भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(सड़क परिवहन और राजमार्ग मंत्रालय, भारत सरकार)
NATIONAL HIGHWAYS AUTHORITY OF INDIA
(Ministry of Road Transport & Highways, Government of india)
क्षेत्रीय कार्यालय - हैदराबाद
प्रथम तल, नया भवन, भारतीय प्रशासनिक स्टाफ कॉलेज, रोड नं-3, बंजारा हिल्स, हैदराबाद-500 034. तेलंगाना.
REGIONAL OFFICE - HYDERABAD
First Floor, New Building, Administrative Staff College of India (ASCI), Road No. 3, Banjara Hills, Hyderabad - 500 034, Telangana.
टेली / Tele : 040 - 29562147 / 48 ई-मेल / Email : rohyderabad@nhai.org, nhairohyd@gmail.com

Notice Inviting Public Comments

NHAI/RO-HYD/25011/1/38/2022/Utility/3458 Dt.15.03.2022

Sub: NHAI - RO Hyderabad - PIU Hyderabad- Proposal for crossing of 765KV D/C Hyderabad Kurnool Transmission line - Crossing of 765 KV D/C line at Km.45+896 on Hyderabad to Srisailam section of NH-765 in the State of Telangana - **Reg.**

Ref: 1. PIU Hyd lr no. NHAI/PIU-HYD/NH-765/Hyd-Dindi/WKTL/2022/303, dt: 18.02.2022

The Project Director, PIU, NHAI, Hyderabad vide letter cited above has recommended the proposal of M/s Warora - Kurnool Transmission Limited regarding Crossing of 765 KV D/C line at Km.45+896 on Hyderabad to Srisailam section of NH-765 in the State of Telangana.

2. As per above para 4 of the Ministry's guidelines no. RW/NH-33044/29/2015/S&R(R) dated 22.11.2016, public comments is hereby invited on the above proposal seeking claims and objections (on grounds of public inconvenience, safety and general public interest) within 30 days on public portal i.e. website of Ministry of Road Transport and Highways (www.morth.nic.in) in Form-A (copy enclosed) for "Accommodation of Public and Industrial Utility Services along and across National Highways".

Comment Inviting Authority
The Regional Officer,
National Highways Authority of India,
Regional Office: Hyderabad,
First Floor, New Building,
Administrative Staff College of India(ASCI),
College Park Campus, Road No.3,
Banjara Hills, Hyderabad - 500 034,
Telangana State,
Phone: 040-29562147, 040-29562148,
Email: rohyderabad@nhai.org, nhairohyd@gmail.com

Yours faithfully,

Encls: Above Proposal

(G.V. Bheemasena Reddy)
Dy. General Manager (Tech)
For Regional Officer-cum-
Highway Administrator, Hyderabad

To:

1. Senior Technical Director, NIC, Transport Bhawan, New Delhi- 110001 for uploading on Ministry's website.
2. Shri S.Manivasagam, Dy. GM (IT), NHAI HQs, New Delhi for uploading on NHAI website.

Copy to:-The Project Director, NHAI, PIU Hyderabad: for information

FORM-A

Form for seeking claims and objections (on grounds of public inconvenience, safety and general public interest) on the application for Accommodation of Public and Industrial Utility Services along and across National Highways

Sub: NHAI - RO Hyderabad - PIU Hyderabad- Proposal for crossing of 765KV D/C Hyderabad Kurnool Transmission line - Crossing of 765 KV D/C line at Km.45+896 on Hyderabad to Srisailam section of NH-765 in the State of Telangana - **Reg.**

The claims and objections (on grounds of public inconvenience, safety and general public interest) by the general public needs to be given within 30 days of uploading the online application for comments

Sl. No	Item	Details
1	Name of the person who is desiring to give claims and objections (on grounds of public inconvenience, safety and general public interest)	
2	Address of the person	
3	Details of the application for Accommodation of Public and Industrial Utility Services along and across National Highways against which claims and objections are being given (name of applicant and other details like site address etc.)	
	a) Application No.	
	b) Name of applicant (who applied to Accommodation of Public and Industrial Utility Services along and across National Highways)	
	c) Details of Application	
4	The claims and objections (on grounds of public inconvenience, safety and general public interest)	

सत्यमेव जयते

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(सड़क परिवहन और राजमार्ग मंत्रालय, भारत सरकार)
NATIONAL HIGHWAYS AUTHORITY OF INDIA
(Ministry of Road Transport & Highways, Government of india)
परियोजना कार्यान्वयन इकाई - हैदराबाद
आवास सं : **25A & 28A**, भारत का प्रसासनिक स्टाफ कॉलेज, कॉलेज पार्क कैंपस, सड़क सं : **3**, बंजारा हिल्स, हैदराबाद – **500 034**, तेलंगाना
PROJECT IMPLEMENTATION UNIT - HYDERABAD
Qtr.No. 25A & 28A, Administrative Staff College of India (ASCI), College Park Campus, Road No.3, Banjara Hills, Hyderabad- 500 034, Telangana
Land Mark : Near TV9 Bus Stop
टेली / Tele : 040-29550558 **ई–मेल / Email :** hyd@nhai.org / nhaihyd@gmail.com

NHAI/PIU-HYD/NH-765/Hyd-Dindi/WKTL/2022/303 Date: 18.02.2022

To
The Regional Officer
National Highways Authority of India
Regional Office, 1st Floor, New Building,
ASCI, College park campus, Road No. 3,
Banjara Hills, Hyderabad- 500 034

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
RECEIVED
24 FEB 2022
11056
Regional Office, Hyderabad.
क्षेत्रिय कार्यालय, हैदराबाद.

DGM (T)-I & II
Dy Mngr (T) KB
PD
AM (F&A)

Sub: NHAI, PIU-Hyderabad - Short term improvement and routine maintenance of 2-lane with paved shoulders of stretch from Km. 23.000 to Km. 108.800 for a length of 85.800 kms of Hyderabad (near Tukkuguda) to Dindi section of NH-765 in the state of Telangana for a period of 12 months-**Additional Inter-Regional AC link for import of power into Southern Region i.e. Warora - Warangal and Chilkaluripeta-Hyderabad Kurnoo 765 link being implementation by Warora Kurnool Transmission Ltd.(WKTL)-NH crossing-Reg.**

Ref 1 WKTL lr.no. WKTL/HYD/2021/169,18.11.2021
2 M/s. Aarvee associates lr.no. AA/TL/NH-765/NHAI/2283/20-21/541,dated.20.01.2022
3 WKTL lr.no. WKTL/HYD/2022/278,14.02.2022

*****

Sir,

This has reference to letter 1st cited, wherein it has been requested to accord approval for 765KV line crossing the subject stretch. The proposal has been examined by the Supervision Consultant as per Indian Electricity Rules,1956 and Manual on transmission lines published by Central Board of Irrigation & Power (CBIP) and MoRT&H circular no.RW/NH-33044/29/2015/S&R (R), dated. 22.11.2016 and recommended the proposal vide reference 2nd cited.

2. In this connection, M/s. Warora Kurnool Transmission Ltd.(WKTL) has submitted the following:

i. Check list
ii. Methodology for execution
iii. Sag Calculation
iv. Undertakings
v. List of Specific safety precautions taken during execution
vi. Draft license agreement as per MoRT&H circular no.RW/NH-33044/29/2015/S&R (R), dated. 22.11.2016

3. In this regard, the above proposal is examined in this office and recommended for approval of Highway Administrator.

Yours faithfully

18/2/22

(P.NageswaraRao)
GM (T) &Project Director

Encl: As above

Letter No. AA/TL/NH-765/NHAI/2283/21-22/541
Date: 20th January, 2022

To
The Project Director,
Project Implementation Unit,
National Highways Authority of India,
Hyderabad, Telangana.

Sub: Supervision Consultancy Service for Operation & Maintenance of the Stretch from Km. 23.000 to km. 108.000 of Hyderabad to Dindi Section of NH-765 in the State of Telangana of 2-lane with paved shoulders for a period of 3 years- **Reg: Additional inter-Regional AC Link for import of power into Southern region i.e., Warora-Warangal and Chilakaluripeta Hyderabad Kurnool 765 Link being implementation by warora kurnool Transmission Ltd. (WKTL) -NH crossing- Requested to furnish the detailed report along with the specific recommendations – IE Comments**

Ref:
1. Authority Letter no: NHAI/ PIU-HYD /NH-765/HYD-Dindi/WKTL/2022/52 dated.10.01.2022.
2. WKTL Letter no: WKTL/HYD/2022/231 dated 05.01.2022.
3. Our Lr No. AA/TL/NH-765/NHAI/2283/20-21/522 dated 08.12.2021.
4. Authority Letter no: NHAI/ PIU-HYD /NH-765/HYD-Dindi/WKTL/2021/1625 dated.20.02.2021.
5. WKTL Letter no: WKTL/HYD/2021/169 dated 18.11.2021

Dear Sir,

This has reference to the letter no.3 cited above, wherein we have communicated our observations for compliance. Authority has forwarded the letter of M/s. WKTL after incorporation of observation/changes in our letter.

In view of the above, we have again reviewed the revised submitted proposal of M/s WKTL vide reference letter no. 2 and the Methodology for Execution of National Highway Crossing is attached along with Sag Calculation sheets are found to be in order.

The signboards at the location of Line Crossing for guidance of the highway users shall be fixed at his own cost including maintenance as as per Indian Electricity Rule, 1956

Hence, the applicant may be accorded permission for further processing.

Thanking you and assuring you of the best services at all times

With regards
For **Aarvee Associates Architects Engineers & Consultants Pvt. Ltd**

M.G. Basha
Team Leader

Copy to:

1. The Contractor, M/s. GR Engineers & Constructions Ltd.
2. The Authorized Signatory, Aarvee Associates Architects Engineers & Consultants Pvt. Ltd., Hyd.
3. Project File.

Warora-Kurnool Transmission Limited

Site office: Ground Floor # 001, Sai Prema Nilayam Apartments, Brindavan Gardens, Kishanguda, Telangana- 501218.

Ref: WKTL/HYD/2022/278 Date: 14/02/2022

To,

The GM (T) & Project Director,
National Highway Authority of India,
Project Implementation Unit – Hyderabad,
Dist : Rangareddy,Telangana State

राष्ट्रीय राजमार्ग प्राधिकरण | National Highways Authority of India
840
15 FEB 2022
प.का.इ., हैदराबाद/PIU-Hyderabad

SE - H

Sub: Additional Inter-Regional AC Link for Import of power into Southern region i.e Warora- Warangal and Chilakaluripeta- Hyderabad Kurnool 765 Link being implementation by Warora Kurnool Transmission Ltd. (WKTL) – NH Crossing

Ref: WKTL/HYD/2022/231 Dated:05/01/2022,
NHAI/PIU-HYD/NH-765/Hyd-Dindi/WKTL/2022/175 Dated : 01/02/2022

Dear Sir,

With reference to above subject, we hereby submitting the following documents for your kind information.

