महाराष्ट्र वन विभाग

# Office of the Principal Chief Conservator of Forests (Head of Forests Force), Maharashtra State

Addl. Principal Chief Conservator of Forests & Nodal Officer,
1st Floor, B Wing, Van Bhavan, Ramgiri Road, Civil Lines, Nagpur- 440 001
Tel.No.: 0712- 2556916 , E-mail: apccfnodal@mahaforest.gov.in

**Email**

No.:- Desk-17/FCA-S1/PID-145510/YT/2025-26/1460
Nagpur- 440 001, Dated 25/09/2025

**To,**
**The Assistant Inspector General of Forest**
**Ministry of Environment, Forest & Climate Change**
**(Forest Conservation Division), New Delhi.**

**Sub:** Submission of Final Wildlife Conservation and Mitigarion Plan for diversion of 146.996 ha forest land under section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 for Integrated Coal mining including post mine reclamation in Marki Mangli II Coal Block in Yavatmal District, Maharashtra State in Favour of M/s Yazdani International Pvt. Ltd. (FP/MH/MIN/145510/2021)- Regarding

**Ref:** 1. Government of India, Ministry of Environment, Forests and Climate Change, New Delhi letter dated-25.02.2025
2. Principle Chief Conservator of Forests (Wildlife), Maharashtra State, Nagpur vide letter No. Desk 23 (2)/WL/Survey/C.No149/766, dated 30.05.2025

Sir,

The Government of India, vide letter under reference no. 1, has informed that the competent authority of the Ministry desires to obtain comments regarding the Wildlife Conservation Plan submitted by the State Government.

Accordingly, the Principal Chief Conservator of Forests (Wildlife), Maharashtra State, Nagpur has already submitted a copy of the mitigation plan. A copy of the same is enclosed for further necessary action.

25/9/25

**(Naresh Zurmure)**
**Addl. Principal Chief conservator of Forest &**
**Nodal Officer**

25/9/25

**Copy to:**
Principal Chief Conservator of Forests (Wildlife), Maharashtra State, Nagpur
Chief Conservator of Forests (T), Yavatmal

# Wildlife Mitigation Plan for Marki Mangali II Coal Mine (updated after incorporating the suggestions by WII dated 25/3/2025 )


Submitted to: DCF, Wildlife Pandarkawda

Prepared by: Dr. Manas Badge (PhD. Forest Ecology & Environment), Natural Resources Management Consultant, Nagpur

Revised: 5/4/2025 Place: Nagpur

Yazdani International (P) Ltd.
*Steering success, anchoring credibility*

To,

Date: 02.04.2025

The Principal Chief Conservator of Forest (Wildlife) & HoFF
Maharashtra State Van Shavan,
3rd Floor Ramgiri Road, Civil Lines
Nagpur- 440 001

**Sub.**: Reply to comments received from WII, Dehradun of the Wildlife Mitigation Plan for diversion of 146.996 ha forest land under section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 for Integrated Coal Mining including post mine reclamation in Marki-Mangali II coal block in Yavatmal District of Maharashtra State in favour of Mis Yazdani International Private Limited (Online No FP/MH/MIN/14551 0/2021)- regarding

Ref.:

1. Letter from WII dated 25/3/2025
2. Your letter to WII dated 09/02/2025 with revised WMP

We are in receipt of letter from WII under reference 1 and 2 above giving the comments and observations on the revised Wildlife Mitigation Plan submitted to WII. In this connection the revised report, incorporating suggestions, is being submitted for your kind compliance. The paragraph wise comments are also attached for quick understanding.

02.04.2025

**Ashok Kumar Pani**

**Vice President**

**Authorised Signatory**

YAZDANI INTERNATIONAL (P) LTD.

Authorised Signatory

**PTO**

**COMPLIANCES OF OBSERVATION/ COMMENTS OF WII DATED 25/3/2025**

| S. No. | Remarks on revised WMP (February 2025) by WII | Remarks on revised WMP (25 March 2025) by WII | Reply/ Compliances submitted by YIPL on remarks of WII raised on 25.03.25 |
|---|---|---|---|
| 1. | The list of faunal species is not comprehensive, includes only large common mammals/birds/herpetofauna, and omits smaller mammals.<br>Further the schedules under which these species are placed are not updated based on the revised WPA, 1972. | The schedules are still not as per the 2022 amendment of the WPA, 1972. Further, several faunal species found in the region such as common palm civet, small Indian civet, rusty spotted cat have not been mentioned. Further, several errors have been made in the list of species. Common names and vernacular names have been interchanged for many species. The common name of *Hyaena hyaena* has been given as wild dog. | Schedules presented here are as per the 2022 Amendment of WPA, 1972 Act. Those faunas, which are found/available in the study area are only mentioned in the Schedule furnished in the **Annexure-1.**<br>The Annexure has been updated comprising faunal species such as Common Palm Civet on sr. no. 26, and small Indian civet on sr. no. 37 of the **Annexure-1**. Rusty spotted cat species is not available in our study area. The list of flora and fauna available in the study area authenticated by DFO, Pandharkawd is already been furnished in the WMP. The common name of *Hyaena hyaena* has been Stripped Hyeana on sr. no. 14 of **Annexure -1**<br><br>Updated list is furnished in WMP on page number **58-65** |
| 2. | In addition to being covered under the | The revision mentioned has not been | Yes it is true that total of 146.996 ha of |

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| | Approved Tiger Conservation Plan of Tadoba Andhari Tiger Reserve, the corridor falls within the modelled tiger corridor as per the publication "Telemetry based tiger corridors of Vidarbha Landscape, | made, and cannot be found on the said page (27, under section 3.1. Tiger Corridor of India). | forest land out of 339.467 ha of the proposed coal block for mining covered under the forest compartments which passes through compartments of forest land covered under approved Tiger Conservation Plan (TCP) of Tadoba Andhari Tiger Reserve (TATR) within the modelled tiger corridor as per the publication "Telemetry based tiger corridors of Vidarbha Landscape.<br>Details have been elaborated in **Annexure 2** and also incorporated in page number **28-29** of **WMP** |
| 3. | A chapter on impacts of the mine on biodiversity (chapter 5) and one on mitigation measures for wildlife and biodiversity have been added (Chapter 9). However, these chapters lack detailed measures and plans.<br>Further, considering that the mine falls within the corridor area, a management plan specifically focused on maintaining the corridor function of the area i.e., maintaining animal movement, is noticeably missing | Adequate measures for noise and light pollution, forest fire prevention and spread of invasive species have not been mentioned. Specific measures and their timelines to mitigate these impacts need to be part of the WMP | Details furnished in **Annexure 3** for Measures for noise and light pollution, forest fire prevention and spread of invasive species and incorporated in **WMP** on page no. **45-47** |
| 4. | In addition to measures to control siltation (Page 36 of report), measures to check heavy metal contamination in the | Regular testing has been mentioned as a measure to control heavy metal and other types of water pollution. The | The details of schedule and parameters for monitoring of all the environmental parameters furnished in **Annexure 4** and |

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| | wastewater from mining activities should be explicitly provided. | schedule of testing and the parameters to be tested need to be added here. | is added on **page 47** of **WMP** |
| 5. | In addition to educating workers about wildlife in the area, awareness about legal and illegal activities as per the Wildlife (Protection) Act, 1972 should be created periodically. Further, the report should explicitly state that "Project proponent will make sure that no labour camps are located in the mine area, as well as forest areas surrounding the mine". | In addition to educating workers about wildlife in the area, awareness about legal and illegal activities as per the Wildlife (Protection) Act, 1972 should be created periodically. Further, the report should explicitly state that "Project proponent will make sure that no labour camps are located in the mine area, as well as forest areas surrounding the mine". | No further modifications are required as the revisions are adequate. |
| 6. | In addition to checking siltation, the water from sedimentation tank should be tested for heavy metals and sulphides, as the proponents plan to use the water for green belt development. If unchecked, the heavy metals and other pollutants ma leach into the groundwater. | The schedule of testing and the parameters to be tested need to be added. | Environment Monitoring Programme for Key Parameters (Water) is given in **Annexure 4** and added on **page 47 of WMP** |
| 7. | Measures for maintaining the corridor for movement/dispersal of wildlife is missing from the revised report | Measures for maintaining the corridor for movement/dispersal of wildlife is missing from the revised report | No further modifications are required as the revisions are adequate. |
| ***Comments on Additional Observations by WII*** | | | |
| 8. | Under heading "Waste Management" on Page 34 (Chapter on Mitigation Measures for Environmental Impact), the various types of wastes anticipated to be generated have been listed. However, an explicit plan to mana e this waste is missing | An explicit plan to manage different kinds of solid waste is still missing. Instead of "proper handling and management is suggested to avoid such contamination/pollution", a specific plan to handle different kinds of solid waste should be detailed. | Specific plan for handing the solid waste which is Overburden and which shall be utilised in backfiring of mine void is furnished in **Annexure 5** and also incorporated in WMP on page **36-38** |

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| 9. | In Annexure 6 (Financial Provision for Mitigation of Impact on Wildlife due to Mining Activity), adequate budgetary provisions for repair and maintenance of the chain-link fence (SN 1) and cattle trenches (SN 2) should be made for subsequent years as well (e.g., on 3rd and 5th year) to ensure the effectiveness of the measures. | User Agency have included installation and maintenance costs of chain-link fence and cattle trenches in year 1. Annual maintenance costs and details for the next 5 years should be certified by the local DFO. | Budget has been updated indicating Annual Maintenance Cost for next 5 years incorporating the provision for annual maintenance of fencing and cattle trenches etc. and a copy of budget duly approved by DFO is enclosed as **Appendix**.....in WMP on **page** ..... and enclosed as **Annexure 6** with the compliance report. |
| 10. | Plantation of edible/fruiting trees for herbivores should not be done too close to the mining area (Section "Plantation in Buffer Zone" Page 37). | Plantation of edible/fruiting trees for herbivores should not be done too close to the mining area (Section "Plantation in Buffer Zone" Page 37). | No further modifications are required as the User Agency have proposed plantation activity in collaboration with Forest Department in the revision. |
| 11. | There is no mine closure plan, and details of previous mines (closed or functional in the area, if an | The mine closure plan needs to be certified by the local DFO. | The mine plan and mine closure plan has been approved by Ministry of Coal. Further, copy of the approved mine closure plan certified by D.F.O is enclosed **Annexure 12 on page no. 88-89** of WMP vis-à-vis enclosed separately with the WMP as **Appendix**.....<br>See **Annexure 7** attached with the compliance report. |
| 12. | | Additionally, as per the Wildlife Management Plan submitted for review in December 2024, "Incidentally mine area is well connected to pucca road and hence no new road is required to be constructed for transportation of ore". | Mine area is well connected to pucca road and hence no new road is required to be constructed for transportation of ore. It is proposed to strengthen the existing road only by User Agency/Allottee for ore |

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| | | However, the re-revised WMP mentions that there is a need for an alternate road for transportation. This requires clarification and further approval since construction of multiple roads would add to the impacts on biodiversity in the area, which is part of a wildlife corridor | transportation.<br><br>No new road will be constructed for transportation and has been mentioned in **sr.no. 12 of Table-1 of WMP on page number 8** |
| 13. | | Since the area falls under designated wildlife corridor, a comprehensive and detailed wildlife mitigation plan with timelines and specific measures is desired, which is currently lacking in the management plan. | A detailed and comprehensive wildlife mitigation plan has been prepared and updated in line with the comments and observations of WII time to time.<br>The WMP comprises Timeline on **page no.66** and a budget on **page no. ..... Attached as Appendix.....** for implementing wildlife mitigation plan.<br><br>The same is furnished as budget in **Annexure -6** and timeline in **Annexure-8** along with the compliance report for your perusal. |

02.04.2025

**Ashok Kumar Pani**

**Vice President**

INTERNATIONAL (P) LTD.

**Authorised Signatory**

Authorised Signatory

**Copy to:**

1. The Director, Wildlife Institute of India, Post Box No.18, Chandrabani,Dehradun-248001,Uttarakhand.
2. Additional Principal Chief Conservator of Forests & Nodal Office, M.S.

**Annexure 1:**

**Faunal Diversity from study area (Core zone & Buffer Zone)**

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 1. | *Anathana ellioti* | Indian/Madras Tree Shrew | LC /II |
| 2. | *Antilope cervicapra* | Blackbuck | VU / I |
| 3. | *Axis axis* | Spotted Deer | LC / II |
| 4. | *Bos gaurus* | Indian Gaur / Bison | VU / I |
| 5. | *Boselaphus tragocamelus* | Blue Bull / Nilgai | LC / II |
| 6. | *Canis aureus* | Golden Jackal | LC / I |
| 7. | *Canis lupus pallipes* | Indian Wolf | VU /I |
| 8. | *Rusa unicolor* | Sambar | LC / I |
| 9. | *Felis chaus* | India Jungle Cat | NT / I |
| 10. | *Funambulus pennanti* | Five striped Squirrel | LC /NL |
| 11. | *Herpestes auropunctatus* | Small Indian mongoose | LC / I |
| 12. | *Herpestes edwardsi* | Common mongoose | LC / I |
| 13. | *Hipposideros ater* | Dusky Leaf-nosed bat | LC /NL |
| 14. | *Hyaena hyaena* | **Striped Hyaena** | DD / I |
| 15. | *Hystrix indica* | Indian crested porcupine | LC / I |
| 16. | *Lepus nigricollis* | Indian Hare | LC / II |
| 17. | *Megaderma lyra* | Indian false vampire bat | LC /NL |
| 18. | *Melursus ursinus* | Sloth Bear | VU /I |
| 19. | *Miniopterus schreibersi* | Schreiber's Long-fingered bat | LC /NL |
| 20. | *Moschiola meminna* | Mouse Deer | VU / I |
| 21. | *Muntiacus muntjak* | Barking Deer | LC / I |
| 22. | *Mus phillipsi* | Wroughton's small spiny Mouse | LC / NL |
| 23. | *Mus platythrix* | Indian Brown spiny mouse | LC / NL |
| 24. | *Panthera pardus* | Leopard | VU /I |
| 25. | *Panthera tigris* | Tiger | EN /I |
| 26. | *Paradoxurus hermaphroditus* | **Common Palm civet** | LC /I |
| 27. | *Pipistrellus dormeri* | Dormer's bat | LC /NL |
| 28. | *Pipistrellus coromandra* | Coromandel Pipistrelle | LC /NL |
| 29. | *Prionailurus bengalensis* | Leopard Cat | NT / I |
| 30. | *Pteropus giganteus* | Indian flying fox | LC /II |
| 31. | *Rhinolophus lucius* | Great Eastern Horseshoe bat | NT / NL |
| 32. | *Rhinopoma hardwickei* | Mouse-tailed bat | LC /NL |
| 33. | *Semnopithecus entellus* | Hanuman Langur | LC / II |
| 34. | *Tatera indica* | Indian Antelope Rat | LC / NL |
| 35. | *Tetracerus quadricornis* | Four Horned Antilope | VU / I |
| 36. | *Vandeleuria oleracea* | Indian Long-tailed Tree Mouse | LC / NL |

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| 37. | *Viverricula indica* | **Small Indian civet** | NT / I |
| 38. | *Vulpes bengalensis* | Bengal Fox | LC / I |

**AVES:**

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 1 | *Accipiter badius* | Shikra | LC / I |
| 2 | *Actitis hypoleucos* | Common Sandpiper | LC / II |
| 3 | *Alauda gulgula* | Small Skylark | LC / II |
| 4 | *Alcedo atthis* | Small Blue Kingfisher | LC / II |
| 5 | *Amandava amandava* | Red Munia | LC / II |
| 6 | *Amandava formosa* | Green Munia | LC / I |
| 7 | *Amaurornis phoenicurus* | White-breasted Waterhen | LC / II |
| 8 | *Anas crecca* | Common Teal | LC / II |
| 9 | *Anas poecilorhyncha* | Spot-billed Duck | LC / II |
| 10 | *Anastomus oscitans* | Asian Open Bill Stork | LC / II |
| 11 | *Anhinga melanogaster* | Darter/Snake Bird | LC / II |
| 12 | *Anthus rufulus* | Paddy-field Pipit | LC / II |
| 13 | *Apus affinis* | Indian House Swift | LC / II |
| 14 | *Ardea cinerea* | Grey Heron | LC / II |
| 15 | *Ardea purpurea* | Purple Heron | LC / II |
| 16 | *Ardeola grayii* | Indian Pond Heron | LC / II |
| 17 | *Aythya fuligula* | Tufted Pochard | LC / II |
| 18 | *Aythya nyroca* | Ferruginous Pochard | LC / II |
| 19 | *Bubulcus ibis* | Cattle Egret | LC / II |
| 20 | *Burhninus oedicnemus* | Stone-Curlew | LC / II |
| 21 | *Cacomantis passerinus* | Plaintive Cuckoo | LC / II |
| 22 | *Casmerodius albus* | Eastern Large Egret | LC / II |
| 23 | *Celeus brachyurus* | Rufous Woodpecker | LC / II |
| 24 | *Ceryle rudis* | Lesser Pied Kingfisher | LC / II |
| 25 | *Charadrius dubius* | Little -Ringed Plover | LC / II |
| 26 | *Chrysomma sinense* | Yellow-eyed Babbler | LC / II |
| 27 | *Ciconia episcopus* | White-necked Stork | LC / II |
| 28 | *Cisticola juncidis* | Streaked Fantail Warbler | LC / II |
| 29 | *Clamator jacobinus* | Pied-Crested Cuckoo | LC / II |
| 30 | *Columba livia* | Blue Rock Pigeon | LC / II |
| 31 | *Copsychus saularis* | Oriental Magpie-Robin | LC / II |
| 32 | *Coracias benghalensis* | Indian Roller | LC / II |
| 33 | *Coracina macei* | Large Cuckoo Shrike | LC / II |
| 34 | *Corvus macrorhynchos* | Indian Jungle Crow | LC / II |
| 35 | *Corvus splendens* | Indian House Crow | LC / II |
| 36 | *Coturnix coromandelica* | Rain Quail | LC / II |
| 37 | *Coturnix coturnix* | Common Quail | LC / II |
| 38 | *Cuculus canorus* | Common Cuckoo | LC / II |
| 39 | *Cuculus micropterus* | Indian Cuckoo | LC / II |
| 40 | *Cypsiurus batasiensis* | Palm Swift | LC / II |

