



HIMACHAL PRADESH STATE ELECTRICITY BOARD LIMITED
(A STATE GOVT. UNDERTAKING)

Registered office: Vidyut Bhawan, HPSEBL, Shimla-171004(H.P.)
Number (CIN): U40109HP20092GC031255
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File No. HBSEBL/ESDB/DB-115/FCA/Land/2022-23

1948-510

Dated: - 12⁹
22

To

- 1) The Divisional Forest Officer,
Bilaspur Forest Division, Bilaspur (H.P.)
- 2) The Divisional Forest Officer,
Suket Forest Division, SunderNagar,
District Mandi (H.P.)

Subject: - **Diversion of Forest Land for construction of 132kV Transmission Line from 220/132/33 kV Sub-Station, Kangoo to proposed 132/33 kV, 2X25/3.15 MVA GIS Sub-Station at Kothipura, (AIIMS) Bilaspur.**

Sir,

Kindly refer to Letter No.Ft.18-16/2022 Vol-II FCA dated 29th August,2022 vide which the Minutes of 10th meeting of Regional Empowered Committee held on 12th August,2022 minutes were sent by The Addl. PCCF (FCA) for taking further action.

The point wise reply of the observations pertaining to this office as User Agency is submitted as under:-

- I. *The kml file of CA area is to be uploaded by DFO Suket Forest Division.*
- II. Revised correct Cost-Benefit analysis in ratio is attached.
- III. The revised layout plan has already been submitted by this office vide letter of even no. 1839 dated 25/08/2022, however, the Tower Location Chart showing dimension wise detail of each tower in tabulated form is enclosed.
- IV. The soil and Moisture Conservation plan alongwith its cost of implementation as per MoEF & CC order dated 07.06.2022 is prepared and submitted herewith.
- V. The reply of this point has already been submitted vide letter dated 25/08/2022.
- VI. The reply of this point is to be submitted by Forest Department.
- VII. The reply of this point has already been submitted vide letter dated 25/08/2022.
- VIII. Annexures of FRA viz. Records of Consultations and meetings with Gram Sabhas will be submitted before Stage-II (final approval).
- IX. The abstract and enumeration list of trees proposed for felling will be uploaded by DFO Bilaspur.
- X. Since the proposed Transmission Line is passing through submergence area of Bhakra Dam, therefore, NOC to construct this line has been obtained from BBMB authorities vide which they have issued NOC without using the land of BBMB and allowed as Right of Way, thus, re-diversion is not required. The copy of NOC is enclosed herewith.

It is, therefore, requested kindly to obtain the approval for diversion of land for the transmission line at the earliest possible.

Thanking you,

Yours faithfully,

[Signature]
Sr. Executive Engineer,
ESD HPSEBL, Bilaspur (H.P.)

File No. HBSEBL/ESDB/DB-115/FCA/Land/2022-23

Dated: -

Copy to The Addl. Pr. Chief Conservator of Forest (FCA), Hoff, Taland Simla-2 for information.
Copy to the A.E., ESSD HPSEBL, SunderNagar.

[Signature]
Sr. Executive Engineer,
ESD HPSEBL, Bilaspur (H.P.)

Cost Benefit Analysis for forest land diversion

Table-A : Cases under which a cost-benefit analysis for forest diversion are required

| No. | Nature of proposal | Applicable/ not applicable | Remarks |
|-----|---|-------------------------------|---|
| 1 | All categories of proposals involving forest land upto 20 hectares in plains and upto 5 hectares in hills. | Not Applicable | |
| 2 | Proposal for defence installation purposes and oil prospecting (prospecting only) | Not Applicable | |
| 3 | Habitation, establishment of industrial units, tourist lodges complex and other building construction. | Not Applicable | |
| 4 | All other proposals involving forest land more than 20 hectares in plains and more than 5 hectares in hills including roads, transmission lines, minor, medium and major irrigation projects, hydro projects, mining activity, railway lines, location specific installations like micro-wave stations, auto repeater centres, TV towers etc. | Applicable | The proposal is for diversion of forest land to an extent of 35.1655 ha. for construction of 132kV Transmission line from 220/132/33 kV Substation, Kangoo to proposed 132/33 kV, 2X31.5 MVA GIS Substation at Kothipura(AIIMS), Bilaspur out of total land 51.01 ha. |

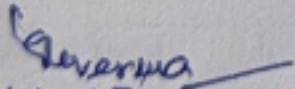

Assistant Engineer
Elect. System Sub-Divn.
HPSEBL, Sunder Nagar (H.P.)

Table- B : Estimation of cost of forest diversion

| No. | Parameters | Remarks |
|--------------------|---|--|
| 1 | Ecosystem services losses due to proposed forest diversion | Rs. 3,53,48,712 as per NPV |
| 2 | Loss of animal husbandry productivity, including loss of fodder | Rs.35,34,871 as 10% of NPV |
| 3 | Cost of human resettlement | Nil |
| 4 | Loss of public facilities and administrative (Roads, buildings, schools, dispensaries, electrical lines , railways etc.) on forest land, which would require forest land if these facilities were diverted due to the project | No such public interest facilities are involved in the proposed area of the project. |
| 5 | Possession value of forest land diverted | 1,06,04,614 as 30% of NPV |
| 6 | Cost of suffering to oustees | Nil |
| 7 | Habitat Fragmentation Cost | 1,76,74,356 as 50% of NPV |
| 8 | Compensatory Afforestation and soil & moisture conservation cost | Rs.1,85,33,747(CA)+36,89,000(SMC) =Rs.2,22,22,747 |
| Grand Total | | Rs.8,93,85,300 say Rs.8.94 crores |

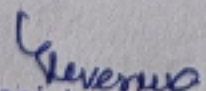
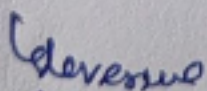

Assistant-Engineer
 Elect. System Sub-Divn.
 HPSEBL, Sunder Nagar (H.P.)