1. Draft license deed agreement
2. Undertaking

Thanking you and assuring you of our best services always.

Thanking you,

For **Warora-Kurnool Transmission Ltd.**

(BANNO)
(Authorized Signatory)
Encl : As above

Warora Kurnool Transmission Limited WKTL Hyderabad

Warora Kurnool Transmission Limited
Adani Corporate House
Shantigram, S G Highway,
Ahmedabad 382 421
Gujarat, India
CIN: U40300DL2015PLC279272

Registered Office: C-105, Anand Niketan, New Delhi -110 021

Tel +91 79 2555 7555
Fax +91 79 2555 7177
info@adani.com
www.adani.com

తెలంగాణ तेलंगाना TELANGANA
SL.NO. 3098. DATE. 24-08-2021. R/O.HYD.
SOLD TO. RAJNISH MAHAJAN.
S/O. SURENDRA MAHAJAN.
FOR WHOM : M/s. WARORA KURNOOL TRANSMISSION LTD,HYD.

AG 998891
YASMEEN BEGUM
LICENSED STAMP VENDOR
Lic No.1607 – 14 of 2017
Ren No.1607-002 of 2020
3-5-480/A, Parda Gate,King Koti
Hyderabad-1. Cont No: 9704810001.

Appendix

\- Draft

Enclosure to Ministry of Road Transport & Highways letter No. 33044 / 29 / 2015 /S&R(R) dated 22.11.2016.

AGREEMENT REGARDING GRANTING OF RIGHT OF WAY PERMISSIONS

FOR LAYING UTILITY SERVICES ON NATIONAL HIGHWAYS

Agreement to lay Telecom cable / OFC cable / electrical cable / pipe line/ ducts etc from _____ to _____ Km of land.

This Agreement made this ____ day of _____ (month) _____ of

Warora-Kurnool Transmission Limited WKTL

(year) between ____ acting in his executive capacity through ____ (hereinafter referred to as the "Authority" which expression shall unless excluded by or repugnant to the context, include his successors in office and assigns) on the one part, and **M/s Warora Kurnool Transmission Limited**, a company registered under the .Companies Act, 1956 and having its Registered Office at Ground Floor # 001, Sai Prema Nilayam Apartments, Brindavan Gardens, Kishanguda, Telangana- 501218 (hereinafter called the "Licensee") which expression shallunless excluded by repugnant to the context, include his successors/administrator assignees on the second part.

Whereas the Authority is responsible, inter-alia, for development and maintenance of lands in Km .45. to ..46.....of NH No..765 RoW.

Whereas the Licensee proposes to lay Telecom cable / OFF cable / electrical cable / pipe line / ducts etc. referred to as utility services in subsequent paras.

Whereas the Licensee has applied to the Authority for permission to lay utility services from Km 45 to Km 46 of road/route up to Hyderabad (Near Kadthal) and from km 45 to km 46 of road/route up to Dindi (Near Kadthal)

And whereas the Authority has agreed to grant such permission for way leave on the NH RoW as per terms and con ditions hereinafter mentioned.

Now this agreement witnesseth that in consideration of the conditions hereinafter contained and on the part of the Licensee to be observed and performed, the Authority hereby grants to the Licensee permission to lay utility services as per the approved drawing attached hereto subject to the following conditions, namely.

I. RoW permissions are only enabling in nature. The purpose of extending the way leave facility on the National Highway RoW is not for enhancing the scope of activity of a utility service provider, either by content or by intent. Further, enforceability of the permission so granted shall be restricted only to the extent of provisions/scope of activities defined in the license agreement & for the purpose for which it is granted.

2. No Licensee shall claim exclusive right or the RoW and any subsequent user will be permitted to use the RoW, either above or below, or by the side of the utilities laid by the first user, subject to technical requirements being fulfilled, Decision of the Authority in relation to fulfillment of technical requirements shall be final and binding on all concerned parties. In case any disruption/damage is caused to any existing user by the subsequent user, the Authority shall not be held accountable or liable in any manner.

3. The Licensee shall be responsible for undertaking all activities including, but not limited to site identification, survey, design, engineering, arranging finance, project management, obtaining regulatory approvals & necessary clearances, supply of equipment, material, construction, erection testing and commissioning, maintenance and operation and all other activities essential or required for efficient

Warora-Kurnool Transmission Limited WKTL Hyderabad

functioning of their own utility/ industrial infrastructure facilities.

4. The Licensee shall pay license fees @ Rs .....--,.... „./sq m/month to the Authority. The License fee shall become payable from the date of handing over of RoW land to the licensee, for laying of utilities/cables/conduits/pipelines for infrastructure / service provider. As regards Tariff and Terms and Conditions for providing common utility ducts along National Highways, there shall be a separate agreement regime.

5. Fee shall have to be paid in advance for the period for which permission is granted for entering into a license agreement. In case of renewal, rate prevailing at the time of renewal shall be charged. Delay in deposition of fee shall attract interest@15% per annum compound annually.

6. Present policy of the MoRT&H is to provide a 2.00 m wide utility corridor on either side of the extreme edge of RoW. In cases where utility ducts with sufficient space are already available along NH, the utility services shall be laid in such ducts subject to technical requirements being fulfilled.

7. The utility services shall be laid at the edge of the RoW, In case of restricted width of RoW, which may be adequate only to accommodate the carriageway, central verge, shoulders, slopes of embankment, drains, other road side furniture etc; the utility services shall be laid beyond the toe line of the embankments and clear of the drain.

8. The Licensee shall make his own arrangement for crossing of cross drainage structure, rivers, etc. below the bed. In case, this is not feasible, the utility services may be carried outside the railings/parapets and the bridge 'Superstructure. The fixing and supporting arrangement with all details shall be required to be approved in advance from the concerned Highway Administration, Additional cost on account of fixing and supporting arrangement as assessed by the Authority shall be payable by the Licensee.

Warora-Kurnool Transmission Limited
WKTL
Hyderabad

9. In exceptional cases, where RoW is restricted the utility services can be allowed beneath the carriageway of service road, if available, subject to the condition that the utility services be laid in concrete ducts, which will be designed to carry traffic on top. The width of the duct shall not be less than one lane. In such cases, it also needs to ensure that maintenance of the utility services shall not interfere with the safe and smooth flow of traffic. The cost of operation and maintenance will have to be borne by the Licensee.

10. It is to be ensured that at no time there is interference with the drainage of the road land and maintenance of the National Highways. Towards this, the top of the utility services shall be at least 0.6 meter below the ground level. However, any structure above ground shall be aesthetically provided for / landscaped with required safety measures as directed by the concerned Authority.

11. The utility services shall be permitted to cross the National Highway either through structure or conduits specially built for that purpose. The casing / conduit 'pipe should, as minimum, extend from drain to drain in cuts and toe of slope to toe of slope in the fills and shall be designed in accordance with the provision of IRC and executed following the Specifications of the Ministry.

12. Existing drainage structure shall not be allowed to carry the lines across.

13, The top of the casing/conduit pipe containing the utility services to cross the road shall be at least 1.2m below the top of the sub grade or the existing ground level whichever is lower, subject to being at lease 0.3m below the drain inverts. A typical sketch showing the clearances is given in Attachment-1.

14. The utility services shall cross the National Highway preferable on a line normal to it or as nearly so as practicable.

15. The casing/conduit pipe for crossing the road may be installed under the road embankment either by boring or digging a trench. Installation by boring method shall be preferred.

16. In case of trenching, the sides of the trench should be done as nearly vertical as possible, The trench width should be at least 30 cm. but not more than 60 cms wider than the outer diameter of the pipe. Filling of the trench shall conform to the specifications contained here in below or as supplied by the Highway Authority.

    a. Bedding shall be to a depth not less than 30 cm. It shall consist of granular material, free of lumps, clods and cobbles, and graded to yield a firm surface without sudden change in the bearing value. Unsuitable soil and rock edges should be excavated and replaced by selected material.

Warora-Kurnool Transmission Limited WKTL Hyderabad

b. The backfill shall be completed in two stages (i) Side fill to the level of the top of the pipe (ii) Overfill to the bottom of the road crust.

c. The side fill shall consist of granular material laid in 15 cm. Layers each consolidated by mechanical tamping and controlled addition of moisture to 95% of the Proctor's Density. Overfill shall be compacted to the same density as the material that had been removed. Consolidation by saturation or ponding will not be permitted.

d. The road crust shall be built to the same strength as the existing crust on either side of the trench or to thickness and specifications stipulated by the Highway Authority,

17. The Licensee shall ensure making good the excavated trench for laying utility services by proper filling and compaction, so as to restore the land into the same condition as it was before digging the trench, clearing debris/loose earth produced due to execution of trenching at least 50m away from the edge of the right of way;

18. All required restoration work subsequent to laying of the cable shall be required to be undertaken by the Licensee at its cost either by itself or through its authorized representative in consultation with the Authority as per predetermined time schedule and quality standards.

19. Prior to commencement of any work on the ground, a performance Bank Guarantee @ Rs. per route meter / Rs per sq m with a validity of one year initially (extendable if required till satisfactory completion of works, shall have to be furnished by the Licensee to the Authority/its designated agency as a security against improper restoration of ground in terms of filling/unsatisfactory compaction damages caused to other underground installations/utility services & interference, interruption, disruption or failure caused thereof to any services etc. In case of the Licensee failing to discharge the obligation of making good of the excavated trench/other restoration work, the Authority shall have a right to make good the damages caused by excavation, at the cost of the Licensee and recover the amount by forfeiture of the Bank Guarantee.

20. In case, the performance Bank Guarantee is invoked as mentioned above, the License shall be required to replenish and reinstate the required performance Bank Guarantee within one month of such invoking. In case the work contemplated herein is not completed to the satisfaction of the authority, which has granted the permissions, within a period of 11 months from the date of issue of the Bank Guarantee, the Licensee shall either furnish a fresh guarantee or extend the guarantee for a further period of one year. Notwithstanding this, the Licensee shall be liable to pay full compensation to the aggrieved Authority/ its designated agency for any damage sustained by them by reason of the exercise of the RoW facility;

Warora-Kurnool Transmission Limited * Hyderabad * WKTL

21. The Licensee shall shift the utility services within 90 days (or as specified by the respective Authority) from the date of issue of the notice by the concerned Authority to shift/relocate the utility services, in case it is so required for the purpose of improvement/widening of the road/route/highway or construction of flyover/bridge and, restore the road/land to its original condition at his own cost and risk.