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 41 | *Dendrocopos mahrattensis* | Yellow fronted Pied Woodpecker | LC / II |
| 42 | *Dendrocopos nanus* | Brown-capped Pygmy Woodpecker | LC / II |
| 43 | *Dendrocygna javanica* | Lesser Whistling Duck | LC / II |
| 44 | *Dicrurus macrocercus* | Black Drongo | LC / II |
| 45 | *Dinopiun benghalense* | Lesser Golden-backed Woodpecker | LC / II |
| 46 | *Dumetia hyperythra* | Rufous bellied Babbler | LC / II |
| 47 | *Egretta garzetta* | Little Egret | LC / II |
| 48 | *Eremopterix grisea* | Ashy-crowned Sparrow Lark | LC / II |
| 49 | *Eudynamys scolopacea* | Asian Koel | LC / II |
| 50 | *Falco tinnunculus* | Common Kestrel | LC / II |
| 51 | *Francolinus pictus* | Painted Francolin | LC / II |
| 52 | *Francolinus pondicerianus* | Grey Francolin | LC / II |
| 53 | *Fulica atra* | Common Coot | LC / II |
| 54 | *Galerida cristata* | Crested Lark | LC / II |
| 55 | *Galerida deva* | Sykes's Crested Lark | LC / II |
| 56 | *Gallicrex cinerea* | Water Cock | LC / II |
| 57 | *Gallinago gallinago* | Common Snipe | LC / II |
| 58 | *Gallinula chloropus* | Common Moorhen | LC / II |
| 59 | *Galloperdix spadicea* | Red Spur-Fowl | LC / II |
| 60 | *Gallus sonneratii* | Grey Jungle Fowl | LC / I |
| 61 | *Halcyon capensis* | Stork-billed Kingfisher | LC / II |
| 62 | *Halcyon smyrnensis* | White-breasted Kingfisher | LC / II |
| 63 | *Hemiprocne coronata* | Crested Tree Swift | LC / I |
| 64 | *Hierococcyx varius* | Common hawk-cuckoo | LC / II |
| 65 | *Himantopus himantopus* | Black-winged Stilt | LC / II |
| 66 | *Hirundo concolor* | Dusky Crag Martin | LC / II |
| 67 | *Hirundo daurica* | Red rumped Swallow | LC / II |
| 68 | *Hirundo fluvicola* | Streak -throated Swallow | LC / II |
| 69 | *Hirundo rusttea* | Common Swallow | LC / II |
| 70 | *Hirundo smithii* | Wire-tailed Swallow | LC / II |
| 71 | *Hydrophasianus chirurgus* | Pheasant-tailed Jacana | LC / II |
| 72 | *Ammomanes phoenicurus* | Rufous-tailed Finch-Lark | LC / II |
| 73 | *Lonchura punctulata* | Spotted Munia | LC / II |
| 74 | *Megalaima haemacephala* | Coppersmith Barbet | LC / II |
| 75 | *Megalaima zeylanica* | Brown-headed Barbet | LC / II |
| 76 | *Merops orientalis* | Small Bee- eater | LC / II |
| 77 | *Merops philippinus* | Blue-Tailed bee-eater | LC / II |
| 78 | *Mesophoyx intermedia* | Median Egret | LC / II |
| 79 | *Metopidius indicus* | Bronze-winged Jacana | LC / II |
| 80 | *Milvus migrans* | Black kite | LC / II |
| 81 | *Motacilla alba* | White Wagtail | LC / II |

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 82 | *Motacilla cinerea* | Grey Wagtail | LC / II |
| 83 | *Motacilla maderaspatensis* | Large Pied Wagtail | LC / II |
| 84 | *Muscicapa dauriea* | Asian Brown Flycatcher | LC / II |
| 85 | *Nectarinia asiatica* | Indian Purple Sunbird | LC / II |
| 86 | *Nettapus coromandelianus* | Cotton Teal | LC / II |
| 87 | *Numenius arquata* | Curlew | LC / II |
| 88 | *Ocyceros birostris* | Indian Grey Hornbill | LC / II |
| 89 | *Orthotomus sutorius* | Indian Tailor Bird | LC / II |
| 90 | *Passer domesticus* | Indian House Sparrow | LC / II |
| 91 | *Pavo cristatus* | Peacock | LC / I |
| 92 | *Perdicula asiatica* | Jungle Bush Quail | LC / II |
| 93 | *Pericrocotus cinnaimomeus* | Small Minivet | LC / I |
| 94 | *Pericrocotus lammeus* | Scarlet Minivet | LC / II |
| 95 | *Phalacrocorax niger* | Little Cormorant | LC / II |
| 96 | *Phylloscopus collybita* | Common Chiff Chaff | LC / II |
| 97 | *Pitta brachyura* | Indian Pitta | LC / II |
| 98 | *Ploceus philippinus* | Baya Weaver | LC / II |
| 99 | *Porphyrio porphyrio* | Purple Moorhen | LC / II |
| 100 | *Prinia socialis* | Ashy Prinia | LC / II |
| 101 | *Psittacula krameri* | Rose-Ringed Parakeet | LC / II |
| 102 | *Pterocles indicus* | Painted Sandgrouse | LC / II |
| 103 | *Pycnonotus cafer* | Red-vented Bulbul | LC / II |
| 104 | *Pycnonotus jocosus* | Red-whiskered Bulbul | LC / II |
| 105 | *Rhipidura albicollis* | White-throated Fantail Flycatcher | LC / II |
| 106 | *Netta rufina* | Red-crested Pochard | LC / II |
| 107 | *Rostra/uta benghalensis* | Greater Painted Snipe | LC / II |
| 108 | *Sarkidiornis melanotus* | Comb Duck | LC / II |
| 109 | *Saxicola caprata* | Pied Bushchat | LC / II |
| 110 | *Saxicoloides julicata* | Indian Robin | LC / II |
| 111 | *Sireptopelia decaocto* | Eurasian Collared Dove | LC / II |
| 112 | *Sterna aurantia* | River Tern | LC / I |
| 113 | *Streplopelia chinensis* | Spotted dove | LC / II |
| 114 | *Streptopelia senegalensis* | Little brown Dove | LC / II |
| 115 | *Sturnus pagodarum* | Brahminy Starling | LC / II |
| 116 | *Tactybaptus rujicollis* | Little Grebe | LC / II |
| 117 | *Tadorna ferruginea* | Brahminy Shelduck | LC / II |
| 118 | *Tephrodornis pondicerianus* | Common Wood shrike | LC / II |
| 119 | *Terpsiphone paradisi* | Asian Paradise- Flycatcher | LC / II |
| 120 | *Tringa glareola* | Wood Sandpiper | LC / II |
| 121 | *Tringa nebularia* | Common Green Shank | LC / II |
| 122 | *Tringa ochropus* | Green Sandpiper | LC / II |
| 123 | *Tringa totanus* | Common Red Shank | LC / II |

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 124 | *Turdoides caudatus* | Common Babbler | LC / II |
| 125 | *Turdoides malcolmi* | Large Grey Babbler | LC / II |
| 126 | *Turdoides striatus* | Peninsular Jungle Babbler | LC / II |
| 127 | *Turnix suscitator* | Common Buttonquail | LC / II |
| 128 | *Upupa epops* | Common Hoopoe | LC / II |
| 129 | *Vanellus indicus* | Red -wattled Lapwing | LC / II |
| 130 | *Vanellus malabaricus* | Yellow-wattled Lapwing | LC / II |
| 131 | *Zoothera citrina* | Orange-headed Thrush | LC / II |
| 132 | *Zosterops palpebrosa* | Oriental White Eye | LC / II |

**HERPETOFAUNA:**

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 1. | *Argyrogena fasciolatus* | Banded racer | NT /NL |
| 2. | *Boiga trigonata* | Cat snake | NT /NL |
| 3. | *Bungarus caeruleus* | Common Indian Krait | LC / NL |
| 4. | *Caloles versicolor* | Indian garden lizard | LC / NL |
| 5. | *Cyrtodactylus collegalensis* | South Indian Rock Gecko | NT /NL |
| 6. | *Elaphe helena* | Trinket Snake | NT / NL |
| 7. | *Hemidactylus frenatus* | Ticticky House Gecko | LC / NL |
| 8. | *Lycodon aulicus* | Common wolf snake | LC / IV |
| 9. | *Mabuya beddomii* | Common skink | LC / NL |
| 10. | *Mabuya carinata* | Common Indian skink | LC / NL |
| 11. | *Mabuya innotata* | Bronzy-olive skink | LC / NL |
| 12. | *Mabuya macularia* | Little skink | DD/ NL |
| 13. | *Naja naja* | Spectacled Cobra | LC / I |
| 14. | *Psammophilus blanfordanus* | Common Indian rock lizard | LC / NL |
| 15. | *Ptyas mucosus* | Rat Snake | LC / I |
| 16. | *Python molurus* | Rock Python | NT / I |
| 17. | *Ramphotyphlops braminus* | Common Blind snake | VU / II |
| 18. | *Varanus bengalensis* | Bengal Monitor Lizard | LC / I |
| 19. | *Vipera russelli* | Russel's Viper | VU / I |
| 20. | *Fowlea piscator* | Checkered keelback snake | NT / I |

**Amphibians**

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 1. | *Bufo melanostictus* | Common Indian Toad | NE / NL |
| 2. | *Bufo stomlaticus* | Marbled toad | NE / NL |
| 3. | *Euphlyctis cyanophlyctis* | Skipper Frog | NE / NL |
| 4. | *Hoplobatrachus crassus* | Jerdon's Bull Frog | NE / NL |
| 5. | *Hoplobatrachus tigerinus* | Indian Bull Frog | NE / II |
| 6. | *Limnonectes limnocharis* | Indian Cricket Frog | NE / NL |
| 7. | *Microhyla ornata* | Ornate Microhylid | NE / NL |
| 8. | *Polypedates maculatus* | Common Tree Frog | NE / NL |

**PISCES:**

| Sr. No. | Scientific name | Common name | IUCN STATUS |
|---|---|---|---|
| 1. | *Ambasis nama* | Indian glassy fish | NA |
| 2. | *Ambasis ranga* | Indian glassy fish | NA |
| 3. | *Barilius barna* | River carp baril | LC |
| 4 | *Catla catla* | Major Carp | LC |
| 5. | *Channa striatus* | Banded snake head | LC |
| 6 | *Cirrhinus mrigala* | Major Carp | LC |
| 7 | *Clarius batracus* | Magur | NA |
| 8 | *Cyprinus carpio* | Cipla | VU |
| 9 | *Gambusia affinis* | Mosquito fish | LC |
| 10 | *Glossogobius giurus* | Tank gobi | NA |
| 11. | *Heteropneustes fossilis* | Stinging cat fish | LC |
| 12. | *Labeo rohita* | Common carp | LC |
| 13. | *Labeo calbasu* | Calbasu | LC |
| 14. | *Mastacembelus armatus* | Spiny eel | LC |
| 15. | *Mystus cavasius* | Cat fish | LC |
| 16. | *Mystus seenghala* | Gangatic mystus | LC |
| 17. | *Nandus nandus* | Leaf fish | LC |
| 18. | *Osteobrama cotio* | Cotio | LC |
| 19. | *Punctius amphibious* | Scarlet Banded barb | NA |
| 20. | *Rita rita* | Rita | LC |
| 21. | *Salmostoma bacaila* | Silver fish | LC |
| 22. | *Tor khudree* | Deccan Mahaseer | LC |
| 23. | *Xenentodon cancilla* | Needle fish | LC |

**BUTTERFLIES:**

| Sr. No. | Scientific name | Common Name | Family | IUCN STATUS |
|---|---|---|---|---|
| 1. | *Ariadne merione* | Common caster | Nymphalidae | NA |
| 2. | *Catopsillia piranthe* | Mottled emigrant | Pieridae | NA |
| 3. | *Catopsillia pomona* | Common emigrant | Pieridae | NA |
| 4. | *Cepora nerissa* | Common gul | Pieridae | NA |
| 5. | *Chilades pandav* | Plain cupid | Hesperiidae | NA |
| 6. | *Danaus chrysippus* | Plain tiger | Nymphalidae | LC |
| 7. | *Euploea core* | common indian crow | Nymphalidae | LC |
| 8. | *Eurema hecabe* | Common grass Yellow | Pieridae | NA |
| 9. | *Hypolimnas misippus* | DANNAID EGG FLY | Nymphalidae | NA |
| 10. | *Junoniya arithya* | Blue pansy | Nymphalidae | NA |
| 11. | *Junoniya iphita* | Chocolate pansy | Nymphalidae | NA |
| 12. | *Junoniya lemonias* | Lemon pansy | Nymphalidae | NA |
| 13. | *Leptotes plinius* | Zebra blue | Lycaenidae | NA |
| 14. | *Melanitis leda* | Common evening brown | Nymphalidae | LC |
| 15. | *Pachliopta aristolochiae* | Common rose | Papilionidae | LC |
| 16. | *Papilio demoleus* | Lime | Papilionidae | NA |
| 17. | *Papilio polytes* | Common mormon | Papilionidae | NA |
| 18. | *Prosotas nora* | common line blue | Hesperiidae | NA |
| 19. | *Tirumala limniace* | Blue tiger | Nymphalidae | NA |
| 20. | *Pachliopta hector* | Crimson Rose | Papilionidae | LC |
| 21. | *Virachola isocrates* | Guava Blue | Lycaenidae | II |
| 22. | *Castalius rosimon* | Common pierrot | Lycaenidae | NA |
| 23. | *Rapala manea* | Slate Flash | Lycaenidae | LC |
| 24. | Synthia cardui | Painted Lady | Nymphalidae | NA |
| 25. | Ypthima asterope | Common Three Ring | Nymphalidae | NA |
| 26. | Catopsilia pomona | Common emigrant | Pieridae | NA |
| 27. | Cepora nerissa | Common Gull | Pieridae | NA |
| 28. | Eurema hecabe | Common Grass yellow | Pieridae | NA |
| 29. | Danaus chrysippus | Plain Tiger | Nymphalidae | NA |
| 30. | Danaus genutia | Striped Tiger | Nymphalidae | NA |
| 31. | Euploea core | Common crow | Nymphalidae | NA |
| 32. | Junonia lemonias | Lemon Pansy | Nymphalidae | NA |
| 33. | Junonia orithya | Blue Pansy | Nymphalidae | NA |
| 34. | Melanitis leda | Common evening brown | Nymphalidae | NA |
| 35. | Hypolimnas bolina | Great eggfly | Nymphalidae | NA |
| 36. | Tirumala septentrionis | Dark Blue Tiger | Nymphalidae | NA |

**INSECTS**

| Sr. No. | Scientific name | Common name | IUCN Status |
|---|---|---|---|
| 1 | *Poduridae* | Podura | LC |
| 2 | *Blatta orientalis* | Cockroach | LC |
| 3 | *Mantodea* | Mantis | LC |
| 4 | *Chinavia hilaris* | Green Stink Bugs | LC |
| 5 | *Pyrrhocoridae* | Red Bugs | LC |
| 6 | *Formucidae* | Ant | LC |
| 7 | *Solenopsis spp.* | Red Ant (Fire Ant) | LC |
| 8 | *Paraponera clavata* | Bullet Ant | LC |
| 9 | *Apis dorsata* | Giant Honey Bee | LC |
| 10 | *Apis dorsata* | Rock Bee | LC |
| 11 | *Apis spp.* | Honey Bee | LC |
| 12 | *Andrenidae* | Bee | LC |
| 13 | *Bombus spp.* | Black Bee | LC |
| 14 | *Vespidae* | Yellow Wasps | LC |
| 15 | *Ichneumonidae* | Wasps | LC |
| 16 | *Chilomenes s. maculate* | Ladybird | LC |
| 17 | *Meloidae* | Blister Beetle | LC |
| 18 | *Honotricha serrate* | Grubs | LC |

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**Annexure 2:**

**Location of proposed mine along the identified Tiger Corridor under the 'Telemetry based tiger corridors of Vidarbha Landscape, Maharashtra, India'**

Wildlife Institute of India has published a report titled "Telemetry based Tiger Corridors of Vidarbha Landscape, Maharashtra, India" (WII Report). This report is about the delineation/identification of critical tiger corridors in Vidarbha Landscape of Maharashtra. The report is based on monitoring of tiger movement over a long period of time, from 2015 to 2020. which has" identified 37,067 square kilometres of tiger movement corridors within the 97,321 square kilometre landscape, revealing the importance of agricultural lands and human-dominated areas for tiger movement. This area with significant Landscape acts as a crucial link between central and southern Indian tiger populations, facilitating gene flow and population viability.