Table- C : Existing guidelines for estimating benefits of forest-diversion in CBA

| No. | Parameters | Remarks |
|--|---|---|
| 1 | Increase in productivity attribute to the specific project | The project is of national importance and directly linked with public health facility. Thus, increase in productivity cannot be measured in monetary term. |
| 2 | Benefits to economy due to the specific project | Rs. 1529.27 lakh will be annual financial benefit due to sale of additional energy (net tariff for project area minus net cost of power purchase). |
| 3 | No. of population benefited due to specific project | This project is specifically proposed for AIIMS, Kothpura, Distt. Bilaspur, H.P. which will provide health facilities to the public of Himachal Pradesh as well as to the public of adjoining states thus it would not be possible to count the population to be benefitted in numbers. |
| 4 | Economic benefits due to of direct and indirect employment due to the project | Direct employment for 27 persons (17 permanent and 10 temporary) after functioning of this project whereas indirect employment will be for more than 1000 persons thus assuming total economic benefits can be estimate to the tune of Rs.16 Lakhs per annum. |
| Total financial benefit of the project | | 1529.27+16 = 1545.27 lakh say per annum 1545 lakh |
| Thus assuming project life= 99 years total benefit will be =152995 lakhs | | |
| Total cost of forest diversion= 894 lakhs | | |
| Benefit/Cost Ratio=171.14:1 | | |


 Assistant Engineer
 Elect. System Sub-Divn.
 HPSEBL, Sunder Nagar (H.P.)

TOWER LOCATION CHART

DETAILED SURVEY FOR CONSTRUCTION OF 132 KV D/C TRANS. LINE ON D/C TOWERS FROM KANGOD TO PROPOSED 132/23 KV, 2024/01.5 MVA GIS SUB-STATION FOR ALIMs AT BILASPUR (KOTHIPURA)