22. The Licensee shall be responsible to ascertain from the respective agency in co-ordination with Authority, regarding the location of other utilities /underground installations/ facilities etc. The Licensee shall ensure the safety and security of already existing underground installations/utilities/facilities etc. before commencement of the excavation/using the existing cable ducts. The Licensee shall procure insurance from a reputed insurance company against damages to already existing underground installations/utilities/facilities etc.

23. The Licensee shall be solely responsible/ liable for full compensation/indemnification of concerned agency / aggrieved Authority for any direct, indirect or consequential damage caused to them/claims or replacements sought for; at the cost .and 'risk of the Licensee. The concerned agency in co-ordination with Authority shall also have a right make good such damages/ recover the claims by forfeiture of Bank Guarantee.

24. If the Licensee fails to comply with any condition to the satisfaction of the Authority, the same shall be executed by the Authority at the cost and risk of the Licensee.

25. Grant of License is subject to the Licensee satisfying (a) minimum disruption of traffic and (b) no damage to the highways. As far as possible, the Licensee should avoid cutting of the road for crossing highway, and other roads and try to carry out the work by trenchless technology. In case any damage is caused to the road pavement in this process, the Licensee will be required to restore the road to the original condition at its cost. If due to unavoidable reasons the road needs to be cut for crossing or laying utility services, the Licensee has to execute the restoration work in a time bound manner at its cost either by itself or through its authorized representative in consultation with the Authority as per predetermined time schedule and quality standards. In case of the Licensee failing to discharge the obligation of making good of the excavated trench/other restoration work, the Authority shall have a right to make good the damages caused by excavation, at the cost of the Licensee red recover the amount by forfeiture of the Bank

26. The Licensee shall inform/give a notice to the concerned agency designated by the Authority at least 15 day in advance with route details prior to digging trenches,

Wardha-Kurnool Transmission Limited
WKTL
Hyderabad

for fresh or maintenance/repair works. A separate performance Bank Guarantee for maintenance/repair works shall have to be furnished by the Licensee.

27. Each day, the extent of digging the trenches should be strictly regulated so that utility services is laid and trenches filled up before the close of the work that day. Filling should be completed to the satisfaction of the concerned agency designated by the Authority.

28. The licensee shall indemnify the concerned agency in co-ordination with Authority, against all damages and claims, if any due to the digging of trenches for laying cables/ducts.

29. The permission for laying utility services is granted maximum for 5 years at a time, which can thereafter be considered for renewal. On payment of additional fee at the time of renewal, the permission shall automatically be renewed, unless Defaults exist. In case of renewal, rate prevailing at the time of renewal shall be Charged. Delay in deposition of fee shall attract interest @ 13% per annum compounded annually.

30. The permission shall be valid only for the period it is issued, and fee deposited. However, the Authority also has a right to terminate the permission or to extend the period of Agreement.

31. That the Licensee shall not undertake any work of shifting, repairs or alterations to the futility services without prior written permission o t e concerns agency in co-ordination with the Authority,

32. The permission granted shall not in any way be deemed to convey to the Licensee any ownership right or any interest in route/road/highway land /property, other than what is herein expressly granted. No use of NH RoW will be permitted for any purpose other than that specified in the Agreement.

33. During the subsistence of this Agreement, the utility services located in highway land / property shall be deemed to have been constructed and continued only by the consent and permission of the Authority so that the right of the Licensee to the use thereof shall not become absolute and in feasible by lapse of time.

34. The Licensee shall bear the Stamp Duty charged on this Agreement,

35. Three copies of 'as laid drawings' of utilities (hard and soft copies) with geo-tagged photographs and geo-tagged video recordings: of laying of cables in the trench (with respect to the NH) and after complete restoration shall be submitted to the Authority for verification and record within a month of completion of works.

36. The Licensee shall allow free access to the Site at all times to the authorized representatives of Authority to inspect the Project Facilities and to investigate any

Warora-Kurnool Transmission Limited * Hyderabad * WKTL

matter within their Authority, and upon reasonable notice, shall provide reasonable assistance necessary to carry out their respective duties and functions.

37. The utility services shall not be made operational by the Licensee unless a completion certificate to the effect that the utility services has been laid in accordance with the approved specifications and drawings and the trenches have been filled up to the satisfaction of the concerned agency in co-ordination with the Authority has been obtained. Notwithstanding anything contained herein, this Agreement may be cancelled at any time by Authority for breach of any condition of the same and the Licensee shall neither be entitled to any compensation for any loss caused to it by such cancellation not shall it be absolved from any liability already incurred.

38. The Licensee shall ensure adherence to relevant Indian standards and follow best industry practices, methods, and standards for the purpose of ensuring the safe, efficient and economic design, construction, commissioning, operation, repair and maintenance of any part of the utility lines/industrial infrastructure facilities and which practices, methods and standards shall be adjusted as necessary, to take Account of

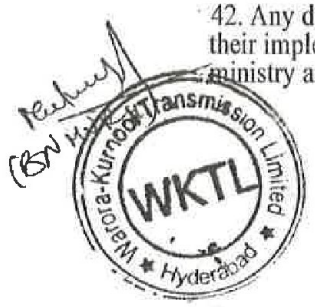
a. operation, repair, and maintenance guidelines given by the manufacturers,
b. The requirement of Law
c. The physical condition at the site, and
d. The safety of operating personnel and human beings

39, The Licensee shall have to provide safety measures like barricading, danger lighting and other necessary caution boards while executing the work.

40. While laying utility services at least one lane of road shall be kept open to traffic at all times, In case of single lane roads, a diversion shall be constructed. If any traffic diversion works are found necessary during the working period such diversion shall be provided at the cost of Licensee.

41. After the termination/expiry of the agreement, the Licensee shall remove the utility services within 90 days and the site shall be brought back to the original condition failing which the Licensee will lose the right to remove the utility services. However before taking up the work of removal of utility services the Licensee shall furnish a bank Guarantee to the Authority for a period of one year for an amount assessed by the authority as a security for making good the excavated trench by proper filing and compaction, clearing debris, loose earth produced due to excavation of trenching at least 50m away from the edge of the RoW

42. Any disputes in interpretation of the terms and conditions of this agreement or their implementation shall be referred to the redress mechanism prevailing in the ministry and the decision of the redress mechanism shall be final and binding on all



42. For PPP Projects, In case of any financial loss incurred by the respective project concessionaires due to such laying/shifting of utility services by the Licensee, compensation for the same shall be required to be borne by the Licensee in mutual agreement with the respective project concessionaires. MoRT&H/ NHAI/ implementing authorities for the project shall not be, liable to the concessionaire in any way in this regard.

This agreement has been made in duplicate each on a Stamp Paper, Each party to this Agreement has retained out stamped copy each.

IN WITNESS HEREOF THE PARTIES HERETO HAVE CAUSED THIS AGREEMENT TO BE EXECUTED THROUGH THEIR RESPECTIVE AUTHORISED REPRESENTATIVES THE DAY AND TO YEAR FIRST ABOVE WRITTEN.

SIGNED SEALED. AND DELIVERED FOR AND ON BEHALF OF AUTHORITY.

BY SHRI_____

(Sig n a t u r e , name & address with stamp)

SIGNED ON BEHALF OF M/S WARORA KURNOOL Transmission Limited (LICENSEE)

BYSHRI(B.N.MURTY)_____

(Sig n a t u r e , name & address with stamp)

HOLDER OF GENERAL POWER OF ATTORNEY DATED_____

EXECUTED IN ACCORDANCE WITH THE RESOLUTION NO._____

DATED PASSED BY THE BOARD OF DIRECTORS IN THE

MEETING HELD ON

IN THE PRESENSE OF (WITNESSES)

1.

2.

తెలంగాణ तेलंगाना TELANGANA

AH 244527

Sl. No: 9626 Date.12/11/2021.
Sold To : Rajnish Mahajan
S/o. : Surendra Mahajan, R/o. Hyd
For Whom : M/s. Warora Kurnool Transmission Ltd. Hyd.

K. RAMA CHANDRAVATHI
LICENSED STAMP VENDOR
L.No. 16-11-027/1999,
R.L.No.16-11-001/2020
SHOP.No.6-3-387,
NEAR HIMALAYA BOOK WORLD
BESIDE IOC PETROL PUMP
PUNJAGUTTA, HYDERABAD-82
PHONE No:040-23351799,9392490025

Undertaking

It is proposed to issue NOC and followed by stringing activity for Construction of 765 KV Hyderabad -Kurnool Transmission Line which is passing through NH-765 near kadthal Village. The section is crossing in between milestone no's 45 & 46 of NH-765 (Hyderabad-Kurnool) between Warora Kurnool Transmission Limited Location No: 12/4 (3B15+0) and 13/0 (3B15+0) for our proposed 765 KV Hyderabad – Kurnool Transmission Line. The section of the National Highway is under the control of Project Director, Project Implementation Unit (PIU), NHAI Hyderabad.

Foundation, Erection and stringing activity would be executed by M/s KEC International Ltd and works under supervision by Warora Kurnool Transmission Ltd.

In this context, I Shri Rajnish Mahajan, General Manager, Hyderabad on behalf of Warora Kurnool Transmission Ltd here by undertake the followings

1. In case any further development works in Kadthal Village section of NH-765 after the 4 lining of the National Highway, Warora Kurnool Transmission Limited would relocate the transmission line at own cost as per instruction of NHAI.

Warora Kurnool Transmission Limited WKTL Hyderabad

2. Warora Kurnool Transmission Limited will compliance all the Safety norms during execution of works (i.e; Foundation, Erection, Stringing)
3. Warora Kurnool Transmission Ltd will give compensation for the damaged if any during execution of works.

Witness:

On Behalf of Warora Kurnool Transmission Ltd

1. (RAJNISH MAHAJAN),
GF-001, SAI PREMANILAYAM),
BRINDAVANGARDEN,
KISHANGUDA, TS-218

2. (S. ADITYA VARDHANREDDY)
GF-001, SAI PREMANILAYAM, BRINDAVAN GARDEN,
KISHANGUDA, TELANGANA-501218

(BNHURTY)
(Authorized Signatory)

Warora Kurnool Transmission Limited WKTL Hyderabad

Warora-Kurnool Transmission Limited

Site office: Ground Floor # 001, Sai Prema Nilayam Apartments, Brindavan Gardens, Kishanguda, Telangana- 501218.