***Yes it is true that total of 146.996 ha of forest land out of 339.467 ha of the proposed coal block mining covered under the forest compartments passes through compartments of forest land which are covered under approved Tiger Conservation Plan (TCP) of Tadoba Andhari Tiger Reserve (TATR) within the modelled tiger corridor as per the publication "Telemetry based tiger corridors of Vidarbha Landscape.***


**Boundary shown in yellow is the Location of proposed mine along the identified Tiger Corridor under the 'Telemetry based tiger corridors of Vidarbha Landscape, Maharashtra, India'**

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**Annexure 3:**

**Measures for noise and light pollution, forest fire prevention and spread of invasive species**

- **Forest Fire prevention:** Fire hazard needs to be prevented for survival of Forest as well as Wildlife. Steps will be taken for prevention of forest fire. The user agency shall create awareness among the truck drivers and their labours not to through cigarette of bidi butts in the forest area.
  This being a tropical forest with open scrub dominant with grass and sparse shrubs and forest with moist deciduous and dry deciduous forest type, it is prone to fire each year between mid-February to June (until onset of rains). Fire lines are to be cleared around the project area, inside and along the forest boundaries, in addition to clearing along the roads, footpaths and nullahs to prevent fire. This can be part of the duties of the temporary guards mentioned in the section on tiger and previous section. It is important that these guards should be trained to fight fire and also carry out the fire line clearance/development and maintenance and use of different fire fighting equipments. These fire fighters should be provided with appropriate fire fighting equipments / tools including wireless sets. Based on discussion with the local people and forest department, forest fire map must be prepared so as to identify areas which are prone to frequent fire that are to be treated under the above said management plans. This can be a short project as part of research and monitoring.
- Invasive Species Management: An invasive species is an introduced species that harms its new environment. Invasive species adversely affect habitats and bioregions, causing ecological, environmental, and/or economic damage. The major invasive floral species found in the study area are *Lantana camara*, *Parthenium hysterophorus* and *Prosopis juliflora*. The most effective method of managing the these species are manual uprooting of Lantana and Parthenium in core and buffer areas and using heavy machinery for Prosopis removal, especially in grassland ecosystems. Post removal of invasive it is important to replant native species to restore ecosystem balance and assisted natural regeneration in degraded areas. Community Participation & Awareness also plays an important role in controlling the invasive species. Engaging local communities, especially through eco-development committees, will help in invasive species removal. Conducting awareness programs on the ecological impacts of invasive plants.
- Control of Light pollution: Light pollution near mining areas can negatively impact local wildlife, human health, and even the efficiency of mining operations. To mitigate these effects, the following measures can be implemented- Use fully shielded, downward-facing lights to prevent light from scattering into the sky and surrounding environment, Use low-intensity, warm-colored LED lights to reduce blue light emissions, which are more disruptive to wildlife, Focus lighting only on necessary work areas and avoid over-illumination of roads and non-essential spaces, Use glare-reducing fixtures and visors to limit

excessive brightness that can disturb workers and animals, Plant trees and vegetation buffers around the site to block light from spreading to nearby habitats, Limit artificial lighting during late-night hours in non-essential areas, Educate workers and nearby communities on the importance of reducing light pollution.

- Control of Noise pollution: Operation of heavy machinery and blasting in the mining area produces large amount of sound which may cause disturbance to wild animals. Periodic maintenance of these machines is important to control the noise levels. No mining, blasting or transportation will be allowed from 7 pm to 7 am. Control Blasting may be resorted and need to be monitoring on daily basis and keep record for surveillance. Development of green belt along the project area is an effective strategy to control the noise pollution. It is suggested that a green belt needs to be developed in the safety zone of 7.5m along the mine lease area. Only native trees must be planted in the safety area. No mining operation must be carried out in this zone; rather dense plantation of evergreen trees must be carried out. This will provide a natural screen between the mine and the adjoining area thus reducing the nuisance caused by noise and dust in the vicinity of the mine. Some additional measures to reduce noise pollution are as follows:
    - Secondary blasting will be minimized to the extent possible;
    - Systematic blasting with proper spacing, burden and stemming will be carried out;
    - Minimum quantity of detonating fuse will be consumed by using non-electrical initiation system;
    - Blasting will be carried out during favorable atmospheric conditions and also when human activities are at their minimum;
    - Prime movers/diesel engines will be properly maintained;
    - A buffer barrier of tree belt will be provided in phased manner along the periphery of the mine to attenuate noise;
    - At transfer points, free fall material will be minimized and suitable lining material will be provided
    - Isolation/enclosure of noisy machines/equipment, wherever possible.
    - Reducing idling time of machines/equipments.
    - Provision of enclosures, silencers, etc to the possible extent to control noise propagation.
    - Use of adequate silencers and practising speed limit for material transport vehicles

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**Annexure 4:**

**Environment Monitoring Programme for Key Parameters (Water)**

The details of the suggested Environment Monitoring Programme and The schedule of testing and the parameters to be tested needed for Marki Mangli II Coal Mining Project are provided in Table below:

| SN | Particular | Monitoring Frequency | Sampling Duration | Monitoring Parameters |
|---|---|---|---|---|
| 1. | Surface Water :<br>1) Dadhani Nala (D/S) | Once in 3 month | Grab | As per the parameters specified under IS: 2296 (Class-C) As per the parameters specified under IS: 10500 – 2012. |
| 2. | 2) Dadhani Nala(U/S) | Once in 3 month | Grab | |
| 3. | 3) Penganga River | One/ month | One time | |
| 4. | Ground water : 5 Stations in Adjoining Villages | Once in 3 month | One time | Ground water quality parameters |
| 5. | Well or Bore Wells or piezometers in Mine Lease (2 locations) and surrounding areas (5 locations). | Once in a season | One time | Static water level, pumped water level, seasonal fluctuation and other relevant parameters |
| 6. | Mine Effluents | Once in a month | 24 hour composite | As per EPA guidelines, 1986 |

**The parameters required to be tested during operation of mine are tested by an Environmental team during field survey for preparation of EIA studies (pre project) and their results are given below for perusal**

**Physical Parameters:**

- **pH Value:** The pH values of all ground water samples ranged between 7.18 to 7.50 pH, whereas those of surface water samples varied between 7.77 to 8.47. These values are within the acceptable pH range of 6.5 to 8.5 as per IS 10500:2012 standards for drinking water.

- **Ambient Temperature:** The ambient temperature encompassing all ground water samples varied from 26.7 to 27.2°C while that of surface water samples varied from 27.4 to 27.9° C.

- **Turbidity:** Turbidity of all ground was observed in the range of 2.2 to 3.5 NTU was lower than the permissible limit (5 NTU) as prescribed in IS : 10500 – 2012 and in surface water samples in the range of 6 to 9.

**Chemical Parameters**

- **DISSOLVED Oxygen**: All surface water samples showed dissolved oxygen levels ranging from 5.6 to 6.0 mg/l which is good as expected.

- **DISSOLVED Solids:** All ground water samples showed dissolved solids concentration from 380 to 668 mg/l, which are below permissible limit of 2000 mg/l as per IS 10500:2012. Whereas all surface water samples showed dissolved solids ranging from 248 to 298 mg/l which are below permissible limit of 1500 mg/l as Per IS 2296 (Class C) for surface water quality standards.

- **SUSPENDED Solids:** All ground water samples showed suspended solids concentration from 7.9 to 23.7 mg/l whereas all surface water samples showed suspended solids concentration ranging from 18.8 to 65.5 mg/l.

- **CHLORIDES:** The chloride concentrations in all ground water samples were 39.2 to 185.8 mg/l, the values are below acceptable limit of 250 mg/l as prescribed in IS 10500:2012. Chloride concentrations were 40.1 to 60.8 mg/l in surface water which are below permissible limit of 600 mg/l as Per IS 2296 (Class C) for surface water quality standards.
- **SULPHATES:** The sulphate concentrations in all ground water samples were 26.8 to 104.2 mg/l, These values are below acceptable limit of 200 mg/l as prescribed in IS 10500:2012. In surface water samples sulphate concentrations were 14.4 to 44.5 mg/l which are below permissible limit of 400 mg/l as Per IS 2296 (Class C) for surface water quality standards.
- **Total Hardness:** All ground water samples showed hardness values ranging from 237 to 418, which are within the permissible limit of 600 mg/l as permisible in IS 10500:2012 and in surface water samples total hardness showed values from 164 to 172 mg/l.

**Health Related Parameters**

- **FLUORIDE:** All ground water samples showed fluoride values ranging from 0.14 to 0.42 mg/l which are below the acceptable limit of 1 mg/l as prescribed in IS 10500:2012. **whereas** all surface water samples showed fluoride values from 0.08 to 0.18 mg/l, which

are below permissible limit of 1.5 mg/l as Per IS 2296 (Class C) for surface water quality standards.

- **NITRATE:** All ground water samples showed nitrate values ranging from 19.1 to 25.6 mg/l which are below the acceptable limit of 45 mg/l as prescribed in IS 10500:2012. Whereas all surface water samples showed nitrate values as 0.032 to 0.048 mg/l.

**Trace Metals**

- **ARSENIC, Cadmium, Chromium, Mercury, Selenium, Lead:** All ground water and surface water samples showed the concentration of above trace metals as BDL and Nil.

- **COPPER:** All ground water samples showed concentration of copper as 0.126 to 0.232 mg/l which are above acceptable limit but below the permissible limit 1.5 mg/l as per IS 10500:2012. Whereas all surface water samples showed concentration of copper as 0.138 to 0.152 mg/l, which are below permissible limit of 1.5 mg/l as Per IS 2296 (Class C) for surface water quality standards.

- **IRON:** All ground water samples showed concentration of iron as 0.023 to 0.063 mg/l which is well within the acceptable limit of 0.3 mg/l.The corresponding concentration in surface water samples was observed 0.236 to 0.342 mg/l which are below the acceptable limits.

- **MANGANESE:** All ground water samples showed concentration of Manganese as 0.032 to 0.053 mg/l. All the ground water samples have Mn values below acceptable limit 0.1 mg/l of IS 10500:2012. The corresponding concentration in surface water samples was observed as 18.1 to 29.2 mg/l.

- **ZINC:** All ground water samples showed concentration of zinc as 0.136 to 0.235 mg/l which were well below the acceptable limit (5mg/l) of IS 10500:2012. Whereas the zinc concentration in surface water ranged from 0.0 to 0.009 mg/l which are well below permissible limit.

In summary, overall quality of water samples indicated that the water quality of all the sources is satisfactory of the area are not polluted.

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**Annexure 5:**

**Solid waste Management : The only significant solid waste in mine is overburden and is fully utilised in Backfilling and Dumps. Detail Management of the OB and associated pollution is as under**

**Overburden dumps management:**

The management of overburden dumps involves the following:

- Stabilization of overburden dumps;
- Construction of retaining boulder walls;
- Construction of garland drains for drainage;
- Provision of jute mesh/ Geotex lining to facilitate grass or vegetative growth on slopes;
- Provision of good soil mixed with manure and subsequent watering for growth of grass for anchorage on slopes. Plantation mixed with indigenous and fast growing plant species;
- Degraded area will be reclaimed and rehabilitated in a phased manner with local plant species;
- Transport roads will be planted with trees on either side.
- The Sand Segregation Plant will be having fully covered crusher units, fully covered vibrating screens to reduce air borne dust.
- In addition the processing of OB to sand involves use of hydrocylones wherein water is used and thus eliminating the sources of air pollution.
- Transportation of sand is proposed in tarpaulin covered trucks, thereby making the pollution from this transportation insignificant.
- Some successful control techniques used for haul roads are dust suppressant application, paving, route modifications, and soil stabilization; for conveyors, covering and wet suppression; for storage piles, wet suppression, windbreaks, enclosure, and soil stabilizers; for conveyor and batch transfer points, wet suppression and various methods to reduce freefall distances (e. g., telescopic chutes, stone ladders, and hinged boom stacker conveyors); and for screening and other size classification, covering and wet suppression.
- Wet suppression techniques include application of water, chemicals and/or foam, usually at crusher or conveyor feed and/or discharge points. Such spray systems at transfer points and on material handling operations have been estimated to reduce emissions 70 to 95 percent. Mist Spray systems can also reduce loading and wind erosion emissions from storage piles of various materials 80 to 90 percent. Control efficiencies depend upon local climatic conditions, source properties and duration of control effectiveness. Wet suppression has a carryover effect downstream of the point of application of water or other wetting agents, as long as the surface moisture content is high enough to cause the fines to adhere to the larger rock particles.

**Surface Water Pollution Control Measures:**

Retaining walls will be provided at the toe of dumps to prevent wash off from dumps and sliding of material from benches. This will help in preventing siltation of water drains/channels;

- Water channels/drains carrying the rain water from the mine will be provided with baffles and settling pits to arrest the suspended solids;
- Worked out slopes will be stabilized by planting appropriate shrub/grass species on the slopes. This will help in preventing wash-off of dump from these slopes;
- The mine water will be regularly tested and appropriate measures will be taken in case any element is found exceeding the limits prescribed by CPCB.
- Seepage water and rain water collected in the open pits will be pumped out and used for dust suppression, plantation and in beneficiation process. Excess water, if any, will be discharged into natural drainage system after de-silting in settling ponds.
- The probable cause of surface water pollution in the proposed mining area will be soil erosion and wash off from the waste dumps and mineral stock yards in monsoon season. The run-off water during monsoon season flows through natural water courses into nallas. The surface water entering into the mine during rainy season will be diverted through suitable drains to reduce the wash off of soil. The general drainage direction in the working area will be towards the mine sump, for collection of water. The water will be utilized for greenbelt development, mining operation, which will reduce the fresh water requirement.
- Adequate measures to protect the mine during rains will be taken by providing garland drains around the mine excavations and also providing suitable drainage gradients for mine benches. Sumps of adequate capacity will be provided on the quarry floor.

Following control measures will be adopted to check the wash-off from soil erosion:

- Plantation of shrubs on down slope of overburden dump;
- Stabilizing road cutting
- Providing suitable drainage system to prevent surface water from entering into mines directly;
- Providing sufficient number of retaining walls/check walls at OB dump
- Diverting natural drains through the undisturbed areas and connecting to local natural nalla.

**Ground Water Pollution Control Measures:**

- The domestic sewage from the canteen and toilets will be routed to Sewage Treatment Plant (STP). Adequate maintenance of the STP will be carried out to avoid choking with sludge.
- Regular monitoring of water levels and quality of water in the existing open wells and bore well in the project area to study the hydrology of the area. If

necessary, additional observation wells will be sunk for monitoring the water table levels and water quality around the mine both in the upstream and downstream. Opencast mine will act as natural rain water harvesting structure. Rain water falling within the active mine area shall be collected in the mine sump and treated for reuse.

**Water Security Plan (WSP):**

Agriculture in the area is characterized by wasteful use of groundwater through low-efficiency irrigation practices, leading to drinking water shortage even in normal summers. The area with single crop farming, has failed to utilize its groundwater resources. The agricultural drought is often the result of cropping patterns, which are determined on anticipation of average rainfall and rarely factor rainfall variations. The pattern of rainfall indicates that there is rainfall of 50 60 days/year. 90% of the rainfall is received during the months of June-August of every year. The intensity of rainfall at this time is high leading to high surface run-off. There is considerable scope to improve the out-put per ha in agriculture sector in the project area by integrating the development of land and water resource. The water harvesting on the principles of watershed management and groundwater recharge techniques need to be implemented in these regions. It is proposed to prepare Water Security Plan for adjoining villages (three villages namely Bhendala, Savali, and Ruikot) WSP aims for drinking water security in selected villages by means of

- Ensuring Quality and quantity of water supply, storage management (aquifer management, demand management), capacity building and training.
- Providing futuristic plan in maintaining sustainable use of water for at least for next 10 years.
- Avoid duplicity of different schemes and provide scope of participation of the local public for their self-reliance.
- The objectives of WSP will include current requirement of water for the villages, practices of water management, and overall development of the selected village in terms of water management.

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**Vice President**
**Authorised Signatory**

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## Annexure 6:
## Certified budget from the DFO

| Sr. No. | Particulars | Cost (Rs. lacs) | | | | | |
|---|---|---|---|---|---|---|---|
| | Wildlife Conservation / Mitigation Plan | 1st Year | 2nd Year | 3rd Year | 4th Year | 5th Year | Total |
| 1 | Fencing (2.5m height ) 5200 meter | 13 | | | | | 13 |
| 2 | Cattle trench along the mine boundary with departmental HEMM | 12 | | 5 | | 5 | 22 |
| 3 | Habitat development and plantation | 20 | 20 | 20 | 15 | 10 | 85 |
| 4 | Nursery development and maintenance of safety zone including green belt development along the lease area | 10 | 5 | 5 | 3 | 2 | 25 |
| 5 | Watch tower | 10 | 0 | 0 | 0 | 0 | 10 |
| 6 | Soil moisture conservation works | 2 | 2 | 1 | 1 | 1 | 7 |
| 7 | Construction of waterholes maintenance | 5 | 5 | 1 | 1 | 1 | 13 |
| 8 | Well with solar pumps | 0 | 10 | | | | 10 |
| 9 | 4% of the project cost to be deposited with wildlife trust as per State Government norm | 372 | 0 | 0 | 0 | 0 | 372 |
| 10 | Awareness and training of JFM and Biodiversity committee for wildlife protection and fire control | 3 | 3 | 3 | 3 | 3 | 15 |
| | Total | | | | | | 572 |

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Dy. Conservator of Forest (T)
Pandharkawda Forest Division

**Annexure 7:**

**Certified copy of approved mine closure plan from DFO**

Mining Plan along with the closer plan approve by competent authority is enclosed duly endorsed by DCF (T) Pandharkawada (as Appendix to WMP)

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**Annexure 8:**

## Timeline for implementing wildlife mitigation plan

| Sr. No | Activities under WMP | TIME LINE FOR IMPLEMENTATION OF WILDLIFE MITIGATION PLAN | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year 1 | | | | | Year 2 | | | | Year 3 | | | | Year4 | | | | Year 5 | | | | Continue till mine closure | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | | |
| 1 | Fensing of proposed mine boundary | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Maintainance and Repairing of Fensing | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Establishing Nursery for saplings , maitaiance and propogation | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Construction of Waterholes and its maintainance | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Habitat development and plantation away from the mine boundary | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Plantation in safety zone including green belt development along the lease area | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Watch tower Construction | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Soil moisture conservation works | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Construction of waterholes maintenance | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Well with solar pumps | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 4% of the project cost to be deposited with wildlife trust as per State Government norm | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Awareness and training of JFM and Biodiversity committee for wildlife protection and fire control. Workshops and campaign in cosultation with stakeholder | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Monitoring of Environmental Parameters as per approved | | | | | | | | | | | | | | | | | | | | | | |

02.04.2025

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# Contents

## Executive Summary

The Marki Mangli II Coal Mine (ML area 339.467 Ha: Forest 146.996 ha & 192.807 ha Non Forest Land as per block summary provided by Ministry of Coal) at village Ruikot, Savli, Tahsil Jhari-jamni, Dist Yavatmal, Maharastra has been vested in favor of Yazdani International Private Limited, Bhubaneswar, Odisha being the successful bidder Vide no NA-104/3/2020-NA date March 03, 2021.