| Horizontal distance: | | | | | | | | | | | | | | | | | | 18.309 Kms. | | 18.660 Kms. | | Inclined distance: | | | | | | | | | |
|----------------------|-----------|------------------------------|------------|-------------------|-------------|-----------------------------|--|-------------------------------|-----------------------|---------------------------|---------------|---------------|-----------|---------------|---------------|-----------|-------|-------------|---------------|---------------------|---------------|--------------------|-------|-----|-------|---|--|--|--|--|--|
| Sa. No. | Tower No. | Line Angle Horizontal (Deg.) | Left/Right | Reduced Level (M) | G/L Cutting | Effective reduced Level (M) | Effective reduced Level including Eten.(M) | Horizontal Distance (Span)(M) | Inclined Distance (M) | Sum of adjacent spans (M) | Back side (M) | Fore side (M) | Total (M) | Back side (M) | Fore side (M) | Total (M) | Min. | Max. | Type of Tower | Full body Extension | Log Extension | | | | | Remarks | | | | | |
| | | | | | | | | | | | | | | | | | | | | | 3M | 6M | 1.5 M | 3 M | 4.5 M | 6 M | | | | | |
| 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 | | | | | |
| 1 | Quantity | 0.00° | | 502.144 | 0 | 502.144 | 502.144 | 18.002 | 18.29 | 46.14 | | | | | | | | | | | | | | | | | | | | | |
| 2 | T-1 | 72°52' | R | 507.817 | 0 | 507.817 | 507.817 | 147.85 | 163.71 | 166.332 | -226 | 974 | 748 | -226 | 996 | 770 | -226 | 976 | B | | | | | | | With Auxiliary X arm 1 No 33 KV line (Truncated Tower) 1 No 132 KV / 1 No 33 KV line | | | | | |
| 3 | T-2 | 37°00' | L | 514.744 | 0 | 514.744 | 514.744 | 175.32 | 175.36 | 322.87 | -827 | 132 | -694 | -449 | 132 | -324 | -827 | 187 | B | | | | | | | | | | | | |
| 4 | T-3 | 20°33' | R | 511.066 | 0 | 511.066 | 511.066 | 90.99 | 90.99 | 266.31 | 23 | 24 | 47 | 80 | 23 | 83 | 23 | 68 | C | | | | | | | (Truncated Tower) | | | | | |
| 5 | T-4 | 8°02' | L | 511.493 | 0 | 511.493 | 511.493 | 178.03 | 178.67 | 306.02 | 67 | -172 | -105 | 58 | -62 | -8 | -172 | 85 | B | | | | | | | 1 No Nalla | | | | | |
| 6 | T-5 | 4°55' | L | 522.762 | 0 | 522.762 | 522.762 | 178.07 | 178.18 | 356.1 | 250 | -19 | 332 | 241 | 27 | 267 | -19 | 368 | B | 1 | | | | | | 1 No Road | | | | | |
| 7 | T-6 | 10°00' | L | 532.871 | 0 | 532.871 | 532.871 | 191.49 | 191.72 | 369.76 | 197 | 42 | 230 | 151 | 65 | 216 | 42 | 218 | B | | | | | | | 1 No Road | | | | | |
| 8 | T-7 | 19°48' | L | 533.293 | 0 | 533.293 | 533.293 | 272.88 | 272.80 | 464.37 | 149 | 227 | 376 | 127 | 180 | 310 | 127 | 244 | C | 1 | | | | | | 1 No Road | | | | | |
| 9 | T-8 | 37°29' | R | 528.279 | 0 | 528.279 | 528.279 | 36.3 | 36.51 | 309.18 | 46 | 104 | 149 | 84 | 68 | 152 | 46 | 131 | B | | | | | | | 1 No 230 KV line crossing | | | | | |
| 10 | Quantity | 15°80' | L | 527.269 | | 527.269 | 527.269 | 35 | 33.03 | 71.5 | -67 | 150 | 82 | -31 | 94 | 63 | -67 | 130 | C | | | | | | | | | | | | |
| 11 | Quantity | 15°52' | L | 525.771 | | 525.771 | 525.771 | 50.91 | 51.09 | 85.91 | -115 | 263 | 170 | -59 | 176 | 117 | -115 | 288 | C | | | | | | | | | | | | |
| 12 | T-9 | 14°52' | R | 521.496 | 0 | 521.496 | 521.496 | 510.2 | 513.08 | 561.11 | -234 | -73 | -307 | -125 | 63 | -40 | -234 | 70 | B | | | | | | | | | | | | |
| 13 | T-10 | 9°11' | R | 569.763 | 0 | 569.763 | 569.763 | | | 658.84 | 863 | -1119 | -333 | 445 | -618 | -172 | -1119 | 598 | ES | | | | | | | Salu River / 1 No Road | | | | | |
| 14 | T-11 | 16°40' | L | 627.280 | 0 | 627.280 | 627.280 | 148.74 | 159.47 | | | | | | | | | | | | | | | | | | | | | | |
| 15 | T-12 | 26°20' | R | 707.975 | 0 | 707.975 | 713.975 | 224 | 238.09 | 372.74 | 1267 | -999 | 268 | 767 | -333 | 234 | -999 | 1290 | ES | | | | | | | 1 No 33 KV line | | | | | |
| 16 | T-13 | 14°24' | L | 715.528 | 0 | 715.528 | 715.528 | 172.64 | 172.65 | 596.64 | 1223 | 99 | 1262 | 757 | 70 | 827 | 59 | 1241 | ES | | | | | | | | | | | | |
| 17 | T-14 | 30°40' | R | 726.555 | 0 | 726.555 | 726.555 | 151.37 | 151.77 | 324.01 | 114 | -149 | -35 | 102 | -55 | 48 | -149 | 129 | B | | | | | | | | | | | | |

Horizontal distance: 18.300 Kms.
Inclined distance: 18.640 Kms.