Ref: WKTL/HYD/2021/ 169

Date: 18/11/2021

To,

The Project Director
National Highway Authority of India,
Hyderabad,
Dist. Rangareddy, Telangana state.

राष्ट्रीय राजमार्ग प्राधिकरण / National Highways Authority of India
6418
22 NOV 2021
प.का.इ., हैदराबाद/PIU-Hyderabad

22/11/21

Sub: Additional Inter-Regional AC Link for Import of power into Southern region i.e Warora- Warangal and Chilakaluripeta- Hyderabad Kurnool 765 Link being implementation by Warora Kurnool Transmission Ltd. (WKTL) – NH Crossing

Dear Sir,

With reference to the above subject, our 765 KV D/C Hyderabad -Kurnool T/L is required to cross existing NH765 Hyderabad – Srisailam owned by NHAI near Mandal: Khadtal. With reference to the vertical clearance, as per Indian Electricity rules/NHAI norms, the minimum ground clearance is worked out for our 765 KV D/C Overhead Power Transmission line as below

S.No	Reference	Minimum Ground Clearance
1	Rule 77, Indian Electricity Rules,1956, -Calculation: 6.1+{ 0.3 x (765-33)/33 } = 6.1+22.18x0.3= 13.00	13.00 m
2	Manual on transmission lines published by Central Board of Irrigation & Power Para 4.4.1 - Ground Clearance (Tabel-4) for DC voltage	18.00 m
3	Warora Kurnool Transmission Ltd, S.No VII, General notes of Tower Spotting data for 765 KV Line	18.80 m
	Maximum of above 3	**18.80 m**

In the instant proposal, the proposed vertical clearance is 21.24 m , which is satisfying the criteria for vertical clearance.

Warora Kurnool Transmission Limited
Adani Corporate House
Shantigram, S G Highway,
Ahmedabad 382-421
Gujarat, India
CIN: U40300DL2015PLC279272
Registered Office: C-105, Anand Niketan, New Delhi –110 021

Tel +91 79 2555 7555
Fax +91 79 2555 7177
info@adani.com
www.adani.com

Warora-Kurnool Transmission Limited

Site office: Ground Floor # 001, Sai Prema Nilayam Apartments, Brindavan Gardens, Kishanguda, Telangana- 501218.

In addition to the proposal submitted vide letter WKTL/HYD/2021/125 Dated: 5-10-2021, we are here with submitting the revised checklist and supporting IE/CBIP Manual/Tower Spotting data.

Thanking you and assuring you of our best services always.

Thanking you,

For **Warora-Kurnool Transmission Ltd.**

Warora-Kurnool Transmission Limited WKTL Hyderabad

Rajnish Mahajan
(Authorized Signatory)
Mail Rajnish.mahajan@adani.com

Warora Kurnool Transmission Limited
Adani Corporate House
Shantigram, S G Highway,
Ahmedabad 382 421
Gujarat, India
CIN: U40300DL2015PLC279272

Tel +91 79 2555 7555
Fax +91 79 2555 7177
info@adani.com
www.adani.com

Registered Office: C-105, Anand Niketan, New Delhi –110 021

CHECK LIST OF NH CROSSING PROPOSAL

Name of the Line : Construction of 765KV D/C Hyderabad - Kiurnool Tranmission Line

Project Name:- Additional Inter Regional AC Link for Import in to Southern Region i.e. Warora - Warangal Chilakaluripeta-Hyderabad-Kurnool 765 KV Link

Owner : Warora Kurnool Transmission Limited

Executing Agency : KEC International Limited

NO	Description	Detail	As per IE Rules/CBIP Manual/Tower Spotting Data/IR 32-1969	Remarks
1	National Highway No	765		
2	Crossing Name	Hyderabad - Srisailam		
3	Crossing Chainge	45 (Kadthal) to 46 (Kadthal)		
4	System of supply (i.e.Voltage) Frequency.no of Phase,Whether neutral is earthed or not	765 KV D/C Line ,50Hz, 3 phase & one Earth wire & one OPGW		
5	Position Of Tower	Between AP NO-12/4 (3B15+0) & AP NO-13/0 (3B15+0)		
6	Normal Span at AL59 ZEBRA Conductor	400 M		
7	Crossing Span	241.74 M	250 M	OK
8	Preceding Span With Loc	455 M		
9	Succeeding Span With Loc	296 M		
10	Height of structure above ground & below ground separately & detail of foundation	From AP12/4 (3B15+0)=67.40M AP13/0 (3B15+0)=67.40M		
11	Clearence over road	21.24 M	18.8 M	OK
12	Height of lower conductor from ground level at loc.	From AP12/4(3B15+0)=28.60M AP13/0 (3B15+0)=28.60M		
13	Angle road Crossing	80° 39' 54"		
14	Distance from NH boundary from centre of tower	From AP12/4(3B15+0)= 83.47M AP13/0 (3B15+0)=148.13M		
15	Perpendicular distance from centre of tower to center of road	From AP12/4(3B15+0)=88.540M AP13/0 (3B15+0)=153.20M		
16	Protection of assembly of line	Danger Board	Danger Board	OK
17	Foundation type	From AP12/4(3B15+0)= DFR AP13/0 (3B15+0)=DFR		
18	No of stay required	None		
19	Min. factor of stay	2		
20	Size of power conductor	AL 59		
21	Size of earth wire	7/3.66mm GS Earth wire		
22	Two legs of tower earthed	Four Legs		
23	Plain paper diagram	Profile (Enclosed)		
24	Earthing	Counter Poise		

Warora Kurnool Transmission Limited WKTL Hyderabad

(SE)

Mgr(T)

CHECK LIST OF NH CROSSING PROPOSAL

Name of the Line : Construction of 765KV D/C Hyderabad - Kurnool Tranmission Line

Project Name:- Additional Inter Regional AC Link for Import in to Southern Region i.e. Warora - Warangal Chilakaluripeta-Hyderabad-Kurnool 765 KV Link

Owner : Warora Kurnool Transmission Limited

Executing Agency : KEC International Limited

NO	Description	Detail	As per IE Rules/CBIP Manual/Tower Spotting Data/IR 32-1969	Remarks
1	National Highway No	765		
2	Crossing Name	Hyderabad - Srisailam		
3	Crossing Chainge	45 (Kadthal) to 46 (Kadthal)		
4	System of supply (i.e.Voltage) Frequency.no of Phase,Whether neutral is earthed or not	765 KV D/C Line ,50Hz, 3 phase & one Earth wire & one OPGW		
5	Position Of Tower	Between AP NO-12/4 (3B15+0) & AP NO-13/0 (3B15+0)		
6	Normal Span at AL59 ZEBRA Conductor	400 M		
7	Crossing Span	241.74 M	250 M	OK
8	Preceding Span With Loc	455 M		
9	Succeeding Span With Loc	296 M		
10	Height of structure above ground & below ground separately & detail of foundation	From AP12/4 (3B15+0)=67.40M AP13/0 (3B15+0)=67.40M		
11	Clearence over road	21.24 M	18.8 M	OK
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15	Perpendicular distance from centre of tower to center of road	From AP12/4(3B15+0)=88.540M AP13/0 (3B15+0)=153.20M		
16	Protection of assembly of line	Danger Board	Danger Board	OK
17	Foundation type	From AP12/4(3B15+0)= DFR AP13/0 (3B15+0)=DFR		
18	No of stay required	None		
19	Min. factor of stay	2		
20	Size of power conductor	AL 59		
21	Size of earth wire	7/3.66mm GS Earth wire		
22	Two legs of tower earthed	Four Legs		
23	Plain paper diagram	Profile (Enclosed)		
24	Earthing	Counter Poise		

(SE)

CHECK LIST OF NH CROSSING PROPOSAL

Name of the Line : Construction of 765KV D/C Hyderabad - Kurnool Tranmission Line

Project Name:- Additional Inter Regional AC Link for Import in to Southern Region i.e. Warora - Warangal Chilakaluripeta-Hyderabad-Kurnool 765 KV Link

Owner : Warora Kurnool Transmission Limited

Executing Agency : KEC International Limited

NO	Description	Detail	As per IE Rules/CBIP Manual/Tower Spotting Data/IR 32-1969	Remarks
1	National Highway No	765		
2	Crossing Name	Hyderabad - Srisailam		
3	Crossing Chainge	45 (Kadthal) to 46 (Kadthal)		
4	System of supply (i.e.Voltage) Frequency.no of Phase,Whether neutral is earthed or not	765 KV D/C Line ,50Hz, 3 phase & one Earth wire & one OPGW		
5	Position Of Tower	Between AP NO-12/4 (3B15+0) & AP NO-13/0 (3B15+0)		
6	Normal Span at AL59 ZEBRA Conductor	400 M		
7	Crossing Span	241.74 M	250 M	OK
8	Preceding Span With Loc	455 M		
9	Succeeding Span With Loc	296 M		
10	Height of structure above ground & below ground separately & detail of foundation	From AP12/4 (3B15+0)=67.40M AP13/0 (3B15+0)=67.40M		
11	Clearence over road	21.24 M	18.8 M	OK
12	Height of lower conductor from ground level at loc.	From AP12/4(3B15+0)=28.60M AP13/0 (3B15+0)=28.60M		
13	Angle road Crossing	80° 39' 54"		
14	Distance from NH boundary from centre of tower	From AP12/4(3B15+0)= 83.47M AP13/0 (3B15+0)=148.13M		
15	Perpendicular distance from centre of tower to center of road	From AP12/4(3B15+0)=88.540M AP13/0 (3B15+0)=153.20M		
16	Protection of assembly of line	Danger Board	Danger Board	OK
17	Foundation type	From AP12/4(3B15+0)= DFR AP13/0 (3B15+0)=DFR		
18	No of stay required	None		
19	Min. factor of stay	2		
20	Size of power conductor	AL 59		
21	Size of earth wire	7/3.66mm GS Earth wire		
22	Two legs of tower earthed	Four Legs		
23	Plain paper diagram	Profile (Enclosed)		
24	Earthing	Counter Poise		

Kurnool Transmission Limited Hyderabad

(SE)

Mgr (CT)

Annexure – A

Methodology for Execution of National Highway Crossings

- Crossing is supported on angle tower on either side.
- The minimum distance of the crossing tower is kept at least equal to the height of the tower plus 6M way from the centre point of the National Highway.
- Minimum ground clearance above road level of the lowest portion of any conductor under condition of maximum sag shall be maintained.
- The crossing span will be limited to 250 M.
- At the time of detailed survey, it was ensured that the National Highway crossing is to be finalize as per the regulations laid down by the Indian Electricity Rules/CBIP Manual/MROTH guidelines.
- The permissions required from the concerned authorities, such as National Highway Authority, police etc., shall be obtained prior to commencement of work
- For controlling the vehicles and pedestrian traffic while performing work at National Highway crossing warning signs / flags will be displayed by keeping a man at crossings

Specific Safety precautions during National Highway Crossings

- The earthing shall be done in accordance with the stipulation made in IS 3043 -1972 and IS 5613 –II /Section I -1976
- Before commencement of stringing, all towers are to be checked for completion in all respect. All bolt/nuts are to be fully tightened. The angle tower is to be provided guy supports for all the phases till completion of the other adjacent section.
- For national highway crossing stringing scaffolding is provided on either side of road to maintain the safety
- There is no M.S. Joint over national highway crossings

Stringing:
The Stringing procedure is broadly divided into the following steps.

i) Paying out & stringing of earth wire.
ii) Paying out & stringing of conductor.
iii) Final sagging of Earthwire & conductor.
iv) Clipping and fixing of accessories.