The National Tiger Conservation Authority in collaboration with the Wildlife Institute of India has published a document titled "Connecting Tiger Populations for Long-term Conservation", which has mapped out 32 major corridors across the country, management interventions for which are operationalized through a Tiger Conservation Plan, mandated under section 38V of the Wildlife (Protection) Act, 1972. Proposed project area does not fall in well-established 32 corridors of country nor it is a part of WII and NTCA's publication "Atlas of Tiger Corridor of Eastern Vidarbha Land scape". The location however is covered under Approved Tiger Conservation Plan of Tadoab Andhari Tiger Reserve and Section 38(V (3) (b) of the said Act , provides for tiger conservation plan to ensure ecologically compatible land uses in areas linking one protected areas of tiger reserve with another and therefore need the recommendations of NBWL.

User agency accordingly prepared comprehensive plan of wildlife conservation/ mitigation measures after detailed field study Principal Chief Conservator of Forest (Wildlife)/ Chief Wildlife Warden Government of Maharashtra and submitted along with the proposal for obtaining recommendations of NBWL as per guidelines under section 38 -1 (O)( g) .

PCCF (WL) vide his letter number 1714 dated 1/9/2023 submitted the WMP submitted by User agency to WII for vetting by expert as the project fall in important corridor area. WII, vide their letter communicated their observations/ suggestions. The WMP was modified after complying and incorporating the suggestions given by WII and has been submitted to PCCF (WL) for according approval and submission to NBWL through State Government along with the recommendations of SBWL in 22$^{nd}$ meeting held on 16/10/23 (Appendix 1)

Subsequently MoEF desired comments of WII on Wildlife Conservation Plan submitted by State Government vide their letter number 17/12/2024. WII vide their letter dated 9/2/2025 (Appendix 3) communicated their comments along with certain observations. Present WMP which forms a part of Conservation Plan has been modified after incorporating extensive details floral and faunal biodiversity study as suggested by WII in core and buffer zone and all the observations and suggestions of WII vide letter 9/2/2025 (Appendix 3)

Project cover the mitigation measures to reduce the impacts of mining on wildlife by practicing sustainable mining practices . The objective for this report on Mitigation of impact on environment in general and wildlife in particular will therefore be:

- Ensure wildlife safety especially during mining.
- Ensure ecological restoration of the mined out area.

- To provide safe spill over corridors for wildlife from Impact Area to relatively rich neighboring forest areas.
- Ensure wild life habitat restoration during and post mine closure plan
- Strict compliances and monitoring of environment mitigation measures especially air, water and noise.
- Lawful compliances of Wild Life Protection Act under section 83 (O) (1) (g) as well as compliances of the conditions imposed under Environment Clearance issued to the project by Ministry of Environment, Forest and Climate Change, GOI.

Reports elaborate the strategies proposed for reducing the impacts of mining on wildlife through mitigation measures with adequate budgetary support.

**Strategies within the project area:**

- Soil and moisture conservation: Mining activity in the proposed area will involve clearing of vegetation. Mining activity will also involve removal of top soil. Due to removal of vegetation cover and top soil, moisture in the soil tends to reduce. The following strategies will be to conserve as much moisture as possible.
  - Garland drains will be provided around the mine wherever required to arrest any soil from the mine area being carried away by the rain water.
  - Toe drains with suitable baffles will be provided all along the toe of the soil dumps to arrest any soil from the dump slopes being carried away by the rain water.
  - Bench levels will be provided with water gradient against the general pit slope, to decrease the speed of storm water and prevent its uncontrolled descent.
  - Gully formations, if any, on sides of the benches will be provided with check dams of local stone or sand filled bags. The inactive slopes will be planted with bushes, grass, shrubs and trees after applying top soil to prevent soil erosion.
  - Loose material slopes will be covered by plantation by making contour trenches at 2 m interval to check soil erosion both due to wind and rain.
  - Retaining walls (concrete or local stone) will be constructed, around the stockpile or wherever required, to support the benches or any loose material as well as to arrest sliding of loose debris.
  - Regular addition of manure and vegetative mulches in soil.
- Preventive steps for the animals not to fall in the Mine Pits: Chain link fencing around the mine of height 2.5 to 3 meter is proposed to prevent wild life from falling into the mine pit. Additional fencing at inner side of the 7.5m green belt is proposed to create green belt to reduce dusts from mining activities. Cattle trench around the mine outside the leasehold boundary would help in this direction besides chain link fencing.
- Restoration of soil dump: Slope stability to reduce erosion would be ensure through bio-engineering , terracing with grassing of slopes besides plantation of native species having deep root systems and besides use of Geo-synthetic fabrics for slope stabilization.

- Control of siltation: Toe drains are proposed along with Gabion wall need to be constructed to control siltation. A series of open drains will be provided on dump body to arrest surface run-off and prevent siltation.
- Wildlife encounter in the project area: Small animals like squirrel, mongoose, and snakes may enter in to the area. The user agency will educate the labours and staff to protect these animals and not harm them. Contact details of snake rescuers in the area will be available with the security room. In case on snake encounter the staff will be trained to report the sighting to the security room.

**Strategies for area outside project boundary:**

- Plantation in Buffer Zone: Trees will be planted in the buffer zone also. This plantation will be done at selected places only and only local species will be used in the plantation. Some of the tree species included will be Saja (*Terminalia tomentosa*), Baheda (*Terminalia bellerica*), Bija (*Pterocarpus masupium*), Bargad (*Ficus benghalensis*), Peepal (*Ficus religiosa*), Mahua (*Madhuca latifolia*), Sal (*Shorea robusta*), etc. Care will be taken to include some fruit bearing trees like Gular (*Ficus glomerata*), Aonla (*Emblica officinalis*), Aam (*Mangifera indica*) and such trees to provide food to the herbivores which in turn will be the food source of the carnivores.
- Creation of water holes and water sheds at appropriate places . If water is available safely, then all other factors become secondary for the presence and survival of the wild life in any forested area. Therefore it is suggested that the user agency in association with the forest department will identify strategic locations for development of water holes at least 1000m away from the mine lease boundary.
- Forest Fire prevention: Fire hazard needs to be prevented for survival of Forest as well as Wildlife. Steps will be taken for prevention of forest fire. The user agency must create awareness among the truck drivers and their labours not to through cigarette of bidi butts in the forest area.
- Make special efforts to create awareness amongst the farmers/ cultivator to reduce the use of chemical in farming and adopt ecofriendly natural farming to create sustainable habitat for movement of wild life.
- Establishment of Joint Forest Management and Biodiversity Committees: The sense of ownership of the forest and its resources amongst the villagers is very important. This can be done by establishing Joint Forest Management and Biodiversity Committees in the nearby villages. This will also help to understand the indigenous knowledge of the locals and accordingly the plantation of locally important trees and shrubs can be carried out.
- Nursery development: It is proposed to enhance the forest area around the mine by carrying out plantation of native trees and shrubs. This activity must be done simultaneously with the mining, so that by the end of mining operation good forest cover is developed adjacent to the mine. Thus user agency is committed for planning and implementation of the mitigation measures suggested by WII and incorporated in this report.

# Chapter 1: Introduction

The Marki Mangli II Coal Mine (ML area 339.467 Ha: Forest 146.996 ha & 192.807 ha Non Forest Land as per block summary provided by Ministry of Coal) at village Ruikot, Savli, Tahsil Jhari-jamni, Dist Yavatmal, Maharastra has been vested in favor of Yazdani International Private Limited, Bhubaneswar, Odisha being the successful bidder Vide no NA-104/3/2020-NA date March 03, 2021 (Annexure 1).

The mining lease area of 340.00 fall in four revenue villages viz., Pardi, Savli, Ruikot and Mukutaban in Yavatmal District of Maharashtra state. The total geological reserves of coal are estimated to be 11.34 million tonnes. It is proposed to produce 0.30 million tonnes / annum of coal from this mine. The life of mine is proposed to be 37 years. The nearest Tiger Reserve from the proposed mine is around 28 km. The mining operations will be carried out by conventional benching method of opencast with shovel-dumper combination.

Figure 1 gives the location of proposed coal deposit. The area of 340 Ha is in the Survey of India toposheet No. 56 I/13 on a scale of 1:50,000 and is bounded by the Latitude 19°49'2"N to 19°50'31"N and Longitude 78°48'56"E to 78°50'32"E.

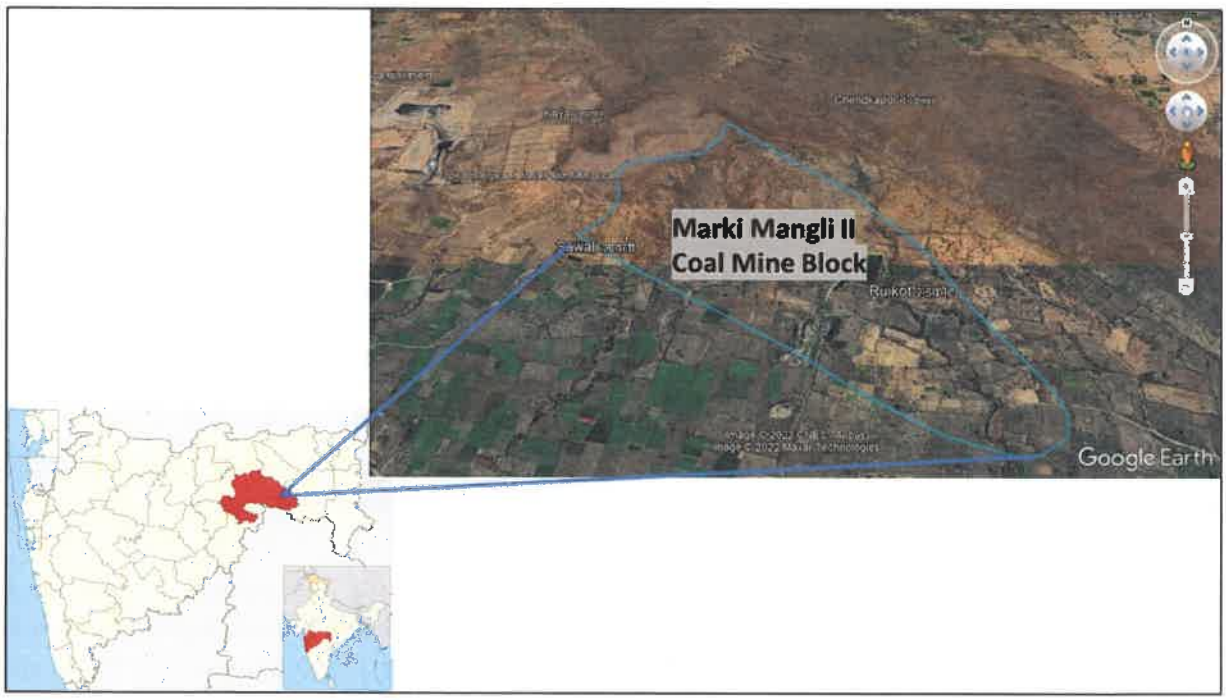



**Figure 1: Location of the Marki Mangli II Coal Mine Block**

The coal block is located around 35 km from Wani. The area can be approached either by Wani-Kayar road. Kayar and Ganeshpur are located at a distance of 12 km and 5 km respectively from Marki Mangli - II coal block.

## 1.1 Salient Features

Table 1: Salient features of the project

| SN | Particulars | Details |
|---|---|---|
| 1. | Applied Mining Leas Area | 339.467 Ha |
| 2. | Location | Latitude: 19°49'2"N to 19°50'31"N<br>Longitude: 78°48'56"E to 78°50'32"E<br>Village: Pardi, Savli, Ruikot, Mukutaban<br>District: Yavatmal<br>State: Maharashtra (Annexure 2) |
| 3. | Land ownership | Private Agriculture Land: 181.066 ha<br>Government non forest land: 11.405 ha<br>Grazing land: 7.875 ha<br>Water body: 3.530 ha<br>Forest land: 146.996 ha<br>Reserve forest: 119.078 ha<br>Zari land: 27.918 ha |
| 4. | Toposheet No. | 56 I/13 |
| 5. | Proposed production capacity | 0.3 million tonnes/annum |
| 6. | Geological reserve | 11.34 million tonnes |
| 7. | Minable reserve | 11.34 million tonnes |
| 8. | Life of mine | 37 years |
| 9. | Project capital cost | 189.89 cr. |
| 10. | Protected area around proposed project | Tipeshwar Tiger Reserve |
| 11. | Distance from Tipeshwar Tiger Reserve buffer zone | 28 km (Annexure 4) |
| 12. | Transportation of coal | Mine area is well connected to pucca road and hence no new road is required to be constructed for transportation of ore. It is proposed to strengthen the existing road . No new road will be constructed for transportation |

## 1.2 Climate of the Project Area

The area has a hot and dry climate. During summer season temperature rises to a maximum of 48°C and humidity falls to a minimum of 10%. Monsoon season starts from mid-June and lasts till mid-September. Winter is experienced between mild-November to January & temperature generally does not fall below 10°C.

• Rainfall: The average rainfall during 10 year period was 1,036 mm for Yavatmal District. The maximum rainfall was 1,379.8 mm in 1995 while minimum was 716.4 mm in 2004. Records of rainfall in the district are available for 11 stations for 10 to 49 years. The normal annual rainfall in the district is 1012.1 mm. The rainfall generally increases from the northwest towards the southeast. Ner, near the northwestern border of the district receives 870.3 mm annual rainfall while Panderkawda near the southeast border receives 1145.7 mm. The rainfall during southwest monsoon accounts for about 87% of the total annual rainfall, July being the most wet month.

• Temperature: There are two meteorological observatories in the district, one each at Yavatmal and Pusad. The temperature rises rapidly after the month of February till May which is the hottest month of the year. In May, the mean daily maximum and minimum temperatures recorded are 42.1°C and 27.7°C respectively. On some days in May and June, the maximum temperature rises up to 47°C. Thundershowers sometimes provide relief from intense heat. With the arrival of the southwest monsoon by middle of June, there is an appreciable drop in day temperatures and the weather becomes pleasant. After the end of September, when the southwest monsoon withdraws, the day temperature increases slightly, but the night temperatures decreases progressively. After October both day and night temperatures decrease rapidly. December is usually the coldest month with the mean daily maximum and minimum temperature at 29°C and 13°C respectively.

• Humidity: Except during the monsoon season when the humidity is high (70- 80%), the air is generally dry. The summer months are the driest, with the relative humidity in the afternoons being about 20%.

• Wind speed and Wind Direction: Winds are generally light to moderate with some increase in speed during May to August. In the post-monsoon and cold seasons the winds generally blows from east or northeast.

## 1.3 Socio Economic Status

As per the 2011 Census data the project area comprises of 64 inhabited villages. The village size as estimated from the number of inhabitants as per the census indicated that 28 villages fall within 1- 500 population range, while 16 village are in the population range of 501-1000, 19 villages fall in 1001-5000 population range and only 1 village has population more than 5000. A village Mehandi with population of 59 is the least populated village whereas Mukutban with population of 6785 is the most populated one.

The study area has 64 inhabited villages with a total population of 56,458 comprising of 28,823 male and 27,635 female. The population is distributed among 13,716 households. The male-female ratio of the society with respect to proportion of males and female is shown in the figure 2.

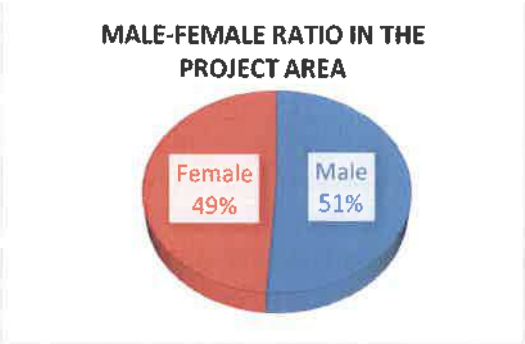



**Figure 2: Male-Female ration in the project area**

As per the 2011 census the scheduled caste population of the study area is 7.51% of the total population and scheduled tribe population is 23.78%.

The people are engaged in agriculture, animal husbandry, weaving and craft-related occupations. Some of them sell vegetables and work as labours.

The overall literacy in the 64 villages of the study area is 77.94%. The male literacy in the study area was 87.18% as compared with State figure 88.38%; the female literacy was 68.01% as compared to 75.87% for the State. It may be noted that percentage of literacy of study area was less than State as a whole in both male and female.

The occupational structure is indicative of overall economy of the project area. In the context of development, structural changes always takes place and shift of resources always occurs away from the primary sectors (Agriculture, forestry, fishery, dairy, poultry, mining etc.) to the manufacturing sector or the secondary sector. Most of the commodities are provided by these two sectors while tertiary sector provides services. The structural transformation sets the economic development process in motion. Occupational structure of the workforce is indicative of the economic activity in the project area. Any changes in the occupational structure are indicative of economical changes. The occupational structure has been worked out for different categories of occupations in the project area which include cultivators, agricultural laborers, household industry workers etc. The families directly engaged in agriculture i.e. cultivators and agriculture labours combined in study area villages were 60.3 per cent, having agriculture as their main source of income, followed by 23.5 per cent who worked as laborers, 1.5 per cent in the services sector, 10.3 per cent were engaged in business, 2.9 per cent were having other occupation and 1.5 per cent were having HH occupation Data is representative of inclusion of respondents from all occupations and economic activities. In the study area, agriculture is the main source of income for the people. The details indicate that:

- Agriculture is purely dependent upon rainfall which is scanty in study area.
- The main crop grown in kharif is Cotton, Soyabean, Tur and other Small Millets and Gram and Wheat in Rabi season.
- Per acre production is less and there is scope for improvement.
- Besides agriculture people are engaged in small and petty business

- There are no cottage industries around and hence there is ample scope for its development. Project proponent is expected to promote cottage industries with special investment under corporate social responsibility.
- The status of marginalized workforce is indicative of high potential for socio-economic development if industrial growth takes place in this area along with natural resources especially agriculture and allied sectors.
- As regards to rearing of domestic animals it was observed that bovine animal (Cow, buffalo and bull) were 57.55 per cent, followed by goat/sheep 19.42 per cent and 23.02 per cent poultry.
- Drinking Water Sources: Information on source of drinking water indicated that 78 per cent respondents had community source of water while 22 % have private source for drinking water.