| Sl. No. | Tower No. | Line Angle Horizontal (Deg.) | Left/Right | Reduced Level (M) | C.R. Canting | Effective reduced Level (M) | Effective reduced Level including Extra (M) | Horizontal Distance (Span) (M) | Inclined Distance (M) | Sum of adjacent spans (M) | Weight Span at 75 Deg. Cent. (Tension 3011 kg) | | | | Weight Span at 75 Deg. Cent. (Tension 1747 kg) | | | | Broken Wire Condition | Type of Tower | Full body Extension | | | | | | Remarks |
|------------------|-----------|------------------------------|------------|-------------------|--------------|-----------------------------|---|--------------------------------|-----------------------|---------------------------|--|---------------|-----------|---------------|--|-----------|------|------|-----------------------|---------------|---------------------|----|-------|----|-------|------------------------------|---------|
| | | | | | | | | | | | Back site (M) | Fore site (M) | Total (M) | Back site (M) | Fore site (M) | Total (M) | Min. | Max. | | | 3M | 6M | 1.5 M | 3M | 4.5 M | 6M | |
| 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 | |
| | | | | | | | | 85.18 | 83.21 | 315.47 | -43 | 137 | 93 | -7 | 128 | 120 | -43 | 145 | B | | | | | | | 1 No Road | |
| 18 | 113 | 6°15' | L | 724.182 | 0 | 724.182 | 724.182 | 230.19 | 230.20 | | | | | | | | | | | | | | | | | 1 No 33 KV line/ 1 No Nullah | |
| 19 | 116 | 44°59' | L | 722.559 | 0 | 722.559 | 722.559 | 234.48 | 234.60 | 464.64 | 93 | 228 | 321 | 102 | 181 | 284 | 93 | 281 | D | | | | | | | 1 No 33 KV line | |
| 20 | 117 | 6°21' | L | 714.160 | 0.000 | 714.160 | 714.16 | 185.13 | 185.82 | 419.58 | 9 | 360 | 367 | 33 | 248 | 301 | 9 | 383 | B | | | | | | | | |
| 21 | 118 | 13°15' | L | 698.110 | 0 | 698.110 | 698.11 | 479.33 | 479.40 | 864.46 | -173 | 203 | 118 | -63 | 271 | 208 | -173 | 311 | B | | | | | | | | |
| 22 | 119 | 8°12' | R | 685.815 | 0 | 685.815 | 685.815 | 308.02 | 308.52 | 787.86 | 186 | 564 | 391 | 209 | 160 | 369 | 160 | 340 | B | | | | | | | | |
| 23 | 120 | 13°56' | L | 688.841 | 0 | 688.841 | 688.841 | 304.53 | 304.55 | 665.07 | 144 | 177 | 321 | 148 | 177 | 323 | 144 | 208 | C | | | | | | | | |
| 24 | 121 | 4°30' | L | 682.910 | 0 | 682.910 | 682.910 | 309.15 | 312.53 | 653.9 | 178 | -783 | -406 | 178 | -392 | -314 | -783 | 208 | B | | | | | | | | |
| 25 | 122 | 6°44' | R | 779.380 | 0 | 779.380 | 779.38 | 137.77 | 139.80 | 436.913 | 1083 | -483 | 620 | 691 | -240 | 431 | -443 | 1096 | D | | | | | | | | |
| 26 | 123 | 24°22' | R | 803.134 | 0 | 803.134 | 803.134 | 168.47 | 168.47 | 306.333 | 601 | 90 | 691 | 378 | 87 | 465 | 87 | 618 | D | | | | | | | | |
| 27 | 124 | 5°19' | R | 802.827 | 0 | 802.827 | 802.827 | 141.38 | 141.48 | 309.882 | 79 | 330 | 409 | 81 | 221 | 302 | 79 | 347 | B | | | | | | | | |
| 28 | 125 | 18°43' | R | 790.519 | 0 | 790.519 | 790.519 | 171.97 | 172.48 | 313.382 | -189 | -151 | -340 | -80 | -52 | -131 | -189 | -37 | C | | | | | | | | |
| 29 | 126 | 48°17' | R | 798.154 | 0 | 798.154 | 804.154 | 238.67 | 239.97 | 410.619 | 333 | 443 | 765 | 234 | 306 | 530 | 234 | 439 | D | | | | | | | | |
| 30 | 127 | 28°15' | L | 773.203 | 0 | 773.203 | 773.203 | 443.34 | 440.06 | 681.91 | -203 | 765 | 562 | -68 | 337 | 469 | -203 | 789 | B | | | | | | | | |
| 31 | 128 | 0°27' | R | 701.119 | 0 | 701.119 | 701.119 | 472.07 | 473.48 | 913.328 | -322 | 512 | 190 | -94 | 396 | 303 | -322 | 387 | C | | | | | | | | |
| 32 | 129 | 14°7' | L | 658.840 | 0 | 658.840 | 658.840 | 420.19 | 423.36 | 892.279 | -40 | 706 | 666 | 76 | 488 | 573 | -40 | 753 | B | | | | | | | | |
| 33 | 130 | 17°12' | L | 591.327 | 0 | 591.327 | 591.327 | 122.92 | 123.10 | 543.11 | -266 | -104 | -389 | -78 | -34 | -112 | -286 | 8 | C | | | | | | | | |
| 34 | 131 | 41°13' | R | 597.905 | 0 | 597.905 | 597.9 | 167.92 | 164.32 | 292.84 | 220 | -1709 | -1483 | 137 | -856 | -1709 | | | B | | | | | | | | |
| 35 | 132 | 25°22' | R | 695.500 | 0 | 695.500 | 695.5 | 157.55 | 161.46 | 305.47 | 1877 | -843 | 1032 | 1124 | -462 | 603 | -843 | 1891 | B | | | | | | | | |
| 36 | 133 | 3°6' | L | 736.290 | 0 | 736.290 | 736.25 | 265.71 | 271.56 | 403.26 | 983 | -519 | 403 | 599 | -246 | 354 | -519 | 1009 | B | | | | | | | | |
| 37 | 134 | 31°44' | L | 792.416 | 0 | 792.416 | 792.416 | 316.36 | 319.21 | 562.07 | 785 | -257 | 328 | 311 | -43 | 429 | -257 | 817 | B | | | | | | | | |