- The guys used generally are 20mm steel wire rope.
- The guys are anchored in the ground at an angle of 45 degrees
- Per phase 4 strings of 210 kN insulators are used.
- For national highway crossings stringing scaffolding is provided on either side of NH to maintain the safety of vehicles. We have to be making up the conductor and earthwire of one side prior to availing blockage.
- Initially conductor and OPGW/Earthwire is to be paying out with help of tractor/Winch Machine and scaffolding and all six phases shall be anchored in rough sag operation. The final sagging of the conductor shall be done using sagging winches.
- After completion of stringing spacer and Vibration damper is to be installed.

Warora-Kurnool Transmission Limited WKTL Hyderabad

2/8

SAG CALCULATION SHEET

ANNEXURE - B

PLS-CADD Version 16.51x64 12:08:27 PM Tuesday, December 21, 2021
KEC International - India
Project Name: 'D:\Work Orders\B 827 ESSEL\05 Tower Spotting\Hyderabad-Kurnool\Stringing charts\765kv dc hyderabad-kurnool ap6-18.dgn'
Line Title: 'WITH MODIFIED CONDUCTOR'

Section Sagging Data

Circuit Sec. No.	Cable File Name	From Str.	To Str.	Voltage (kV)	Ruling Span (m)	Sagging Data: Condition	Sagging Data: Temp. (deg C)	Sagging Data: Catenary Constant (m)	Sagging Data: Horiz. Tension (N)	Sagging Data: Weather Case	Display: Condition	Display: Catenary Constant (m)
9	al59 zeebra(bc)	12/4	13/0	765	241.7	Creep RS	32.0	1860.6	22880.7	85 DEG NIL WIND	Creep RS	1227.9
10	al59 zeebra(bc)	13/0	14/0	765	353.7	Creep RS	32.0	1859.1	22862.3	85 DEG NIL WIND	Creep RS	1437.1
21	al59 zeebra(mc)	12/4	13/0	765	241.7	Creep RS	32.0	1860.6	22880.7	85 DEG NIL WIND	Creep RS	1227.9
22	al59 zeebra(mc)	13/0	14/0	765	353.7	Creep RS	32.0	1859.1	22862.3	85 DEG NIL WIND	Creep RS	1437.1
33	al59 zeebra(tc)	12/4	13/0	765	241.7	Creep RS	32.0	1860.6	22880.7	85 DEG NIL WIND	Creep RS	1227.9
34	al59 zeebra(tc)	13/0	14/0	765	353.7	Creep RS	32.0	1859.1	22862.3	85 DEG NIL WIND	Creep RS	1437.1
45	ground wire	12/4	13/0	765	241.5	Creep RS	0.0	2728.6	15600.2	53 DEG NIL WIND	Creep RS	1969.1
46	ground wire	13/0	14/0	765	354.8	Creep RS	0.0	2452.3	14020.5	53 DEG NIL WIND	Creep RS	2006.8
57	opgw(24 fibres)	12/4	13/0	765	242.0	Creep RS	0.0	2764.1	12333.4	53 DEG NIL WIND	Creep RS	1898.3
58	opgw(24 fibres)	13/0	14/0	765	352.5	Creep RS	0.0	2499.0	11150.5	53 DEG NIL WIND	Creep RS	1969.8

Section Geometry Data

Notes: Lengths are arc lengths along the wire at 15.56 (deg C), Initial.
Lengths are adjusted for the number of phases, the number of subconductors and to exclude the length of strain insulators.
Lengths are computed with any concentrated loads removed.

Circuit Sec. No.	Cable File Name	From Str.	To Str.	Number of Phases	Wires Per Phase	Min. Span (m)	Max. Span (m)	Ruling Span (m)	Total Cable Length (m)
9	al59 zeebra(bc)	12/4	13/0	2	1	241.7	241.7	241.7	483.6
10	al59 zeebra(bc)	13/0	14/0	2	1	296.0	378.9	353.7	3501.5
21	al59 zeebra(mc)	12/4	13/0	2	1	241.7	241.7	241.7	483.6
22	al59 zeebra(mc)	13/0	14/0	2	1	296.0	378.9	353.7	3501.5
33	al59 zeebra(tc)	12/4	13/0	2	1	241.7	241.7	241.7	483.6
34	al59 zeebra(tc)	13/0	14/0	2	1	296.0	378.9	353.7	3501.5
45	ground wire	12/4	13/0	1	1	241.5	241.5	241.5	241.6
46	ground wire	13/0	14/0	1	1	295.1	384.0	354.8	1754.9
57	opgw(24 fibres)	12/4	13/0	1	1	242.0	242.0	242.0	242.1
58	opgw(24 fibres)	13/0	14/0	1	1	296.9	373.8	352.5	1746.4

Hyderabad-Kurnool Transmission Limited WKTL

Section #9 from structure #12/4 to structure #13/0, start set #5 'BOTTOM COND', end set #5 'BOTTOM COND'
Cable 'D:\Work Orders\B 827 ESSEL\05 Tower Spotting\02 Cables\765kv WZ3 AL59\al59 zeebra(bc)', Ruling span (m) 241.727
Sagging data: Catenary (m) 1860.6, Horiz. Tension (N) 22880.7 Condition C Temperature (deg C) 32
Weather case for final after creep 32 DEG NIL WIND, Equivalent to 26.1 (deg C) temperature increase
Weather case for final after load 32 DEG FULL WIND, Equivalent to 0.1 (deg C) temperature increase

Ruling Span Sag Tension Report

Weather Case	Cable Load	R.S. Initial Cond.					R.S. Final Cond. After Creep					R.S. Final Cond. After Load				
# Description	Hor. (N/m)	Vert (N/m)	Res. (N/m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)
1 0 DEG NIL WIND	0.00	12.30	12.30	43554	43517	40	3539	2.06	32483	32437	30	2638	2.77	43554	43517	40	3539	2.06
2 32 DEG NIL WIND	0.00	12.30	12.30	30330	30282	28	2462	2.97	22921	22861	21	1859	3.93	30330	30282	28	2462	2.97
3 32 DEG FULL WIND	49.98	12.30	51.47	62280	61956	58	1204	6.07	56487	56131	52	1091	6.70	62280	61956	58	1204	6.07
4 0 DEG 36% WIND	17.99	12.30	21.79	50192	50112	46	2299	3.18	41004	40908	38	1877	3.89	50192	50112	46	2299	3.18
5 32 DEG 75% WIND	37.48	12.30	39.45	53577	53353	50	1352	5.40	47586	47334	44	1200	6.09	53577	53353	50	1352	5.40
6 85 DEG NIL WIND	0.00	12.30	12.30	18100	18028	17	1466	4.99	15184	15100	14	1228	5.95	18100	18028	17	1466	4.99
7 53 DEG NIL WIND	0.00	12.30	12.30	24108	24051	22	1956	3.74	18980	18910	18	1538	4.75	24108	24051	22	1956	3.74
8 32 DEG FULL WIND(AL ZEBRA BC)	43.94	12.30	45.63	58144	57870	54	1268	5.76	52261	51957	48	1139	6.42	58144	57870	54	1268	5.76
9 32 DEG FULL WIND(AL ZEBRA MC)	47.37	12.30	48.94	60507	60205	56	1230	5.94	54684	54351	51	1110	6.58	60507	60205	56	1230	5.94
10 32 DEG FULL WIND(AL ZEBRA TC)	49.98	12.30	51.47	62280	61956	58	1204	6.07	56487	56131	52	1091	6.70	62280	61956	58	1204	6.07

Warora-Kurnool Transmission Limited WKTL Hyderabad

Section #10 from structure #13/0 to structure #14/0, start set #5 'BOTTOM COND', end set #5 'BOTTOM COND'
Cable 'D:\Work Orders\B 827 ESSEL\05 Tower Spotting\02 Cables\765kv WZ3 AL59\al59 zeebra(bc)', Ruling span (m) 353.664
Sagging data: Catenary (m) 1859.1, Horiz. Tension (N) 22862.3 Condition C Temperature (deg C) 32
Weather case for final after creep 32 DEG NIL WIND, Equivalent to 25.9 (deg C) temperature increase
Weather case for final after load 32 DEG FULL WIND, Equivalent to 0.1 (deg C) temperature increase

Ruling Span Sag Tension Report

#	Weather Case Description	Cable Load Hor. (N/m)	Cable Load Vert. (N/m)	Cable Load Res. (N/m)	R.S. Initial Cond. Max. Tens. (N)	R.S. Initial Cond. Hori. Tens. (N)	R.S. Initial Cond. Max Ten %UL	R.S. Initial Cond. C (m)	R.S. Initial Cond. Sag (m)	R.S. Final Cond. After Creep Max. Tens. (N)	R.S. Final Cond. After Creep Hori. Tens. (N)	R.S. Final Cond. After Creep Max Ten %UL	R.S. Final Cond. After Creep C (m)	R.S. Final Cond. After Creep Sag (m)	R.S. Final Cond. After Load Max. Tens. (N)	R.S. Final Cond. After Load Hori. Tens. (N)	R.S. Final Cond. After Load Max Ten %UL	R.S. Final Cond. After Load C (m)	R.S. Final Cond. After Load Sag (m)
1	0 DEG NIL WIND	0.00	12.30	12.30	34954	34804	32	2830	5.53	28418	28262	26	2298	6.81	34954	34804	32	2830	5.53
2	32 DEG NIL WIND	0.00	12.30	12.30	27204	27046	25	2199	7.11	23021	22854	21	1858	8.42	27204	27046	25	2199	7.11
3	32 DEG FULL WIND	49.98	12.30	51.47	70765	70040	66	1361	11.51	66158	65384	61	1270	12.33	70765	70040	66	1361	11.51
4	0 DEG 36% WIND	17.99	12.30	21.79	46989	46759	44	2146	7.29	41018	40761	38	1870	8.37	46989	46759	44	2146	7.29
5	32 DEG 75% WIND	37.48	12.30	39.45	59217	58695	55	1488	10.52	54664	54101	51	1371	11.42	59217	58695	55	1488	10.52
6	85 DEG NIL WIND	0.00	12.30	12.30	19995	19809	19	1611	9.72	17875	17673	17	1437	10.89	19995	19809	19	1611	9.72
7	53 DEG NIL WIND	0.00	12.30	12.30	23718	23554	22	1915	8.17	20581	20399	19	1659	9.43	23718	23554	22	1915	8.17
8	32 DEG FULL WIND(AL ZEBRA BC)	43.94	12.30	45.63	65275	64651	60	1417	11.05	60695	60026	56	1316	11.90	65275	64651	60	1417	11.05
9	32 DEG FULL WIND(AL ZEBRA MC)	47.37	12.30	48.94	68411	67729	63	1384	11.31	63822	63094	59	1239	12.15	68411	67729	63	1384	11.31
10	32 DEG FULL WIND(AL ZEBRA TC)	49.98	12.30	51.47	70765	70040	66	1361	11.51	66158	65384	61	1270	12.33	70765	70040	66	1361	11.51