Seasonal diseases are indicative of the fact that precautionary measures are needed in study area villages. Villagers, being in close proximity of Wani have always preferred the services of Private Doctors for disease cure. Health facilities are the one of the most essential part of livelihood that is needed in this area. They Include hospitals, clinics, outpatient care centers, and specialized care centers, such as birthing centers and psychiatric care centers. Good medical facilities are provided by Government of Maharashtra such as Sub-Health center, health center, Anganwadi etc. People are also benefited by various Government health schemes such as Development of Women and Children in Rural areas, Self Help Group, National Rural Health Mission etc. The findings from this survey in the 10 km radius area, indicate that medical facilities are needed to be improved by the Government Health Sub-Centre's is available only in some villages i.e. Parsevni, Sali, Nayakund, Amdi villages. Primary Health Centre is also available in some villages only. In the case of serious condition patients are moved to the nearest villages where hospitals are available. Tuberculosis, Asthma and Cancer diseases are reported in some villages. The degree of the facility is important, so the area requires better health services.

# Chapter 2: Biological Environment

## 2.1 Type of Forests:

The study area is located in Yavatmal district of Maharashtra state. is a state in the western peninsular region of India occupying a substantial portion of the Deccan Plateau. Maharashtra is the second-most populous state in India and the second-most populous country subdivision globally. Maharashtra is the third largest state of the country with an area of 3,07,713 km2. The State lies between 15°35' N to 22°02' N latitude and 72°36' E to 80°54' E longitude. Study area is dominated by the terrestrial vegetation survey, which includes sparse deciduous forests, and degraded forest.

The Yavatmal district of Central Vidarbha Zone of Maharashtra State is located between 20.39925" of North Latitude while 78.11792" of Eastern Longitude. The major area of the district is located in the Southern Plateau of Berar. It is surrounded by Amravati districts in the North, Akola and Parbhani districts in the West, Nanded and Adilabad districts in the South and Chandrapur and Wardha districts in the East. The district comes under assured rainfall area of VIII th Agroclimatic Zone with average annual rainfall of 1050 mm mostly received during June to September months from the north -eastern monsoon rains. Average annual temperature varies from 22°C to 25°C. The State is drained by a number of rivers, which include Wardha and Penganga, Narmada, Tapti, Son, Betwa, Shipra and Chambal. The State has 50 districts, of which 21 are tribal districts. The state of Maharashtra is home to rich biodiversity and unique biological diversity. It is significantly rich in endemism with respect to many plants having medicinal properties.

As per the Working Plan of Pandharkawada for the period 2012-13 to 2021-22 the forest in the area is falls under following categories of Champion and Seth's Classification:

Group 5- Tropical Dry Deciduous Forest,

Sub Group 5A - Southern Tropical Dry Deciduous Forests,

Climax Type – (1) 5A/Cia - Dry Teak Bearing Forests, Local Sub type Teak Forest and (2) 5A/Cib - Dry Teak Forest,

Local Sub type - Degraded Scrub Forest

## 2.2 Terrestrial Flora and Fauna:

Biological communities are the indicator environmental condition and resource of its distribution and survival. Biotic component comprises of both plants (Flora) and animal (Fauna) communities, which interact not only within and between them but also with the Abiotic components, viz. physical and chemical components of the environment. The changes in biotic community are studied in the pattern of distribution, abundance and diversity.

### 2.2.1 Flora Biodiversity

The Vegetation and plant species composition observed and documented during field visit in and around the proposed location of the project. Besides primary surveys in the project sites, published literature

and various floras were consulted to prepare an inventory of plant species growing at project sites. The vegetation of the study area is highly degraded and some areas consisting water bodies. The plant diversity is classified into various plant groups such as tree, shrubs, herbs, climbers, sedges and grasses. The plant diversity survey in the project area was undertaken during the summer season with the objectives of preparing a checklist of flora in the study area which is divided into two parts i.e. Core Zone & Buffer Zone.

### *2.2.2 Methodology for Terrestrial Flora*

**Table 0.1: Mode of data collection and parameters considered during the Survey**

| Sr. No. | Aspect | Mode of Data collection | Parameters monitored | Remarks |
|---|---|---|---|---|
| 1. | Terrestrial Biodiversity | By field survey | Floral and Faunal diversity | **For Floral Diversity:** Random survey, sapling survey/forest inventory, walking transect, collection and identification with the help of relevant literature. **For Faunal Diversity:** direct and indirect sampling, walking transect, point sampling and nest sampling etc. |
| 2. | | From authentic sources like Forests department of Maharashtra and available published literatures from ZSI, BSI etc. | Floral and Faunal diversity and study of vegetation, forest type, importance etc. | Data collected from the working plan of the region, forest types from the authentic literature of Champion & Seth. |
| 3. | Aquatic Biodiversity | By field survey | Floral and Faunal diversity | **For Plankton Study-** Lackey's drops method and light microscope **For other aquatic-** Random survey, opportunistic observations |
| 4. | | From authentic sources like Forests department of Maharashtra. | Floral and Faunal diversity and study of vegetation, forest type, importance etc. | Desktop literature review to indentify the representative spectrum of threatened species, population and ecological communities. |

### *2.2.3 Selection of Monitoring Location*

The selection of terrestrial and aquatic ecological sampling location was based on land use pattern, topography and habitat patterns of the study area. Ecological survey was carried out in forest and non-forest areas (agricultural fields, roadsides, urban & semi-urban wastelands, etc.) and the aquatic

ecological survey was carried out in rivers & ponds/lakes (within the study area). The study area outside the ML area was divided into three buffer zones stretching for 10 Km radially from the core.

**Table 0.2: List of Biological Environment Survey Stations**

| Code | Latitude | Longitude | Near Village | Distance (KM) | Direction | Type of Forest |
|---|---|---|---|---|---|---|
| BS-01 | 19°49'45.25"N | 78°49'37.59"E | Ruikot | - | - | Reserved Forest Area |
| BS-02 | 19°50'26.82"N | 78°49'29.66"E | Ruikot | - | - | Reserved Forest Area |
| BS -03 | 19°49'26.85"N | 78°51'17.69"E | Mukutban | 1.50 | EES | Forest Area |
| BS -04 | 19°49'35.91"N | 78°54'9.48"E | Chilai | 6.90 | E | Chilai RF |
| BS -05 | 19°49'51.34"N | 78°55'25.78"E | Chilai | 7.1 | E | Chilai RF |
| BS -06 | 19°46'28.85"N | 78°49'34.63"E | Bailampur | 4.91 | SSW | Reserved Forest Area |
| BS-07 | 19°46'32.73"N | 78°49'52.63"E | Bailampur | 4.80 | SSW | Reserved Forest Area |
| BS -08 | 19°49'37.46"N | 78°45'42.71"E | Khapri | 4.50 | W | Sekapur Forest |
| BS-09 | 19°50'27.43"N | 78°44'38.87"E | Khapri | 5.23 | NW | Paunar Forest |
| BS -10 | 19°50'14.10"N | 78°43'53.31"E | Khapri | 7.9 | Nw | Forest Area |
| BS-11 | 19°50'43.16"N | 78°49'8.87"E | Adakoli | 7.4 | NNW | Paunar Forest |
| BS-12 | 19°53'16.57"N | 78°46'25.87"E | Adakoli | 7.6 | NNW | Paunar Forest |
| BS-13 | 19°43'57.27"N | 78°50'20.81"E | Chinchghat | 9.8 | N | Forest Area |
| BS-14 | 19°49'50.65"N | 78°55'53.98"E | Chilai | 8.9 | N | Chilai RF |
| BS-15 | 19°51'56.21"N | 78°54'5.27"E | Nerad | 9.2 | SE | Scrub Land |

### 2.2.4 Observations and Results

A total of 198 floral species have been recorded during survey in the Buffer zone of the study area having green cover, out of which 85 are trees, 29 are herbs, 37 are shrubs, 24 are climbers, 23 species of Grasses & bamboos have been recorded from Buffer zone. In the Core zone total 171 floral species recorded out of which Tree (65), Shrub (37), Herb (23), climber (23) and Grasses and Bamboos (23).

**Table 0.3: List of existing floristic composition within core and Buffer zone**

**TREES:**

| S. No | *Botanical Name* | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 1 | *Acacia catechu* (L.f.) Willd. | Khair | Fabaceae | * | * |
| 2 | *Acacia concinna* (Willd.) DC. | Sikakai | Fabaceae | * | * |
| 3 | *Acacia leucophloea* (Roxb.) Willd. | Hiwar/Reunjha | Fabaceae | * | * |
| 4 | *Aegle marmelos* (L.) Corrêa | Bel | Rutaceae | - | * |
| 5 | *Ailanthus excelsa* Roxb. | Maharukh/ Mahaneem | Simarubiaceae | * | * |
| 6 | *Albizia lebbeck* (L.) Benth. | Kala siris | Fabaceae | * | * |
| 7 | *Albizia odoratissima* (L.f.) Benth. | Chichwa | Fabaceae | * | * |
| 8 | *Albizia procera* (Roxb.) Benth. | Safed Siris/ Karahi | Fabaceae | * | * |
| 9 | *Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Guillem. & Perr. | Dhaora/Dhawda | Combretaceae | * | * |
| 10 | *Azadiracta indica* A.Juss. | Neem | Meliaceae | * | * |
| 11 | *Balanites aegyptiaca* (L.) Del. | Hingot | Balanitaceae | * | * |
| 12 | *Bauhinia malabarica* Roxb. | Amti | Fabaceae | | * |
| 13 | *Bauhinia purpurea* L. | Keolar | Fabaceae | * | * |
| 14 | *Bauhinia racemosa* Lam. | Asta/Aapta | Fabaceae | * | * |
| 15 | *Bauhinia variegata* L. | Kachnar | Fabaceae | * | * |
| 16 | *Bombax ceiba* L. | Semal | Malvaceae | * | * |
| 17 | *Boswellia serrata* Roxb. ex Colebr. | Salai/ Saliha | Burseracea | * | * |
| 18 | *Bridelia retusa* (L.) A.Juss. | Kasai/Kasahi | Euphorbiacea | * | * |
| 19 | *Buchanania lanzan* (Lour.) M.R.Almeida | Achar/ Char Chiraonji | Anacardiaceae | * | * |
| 20 | *Butea monosperma* (Lam.) Taub. (Butea Manosperma Kuntze) | Palash/ Parsa/Padas | Fabaceae | * | * |
| 21 | *Careya arborea* Roxb. | Kumbhi/ Bhui | Mayrtaceae | - | * |
| 22 | *Caryota urens* L. | Fish tail palm | Arecaceae | - | * |
| 23 | *Casearia graveolens* Dalzell | Gilchi | Samydaceae | * | * |
| 24 | *Casearia tomentosa* Roxb. | Tondri | Samydaceae | * | * |
| 25 | *Cassia fistula* L. | Amaltas/Bahawa | Fabaceae | * | * |

| S. No | *Botanical Name* | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 26 | *Cassine glauca* (Rottb.) Kuntze | Jamrasi | Celastraceae | * | * |
| 27 | *Catunaregam spinosa* (Thunb.) Tirveng. | Mainphal | Rubiaceae | * | * |
| 28 | *Chloroxylon swietenia* DC. | Bhirra | Meliaceae | * | * |
| 29 | *Cochlospermum religiosum* (L.) Alston | Galgala | Bixaceae | * | * |
| 30 | *Cocos nucifera* L. | Nariyal | Arecaceae | | * |
| 31 | *Cordia macleodii* | Bhokar | Boraginaceae | * | * |
| 32 | *Dalbergia latifolia* Roxb. | Shisham | Fabaceae | - | * |
| 33 | *Dalbergia paniculata* (Roxb.) Thoth. | Dhobin | Fabaceae | * | * |
| 34 | *Dalbergia sissoo* DC. | Sissoo/Sisham | Fabaceae | - | * |
| 35 | *Diospyros melanoxylon* Roxb. | Tendu | Ebenaceae | * | * |
| 36 | *Diospyros montana* Roxb. | Bistendu | Ebenaceae | * | * |
| 37 | *Dolichandrone falcata* | Medsing | Bignoniaceae | * | * |
| 38 | *Ehretia laevis* Roxb. | Datranga | Boraginaaceae | * | * |
| 39 | *Emblica officinalis* | Amla | Phyllanthaceae | * | * |
| 40 | *Erythrina indica* Lam. | Pangra | Fabaceae | * | * |
| 41 | *Eucalyptus sp.* | Nilgiri | myrtaceae | - | * |
| 42 | *Ficus benghalensis* L. | Bad | Moraceae | * | * |
| 43 | *Ficus mollis* Vahl | Gular | Moraceae | - | * |
| 44 | *Ficus racemosa* L. | Gular | Moraceae | - | * |
| 45 | *Ficus religiosa* L. | Pipal | Moraceae | * | * |
| 46 | *Gardenia latifolia* Aiton | Papra | Rubiaceae | - | * |
| 47 | *Garuga pinnata* Roxb. | Kekad | Burseracea | - | * |
| 48 | *Gmelina arborea* Roxb. | Khamhar | Verbenaceae | - | * |
| 49 | *Grewia tiliifolia* Vahl | Dhaman | Tilliaceae | * | * |
| 50 | *Haldina cordifolia* (Roxb.) Ridsdale | Haldu/Kalmi | Rubiaceae | - | * |
| 51 | *Hymenodictyon orixense* (Roxb.) Mabb. | Bhanwarmal | Rubiaceae | * | * |
| 52 | *Kydia calycina* Roxb. | Baranga | Malvaceae | * | * |
| 53 | *Lagerstroemia parviflora* Roxb. | Lendia | Lythraceae | * | * |

| S. No | *Botanical Name* | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 54 | *Lannea coromandelica* | Jhingan/Movei | Anacardiaceae | * | * |
| 55 | *Limonia acidissima* | Kawat | Rutaceae | * | * |
| 56 | *Madhuca longifolia* | Mahua | Sapotaceae | * | * |
| 57 | *Mallotus philippensis* (Lam.) Müll. Arg. | Sinduri/ Rori | Euphorbiacea | - | * |
| 58 | *Mitragyna parvifolia* (Roxb.) Korth. | Kalam/Kadamb | Rubiaceae | * | * |
| 59 | *Neolamarckia cadamba* (Roxb.) Bosser | Kadamb | Combretaceae | - | * |
| 60 | *Ougenia oojeinesis* | Tiwas | Fabaceae | * | * |
| 61 | *Peltophorum ferrugineum* (Decne.) Benth. | Peltaphorum | Fabaceae | * | * |
| 62 | *Phoenix sylvestris* (L.) Roxb. | Khajur | Palmae | * | * |
| 63 | *Polyalthia longifolia (Sonn.) Thwaites* | China ashok | Annonaceae | | * |
| 64 | *Pongamia pinnata* (L.) Pierre | Karanj | Fabaceae | * | * |
| 65 | *Prosopis juliflora* (Sw.) DC. | Khejdi | Fabaceae | * | * |
| 66 | *Psidium guajava* L. | Jam | myrtaceae | - | * |
| 67 | *Pterocarpus marsupium* Roxb. | Bija | Fabaceae | * | * |
| 68 | *Saccopetalum tomentosum* Hook.f. & Thomson | Kari | Annonaceae | * | * |
| 69 | *Schleichera oleosa* (Lour.) Merr. | Kusum | Sapindaceae | * | * |
| 70 | *Schrebera swietenioides* Roxb. | Mokha | Oleaceae | * | * |
| 71 | *Semecarpus anacardium* L.f. | Bibba | Anacardiaceae | * | * |
| 72 | *Senna occidentalis* (L.) Link | Kasondi | Fabaceae | * | * |
| 73 | *Senna siamea* (Lam.) H.S. Irwin & Barneby | Acacia | Fabaceae | * | * |
| 74 | *Soymida febrifuga* (Roxb.) A. Juss. | Rohan | Meliaceae | * | * |
| 75 | *Sterculia urens* Roxb. | Kulu | Sterculiaceae | - | * |
| 76 | *Stereospermum suaveolens* (Roxb.) DC. | Badapadar | Bignoniaceae | * | * |
| 77 | *Syzygium cumini* (L.) Skeels | Jamun | Myrtaceae | * | * |
| 78 | *Tamarindus indica* L. | Imli | Fabaceae | * | * |
| 79 | *Tamilnadia uliginosa* (Retz.) Tirveng. & Sastre | Kala Phetra | Rubiaceae | * | * |
| 80 | *Tectona grandis* L.f. | Sagaun | Verbenaceae | * | * |

| S. No | *Botanical Name* | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 81 | *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn. | Arjun | Combretaceae | * | * |
| 82 | *Terminalia tomentosa* | Ain/Saja | Combretaceae | * | * |
| 83 | *Trema orientalis* (L.) Blume | Jivan | Urticaeceae | - | * |
| 84 | *Vitex negundo* L. | Morphal | Verbenaceae | - | * |
| 85 | *Ziziphus jujuba* Mill. | Ber | Rhamnaceae | * | 85 |
| **Total** | | | | **65** | **85** |

