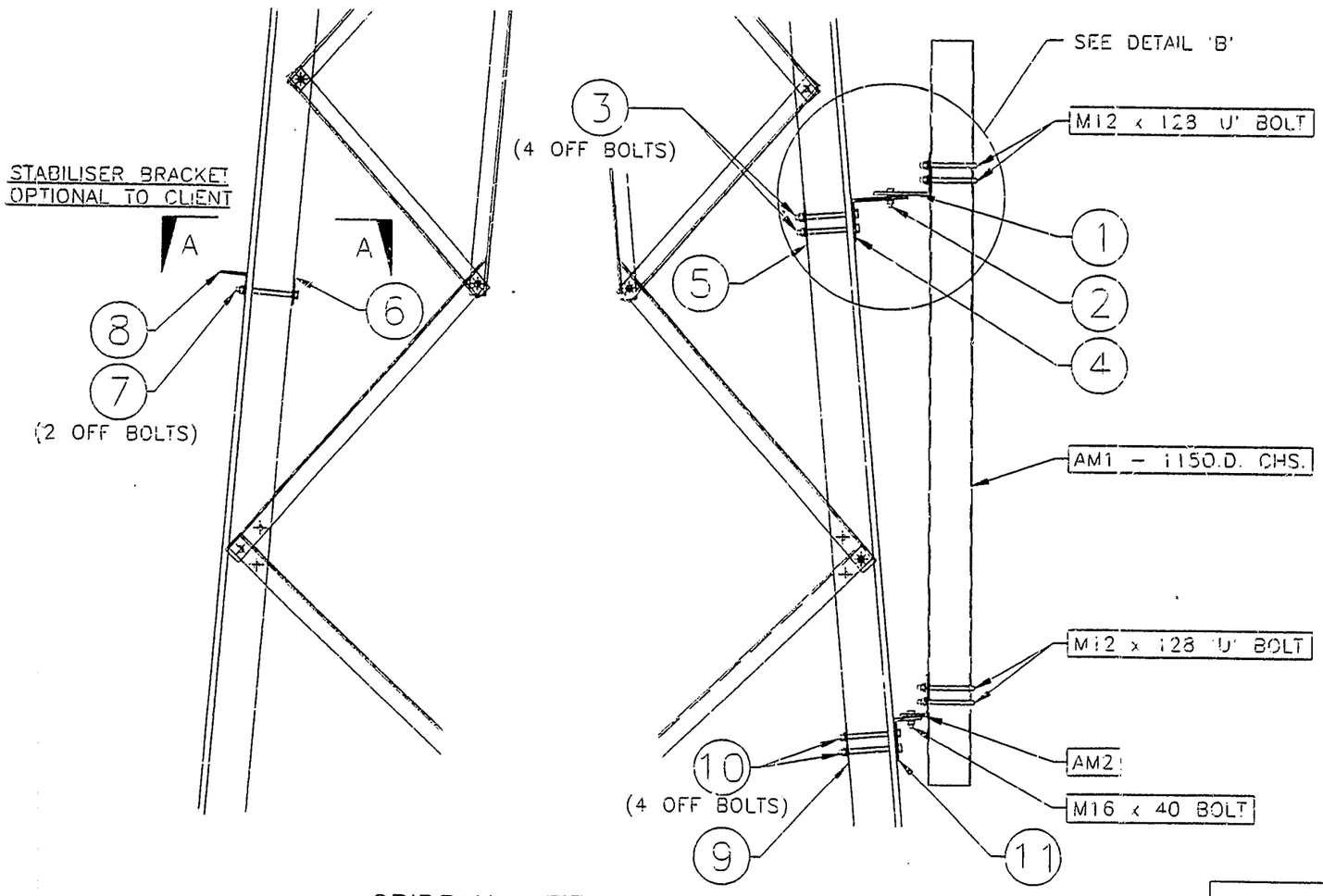
FIJI ELECTRICITY AUTHORITY
JL2000C S.S. TOWER
ANTENNA MOUNT ON FACE
GENERAL ARRANGEMENT

DRAWN TJH	CHECKED			
TRACED	APPROVED PKK			
	DATE 27-12-89	SCALE NTS	DRG. NO. J441/2/5	REV.



DETAIL 'B' FOR TYPE AA15(A to Y)



GRIDPAK ANTENNA MOUNT
ASSY. TYPE AA1(1 to 5)(A to Y)

ANTENNA TYPE	AA15R4	AA15W4		
ITEM NO	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION
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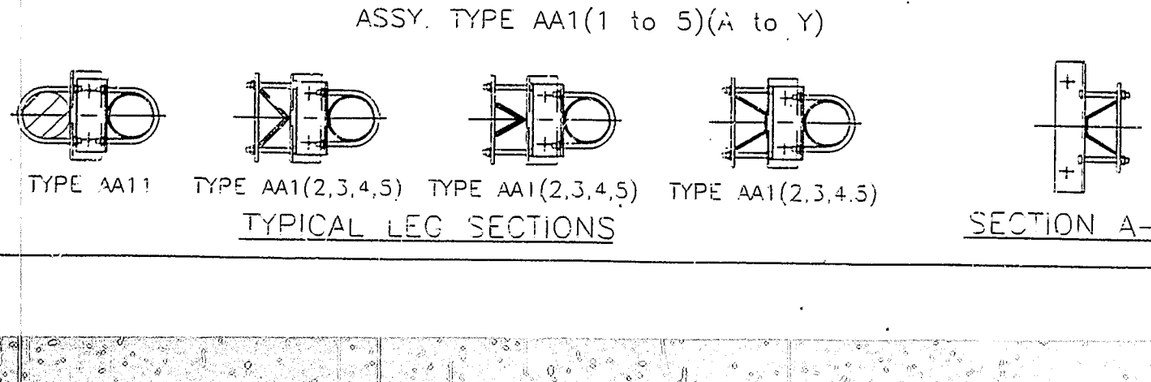
2	M16 x 50 (4 OFF)	M16 x 50 (4 OFF)		
3	M12 x 140	M12 x 160		
4	AM7R	AM7W		
5	AM4R	AM4W		
6	BM2R	BM2W		
7	M12 x 140	M12 x 160		
8	BM1R	BM1W		
9	AM4R	AM4W		
10	M12 x 140	M12 x 160		
11	AM5R	AM5W		
12	AM78	AM78		



TYPICAL LEG SECTIONS

SECTION A–A

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FIJI ELECTRICITY AUTHORITY
JL2000C S.S TOWER
ANTENNA MOUNT ON LEG
GENERAL ARRANGEMENT

DRAWN TJH	CHECKED			
TRACED	APPROVED PKK			
	DATE 27-12-89	SCALE NTS	DRG. NO. J441/2/6	REV.