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Section #21 from structure #12/4 to structure #13/0, start set #4 'MID COND', end set #4 'MID COND'
Cable 'D:\Work Orders\B 827 ESSEL\05 Tower Spotting\02 Cables\765kv WZ3 AL59\al59 zeebra(mc)', Ruling span (m) 241.729
Sagging data: Catenary (m) 1860.6, Horiz. Tension (N) 22880.7 Condition C Temperature (deg C) 32
Weather case for final after creep 32 DEG NIL WIND, Equivalent to 26.1 (deg C) temperature increase
Weather case for final after load 32 DEG FULL WIND, Equivalent to 0.1 (deg C) temperature increase

Ruling Span Sag Tension Report

Weather Case	Cable Load			R.S. Initial Cond.					R.S. Final Cond. After Creep					R.S. Final Cond. After Load				
# Description	Hor. Load (N/m)	Vert Load (N/m)	Res. Load (N/m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)
1 0 DEG NIL WIND	0.00	12.30	12.30	43554	43517	40	3539	2.06	32483	32437	30	2638	2.77	43554	43517	40	3539	2.06
2 32 DEG NIL WIND	0.00	12.30	12.30	30330	30282	28	2462	2.97	22921	22861	21	1859	3.93	30330	30282	28	2462	2.97
3 32 DEG FULL WIND	49.98	12.30	51.47	62280	61956	58	1204	6.07	56487	56131	52	1091	6.70	62280	61956	58	1204	6.07
4 0 DEG 36% WIND	17.99	12.30	21.79	50192	50112	46	2299	3.18	41004	40908	38	1877	3.89	50192	50112	46	2299	3.18
5 32 DEG 75% WIND	37.48	12.30	39.45	53577	53353	50	1352	5.40	47586	47334	44	1200	6.09	53577	53353	50	1352	5.40
6 85 DEG NIL WIND	0.00	12.30	12.30	18100	18028	17	1466	4.99	15184	15100	14	1228	5.95	18100	18028	17	1466	4.99
7 53 DEG NIL WIND	0.00	12.30	12.30	24108	24051	22	1956	3.74	18980	18910	18	1538	4.75	24108	24051	22	1956	3.74
8 32 DEG FULL WIND(AL ZEBRA BC)	43.94	12.30	45.63	58144	57870	54	1268	5.76	52261	51957	48	1139	6.42	58144	57870	54	1268	5.76
9 32 DEG FULL WIND(AL ZEBRA MC)	47.37	12.30	48.94	60507	60205	56	1230	5.94	54684	54351	51	1110	6.58	60507	60205	56	1230	5.94
10 32 DEG FULL WIND(AL ZEBRA TC)	49.98	12.30	51.47	62280	61956	58	1204	6.07	56487	56131	52	1091	6.70	62280	61956	58	1204	6.07

Section #22 from structure #13/0 to structure #14/0, start set #4 'MID COND', end set #4 'MID COND'
Cable 'D:\Work Orders\B 827 ESSEL\05 Tower Spotting\02 Cables\765kv WZ3 AL59\al59 zeebra(mc)', Ruling span (m) 353.665
Sagging data: Catenary (m) 1859.1, Horiz. Tension (N) 22862.3 Condition C Temperature (deg C) 32
Weather case for final after creep 32 DEG NIL WIND, Equivalent to 25.9 (deg C) temperature increase
Weather case for final after load 32 DEG FULL WIND, Equivalent to 0.1 (deg C) temperature increase

Ruling Span Sag Tension Report

#	Weather Case	Cable Load			R.S. Initial Cond.					R.S. Final Cond. After Creep					R.S. Final Cond. After Load				
	Description	Hor. Load (N/m)	Vert Load (N/m)	Res. Load (N/m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)
1	0 DEG NIL WIND	0.00	12.30	12.30	34954	34804	32	2830	5.53	28418	28262	26	2298	6.81	34954	34804	32	2830	5.53
2	32 DEG NIL WIND	0.00	12.30	12.30	27204	27046	25	2199	7.11	23021	22854	21	1858	8.42	27204	27046	25	2199	7.11
3	32 DEG FULL WIND	49.98	12.30	51.47	70765	70040	66	1361	11.51	66158	65384	61	1270	12.33	70765	70040	66	1361	11.51
4	0 DEG 36% WIND	17.99	12.30	21.79	46989	46759	44	2146	7.29	41018	40761	38	1870	8.37	46989	46759	44	2146	7.29
5	32 DEG 75% WIND	37.48	12.30	39.45	59217	58695	55	1488	10.52	54664	54101	51	1371	11.42	59217	58695	55	1488	10.52
6	85 DEG NIL WIND	0.00	12.30	12.30	19995	19809	19	1611	9.72	17875	17673	17	1437	10.89	19995	19809	19	1611	9.72
7	53 DEG NIL WIND	0.00	12.30	12.30	23718	23554	22	1915	8.17	20581	20399	19	1659	9.43	23718	23554	22	1915	8.17
8	32 DEG FULL WIND(AL ZEBRA BC)	43.94	12.30	45.63	65275	64651	60	1417	11.05	60695	60026	56	1316	11.90	65275	64651	60	1417	11.05
9	32 DEG FULL WIND(AL ZEBRA MC)	47.37	12.30	48.94	68411	67729	63	1384	11.31	63822	63094	59	1289	12.15	68411	67729	63	1384	11.31
10	32 DEG FULL WIND(AL ZEBRA TC)	49.98	12.30	51.47	70765	70040	66	1361	11.51	66158	65384	61	1270	12.33	70765	70040	66	1361	11.51

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Section #33 from structure #12/4 to structure #13/0, start set #3 'TOP COND', end set #3 'TOP COND'
Cable 'D:\Work Orders\B 827 ESSEL\05 Tower Spotting\02 Cables\765kv WZ3 AL59\al59 zeebra(tc)', Ruling span (m) 241.729
Sagging data: Catenary (m) 1850.6, Horiz. Tension (N) 22880.7 Condition C Temperature (deg C) 32
Weather case for final after creep 32 DEG NIL WIND, Equivalent to 26.1 (deg C) temperature increase
Weather case for final after load 32 DEG FULL WIND, Equivalent to 0.1 (deg C) temperature increase

Ruling Span Sag Tension Report

Weather Case	Cable Load	R.S. Initial Cond.					R.S. Final Cond. After Creep					R.S. Final Cond. After Load				
# Description	Hor. (N/m)	Vert (N/m)	Res. (N/m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)
1 0 DEG NIL WIND	0.00	12.30	12.30	43554	43517	40	3539	2.06	32483	32437	30	2638	2.77	43554	43517	40	3539	2.06
2 32 DEG NIL WIND	0.00	12.30	12.30	30330	30282	28	2462	2.97	22921	22861	21	1859	3.93	30330	30282	28	2462	2.97
3 32 DEG FULL WIND	49.98	12.30	51.47	62280	61956	58	1204	6.07	56487	56131	52	1091	6.70	62280	61956	58	1204	6.07
4 0 DEG 36% WIND	17.99	12.30	21.79	50192	50112	46	2299	3.18	41004	40908	38	1877	3.89	50192	50112	46	2299	3.18
5 32 DEG 75% WIND	37.48	12.30	39.45	53577	53353	50	1352	5.40	47586	47334	44	1200	6.09	53577	53353	50	1352	5.40
6 85 DEG NIL WIND	0.00	12.30	12.30	18100	18028	17	1466	4.99	15184	15100	14	1228	5.95	18100	18028	17	1466	4.99
7 53 DEG NIL WIND	0.00	12.30	12.30	24108	24051	22	1956	3.74	18980	18910	18	1538	4.75	24108	24051	22	1956	3.74
8 32 DEG FULL WIND(AL ZEBRA BC)	43.94	12.30	45.63	58144	57870	54	1268	5.76	52261	51957	48	1139	6.42	58144	57870	54	1268	5.76
9 32 DEG FULL WIND(AL ZEBRA MC)	47.37	12.30	48.94	60507	60205	56	1230	5.94	54684	54351	51	1110	6.58	60507	60205	56	1230	5.94
10 32 DEG FULL WIND(AL ZEBRA TC)	49.98	12.30	51.47	62280	61956	58	1204	6.07	56487	56131	52	1091	6.70	62280	61956	58	1204	6.07

Section #34 from structure #13/0 to structure #14/0, start set #3 'TOP COND', end set #3 'TOP COND'
Cable 'D:\Work Orders\B 827 ESSEL\05 Tower Spotting\02 Cables\765kv WZ3 RL59\al59 zeebra(tc)', Ruling span (m) 353.665
Sagging data: Catenary (m) 1859.1, Horiz. Tension (N) 22862.3 Condition C Temperature (deg C) 32
Weather case for final after creep 32 DEG NIL WIND, Equivalent to 25.9 (deg C) temperature increase
Weather case for final after load 32 DEG FULL WIND, Equivalent to 0.1 (deg C) temperature increase