Note: (*) indicates presence of species & (-) indicates absence

**SHRUBS:**

| S.No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 1 | *Achyranthes aspera* L. | Chirchira | Amaranthaceae | * | * |
| 2 | *Balanites aegyptiaca* (L.) Del. | Hingot | Balanitaceae | * | * |
| 3 | *Calotropis gigantea* (L.) Dryand. | Aak | Asclepiadaceae | * | * |
| 4 | *Colebrookea oppositifolia* Sm. | Kalabans | Labiatae | * | * |
| 5 | *Dodonaea viscosa subsp. Aungustifolia (L.f.) J.G. WEST* | sadabahar | Apocynaceae | * | * |
| 6 | *Eranthemum pulchellum* Andrews | Bantulsi | Acanthceae | * | * |
| 7 | *Flacourtia indica* (Burm.f.) Merr. | Kakai | Bixaceae | * | * |
| 8 | *Gardenia gummifera* L.f. | Dikamali | Rubiaceae | * | * |
| 9 | *Grewia hirsuta* Vahl | Gutdukri | Tiliaceae | * | * |
| 10 | *Grewia rothii* DC. | Bansuli | Tiliaceae | * | * |
| 11 | *Gymnosporia spinosa* (Blanco) Merr. & Rolfe | Baikal | Celastraceae | * | * |
| 12 | *Helicteres isora* L. | Marophali | Sterculiaceae | * | * |
| 13 | *Hibiscus rosa-sinensis* L. | Gudhal | Malvaceae | * | * |
| 14 | *Holarrhena antidysenterica* (Roth) Wall. ex A.DC. | Dhudh | Apocynanceae | * | * |
| 15 | *Hyptis suaveolens* (L.) Poit. | Van Tulsi | Meliaceae | * | * |
| 16 | *Indigofera cassioides* DC. | Girol | Fabaceae | * | * |
| 17 | *Ixora parviflora* | Lokhandi | Rubiaceae | * | * |
| 18 | *Jasminum sambac* (L.) Aiton | Bela | Oleaceae | * | * |
| 19 | *Justicia adhatoda* L. | Adusa | acanthaceae | * | * |
| 20 | *Martynia annua* L. | Baghanakha | Martiniaceae | * | * |
| 21 | *Mimosa pudica* L. | Chhuimui | Fabaceae | * | * |
| 22 | *Morinda tinctoria* | Bartondi/Aali | Rubiaceae | * | * |
| 23 | *Mucuna pruriens* (L.) DC. | Beeja | Fabaceae | * | * |
| 24 | *Nerium oleander* L. | Lal Kaner | Apocynaceae | * | * |
| 25 | *Phoenix acaulis* Roxb. | Chhind | Palmae | * | * |

| S.No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 26 | *Pithecellobium dulce* (Roxb.) Benth. | Bilayati Imli | Fabaceae | * | * |
| 27 | *Prosopis cineraria* (L.) Druce | Sami/Gugurali | Fabaceae | * | * |
| 28 | *Ricinus communis* L. | Arand | Euphorbiaceae | * | * |
| 29 | *Senna auriculata* (L.) Roxb. | Takhad | Fabaceae | * | * |
| 30 | *Solanum virginianum* L. | Bhatkataiya | Solanaceae | * | * |
| 31 | *Tephrosia purpurea L.* | Sarphonka | Fabaceae | * | * |
| 32 | *Triumfetta rhomboidea* Jacq. | Chipti | Malvaceae | * | * |
| 33 | *Urena lobata* L. | Chikti | Malvaceae | * | * |
| 34 | *Wrightia tinctoria* | Dudhi | Apocynaceae | * | * |
| 35 | *Xanthium strumarium* L. | Okharu | Asteraceae | * | * |
| 36 | *Ziziphus mauritiana* | Ber | Rhamnaceae | * | * |
| 37 | *Zizyphus xylopyrus* | Ghoti | Rhamnaceae | * | * |
| **Total** | | | | **37** | **37** |

Note: (*) indicates presence of species & (-) indicates absence

**HERBS:**

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 1 | *Alternanthera sessilis* (L.) R.Br. ex DC. | Phool ghans | Amaranthaceaea | * | * |
| 2 | *Alysicarpus vaginalis* (L.) DC. | Chipti | Fabaceae | * | * |
| 3 | *Antidesma acidum* Retz. | Khatua | Euphorbiaceae | * | * |
| 4 | *Azanza lampas* (Cav.) Alef. | Bankapas | Malvaceae | | * |
| 5 | *Boerhavia diffusa* L. | Punarnava | Nictaginaceae | * | * |
| 6 | *Senna tora* (L.) Roxb. | Panwar | Fabaceae | * | * |
| 7 | *Andrographis paniculata (Burm.f.) Wall. Ex Nees* | Kalmegh | Acanthaceae | * | * |
| 8 | *Curculigo orchioides* Gaertn. | Kali mushli | Hypoxidaceae | | * |
| 9 | *Cyperus scariosus* R.Br. | Motha | Cyparaceae | * | * |
| 10 | *Cyperus dubius* Rottb. | Motha | Cyparaceae | * | * |
| 11 | *Desmodium gangeticum* (L.) DC. | Chapti | Fabaceae | * | * |
| 12 | *Desmodium laxiflorum* DC. | Latkani | Fabaceae | * | * |
| 13 | *Desmodium triflorum* (L.) DC. | Tinpatiya | Fabaceae | * | * |
| 14 | *Enicostemma littorale* Blume. | Naibuti | Gentianaceae | * | * |
| 15 | *Euphorbia hirta* L. | Dudhi | Euphorbiaceae | * | * |
| 16 | *Euphorbia thymifolia* L. | Choti dudhi | Euphorbiaceae | * | * |

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 17 | *Jatropha gossypiifolia* L. | Jamal ghota | Euphorbiaceae | | * |
| 18 | *Merremia emarginata* (Burm. f.) Hallier f. | Muskani | Fabaceae | | * |
| 19 | *Ocimum basilicum* L. | Barbari tulsi | Meliaceae | * | * |
| 20 | *Ocimum sanctum* L. | RamaTulsi | Meliaceae | | * |
| 21 | *Petalidium angustitubum* P.G. Mey. | Indrajata | Acanthaceae | | * |
| 22 | *Phyllanthus amarus* Schumach. & Thonn. | Bhui Aonla | Phyllanthaceae | * | * |
| 23 | *Sida acuta* Burm.f. | Khakhara | Malvaceae | * | * |
| 24 | *Sida cordifolia* L. | Bariyari | Malvaceae | * | * |
| 25 | *Sida rhombifolia* L. | Vishkhapadi | Malvaceae | * | * |
| 26 | *Tagetes erecta* L. | Genda | Asteraceae | * | * |
| 27 | *Tephrosia purpurea* (L.) Pers. | Sarphonka | Fabaceae | * | * |
| 28 | *Tridax procumbens* (L.) L. | Ghamara | Asteraceae | * | * |
| 29 | *Trigonella sp.* | Ban methi | Fabaceae | * | * |
| Total | | | | 23 | 29 |

Note: (*) indicates presence of species & (-) indicates absence

**CLIMBERS:**

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 1 | *Ampelocissus latifolia* (Roxb.) Planch. | Jangli angur | Vitaceae | * | * |
| 2 | *Antigonon leptopus* Hook. & Arn. | | Polygonaceae | * | * |
| 3 | *Asparagus racemosus* Willd. | Stawar | Liliaceae | | * |
| 4 | *Spatholobus parviflorus* (DC.) Kuntze | Nasbel | Fabaceae | * | * |
| 5 | *Butea superba* Roxb. | Palas bel | Fabaceae | * | * |
| 6 | *Capparis zeylanica* | Waghati | Capparidaceae | * | * |
| 7 | *Celastrus paniculatus* Willd. | Mal Kangni | Celastraceae | * | * |
| 8 | *Cocculus hirsutus* (L.) W.Theob. | Jaljamni | Menispermaceae | * | * |
| 9 | *Cryptolepis dubia* (Burm.f.) M.R.Almeida | Karanta | Asclepiadaceae | * | * |
| 10 | *Dioscorea bulbifera* L. | | Dioscoreaceae | * | * |
| 11 | *Dioscorea hispida* Dennst. | Baichandi | Dioscoreaceae | * | * |
| 12 | *Dioscorea pentaphylla* L. | Musalkand | Dioscoreaceae | * | * |
| 13 | *Diplocyclos palmatus* (L.) C. Jeffrey | | Cucurbitaceae | * | * |
| 14 | *Hemidesmus indicus* (L.) R. Br. ex Schult. | | Apocynaceae | * | * |
| 15 | *Ichnocarpus frutescens* (L.) W.T.Aiton | Dhimar Bel | Apocynaceae | * | * |

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 16 | *Ipomoea pes-tigridis* L. | | convolvulaceae | * | * |
| 17 | *Pergularia daemia* (Forssk.) Chiov. | Kadukand | Apocynaceae | * | * |
| 18 | *Rhynchosia minima* (L.) DC. | Ban sem | Fabaceae | * | * |
| 19 | *Tinospora cordifolia* (Willd.) Miers | Giloy | Menispermaceae | * | * |
| 20 | *Tylophora indica* (Burm. f.) Merr. | Dambela | Apocynaceae | * | * |
| 21 | *Vallaris solanacea* (Roth) Kuntze | Dudhbela | Apocynaceae | * | * |
| 22 | *Ventilago denticulata* Willd. | Keoti | Rhamnaceae | * | * |
| 23 | *Ampelocissus indica* (L.) Planch. | Jangli angur | vitaceae | * | * |
| 24 | *Ziziphus oenopolia* (L.) Mill. | Makor | Rhamnaceae | * | * |
| Total | | | | 23 | 24 |

Note: (*) indicates presence of species & (-) indicates absence

**GRASSES & BAMBOOS:**

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 1 | *Aristida setacea* Retz. | Bargi Ronda | Poaceae | * | * |
| 2 | *Arundinella setosa* Trin. | Sidi | Poaceae | * | * |
| 3 | *Bothriochloa pertusa* (L.) A.Camus | Bhond grass | Poaceae | * | * |
| 4 | *Cenchrus purpureus* (Schumach.) Morrone | | Poaceae | * | * |
| 5 | *Cynodon dactylon* L. | Doob | Poaceae | * | * |
| 6 | *Dichanthium annulatum* (Forssk.) Stapf | Chhoti Marbel | Poaceae | * | * |
| 7 | *Eragrostis amabilis* (L.) Wight & Arn. | Bhurbhusi | Poaceae | * | * |
| 8 | *Eulaliopsis binata* (Retz.) C.E.Hubb. | Bagai | Poaceae | * | * |
| 9 | *Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult. | Kushal, lampa | Poaceae | * | * |
| 10 | *Imperata cylindrica* (L.) Raeusch. | Chhir | Poaceae | * | * |
| 11 | *Eulaliopsis binata* (Retz.) C.E.Hubb. | Sabai | Poaceae | * | * |
| 12 | *Iseilema laxum* Hack. | Mushan | Poaceae | * | * |
| 13 | *Sehima nervosum* (Rottler) Stapf | Munsel | Poaceae | * | * |
| 14 | *Panicum antidotale* Retz. | Kosra | Poaceae | * | * |
| 15 | *Panicum sumatrense* Roth | Chire Kutik | Poaceae | * | * |
| 16 | *Panicum repens* L. | | Poaceae | * | * |
| 17 | *Saccharum spontaneum* L. | Kans | Poaceae | * | * |
| 18 | *Sehima nervosum* (Rottler) Stapf | Sheda | Poaceae | * | * |
| 19 | *Setaria verticillata* (L.) P.Beauv. | Latkani | Poaceae | * | * |
| 20 | *Sorghum halepense* (L.) Pers. | Baru | Poaceae | * | * |

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 21 | *Themeda quadrivalvis* (L.) Kuntze | Gunher | Poaceae | * | * |
| 22 | *Bambusa bambos* (L.) Voss | Kanta bans | Graminaeae | * | * |
| 23 | *Dendrocalamus strictus* (Roxb.) Nees | Bans | Graminaeae | * | * |
| Total | | | | 23 | 23 |

Note: (*) indicates presence of species & (-) indicates absence

(Source: Primary Survey Data)

## Fauna Biodiversity

The study of fauna takes substantial amount of time to understand the specific faunal characteristic of area. The assessments of fauna were done by extensive field survey of the area. During survey, the presence of wildlife has been confirmed by direct field survey and by the oral information by local inhabitants and data procured from the concerned forest department has been made and given in below.

Total 86 faunal species has been recorded from field survey and from secondary information documented in forest working plan of Pandharkawada forest division of Yavatmal district where Aves (13), Mammals (23), Herpatofauna (8), Butterflies (19) and 23 species of Pisces were recorded.

In the core zone of the study area, the faunal presence has been separately analysed where total 35 faunal species diversity have been recorded. Class wise faunal presence like Aves (8), Mammals (13), Herpatofauna (6), Butterflies (6) and only two species of Pisces were recorded.

**Table 0.4: Faunal Diversity from study area (Core zone & Buffer Zone)**

**MAMMALS:**

| Sr. No. | Scientific name | Vernacular name | Common name | Schedules of Wildlife Act/ IUCN Status | CORE | BUFFER |
|---|---|---|---|---|---|---|
| 1 | *Antilope cervicapra* | Blackbuck | | I | * | * |
| 2 | *Axis axis* | Cheetal | | III/LC | | * |
| 3 | *Boselaphus tragocamelus* | Nilgai | Blue bull | III/LC | | * |
| 4 | *Canis aureus* | Kolha | Jackal | II/LC | | * |
| 5 | *Canis lupus pallipes* | Indian Wolf | | I | * | * |
| 6 | *Cervus unicolor* | Sambar | Sambar | III/VU | | * |
| 7 | *Cuon alpinus* | Dhol | Wild Dog | II/EN | | * |
| 8 | *Felis chaus* | Ranmanjar | Jungle cat | II/LC | * | * |
| 9 | *Funambulus tristriatus* | Khar | Five striped palm squirrel | IV/LC | * | * |
| 10 | *Gazella bennettii* | Chinkara | | I | * | * |
| 11 | *Herpestes edwardsi* | Mongoose | Common mongoose | LC | * | * |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12 | *Hyaena hyaena* | Hyaena | | III | * | * |
| 13 | *Hystrix indica* | Indian Porcupine | | II | * | * |
| 14 | *Lupus nigricollis* | Sasa | Indian hare | IV/LC | | * |
| 15 | *Melursus ursinus* | Sloth bear | | I | * | * |
| 16 | *Panthera tigris* | Tiger | Tiger | I | | * |
| 17 | *Panthera pardus* | Tendua | Panther | I | | * |
| 18 | *Presbytis entellus* | Langur | | II | * | * |
| 19 | *Presbytis pileatus* | Common langur | | II | * | * |
| 20 | *Rhesus macaque* | Bandar | Monkey | II/LC | | * |
| 21 | *Sus scrofa cristatus* | Randukkar | Wild boar | III/LC | * | * |
| 22 | *Tetracerus quadrieornis* | Four Horned Antilope | | I | * | * |
| 23 | *Vulpes bengalnesis* | Indian Fox | Indian Fox | II/LC | | * |
| Total | | | | | 13 | 23 |

**AVES:**

| Sr. No. | Scientific name | Vernacular name | Common name | Schedules of Wildlife Act/ IUCN Status | CORE | BUFFER |
|---|---|---|---|---|---|---|
| 1 | *Acridotheres tristis* | Salunki | Indian myna | IV | * | * |
| 2 | *Alauda gulgula* | Turrebaj chandol | Oriental skylark | IV/LC | | * |
| 3 | *Ardeola grayii* | Vanchak | Pond heron | IV/LC | * | * |
| 4 | *Columba livia* | Parva | Blue rock pigeon | LC | * | * |
| 5 | *Corvus splendens* | Kawala | House crow | LC | * | * |
| 6 | *Coturnix coturnix* | Rakhi durlav | Grey quail | IV/LC | | * |
| 7 | *Francolinus pondicerianus* | Chitur | Grey francolin | IV/LC | | * |
| 8 | *Lanius vittatus* | Khatik | Baybacked shrike | LC | | * |
| 9 | *Passer domesticus* | Chimni | House sparrow | LC | * | * |
| 10 | *Pavo cristatus* | mor | Peacock | I | * | * |
| 11 | *Psittacula krameri* | Popat | Roseringed parakeet | IV/LC | * | * |
| 12 | *Saxicoloides fulicata* | Chirak | Indian robin | LC | * | * |
| 13 | *Streptopelia senegalensis* | Hola | Laughing dove | IV/LC | | * |
| Total | | | | | 8 | 13 |

**HERPATOFAUNA:**

| Sr. No. | Scientific name | Vernacular name | Common name | Schedules of Wildlife Act/IUCN Status | CORE | BUFFER |
|---|---|---|---|---|---|---|
| 1 | *Calotes versicolor* | Sargota | Common garden lizard | LC | * | * |
| 2 | *Eryx conicus* | | Red sand boa | IV | * | * |
| 3 | *Mabuya carinata* | Sapsoli | Common skink | LC | * | * |
| 4 | *Naja naja* | Nag | Cobra | II/LC | | * |
| 5 | *Ptyas mucosa* | Dhaman | Common rat snake | II/LC | | * |
| 6 | *Python molurus* | | Rock python | I | * | * |
| 7 | *Rana hexadactyla* | Beduk | Indian Pond Frog | IV/NA | * | * |
| 8 | *Rana tigerinus* | Beduk | Indian Bull Frog | IV/LC | * | * |
| **Total** | | | | | **6** | **8** |

(Source: Primary Survey & Secondary Data)

Note:- NA= Not yet assessed, LC=Least Concern, VU= Vulnerable.