| HT LINE CROSSING | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LT LINE CROSSING | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HT LINE CROSSING | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Tower No. | Tower No. | Line Angle (Deg) | Left/Right | Reduced Level (M) | GR. Cutting | Effective reduced Level (M) | Effective reduced Level including Extra (M) | Horizontal Distance (Span)(M) | Inclined Distance (M) | Sum of adjacent spans (M) | Weight Span at 15 Deg. Cent. (Tension 3011 kg) | | | | | | Weight Span at 75 Deg. Cent. (Tension 1747 kg) | | | | | | Broken Wire Condition | Type of Tower | Full body Extension | | | | | | Leg Extension | Remarks |
|-----------|-----------|------------------|------------|-------------------|-------------|-----------------------------|---|-------------------------------|-----------------------|---------------------------|--|---------------|-----------|---------------|---------------|-----------|--|------|----|----|-------|----|-----------------------|---------------|---------------------|----|--|--|--|--|---------------|---------|
| | | | | | | | | | | | Back side (M) | Fore side (M) | Total (M) | Back side (M) | Fore side (M) | Total (M) | Min. | Max. | 3M | 6M | 1.5 M | 3M | | | 4.5 M | 6M | | | | | | |
| 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 | T-33 | 12°48' | L | 828.901 | 0 | 828.961 | 834.961 | 278.14 | 306.44 | 594.5 | 573 | -1287 | -714 | 399 | 489 | -900 | -1287 | 601 | B5 | B5 | 1 | | | | | | | | | | | |
| 29 | T-30 | 40°27' | R | 937.577 | 0 | 937.577 | 961.577 | 75.78 | 81.77 | 383.92 | 1566 | -1213 | 353 | 967 | 688 | 279 | -1213 | 1573 | B5 | | 1 | 2 | | | | | | | | | | |
| 40 | T-37 | 21°33' | L | 994.294 | 0 | 994.294 | 994.294 | 149.46 | 151.80 | 223.24 | 1288 | -474 | 815 | 763 | -243 | 520 | -474 | 1303 | B5 | | | 1 | 1 | | | | | | | | | |
| 41 | T-38 | 28°34' | R | 1020.865 | 0 | 1020.865 | 1020.865 | 178.85 | 201.50 | 328.31 | 623 | -1512 | -608 | 293 | -839 | -447 | -1512 | 641 | B5 | | | | 1 | | | | | | | | | |
| 42 | T-39 | 28°39' | R | 1113.677 | 0 | 1113.677 | 1113.677 | 185.26 | 185.28 | 364.11 | 1670 | 43 | 1734 | 1018 | 64 | 1082 | 43 | 1709 | B5 | | | 2 | 2 | | | | | | | | | |
| 43 | T-40 | 59°04' | L | 1116.640 | 0 | 1116.640 | 1116.640 | 193.61 | 195.94 | 380.87 | 142 | 288 | 430 | 121 | 206 | 339 | 121 | 307 | D | | | 2 | 1 | | | | | | | | | |
| 44 | T-41 | 13°48' | L | 1101.581 | 0 | 1101.581 | 1104.581 | 438.30 | 441.31 | 633.81 | -92 | 887 | 495 | -13 | 433 | 420 | -92 | 607 | D | | 1 | | 1 | 1 | | | | | | | | |
| 45 | T-42 | 08°26' | L | 1052.288 | 0 | 1052.288 | 1052.288 | 440.26 | 461.19 | 898.46 | -149 | 427 | 278 | 5 | 344 | 350 | -149 | 471 | B | | | | | | | | | | | | | |
| 46 | T-43 | 38°19' | L | 1022.915 | 0 | 1022.915 | 1022.915 | 226.36 | 226.44 | 666.63 | 34 | 31 | 65 | 116 | 66 | 182 | 31 | 139 | D | | | | 2 | | | | | | | | | |
| 47 | T-44 | 19°27' | R | 1028.939 | 0 | 1028.939 | 1028.939 | 173.66 | 178.14 | 400.02 | 199 | -619 | -424 | 161 | -322 | -162 | -619 | 212 | D | | | 1 | | | | | | | | | | |
| 48 | T-45 | 17°06' | R | 1062.668 | 0 | 1062.668 | 1062.668 | 386.03 | 389.04 | 558.02 | 879 | -396 | 184 | 417 | -193 | 224 | -396 | 596 | | | | | | | | | | | | | | |
| 49 | T-46 | 18°39' | R | 1110.983 | 0 | 1110.983 | 1114.983 | 171.99 | 174.07 | 856.13 | 568 | 319 | 886 | 365 | 221 | 586 | 221 | 583 | C | | 1 | | | | | | | | | | | |
| 50 | T-47 | 0°0' | R | 1137.830 | 0 | 1137.830 | 1143.83 | 172.14 | 172.63 | 551.7 | -147 | 94 | -53 | -49 | 130 | 81 | -147 | 147 | | | | 1 | 1 | | | | | | | | | |
| 51 | T-48 | 31°43' | L | 1130.843 | 0 | 1130.843 | 1130.843 | 339.56 | 339.70 | 494.05 | 266 | 197 | 462 | 230 | 143 | 372 | 143 | 279 | D | | | | 1 | 1 | | | | | | | | |
| 52 | T-49 | 14°07' | R | 1140.863 | 0 | 1140.863 | 1140.863 | 133.30 | 135.42 | 448.99 | 61 | 831 | 770 | -7 | 348 | 341 | -61 | 843 | C | | | | 1 | 3 | | | | | | | | |
| 53 | T-50 | 36°18' | R | 1135.203 | 0 | 1135.203 | 1135.203 | 313.69 | 321.09 | 448.99 | 61 | 831 | 770 | -7 | 348 | 341 | -61 | 843 | B | | | | 2 | | | | | | | | | |
| 54 | T-51 | 16°41' | R | 1066.656 | 0 | 1066.656 | 1066.656 | 254.07 | 258.64 | 547.76 | -817 | -483 | -1013 | -234 | -238 | -473 | -517 | -303 | C | | | | 1 | | | | | | | | | |
| 55 | T-52 | 41°24' | R | 1113.117 | 0 | 1113.117 | 1113.117 | 219.34 | 219.53 | 455.61 | 730 | 79 | 804 | 472 | 89 | 362 | 79 | 731 | B | | | | 2 | | | | | | | | | |
| 56 | T-53 | 5°20' | R | 1115.621 | 0 | 1115.621 | 1115.621 | 268.94 | 274.98 | 488.48 | 145 | -823 | -378 | 130 | -247 | -117 | -323 | 172 | C | | | | | | | | | | | | | |
| 57 | T-54 | 1°04' | R | 1172.931 | 0 | 1172.931 | 1172.931 | 138.63 | 139.44 | 407.59 | 792 | -261 | 331 | 516 | -122 | 394 | -261 | 806 | B | | | | 1 | | | | | | | | | |
| 58 | T-55 | 5°50' | R | 1187.773 | 0 | 1187.773 | 1187.773 | 235.23 | 238.80 | 373.88 | 460 | -422 | -22 | 261 | -193 | 66 | -422 | 423 | C | | | | | | | | | | | | | |