Ruling Span Sag Tension Report

#	Description	Cable Load Hor. (N/m)	Cable Load Vert (N/m)	Cable Load Res. (N/m)	R.S. Initial Cond. Max. Tens. (N)	R.S. Initial Cond. Hori. Tens. (N)	R.S. Initial Cond. Max Ten %UL	R.S. Initial Cond. C (m)	R.S. Initial Cond. R.S. Sag (m)	R.S. Final Cond. After Creep Max. Tens. (N)	R.S. Final Cond. After Creep Hori. Tens. (N)	R.S. Final Cond. After Creep Max Ten %UL	R.S. Final Cond. After Creep C (m)	R.S. Final Cond. After Creep R.S. Sag (m)	R.S. Final Cond. After Load Max. Tens. (N)	R.S. Final Cond. After Load Hori. Tens. (N)	R.S. Final Cond. After Load Max Ten %UL	R.S. Final Cond. After Load C (m)	R.S. Final Cond. After Load R.S. Sag (m)
1	0 DEG NIL WIND	0.00	12.30	12.30	34954	34804	32	2830	5.53	28418	28262	26	2298	6.81	34954	34804	32	2830	5.53
2	32 DEG NIL WIND	0.00	12.30	12.30	27204	27046	25	2199	7.11	23021	22854	21	1858	8.42	27204	27046	25	2199	7.11
3	32 DEG FULL WIND	49.98	12.30	51.47	70765	70040	66	1361	11.51	66158	65384	61	1270	12.33	70765	70040	66	1361	11.51
4	0 DEG 36% WIND	17.99	12.30	21.79	46989	46759	44	2146	7.29	41018	40761	38	1870	8.37	46989	46759	44	2146	7.29
5	32 DEG 75% WIND	37.48	12.30	39.45	59217	58695	55	1488	10.52	54664	54101	51	1371	11.42	59217	58695	55	1488	10.52
6	85 DEG NIL WIND	0.00	12.30	12.30	19995	19809	19	1611	9.72	17875	17673	17	1437	10.89	19995	19809	19	1611	9.72
7	53 DEG NIL WIND	0.00	12.30	12.30	23718	23554	22	1915	8.17	20581	20399	19	1659	9.43	23718	23554	22	1915	8.17
8	32 DEG FULL WIND(AL ZEBRA BC)	43.94	12.30	45.63	65275	64651	60	1417	11.05	60695	60026	56	1316	11.90	65275	64651	60	1417	11.05
9	32 DEG FULL WIND(AL ZEBRA MC)	47.37	12.30	48.94	68411	67729	63	1384	11.31	63822	63094	59	1289	12.15	68411	67729	63	1384	11.31
10	32 DEG FULL WIND(AL ZEBRA TC)	49.98	12.30	51.47	70765	70040	66	1361	11.51	66158	65384	61	1270	12.33	70765	70040	66	1361	11.51

Section #45 from structure #12/4 to structure #13/0, start set #1 'GW', end set #1 'GW'
Cable 'D:\Work Orders\B 827 ESSEL\05 Tower Spotting\02 Cables\765kv WZ3 AL59\ground wire', Ruling span (m) 241.476
Sagging data: Catenary (m) 2728.6, Horiz. Tension (N) 15600.2 Condition C Temperature (deg C) 0
Weather case for final after creep 32 DEG NIL WIND, Equivalent to 25.1 (deg C) temperature increase
Weather case for final after load 32 DEG FULL WIND, Equivalent to 0.1 (deg C) temperature increase

Ruling Span Sag Tension Report

Weather Case	Cable Load (N/m)			R.S. Initial Cond.					R.S. Final Cond. After Creep					R.S. Final Cond. After Load				
# Description	Hor.	Vert	Res.	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)
1 0 DEG NIL WIND	0.00	5.72	5.72	18367	18348	27	3209	2.27	15622	15601	23	2729	2.67	18367	18348	27	3209	2.27
2 32 DEG NIL WIND	0.00	5.72	5.72	14929	14907	22	2607	2.80	12747	12723	19	2225	3.28	14929	14907	22	2607	2.80
3 32 DEG FULL WIND	19.80	5.72	20.61	28212	28097	41	1364	5.35	26563	26441	39	1283	5.68	28212	28097	41	1364	5.35
4 0 DEG 36% WIND	7.13	5.72	9.14	21329	21295	31	2331	3.13	18964	18926	28	2071	3.52	21329	21295	31	2331	3.13
5 32 DEG 75% WIND	14.85	5.72	15.91	24439	24358	36	1531	4.76	22714	22627	33	1422	5.13	24439	24358	36	1531	4.76
6 85 DEG NIL WIND	0.00	5.72	5.72	10862	10834	16	1895	3.85	9568	9537	14	1668	4.37	10862	10834	16	1895	3.85
7 53 DEG NIL WIND	0.00	5.72	5.72	13066	13042	19	2281	3.20	11284	11258	17	1969	3.70	13066	13042	19	2281	3.20
11 32 DEG FULL WIND (EW)	24.38	5.72	25.04	31553	31402	46	1254	5.82	29937	29778	44	1189	6.13	31553	31402	46	1254	5.82
12 0 DEG 36% WIND (EW)	8.78	5.72	10.47	22480	22439	33	2142	3.40	20212	20167	30	1925	3.79	22480	22439	33	2142	3.40

Section #46 from structure #13/0 to structure #14/0, start set #1 'GW', end set #1 'GW'
Cable 'D:\Work Orders\B 827 ESSEL\05 Tower Spotting\02 Cables\765kv WZ3 AL59\ground wire', Ruling span (m) 354.833
Sagging data: Catenary (m) 2452.3, Horiz. Tension (N) 14020.5 Condition C Temperature (deg C) 0
Weather case for final after creep 32 DEG NIL WIND, Equivalent to 25.1 (deg C) temperature increase
Weather case for final after load 32 DEG FULL WIND, Equivalent to 0.1 (deg C) temperature increase

Ruling Span Sag Tension Report

Weather Case	Cable Load			R.S. Initial Cond.					R.S. Final Cond. After Creep					R.S. Final Cond. After Load				
# Description	Hor. Load (N/m)	Vert Load (N/m)	Res. Load (N/m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)
1 0 DEG NIL WIND	0.00	5.72	5.72	15722	15643	23	2736	5.75	14095	14015	21	2451	6.42	15722	15643	23	2736	5.75
2 32 DEG NIL WIND	0.00	5.72	5.72	13699	13619	20	2382	6.61	12435	12354	18	2161	7.29	13699	13619	20	2382	6.61
3 32 DEG FULL WIND	19.80	5.72	20.61	31916	31651	47	1536	10.26	30627	30351	45	1473	10.70	31916	31651	47	1536	10.26
4 0 DEG 36% WIND	7.13	5.72	9.14	20548	20455	30	2239	7.03	19007	18907	28	2069	7.61	20548	20455	30	2239	7.03
5 32 DEG 75% WIND	14.85	5.72	15.91	26874	26681	40	1677	9.39	25584	25382	38	1595	9.88	26874	26681	40	1677	9.39
6 85 DEG NIL WIND	0.00	5.72	5.72	11295	11212	17	1961	8.03	10459	10375	15	1815	8.68	11295	11212	17	1961	8.03
7 53 DEG NIL WIND	0.00	5.72	5.72	12624	12543	19	2194	7.18	11556	11473	17	2007	7.85	12624	12543	19	2194	7.18
11 32 DEG FULL WIND (EW)	24.38	5.72	25.04	36342	36003	53	1438	10.96	35043	34691	52	1385	11.37	36342	36003	53	1438	10.96
12 0 DEG 36% WIND (EW)	8.78	5.72	10.47	22278	22169	33	2117	7.44	20770	20654	31	1972	7.99	22278	22169	33	2117	7.44

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Section #57 from structure #12/4 to structure #13/0, start set #2 'OPGW', end set #2 'OPGW'
Cable 'D:\Work Orders\B 627 ESSEL\05 Tower Spotting\02 Cables\765kv WZ3 AL59\opgw(24 fibres)', Ruling span (m) 241.973
Sagging data: Catenary (m) 2764.1, Horiz. Tension (N) 12333.4 Condition C Temperature (deg C) 0
Weather case for final after creep 32 DEG NIL WIND, Equivalent to 25.1 (deg C) temperature increase
Weather case for final after load 32 DEG FULL WIND, Equivalent to 0.1 (deg C) temperature increase

Ruling Span Sag Tension Report

Weather Case	Cable Load			R.S. Initial Cond.					R.S. Final Cond. After Creep					R.S. Final Cond. After Load				
# Description	Hor. Load (N/m)	Vert Load (N/m)	Res. Load (N/m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)	Max. Tens. (N)	Hori. Tens. (N)	Max Ten %UL	C (m)	R.S. Sag (m)
1 0 DEG NIL WIND	0.00	4.46	4.46	14865	14851	16	3328	2.20	12342	12326	13	2762	2.65	14865	14851	16	3328	2.20
2 32 DEG NIL WIND	0.00	4.46	4.46	11706	11690	13	2620	2.79	9767	9748	11	2185	3.35	11706	11690	13	2620	2.79
3 32 DEG FULL WIND	21.64	4.46	22.09	26178	26037	28	1179	6.22	24765	24616	27	1114	6.57	26178	26037	28	1179	6.22
4 0 DEG 36% WIND	7.79	4.46	8.98	18536	18500	20	2061	3.55	16517	16478	18	1836	3.99	18536	18500	20	2061	3.55
5 32 DEG 75% WIND	16.23	4.46	16.83	22392	22295	24	1325	5.53	20926	20822	23	1237	5.92	22392	22295	24	1325	5.53
6 85 DEG NIL WIND	0.00	4.46	4.46	8128	8106	9	1817	4.03	7060	7035	8	1577	4.64	8128	8106	9	1817	4.03
7 53 DEG NIL WIND	0.00	4.46	4.46	10048	10029	11	2248	3.26	8492	8470	9	1898	3.86	10048	10029	11	2248	3.26
11 32 DEG FULL WIND (EW)	26.64	4.46	27.01	29470	29283	32	1084	6.76	28093	27898	30	1033	7.09	29470	29283	32	1084	6.75
12 0 DEG 36% WIND (EW)	9.59	4.46	10.58	19812	19766	21	1869	3.92	17889	17839	19	1686	4.34	19812	19766	21	1869	3.92

Section #58 from structure #13/0 to structure #14/0, start set #2 'OPGW', end set #2 'OPGW'
Cable 'D:\Work Orders\B 827 ESSEL\05 Tower Spotting\02 Cables\765kv WZ3 AL59\opgw(24 fibres)', Ruling span (m) 352.517
Sagging data: Catenary (m) 2499, Horiz. Tension (N) 11150.5 Condition C Temperature (deg C) 0
Weather case for final after creep 32 DEG NIL WIND, Equivalent to 25.1 (deg C) temperature increase
Weather case for final after load 32 DEG FULL WIND, Equivalent to 0.1 (deg C) temperature increase