**PISCES:**

| Sr. No. | Scientific name | Vernacular name | Common name | IUCN STATUS | CORE | BUFFER |
|---|---|---|---|---|---|---|
| 1 | *Ambasis nama* | Zanjad | Indian glassy fish | NA | | * |
| 2 | *Ambasis ranga* | Zanjad | Indian glassy fish | NA | | * |
| 3 | *Barilius barna* | Batri | River carp baril | LC | | * |
| 4 | *Catla catla* | Katla | Major Carp | LC | | * |
| 5 | *Channa striatus* | Dhadak | Banded snake head | LC | | * |
| 6 | *Cirrhinus mrigala* | Naren | Major Carp | LC | * | * |
| 7 | *Clarius batracus* | Mangur | Magur | NA | | * |
| 8 | *Cyprinus carpio* | Cipla | Cipla | VU | | * |
| 9 | *Gambusia affinis* | Machar Machli | Mosquito fish | LC | | * |
| 10 | *Glossigobius girus* | Kaddu | Tank gobi | NA | | * |
| 11 | *Heteropneustes fossilis* | Ingur | Stinging cat fish | LC | | * |
| 12 | *Labeo rohita* | Rohu | Common carp | LC | * | * |
| 13 | *Labeo calbasu* | Black rohu | Calbasu | LC | | * |
| 14 | *Mastacembelus armatus* | Bamb | Spiny eel | LC | | * |
| 15 | *Mystus cavasius* | Singara | Cat fish | LC | | * |
| 16 | *Mystus seenghala* | Katwa | Gangatic mystus | LC | | * |

| Sr. No. | Scientific name | Vernacular name | Common name | IUCN STATUS | CORE | BUFFER |
|---|---|---|---|---|---|---|
| 17 | *Nandus nandus* | Dukkar | Leaf fish | LC | | * |
| 18 | *Osteobrama cotio* | Bhondu | Cotio | LC | | * |
| 19 | *Punctius amphibious* | Ghuruti | Scarlet Banded barb | NA | | * |
| 20 | *Rita rita* | Bhokhi | Rita | LC | | * |
| 21 | *Salmostoma bacaila* | Chal | Silver fish | LC | | * |
| 22 | *Tor khudree* | Mahseer | Deccan Mahaseer | LC | | * |
| 23 | *Xenentodon cancilla* | Chocha | Needle fish | LC | | * |
| Total | | | | | 2 | 23 |

(Source: Primary Survey & Secondary Data)

Note: NA= Not yet assessed, LC=Least Concern, VU=Vulnerable.

**BUTTERFLIES:**

| Sr. No. | Scientific name | Vernacular name | Family | IUCN STATUS | CORE | BUFFER |
|---|---|---|---|---|---|---|
| 1 | *Ariadne merione* | Common caster | Nymphalidae | NA | * | * |
| 2 | *Catopsillia piranthe* | Mottled emigrant | Pieridae | NA | | * |
| 3 | *Catopsillia pomona* | Common emigrant | Pieridae | NA | * | * |
| 4 | *Cepora nerissa* | Common gul | Pieridae | NA | | * |
| 5 | *Chilades pandav* | Plain cupid | Hesperiidae | NA | * | * |
| 6 | *Danaus chrysippus* | Plain tiger | Nymphalidae | LC | | * |
| 7 | *Euploea core* | common indian crow | Nymphalidae | LC | | * |
| 8 | *Eurema hecabe* | Common grass Yellow | Pieridae | NA | | * |
| 9 | *Hypolimnas misippus* | DANNAID EGG FLY | Nymphalidae | NA | * | * |
| 10 | *Junoniya arithya* | Blue pansy | Nymphalidae | NA | | * |
| 11 | *Junoniya iphita* | Chocolate pansy | Nymphalidae | NA | | * |
| 12 | *Junoniya lemonias* | Lemon pansy | Nymphalidae | NA | | * |
| 13 | *Leptotes plinius* | Zebra blue | Lycaenidae | NA | | * |
| 14 | *Melanitis leda* | Common evening brown | Nymphalidae | LC | | * |
| 15 | *Pachliopta aristolochiae* | Common rose | Papilionidae | LC | | * |
| 16 | *Papilio demoleus* | Lime | Papilionidae | NA | | * |
| 17 | *Papilio polytes* | Common mormon | Papilionidae | NA | * | * |
| 18 | *Prosotas nora* | common line blue | Hesperiidae | NA | | * |
| 19 | *Tirumala limniace* | Blue tiger | Nymphalidae | NA | * | * |
| Total | | | | | 6 | 19 |

(Source: Primary Survey & Secondary Data)

Note:- NA= Not yet assessed, LC=Least Concern, VU= Vulnerable.

| Class | Core Zone | Buffer Zone | TOTAL |
|---|---|---|---|
| **Mammals** | 13 | 23 | 23 |
| **Herpatofauna** | 6 | 8 | 8 |
| **Aves** | 8 | 13 | 13 |
| **Pisces** | 2 | 23 | 23 |
| **Butterfly** | 6 | 19 | 19 |
| | 35 | 86 | 86 |

## ENDANGERED FLORA:

No endangered or endemic flora was recorded from core and buffer zone of the project area.

## ENDANGERED FAUNA:

A total of 86 faunal species documented through primary and secondary data which could be seen in the vicinity of the project site as well as 10 km area radius following schedule -I species as per WPA 1972 has been listed within the study area (**Table 2.6**).

**Table 0.5: List of Schedule –I species as per WPA, 1972**

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 1 | *Antilope cervicapra* | Blackbuck | VU / I |
| 2 | *Bos gaurus* | Indian Gaur / Bison | VU / I |
| 3 | *Canis aureus* | Golden Jackal | LC / I |
| 4 | *Canis lupus pallipes* | Indian Wolf | VU /I |
| 5 | *Rusa unicolor* | Sambar | LC / I |
| 6 | *Felis chaus* | India Jungle Cat | NT / I |
| 7 | *Herpestes auropunctatus* | Small Indian mongoose | LC / I |
| 8 | *Herpestes edwardsi* | Common mongoose | LC / I |
| 9 | *Hyaena hyaena* | Striped Hyaena | DD / I |
| 10 | *Hystrix indica* | Indian crested porcupine | LC / I |
| 11 | *Melursus ursinus* | Sloth Bear | VU /I |
| 12 | *Moschiola meminna* | Mouse Deer | VU / I |
| 13 | *Muntiacus muntjak* | Barking Deer | LC / I |
| 14 | *Panthera pardus* | Leopard | VU /I |
| 15 | *Panthera tigris* | Tiger | EN /I |
| 16 | *Paradoxurus hermaphroditus* | Common Palm civet | LC /I |
| 17 | *Prionailurus bengalensis* | Leopard Cat | NT / I |
| 18 | *Tetracerus quadrieornis* | Four Horned Antilope | VU / I |
| 19 | *Viverricula indica* | Small Indian civet | NT / I |
| 20 | *Vulpes bengalensis* | Bengal Fox | LC / I |
| 21 | *Accipiter badius* | Shikra | LC / I |
| 22 | *Amandava formosa* | Green Munia | LC / I |

| | | | |
|---|---|---|---|
| 23 | *Gallus sonneratii* | Grey Jungle Fowl | LC / I |
| 24 | *Hemiprocne coronata* | Crested Tree Swift | LC / I |
| 25 | *Pavo cristatus* | Peacock | LC / I |
| 26 | *Pericrocotus cinnaimomeus* | Small Minivet | LC / I |
| 27 | *Sterna aurantia* | River Tern | LC / I |
| 28 | *Naja naja* | Spectacled Cobra | LC / I |
| 29 | *Ptyas mucosus* | Rat Snake | LC / I |
| 30 | *Python molurus* | Rock Python | NT / I |
| 31 | *Varanus bengalensis* | Bengal Monitor Lizard | LC / I |
| 32 | *Vipera russelli* | Russel's Viper | VU / I |
| 33 | *Fowlea piscator* | Checkered keelback snake | NT / I |

As per survey we have not seen any direct evidences about presence of these scheduled animal within the study area because more than 3 mining projects are already operational within study area and major land use of area is agriculture. Very small patches between human habitation and agricultural land indicate that this area is quite disturbed area for such wildlife.

But during survey, the discussion from the local persons about panther / tiger incident were reported in the past and presence are mentioned in working plan of Pandhar Kawada Forest division. The National Tiger Conservation Authority in collaboration with the Wildlife Institute of India has published a document titled "Connecting Tiger Populations for Long-term Conservation", which has mapped out 32 major corridors across the country,

Proposed project area does not fall in well-established 32 corridors of country. However, WII and NTCA in its publication of Atlas of Tiger Corridor of Eastern Vidarbh Land scape indicated connectivity between different Tiger Reserve in their study.

**The above lists have been updated as per updated Wildlfie( Protection) Act 1972 is furnished in appendix1 on page number 58-65**

# Chapter 3: Tiger Corridor and its Importance

Wildlife Corridors/ tiger corridor can be defined as a linear habitat, embedded in a dissimilar matrix, that connects two or more large blocks of habitat and that is proposed for conservation on the premise that it will enhance or maintain the viability of specific wildlife populations in the habitat blocks

These wildlife corridors serve as 'links' to allow the wildlife populations to migrate to the 'sources', where the population can survive and breed. Together, they provide the habitats upon which the conservation of much of the flora and fauna in developed landscapes ultimately depends. Although corridors may have intrinsic habitat value, their salient wildlife value is that they connect more substantive patches of habitat. The dispersal of populations over distant habitats enhances the chances of survival of species due to a reduction in competition for food and space. If species are not restricted to smaller areas then the localized extinction of a population will not occur due to an outbreak of epidemics as well as natural calamities such as floods or forest fires. In the long run, the chances of extinction of populations due to excessive inbreeding are also reduced. The loss of wildlife corridors also results in a steep escalation in human-wildlife conflict. Some wildlife corridors are of immense importance as they are crucial for the long-term survival of wildlife, including threatened species such as the Indian tiger (*Panthera tigris*). Areas linking one tiger reserve or protected area with another tiger reserve or protected area are not diverted for ecologically unsustainable uses, except in public interest and with approval of the National Board for Wildlife and on advice of the National Tiger Conservation Authority as per Section 38 O (1) (g) of the Wildlife (Protection) Act, 1972.

## 3.1 Tiger Corridor of India

India is committed to secure the livelihoods of its citizens while simultaneously minimizing its impact on its wildlife conservation goals. The National Tiger Conservation Authority in collaboration with the Wildlife Institute of India has published a document titled "Connecting Tiger Populations for Long-term Conservation", which has mapped out 32 major corridors across the country, management interventions for which are operationalized through a Tiger Conservation Plan, mandated under section 38V of the Wildlife (Protection) Act, 1972. Proposed project area does not fall in well-established 32 corridors of country nor it is a part of WII and NTCA's publication "Atlas of Tiger Corridor of Eastern Vidarbha Land scape".

## 3.2 Corridor identified in Telemetry Study by WII

Wildlife Institute of India has published a report titled "Telemetry based Tiger Corridors of Vidarbha Landscape, Maharashtra, India" (WII Report). This report is about the delineation/identification of critical tiger corridors in Vidarbha Landscape of Maharashtra. The report is based on monitoring of tiger movement over a long period of time, from 2015 to 2020. which has identified 37,067 square kilometres of tiger

movement corridors within the 97,321 square kilometre landscape, revealing the importance of agricultural lands and human-dominated areas for tiger movement. This area with significant Landscape acts as a crucial link between central and southern Indian tiger populations, facilitating gene flow and population viability.

***Yes it is true that total of 146.996 ha of forest land out of 339.467 ha of the proposed coal block mining covered under the forest compartments passes through compartments of forest land which are covered under approved Tiger Conservation Plan (TCP) of Tadoba Andhari Tiger Reserve (TATR) within the modelled tiger corridor as per the publication "Telemetry based tiger corridors of Vidarbha Landscape.***


**Boundary shown in yellow is the Location of proposed mine along the identified Tiger Corridor under the 'Telemetry based tiger corridors of Vidarbha Landscape, Maharashtra, India'**

# Chapter 4: Need of the project

Coal is one of the major mineral deposits occurring in the Indian sub-continent. It has played a great role in industrial development. There is a significant demand- supply gap in coal which is a key raw material for production of power. It is therefore necessary to increase the production of coal for power generation to make the country self-sufficient in power sector to maintain pace of sustainable industrial development. The government is also providing various subsidies to industrial sector to help Indian industry to grow.

The occurrence and production of coal in the proposed project area will be supplied for steel production and power generation which in turn would result in increasing employment potential, improvement in infrastructure, communication network, and socioeconomic development of the project region.

The Yavatmal region, where the project is located is mostly dependent on agriculture, forest and mineral resources where coal & limestone have a major share. The development of mining in the area will expected to make significant contribution directly and indirectly to the overall socio-economic development in term of employment generation, infrastructure, health medical facilities, water supply & sanitation etc.

# Chapter 5: Impact of proposed project on biodiversity

The Construction phase involves Site cleaning, Excavation, Construction, Erection or Installation of equipment & machinery, Transportation, Material Handling, etc. During site clearance, the existing trees will have to be removed from the proposed mining area and plant site. Tree cutting will be carried out by the forest department. Dust generated during excavation and construction operations may get deposited on the surrounding vegetation thereby affecting the plant growth. Noise generated during construction operation and due to transport vehicles may drive wild animals away from the plant site. The lights during night time may also disturb the wild animals and may change the behaviour pattern of the animals. Development and working of the mine in the forest area will result in loss of the natural ecosystem standing on the land. Removal of all vegetation from the area required for mining and other purposes alters the availability of food and shelter for faunal population. Increase in turbidity due to runoff from overburden dumps and addition of suspended solids from the other activities will deteriorate the water quality if discharge is allowed without any treatment. Due to mining and associated activities, fugitive dust in the atmosphere may deposit on different parts of the plants in the surrounding area leading to the damage to the flora. During operation phase, various vehicle/ machinery movement and blasting activities would create excessive noise that may force the movement of animals from nearby forest patches. The impacts will be minimized by opting for plantation with locally available varieties of species to make up for the lost vegetation. The impact of flora will be limited to core zone only as there will not be any removal of vegetation outside the core zone. There is no Wildlife Sanctuary or National Park in 15 Km radius of the Marki Mangli-II coal mining project. Tipeshwar is nearest Wildlife Sanctuary is at distance 30 km. Hence, no impact due to mining and allied activities is envisaged from this project. There is no reported migratory path of wildlife or bird species of threatened or protected species. The transport route of the mineral also lies away from these areas. Plantation activities and creation of water reservoir at the conceptual stage will help to improve the biodiversity of the area. Mining activities though limited to core zone but the impact of noise and blasting vibration as well as movement of vehicle movement may have significant effect on the forest surrounding the mine. Such impact can be minimized only by adoption of various control measures such as controlled blasting, creation of thick green belt around the mining lease with 3 tier arrangement of local trees. M/s YIPL will support Forest Department officials for development of Water holes in reserved forest patches. In addition awareness programs for the workers and villagers will be held on regular basis to highlight importance of protection of forest, use of clean fuel instead of firewood (collection of illicit firewood from forest is reported from the area), supply of gas connection to the needy families etc. Support to Gram panchayat in creation of grassland in village land will also be given to reduce intrusion of cattle's in adjoining forest for food.

## 5.1 Impact of Proposed Mining on Flora and Fauna:

Out of the 339.467 Ha of MLA the forest land is about 146.996 Ha, Private agricultural and is 185.041 Ha and 7.43 ha land is of non-forestry government land. Since the proposed mining is by O/C method, excavations are proposed in the mining lease area. MLA will be excavated in yearly plan wise method mentioned in the approved mining plan. It means not all MLA will be disturbed form the opening of coal mining, some mine lease area will be used for Top soil dump and for OB dump details are in the mining

plan. Major part of MLA is Forest land where scrub vegetation present and it will be removed at the place where mining start and with this proper plantation at safety zone and both side of the approach road will be done prior to mining activity begins as per the specific condition mentioned in the EC Letter. FC application has been submitted for the FC Clearance and proper wildlife mitigation plan & wildlife conservation plan has been submitted to the competent authority for approval. The wildlife conservation plan has been approved by the competent authority. Agricultural land of MLA will be converted into the mining area which will be impacted on the crop productivity at least for the life of mine. A part of the generated overburden will be further crushed and screened for the sand generation in a Sand segregation plant installed in Mine Lease area. A major portion of OB generated will be utilised for backfillng in decoaled voids. A void of 51.78 Ha shall remain at the end of mining activities which will be used for ground water recharge of the area, pisiculture and tourist attraction spot water park for picnic. As per the specific point on TOR it is clearly mentioned that the Tar approach road will be made for transportation of produce and a concrete road with Wind Barrier Wall & Vertical Greenery along the transport road connecting SH has been proposed for the purpose in the report, hence it is anticipated there will be no major impact in the local area due to fugitive dust emission. This area is known for mining activity and currently 2- coal mining projects are already operational in the vicinity, thus there will be an additional impact on the vehicular traffic density on the existing road when this mining will also become operational, hence there is a need of having alternate route for the transportation to minimize the traffic load on the existing route and this issue has been brought to the knowledge of Competant State Government Authority during Public Hearing. After the mining activity finished this area will be developed as good woodland area with major water reservoir to increase their scenic beauty and aesthetic value. Transportation will be done by covered tippers of 25 tonne capacity within the ML area to minimize the number of trip and less pollution due to transportation. Due to increase in the human activities, negligence etc, forest fire may take place, though otherwise also, it is quite common in tropical forest. Fire in such type of deciduous forest is mostly anthropogenic in origin. Necessary measures shall be undertaken to control occurrences of such incidences. Spreading of obnoxious weeds prevents rejuvenation of the forage thereby effecting the food and shelter. Necessary control measures to avoid spreading of weeds shall be undertaken. The smoke emanated from burning of coal, fuel wood in rural areas is one of the sources of air pollution particularly in the coal bearing areas. Awareness and promotion of gas for domestic / commercial purposes is proposed by M/s Yadzani International Pvt Ltd in CSR activities. The Man Animal Conflict is a general impact where any development is undertaken. Occurrence of major wildlife is not reported from the nearby areas. The proposed plantation within the mining lease as well as outside the mining lease under CSR and Avenue plantation will help in creation of habitats for various faunal assemblage thereby adding to richness of biodiversity.