| Sec. No. | Tower No. | Line Angle Horizontal (Deg.) | Left/Right | Reduced Level (M) | GR. Conting | Effective reduced Level (M) | Effective reduced Level including Btm (M) | Horizontal Distance (Span) (M) | Inclined Distance (M) | Sum of adjacent Spans (M) | Weight Span at 15 Deg. Cent. (Tension 3015 kg) | | | | Weight Span at 75 Deg. Cent. (Tension 1747 kg) | | | | Broken Wire Condition | Type of Tower | Full body Extension | | | | | Leg Extension | Remarks |
|----------|-----------|------------------------------|------------|-------------------|-------------|-----------------------------|---|--------------------------------|-----------------------|---------------------------|--|---------------|-----------|---------------|--|-----------|-------|------|-----------------------|---------------|---------------------|----|-------|----|-------|---------------|---------|
| | | | | | | | | | | | Back side (M) | Fore side (M) | Total (M) | Back side (M) | Fore side (M) | Total (M) | Min. | Max. | | | 3M | 6M | 1.5 M | 3M | 4.5 M | 6M | |
| 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 | |
| 39 | T-56 | 23°16' | R | 1228.899 | 0 | 1228.899 | 1228.899 | 251.29 | 253.12 | 486.52 | 637 | -248 | 409 | 431 | -91 | 340 | -248 | 642 | D | | | | | | | | |
| 60 | T-57 | 3°58' | R | 1229.312 | 0 | 1229.312 | 1229.312 | 234.64 | 235.29 | 466.13 | 499 | -73 | 426 | 342 | 7 | 349 | -73 | 323 | C | | | | | | | | |
| 61 | T-58 | 41°44' | L | 1273.779 | 0 | 1273.779 | 1273.779 | 123.61 | 123.87 | 350.43 | 307 | -140 | 168 | 228 | -33 | 173 | -140 | 333 | D | | | | | | | | |
| 62 | T-59 | 32°27' | L | 1281.851 | 0 | 1281.851 | 1281.851 | 125.50 | 131.49 | 249.11 | 263 | 1027 | 1290 | 179 | 632 | 801 | 179 | 1040 | E | | | | | | | | |
| 63 | T-60 | 28°49' | L | 1242.616 | 0 | 1242.616 | 1242.616 | 181.14 | 187.83 | 360.64 | -902 | 937 | 35 | -497 | 282 | 65 | -902 | 949 | E | | | | | | | | |
| 64 | T-61 | 30°00' | L | 1192.922 | 0 | 1192.922 | 1192.922 | 282.48 | 283.27 | 463.62 | -736 | -89 | -843 | -400 | 8 | -303 | -736 | 26 | E | | | | | | | | |
| 65 | T-62 | 30°00' | R | 1214.021 | 0 | 1214.021 | 1214.021 | 204.32 | 207.60 | 486.8 | 372 | -436 | -64 | 278 | -310 | 63 | -436 | 392 | D | | | | | | | | |
| 66 | T-63 | 7°12' | L | 1249.643 | 0 | 1249.643 | 1249.643 | 224.70 | 225.60 | 439.02 | 640 | 401 | 1041 | 414 | 280 | 694 | 280 | 663 | D | | | | | | | | |
| 67 | T-64 | 30°30' | L | 1228.591 | 0 | 1228.591 | 1228.591 | 163.92 | 165.33 | 388.62 | -177 | -324 | -501 | -33 | -134 | -209 | -324 | -39 | D | | | | | | | | |
| 68 | T-65 | 3°08' | R | 1280.183 | 0 | 1280.183 | 1280.183 | 124.38 | 123.71 | 248.3 | 488 | -390 | 97 | 317 | -200 | 117 | -390 | 500 | C | | | | | | | | |
| 69 | T-66 | 30°46' | L | 1262.402 | 0 | 1262.402 | 1262.402 | 150.73 | 152.34 | 304.38 | 515 | -377 | 137 | 323 | -187 | 137 | -377 | 330 | D | | | | | | | | |
| 70 | T-67 | 23°13' | R | 1284.320 | 0 | 1284.320 | 1284.320 | 344.48 | 337.80 | 689.18 | 528 | 1943 | 2073 | 338 | 968 | 1307 | 338 | 1340 | E3 | | | | | | | | |
| 71 | T-68 | 2°25' | L | 1131.290 | 0 | 1131.290 | 1131.290 | 167.52 | 256.83 | 541.97 | -1200 | 1037 | -143 | -624 | 635 | 31 | -1200 | 1091 | E5 | | | | | | | | |
| 72 | T-69 | 21°18' | R | 1073.941 | 0 | 1073.941 | 1073.941 | 361.49 | 373.28 | 589.01 | -859 | 1033 | 175 | -687 | 676 | 219 | -859 | 1034 | E3 | | | | | | | | |
| 73 | T-70 | 19°10' | L | 969.883 | 0 | 969.883 | 969.883 | 338.80 | 350.87 | 700.29 | -473 | 1001 | 328 | -315 | 652 | 337 | -473 | 1037 | E | | | | | | | | |
| 74 | T-71 | 18°33' | L | 878.582 | 0 | 878.582 | 878.582 | 258.22 | 213.75 | 547.02 | -662 | -611 | -1223 | -313 | -311 | -624 | -662 | -277 | D | | | | | | | | |
| 75 | T-72 | 8°8' | L | 929.878 | 0 | 929.878 | 929.878 | 355.09 | 387.53 | 503.31 | 820 | 1526 | 2346 | 519 | 960 | 1479 | 519 | 1347 | E5 | | | | | | | | |
| 76 | T-73 | 0°12' | L | 771.679 | 0 | 771.679 | 771.679 | 116.57 | 116.44 | 671.46 | -1171 | -82 | -1223 | -605 | -6 | -610 | -1171 | 30 | E5 | | | | | | | | |
| 77 | T-74 | 3°32' | L | 781.828 | 0 | 781.828 | 781.828 | 80.91 | 81.15 | 197.28 | 168 | 278 | 446 | 122 | 178 | 300 | 122 | 280 | 9 | | | | | | | | |
| 78 | T-75 | 27°05' | L | 775.600 | 0 | 775.600 | 775.600 | 301.63 | 322.37 | 282.54 | -197 | 367 | 170 | -97 | 276 | 179 | -197 | 373 | C | | | | | | | | |
| 79 | T-76 | 0°30' | L | 734.504 | 0 | 734.504 | 734.504 | 185.62 | 186.23 | 687.23 | -43 | -187 | -222 | 26 | -32 | -36 | -137 | 44 | B | | | | | | | | |