Ruling Span Sag Tension Report

#	Weather Case Description	Cable Load Hor. (N/m)	Cable Load Vert (N/m)	Cable Load Res. (N/m)	R.S. Initial Cond. Max. Tens. (N)	R.S. Initial Cond. Hori. Tens. (N)	R.S. Initial Cond. Max Ten %UL	R.S. Initial Cond. C (m)	R.S. Initial Cond. R.S. Sag (m)	R.S. Final Cond. After Creep Max. Tens. (N)	R.S. Final Cond. After Creep Hori. Tens. (N)	R.S. Final Cond. After Creep Max Ten %UL	R.S. Final Cond. After Creep C (m)	R.S. Final Cond. After Creep R.S. Sag (m)	R.S. Final Cond. After Load Max. Tens. (N)	R.S. Final Cond. After Load Hori. Tens. (N)	R.S. Final Cond. After Load Max Ten %UL	R.S. Final Cond. After Load C (m)	R.S. Final Cond. After Load R.S. Sag (m)
1	0 DEG NIL WIND	0.00	4.46	4.46	12779	12718	14	2850	5.45	11213	11151	12	2499	6.22	12779	12718	14	2850	5.45
2	32 DEG NIL WIND	0.00	4.46	4.46	10825	10762	12	2412	6.44	9651	9587	10	2149	7.23	10825	10762	12	2412	6.44
3	32 DEG FULL WIND	21.64	4.46	22.09	30417	30120	33	1363	11.41	29250	28941	31	1310	11.87	30417	30120	33	1363	11.41
4	0 DEG 36% WIND	7.79	4.46	8.98	18668	18578	20	2070	7.51	17259	17162	19	1912	8.13	18668	18578	20	2070	7.51
5	32 DEG 75% WIND	16.23	4.46	16.83	25438	25227	27	1499	10.37	24270	24050	26	1429	10.83	25438	25227	27	1499	10.37
6	85 DEG NIL WIND	0.00	4.46	4.46	8622	8556	9	1918	8.11	7892	7825	8	1756	8.87	8622	8556	9	1918	8.11
7	53 DEG NIL WIND	0.00	4.46	4.46	9824	9761	11	2187	7.10	8854	8789	10	1970	7.89	9824	9761	11	2187	7.10
11	32 DEG FULL WIND (EW)	26.64	4.46	27.01	34742	34357	37	1272	12.23	33569	33170	36	1228	12.67	34742	34357	37	1272	12.23
12	0 DEG 36% WIND (EW)	9.59	4.46	10.58	20534	20424	22	1931	8.05	19148	19031	21	1799	8.64	20534	20424	22	1931	8.05

Kurnool Transmission Limited WKTL Hyderabad

CBIP Manual

Table 1

AC Voltage (kV) Nominal /Highest (System)	Power Frequency Withstand Voltage (kV rms)	Lightning Impulse level (kV peak)	Switching Impulse level (kV peak)
66/72.5	140	325	-
110/125 &132/145	275	650	-
220/245	460	1050	-
400/420	680	1550	1050
765/800	830	2400	1550
1150/1200	1200	2400	1800

4.4 TYPES OF AIR CLEARANCES

The electrical clearances applicable for transmission lines are :

(i) Ground clearance,
(ii) Phase to ground metal clearance (Live- Metal Clearance)
(iii) Phase to phase clearance,
(v) Clearance between power conductor and ground / Shield wire/ OPGW,
(vi) Clearance of power lines crossing over water bodies
(vii) Clearance between power lines crossing each other
(viii) Clearance of power lines crossing railway tracks (Electrified / Non Electrified)
(ix) Clearance of power lines crossing telecommunication lines

4.4.1 Ground Clearance

The minimum clearance to be provided above ground as per regulation 58 (4) of CEA regulations on Safety and Electricity Supply - 2010 for A.C Transmission lines is stipulated as 5.2 m plus 0.3 metre for every 33000 Volts or part thereof by which the voltage of the line exceeds 33000 Volts; provided that the minimum clearance along or across any street shall not be less than 6.1 m. Accordingly the minimum electrical clearances above ground to be provided for A.C transmission lines is as under:

Table 2

AC Voltage (kV) Nominal /Highest (System)	Minimum clearance above ground (mm)*
66/72.5	5500 (6100 along or across street)
132/145	6100
220/245	7000
400/420	8840
765/800	12100
1150/1200	15400

* Based on Nominal Voltage

The minimum clearance to be provided above ground as per regulation 58 (5) of CEA Regulations on Safety and Electricity Supply - 2010 for D.C. Transmission lines is stipulated as under:

Table 3

DC Voltage (kV)	Minimum clearance above ground (mm)
100	6100
200	7300
300	8500
400	9400
500	10600
600	11800
800	13900

The minimum ground clearance for transmission lines is also dependent upon interference limits including Electric Field, Audible Noise, RIV, TVI etc.and become ruling condition specifically for transmission lines of Voltage levels above 400 kV. ICNIRP guidelines are generally being followed for the electro static field effect which are 5 kV/m for general exposure (at edge of ROW) and 10 kV/m for exposure within the Right of Way.

Accordingly the minimum ground clearances being kept by the utilities in India are as follows:

AC Voltage (kV) Nominal /Highest (System)	Minimum clearance above ground (mm)*
66/72.5	5500 (6100 along or across street)
110/125 &132/145	6100
220/245	7015
400/420	8840
765/800	15000
1150/1200	24000

*Based on Nominal Voltage

Table 4

DC Voltage (kV)	Minimum clearance above ground (mm)
500	12500
800	18000

Note: The minimum clearances given above are Normative as these are dependent upon conductor configuration, phase to phase distances, other mitigation measures etc

Maximum of ground clearance value given in Table 2 & Table 4 for AC transmission line and maximum of ground clearance value given in Table 3 & Table 4 for DC transmission line may be considered.

4.4.2 Phase to Ground Metal Clearances (Live – Metal Clearances)

The maximum over voltage occurs very rarely and likewise insulation strength of an air gap very rarely decreases to its lowest value. The likelihood of both events occurring simultaneously is very limited. Therefore considerable economy may be achieved by recognizing the probabilistic nature of both voltage stress and insulation strength and by accepting a certain risk of failure. The decrease in line cost must be weighed against the increased risk of failure(i.e., service interruptions) and affordability/cost of such failures/ interruptions. This philosophy of insulation coordination is considered while deciding Live- Metal electrical clearances corresponding to various swing angles of conductor.

(c) For latticed steel or other compound structures the wind pressure on the lee side members shall be taken as one-half of the wind pressure on the windward side members and the factors of safety shall be calculated on the crippling load of struts and upon the elastic limit of tension members;

(d) The maximum and minimum temperatures shall be such as the State Government may specify in each case.

(3) Notwithstanding anything contained in sub-rules (1) and (2), in localities where overhead lines are liable to accumulations of ice or snow the State Government may, by order in writing, specify the loading conditions for the purpose of calculating the factor of safety.

77. Clearance above ground of the lowest conductor-

(1) No conductor of an overhead line, including service lines, erected across a street shall at any part thereof be at a height of less than-

(a)	For low and medium voltage lines	5.8 metres
(b)	For high voltage lines	6.1 metres

(P.T.O)

(2) No conductor of an overhead line, including service lines, erected along any street shall at any part thereof be at a height less than-

(a) For low and medium voltage lines 5.5 metres

(b) For high voltage lines 5.8 metres

(3) No conductor of in overhead line including service lines, erected elsewhere than along or across any street shall be at a height less than-

(a) For low, medium and high voltages lines upto and including 11,000 volts, if bare	4.6 metres
(b) For low, medium and high voltage lines upto and including 11,000 volts, if insulated	4.0 metres
(c) For high voltage lines above 11,000 volts	5.2 metres

(4) For extra-high voltage lines the clearance above ground shall not be less than 5.2 metres plus 0.3 metre for every 33,000 volts or part thereof by which the voltage of the line exceeds 33,000 volts.

Provided that the minimum clearance along or across any street shall not be less than 6.1 metres.

78. Clearance between conductors and trolley wires-

[1][(I)] No conductor of an overhead line crossing a tramway or trolley bus route using trolley wires shall have less than the following clearances above and trolley wire-

(a) Low and medium voltage lines 1.2 metres.

Provided that where an insulated conductor suspended from a bearer wire crosses over a trolley wire the minimum clearance for such insulated conductor shall be 0.6 metre.

(b) High voltage lines up to and including 11,000 volts	1.8 metres
(c) High voltage lines above 11,000 volts	2.5 metres
(d) Extra-high voltage lines	3.0 metres

Wardha Kurnool Transmission Ltd

II ELECTRICAL CLEARANCE FOR RAILWAY CROSSING:

> Prior apporoval of Railway Authority is to be obtained.

> As per the railway guideline of 2004(ammended upto March-2012), the minimum clearance between crossing conductor under maximum sag and railway line shall be maximum of the following:

- For Electrified section: Minimum Clearance from rail level
  (I) at OHE structures: 21.86m
  (II) at Mid OHE Span: 17.884m
- For non-Electrified section:
  (i) Minimum Clearance from rail level: 21.86m
- Minimum Clearance between highest traction conductor & lowest conductor: 7.94m.

> The crossing span shall be limited to 300m.
> The crossing span shall normally be at right angle to the railway track.
> The crossing should be done with 3D45/3D60 type tower.

III MINIMUM CLEARANCE FOR POWER LINE CROSSING EACH OTHER

Voltage Level	765 kV (mm)
66 kV	7940
132 kV	7940
220 kV	7940
400 kV	7940
500 kV HVDC	7940
765 kV	7940
800 kV HVDC	9040
1200 kV	10440

a) Power line crossing for 400kv and above should be done only with 3D45/3D60 type tower.

b) Power line crossing for 220KV and 132KV line could be done with angle tower as per requirement.

c) Power line crossing for 66KV and below line could be done with any type of tower.

IV TELECOMMUNICATION LINE CROSSING:

The angle of crossing shall be as near 90 deg. As possible. However, deviation to the extent of 60deg. May be permitted under exceptionally difficult situations. For a crossing angle below 60 deg. Matter shall be reffered to the authorities. Minimum clearance between 765kV conductors and telecommunication lines shall be 7.5m with maximum conductor sag.

V The number of consecutive spans between the section points shall not exceed 15 span or 5Km in plain terrain and 10 spans or 3Km in hilly terrain. A section point shall comprise of tension point with 3B5, 3B15, 3C30, 3D45 & 3D60 type towers as applicable.

VI Minimum ground clearance required: 15000 mm.

VII For all National Highway crossing, tension tower is to be used and the crossing span is not to exceed 250m. The minimum clearance between conductor and road surface shall be 18.8m with maximum conductor sag.

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