NOTE

- i) The tension between terminal towers and gantry structure should be limited to 100 kg. (Maximum)
- ii) Tension for conductor has been considered as 30.1 kg and 17.47 kg at -5 deg C and 25 deg C respectively. (As per design of IDT-25)
- iii) The requisite electrical clearances between power line/cable < communication / bundling/cable etc. shall be maintained as per I.E.R. rules 1956 and as per IS: 5613 (Part-2, Section II - 1985 with latest amendments).

ABSTRACT

| Sd. No. | 112 kV Type tower | Qty. | Full Body Extension | | | | |
|---------|-------------------------|------|------------------------|----|------|----|------|
| | | | 3 m | 6m | 1.5m | 2m | 4.5m |
| 1 | B | 14 | 1 | 0 | 4 | 1 | 0 |
| 2 | C | 18 | 1 | 2 | 18 | 5 | 3 |
| 3 | D | 15 | 2 | 3 | 17 | 10 | 2 |
| 4 | E | 15 | 0 | 4 | 13 | 4 | 1 |
| 5 | ES | 16 | 0 | 4 | 8 | 12 | 2 |
| 6 | Gully | 2 | | | | | |
| TOTAL | | 83 | 4 | 18 | 60 | 32 | 8 |

Assigned Engineer
QAD Superintending Engineer (Design)
Electrical Systems, MPSEBL, Manipalpur

Sr. Executive Engineer
OYO Superintending Engineer (Design)
Electrical System, MITSUBI Heavypur

Superintending Engineer (Design)
Electrical System, MPSEB, Madhya Pradesh

Title:-

Diversion of Forest Land for construction of 132kV Transmission Line from 220/132/33 kV Sub-Station , Kangoo to proposed 132/33 kV, 2X25/3.15 MVA GIS Sub-Station at Kothipura,(AIIMS) Bilaspur.

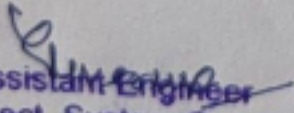
Soil Moisture Conservation Plan

As the Transmission Line is crossing from most of the forest land of Bilaspur District, which is a hilly terrain. Out of 6348 trees/sapplings coming under the ROW of the line we have proposed to fell only 757 trees at the time of construction the line and will prune rest of trees as and required. After felling these of these trees there is possibility of soil erosion in the proposed area of diversion, particularly where Towers are proposed to be erected. Therefore, HPSEBL is very serious towards environment and soil erosion and thus earmarked a sum of Rs.36,89,000/-(Rupees Thirty Six Lakh Eighty Nine Thousand for this purpose).

The main objective of soil moisture conservation is to minimize the amount of water lost from the soils through evaporation (water loss directly from the soil) and transpiration (water loss occurring through the plants) – or combined, the evapotranspiration. Preserving soil moisture is important means to maintain the necessary water for agricultural production, and also helps minimize irrigation needs of the crops. This is especially important in areas where rainwater and/or groundwater resources for irrigation are scarce or decreasing due to climate change or other causes.

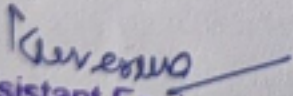
To implement this soil conservation plan, HPSEBL have decided to use following techniques/ methods:-

There are a variety of methods that can be used to conserve soil moisture. Most of these **soil moisture conservation techniques** are relatively low cost and complexity approaches, primarily relying on the presence of required materials and technical capacity locally. Many of the methods rely on providing some kind of cover for the soil to minimize evapotranspiration and direct soil exposure to heat and sun. Generally, most methods used for soil quality improvement and conservation, will also yield benefits to


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soil moisture conservation. So HPSEBL has proposed to use several methods for reducing excess soil moisture loss include following:

- Spreading manure or compost over the soil – this minimizes evapotranspiration and also provides valuable nutrients to the soil through processes of decomposition
- Mulching – mulch is a layer of organic (or inorganic) material that is placed on the root zone of the plants. For this HPSEBL has proposed to use materials include straw, wood chips, peat. Inorganic mulch in form of plastic sheeting is also used which is most suited for low to medium rainfall areas, and less suited for areas with very wet conditions.
- Conservation tillage – reducing or, in extreme cases, completely eliminating the tillage to maintain healthy soil organic levels which increases the soils capacity to absorb and retain water. Conservation tillage is a specific type of such approach where crop residue is left on the soil to reduce evapotranspiration, and protect soil surface from wind, sun and heavy rain impacts which will also be used.
- Green manuring – growing of plant materials with the sole purpose of adding to the soil for improved organic matter and nutrients. The improved soil quality then also improves water retention capacity.
- Deep tillage – suited for some areas and soils, deep tillage can help increase porosity and permeability of the soil to increase its water absorption capacity.
- Mixed cropping and interplanting - different planting times and different length of growth periods.


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क्रमांक 13517-18/बीबीएमबी/4 बीडी/575/02 दिनांक: 24/8/2022

सेवा में

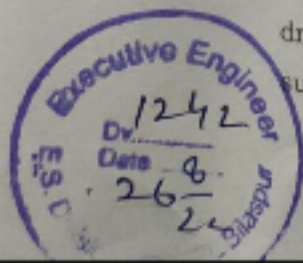
✓ Sr.Executive Engineer,
ES Division, HPSEBL,
Bilaspur.

विषय: Diversion of Forest Land for construction of 132 K.V. Line from
220/132/33 K.V.S/Stn. Kangoo to proposed 132/33 K.V,
2x25/31.5 MVA GIS substation, Kothipura AIIMS Bilaspur.

सन्दर्भ: आपके कार्यालय के पत्र क्रमांक:FCA/AIIMS/2021-22/4187 दिनांक
20.09.2021 & क्रमांक:HPSEBL/FCA/AIIMS/2022-23/1790-93
दिनांक 17.08.2022 .

On the recommendation of field office, this office has no objection for the subject cited line to cross through the Gobind Sagar reservoir /Satluj river of BBMB (without using the land of BBMB and only as right of way) with the following terms & conditions, please:-

1. Any damages caused to BBMB or public properties or person or otherwise during the execution of work and afterwards shall be the sole responsibility of HPSEBL, authorities Bilaspur alone and in such eventuality all the structure/building and properties in general shall be restored repaired by HPSEBL, authorities Bilaspur and the affected parties including general public, if any, will have to be compensated by HPSEBL at its own cost.
2. All safeguarding measures including any other prevention/ protection measures as desired by Executive Engineer, R.M & S.R Divisin, BBMB, Nangal for safety of reservoir due to construction work shall be provided by HPSEBL authorities.
3. HPSEBL authorities shall be solely responsible for the structural design and for the safety of proposed crossing line, other construction structures and its allied works during and after the execution of work and there after during operation and maintenance.
4. The design of all superstructures, substructures, foundation etc. pertaining to cross the line through Gobind sagar reservoir/Satluj river shall be got conducted by the HPSEBL authorities from an institute of repute at their own level and as per Indian Standard. The final detailed drawings/designs dully signed by the competent authority are to be supplied to BBMB for perusal, refrence and record.





BHAKRA BEAS MANAGEMENT BOARD

Chief Engineer, Bhakra Dam,
(Irrigation Wing), Nangal Township
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5. BBMB will not be responsible for any accident at site during construction or after wards. The responsible for the same will be solely upon the HPSEBL authorities.
6. The BBMB has every right to stop the construction of proposed line to cross through the reservoir of BBMB, other structures and its operation, if the structure poses a problem to the safety, operation and maintenance to the general public at large as well as problem in regulation of reservoir.
7. HPSEBL authorities will keep on getting the construction sites inspected from concerned field authorities of BBMB during the construction work and will comply with the instructions/ decisions taken during the above inspection.
8. Dumping of the muck will be done only at designated dumping sites. HPSEBL authorities shall ensure to provide all preventive/ corrective measures as per site requirement during the construction work no damage should be done to the fringe of Gobind Sagar Reservoir/river banks.
9. If any dispute or differences arises between the parties in connection with term and conditions and royalty for construction of work, then only Civil Court, Nangal/District Court, Ropar shall have the territorial justification to decide the matter.
10. HPSEBL authorities will take the approval for construction from concerned Forest, NGT, Panchyat, Municipal authorities etc. at their own level before starting the work.

उप मुख्य अभियन्ता/मुख्यालय,
का: मुख्य अभियन्ता, भाखडा बाँध,
बीबीएमबी, नंगल।

प्रतिलिपि:-

उप मुख्य अभियन्ता, भाखडा बाँध परिमण्डल, बीबीएमबी, नंगल को उनके कार्यालय के पत्र क्रमांक: 2155-56/20-W/1G दिनांक: 18.08.2022 के सन्दर्भ में प्रेषित है जी।