# Chapter 6: Sustainable Mining: Right Key for mitigation of negative impacts of mining

Mineral development has a close interface with the issues of environment, development, welfare of local (indigenous) communities and poverty alleviation and its sustainability is crucial for the promotion of inclusive growth. Emerging Issues in India's Mineral Sector' has identified the following elements for Sustainable Mining:

- Scientific Mining
  - Mine planning
  - Methods of mining
  - Level of mechanization
  - Technology upgradation
  - Availability, depletion and conservation of mineral resources
  - Mine closure planning and target-setting
  - Progressive implementation of mine closure plan and commitment to rehabilitation
- Environmental protection and mitigation
  - Land use
  - Water use and efficiency
  - Energy use and efficiency
  - Waste minimization
  - Tailings management
  - Air pollution, liquid effluents and solid wastes
  - Dust management
  - Noise and vibration control
  - Biodiversity loss and mitigation
  - Environmental compliance and voluntary activities
  - Conformity to environmental management standards (eg. ISO-14001)
- Community stakeholder engagement
  - Policy on and extent of stakeholder involvement in mining operations
  - Mechanisms of stakeholder participation/consultations in decision-making
  - Procedures for attending to stakeholder grievances and concerns
  - Engagement procedures and principles in respect of indigenous people (adivasis)
  - Policy on business ethics
  - Approach to bribery and competition
  - Resettlement of communities affected by mining project
- Local socio-economic development in mining project areas
  - Policy on and procedure for assessing socio-economic impact of mining operations in a project area
  - Mechanisms and procedures for preparing and implementing area development plans and projects
  - Plans for generating local community income
  - Investments in community and mineral wealth distribution
  - Contribution to local employment
  - Level of commitment to education, training and skill development
  - Contribution to the development of physical infrastructure in mining area
- Transparency and Accountability
  - Policy on and approach to public disclosure of key elements of enterprise performance
  - Nature and effectiveness of the reporting system

# Chapter 7: Integrating Biodiversity Enhancement with Mining Activity

## 7.1 During Project Development

In the early stages of exploration, impacts on biodiversity are limited, although they can become more significant as exploration progresses. At a macro-level, however, assuming exploration efforts identify economically viable mineral deposits, the initial choice of exploration area can have a profound long-term influence on the impacts on biodiversity. Therefore even at this very early stage it is critically important to have some appreciation of likely long-term interfaces with biodiversity. At this stage, companies should begin to develop an appreciation of the overall biodiversity importance of the area within which exploration is being undertaken by reviewing legal provisions relating to biodiversity and mapping the occurrence of protected areas.

Following practices are proposed for limiting impacts on biodiversity during exploration include:

- Limiting land clearing by using technologies and mining practices that minimize habitat disturbance; Keeping mandatory safety zone of 7.5 meter is sound practice to create green belt to reduce noise and arrest dust from getting airborne outside the work area,
- Avoiding road building wherever possible by using existing tracks – Incidentally mine area is well connected to pucca road and hence no new road is required to be constructed for transportation of ore;
- Using lighter and more efficient equipment to reduce impacts on biodiversity;
- Positioning drill holes and trenches away from sensitive areas;
- Capping or plugging of drill holes to prevent small mammals from becoming trapped;
- Removing and reclaiming roads and tracks that are no longer needed;
- Using native vegetation to revegetate land cleared during exploration.

## 7.2 During Mining Operation

The major potential impacts of ancillary infrastructure occur during design and construction, although a number of operational considerations are also relevant to biodiversity. The potential impacts associated with water and sanitation infrastructure are also present during operations and were dealt with earlier. While the major impacts occur during construction, the continuing presence of physical barriers can present a threat to migratory animal species.

Biodiversity may also be affected by maintenance activities, particularly weed and pest control. This can be minimized by implementing an integrated pest management or integrated vector management approach for all pest management activities. This advocates the use of alternative approaches to chemical controls in the first instance.

The primary impacts on biodiversity result from land clearance for the pit, access routes, and progressive expansion into new areas. Typically, mines undergo many expansions in area and capacity, generating a sequence of events that can be the equivalent of new mines being started, so there may also be a requirement to conduct a new Environmental and Social Impact Assessment or update the initial ESIA.

## 7.3 During Closure

Achievable objectives and targets for biodiversity re-establishment are essential to give the company a framework on which to base its rehabilitation program and to provide measurable standards against which regulatory authorities and other stakeholders can determine whether the company has met all necessary requirements prior to mine closure and lease relinquishment.

The establishment of closure targets and objectives is not a one-shot desk-based exercise; it should be developed through a dynamic and iterative process involving mining stakeholders. When setting biodiversity objectives and targets, the following aspects should always be taken into account:

- Relevant regulatory requirements and other guidelines
- Effective consultation with key stakeholders
- Competing interests need to be understood and reconciled
- All available information on biodiversity
- Technical limitations
- Pre-mining land uses and the extent of biodiversity degradation
- Whether mitigation or enhancement is intended
- Post-mining land tenure and land uses
- Minimizing secondary impacts
- Other opportunities for biodiversity improvement

# Chapter 8: Mitigation Measures for Environmental Impact

- Control water and air pollution: The water accumulated within the mining area is likely to be muddy due to presence of large amount of dust and soil. Strategy will be developed to check the mixing of contaminated water with nearby water source. Mining activity involves use of Heavy Earth Moving Machinery (HEMM) and vehicles. The movement of vehicles laden with ore caused air pollution because of dust flying in the area. Care will be taken to cover these trucks with tarpolin to avoid dust getting airborne and frequent water sprinkling on haul roads, loading and unloading points and crusher sites.
- Control of Noise pollution: Operation of heavy machinery and blasting in the mining area produces large amount of sound which may cause disturbance to wild animals. Periodic maintenance of these machines is important to control the noise levels. No mining, blasting or transportation will be allowed from 6 pm to 6 am. Control Blasting may be resorted and need to be monitoring on daily basis and keep record for surveillance. Development of green belt along the project area is an effective strategy to control the noise pollution. It is suggested that a green belt needs to be developed in the safety zone of 7.5m along the mine lease area. Only native trees must be planted in the safety area (Annexure 7). No mining operation must be carried out in this zone; rather dense plantation of evergreen trees must be carried out. This will provide a natural screen between the mine and the adjoining area thus reducing the nuisance caused by noise and dust in the vicinity of the mine.
- Waste Management: Mining process involves movement of large number of work force and vehicles within the mining area, a large quantity of waste and garbage is generated in the mining area. The garbage includes solid waste such as over burden, mine waste, sub-grade ore, some amount of bio degradable waste and hazardous waste such as used oil, used batteries, oily sludge, filter materials containing oil are likely to be generated within the project area. These materials will create pollution leading to various health problems for wild animals. So, proper handling & management is suggested to avoid such contamination/pollution.

**Solid waste Management: The only significant solid waste in mine is overburden and is fully utilised in Backfilling and Dumps. Detail Management of the OB and associated pollution is as under**

**Overburden dumps management:**

The management of overburden dumps involves the following:

- Stabilization of overburden dumps;
- Construction of retaining boulder walls;
- Construction of garland drains for drainage;
- Provision of jute mesh/ Geotex lining to facilitate grass or vegetative growth on slopes;

- Provision of good soil mixed with manure and subsequent watering for growth of grass for anchorage on slopes. Plantation mixed with indigenous and fast growing plant species;
- Degraded area will be reclaimed and rehabilitated in a phased manner with local plant species;
- Transport roads will be planted with trees on either side.
- The Sand Segregation Plant will be having fully covered crusher units, fully covered vibrating screens to reduce air borne dust.
- In addition the processing of OB to sand involves use of hydrocylones wherein water is used and thus eliminating the sources of air pollution.
- Transportation of sand is proposed in tarpaulin covered trucks, thereby making the pollution from this transportation insignificant.
- Some successful control techniques used for haul roads are dust suppressant application, paving, route modifications, and soil stabilization; for conveyors, covering and wet suppression; for storage piles, wet suppression, windbreaks, enclosure, and soil stabilizers; for conveyor and batch transfer points, wet suppression and various methods to reduce freefall distances (e. g., telescopic chutes, stone ladders, and hinged boom stacker conveyors); and for screening and other size classification, covering and wet suppression.
- Wet suppression techniques include application of water, chemicals and/or foam, usually at crusher or conveyor feed and/or discharge points. Such spray systems at transfer points and on material handling operations have been estimated to reduce emissions 70 to 95 percent. Mist Spray systems can also reduce loading and wind erosion emissions from storage piles of various materials 80 to 90 percent. Control efficiencies depend upon local climatic conditions, source properties and duration of control effectiveness. Wet suppression has a carryover effect downstream of the point of application of water or other wetting agents, as long as the surface moisture content is high enough to cause the fines to adhere to the larger rock particles.

**Surface Water Pollution Control Measures:**

Retaining walls will be provided at the toe of dumps to prevent wash off from dumps and sliding of material from benches. This will help in preventing siltation of water drains/channels;

- Water channels/drains carrying the rain water from the mine will be provided with baffles and settling pits to arrest the suspended solids;
- Worked out slopes will be stabilized by planting appropriate shrub/grass species on the slopes. This will help in preventing wash-off of dump from these slopes;
- The mine water will be regularly tested and appropriate measures will be taken in case any element is found exceeding the limits prescribed by CPCB.

- Seepage water and rain water collected in the open pits will be pumped out and used for dust suppression, plantation and in beneficiation process. Excess water, if any, will be discharged into natural drainage system after de-silting in settling ponds.
- The probable cause of surface water pollution in the proposed mining area will be soil erosion and wash off from the waste dumps and mineral stock yards in monsoon season. The run-off water during monsoon season flows through natural water courses into nallas. The surface water entering into the mine during rainy season will be diverted through suitable drains to reduce the wash off of soil. The general drainage direction in the working area will be towards the mine sump, for collection of water. The water will be utilized for greenbelt development, mining operation, which will reduce the fresh water requirement.
- Adequate measures to protect the mine during rains will be taken by providing garland drains around the mine excavations and also providing suitable drainage gradients for mine benches. Sumps of adequate capacity will be provided on the quarry floor.

**Following control measures will be adopted to check the wash-off from soil erosion:**

- Plantation of shrubs on down slope of overburden dump;
- Stabilizing road cutting
- Providing suitable drainage system to prevent surface water from entering into mines directly;
- Providing sufficient number of retaining walls/check walls at OB dump
- Diverting natural drains through the undisturbed areas and connecting to local natural nalla.

**Ground Water Pollution Control Measures:**

- The domestic sewage from the canteen and toilets will be routed to Sewage Treatment Plant (STP). Adequate maintenance of the STP will be carried out to avoid choking with sludge.
- Regular monitoring of water levels and quality of water in the existing open wells and bore well in the project area to study the hydrology of the area. If necessary, additional observation wells will be sunk for monitoring the water table levels and water quality around the mine both in the upstream and downstream. Opencast mine will act as natural rain water harvesting structure. Rain water falling within the active mine area shall be collected in the mine sump and treated for reuse.

**Water Security Plan (WSP):**

Agriculture in the area is characterized by wasteful use of groundwater through low-efficiency irrigation practices, leading to drinking water shortage even in normal

summers. The area with single crop farming, has failed to utilize its groundwater resources. The agricultural drought is often the result of cropping patterns, which are determined on anticipation of average rainfall and rarely factor rainfall variations. The pattern of rainfall indicates that there is rainfall of 50 60 days/year. 90% of the rainfall is received during the months of June-August of every year. The intensity of rainfall at this time is high leading to high surface run-off. There is considerable scope to improve the out-put per ha in agriculture sector in the project area by integrating the development of land and water resource. The water harvesting on the principles of watershed management and groundwater recharge techniques need to be implemented in these regions. It is proposed to prepare Water Security Plan for adjoining villages (three villages namely Bhendala, Savali, and Ruikot) WSP aims for drinking water security in selected villages by means of

- Ensuring Quality and quantity of water supply, storage management (aquifer management, demand management), capacity building and training.
- Providing futuristic plan in maintaining sustainable use of water for at least for next 10 years.
- Avoid duplicity of different schemes and provide scope of participation of the local public for their self-reliance.
- The objectives of WSP will include current requirement of water for the villages, practices of water management, and overall development of the selected village in terms of water management.

| Year/Stage | | OB Removal | | | External Dump | | Internal | | Embankment | |
|---|---|---|---|---|---|---|---|---|---|---|
| (Life of the mine plus post closure) | | (Cumulative) | | | (Cumulative) | | (Cumulative) | | (Cumulative) | |
| post closure period) | | Top Soil | OB | Total | Top Soil | OB | Top Soil | OB | Top Soil | OB |
| Up to Base year | 2026 | 0.07 | 0.35 | 0.42 | 0.07 | 0.35 | 0 | 0 | 0 | 0 |
| Y-1 | 2026-27 | 0.22 | 1.85 | 2.07 | 0.22 | 1.33 | 0 | 0.52 | 0 | 0 |
| Y-3 | 2028-29 | 0.54 | 4.73 | 5.27 | 0.54 | 3.41 | 0 | 1.32 | 0 | 0 |
| Y-5 | 2030-31 | 1.03 | 7.52 | 8.55 | 0.54 | 5.71 | 0.49 | 1.81 | 0 | 0 |
| Y-10 | 2035-36 | 1.38 | 15.86 | 17.24 | 0.54 | 9.41 | 0.84 | 6.33 | 0 | 0.12 |
| Y-15 | 2034-35 | 1.72 | 27.24 | 28.96 | 0.54 | 9.41 | 1.18 | 17.71 | 0 | 0.12 |
| Y-20 | 2045-46 | 1.97 | 40.99 | 42.96 | 0.54 | 9.41 | 1.43 | 31.46 | 0 | 0.12 |
| Y-25 | 2050-51 | 2 | 56.71 | 58.71 | 0.54 | 9.41 | 1.46 | 47.18 | 0 | 0.12 |
| Y-30 | 2055-56 | 2.05 | 72.41 | 74.46 | 0.54 | 9.41 | 1.51 | 62.88 | 0 | 0.12 |
| Y-34 | 2059-60 | 2.15 | 84.91 | 87.06 | 0.54 | 9.41 | 1.61 | 75.38 | 0 | 0.12 |
| Post Closure | | | | | | | | | | |
| Y-39 | 2064-65 | 2.15 | 84.91 | 87.06 | 0.54 | 9.41 | 1.61 | 75.38 | 0 | 0.12 |

# Chapter 9: Mitigation Measures for Impact on Wildlife and Biodiversity

## 9.1 Objectives of mitigation to address issues of wildlife conservation

Due to the mining operation 151 ha of forest (add additional adjoining areas keeping 50 meter buffer) area will not be available for use by the wild animals till the mining is completed as per mine closure plan. Mine closure land use is presented in Annexure 5. The objective for the project area will therefore be:

- Ensure wildlife safety especially during mining.
- Ensure ecological restoration of the mined out area.
- To provide safe spill over corridors for wildlife from Impact Area to relatively rich neighboring forest areas.
- Ensure wild life habitat restoration during and post mine closure plan
- Strict compliances and monitoring of environment mitigation measures especially air, water and noise.
- Lawful compliances of Wild Life Protection Act under section 83 (O) (1) (g) as well as compliances of the conditions imposed under Environment Clearance issued to the project by Ministry of Environment, Forest and Climate Change, GOI.

## 9.2 Strategies to mitigate the adverse impacts on wildlife

In order to reduce the impact of the proposed Manganese Ore mining projects of M/s Yazdani International Private Limited, Bhubaneswar at Marki Mangli II Coal Mine on environment and around wildlife areas, following mitigation measures are suggested. The financial provision to be made available for implementation of following measures is given in Annexure 6.

Habitat must to be developed as a gradual process side by side with the mining activity.

Strategies within the project area:

- Soil and moisture conservation: Mining activity in the proposed area will involve clearing of vegetation. Mining activity will also involve removal of top soil. Due to removal of vegetation cover and top soil, moisture in the soil tends to reduce. The following strategies will be to conserve as much moisture as possible.
  - Garland drains will be provided around the mine wherever required to arrest any soil from the mine area being carried away by the rain water.
  - Toe drains with suitable baffles will be provided all along the toe of the soil dumps to arrest any soil from the dump slopes being carried away by the rain water.
  - Bench levels will be provided with water gradient against the general pit slope, to decrease the speed of storm water and prevent its uncontrolled descent.
  - Gully formations, if any, on sides of the benches will be provided with check dams of local stone or sand filled bags. The inactive slopes will be planted with bushes, grass, shrubs and trees after applying top soil to prevent soil erosion.
  - Loose material slopes will be covered by plantation by making contour trenches at 2 m interval to check soil erosion both due to wind and rain.

- Retaining walls (concrete or local stone) will be constructed, around the stockpile or wherever required, to support the benches or any loose material as well as to arrest sliding of loose debris.
- Regular addition of manure and vegetative mulches in soil.

- Preventive steps for the animals not to fall in the Mine Pits: The mine pits are dug with very steep slopes. It is necessary to take preventive steps so that, the wild animals/ domestic animals do not fall in the mine pits. Therefore chain link fencing around the mine of height 3 meter is proposed to prevent wild life from falling into the mine pit. Another chain link fence of one meter height is prescribed on the inner side of the 7.5m green belt. Cattle trench around the mine outside the leasehold boundary would help in this direction besides chain link fencing.
- Restoration of soil dump: Slope instability and erosion is one of the major issue faced by the mining activity. The best solution to reduce this is stabilizing the slopes. In nature, vegetation is the best way to reduce the risk of slope failures and erosion. One of the most useful and environment friendly method for slope stabilization is bioengineering. Bioengineering, with respect to this topic, entails the use of living plants and other auxiliary materials for stabilization of hill slopes. For the purpose of slope stabilization, native species having deep root systems and simple propagation have to be chosen (Annexure 7). Geo-synthetic fabrics are also proposed for slope stabilization. These are porous and flexible material that increases the stability of slopes or any earthen structures. The most commonly used geo-synthetic fabric is called geotextile. Geotextiles are woven or non-woven synthetic polymers made of polyester, polyamide or polypropylene and polyethylene. These materials are highly resistant to biological and chemical degradation. One of the natural fibers commonly used as geotextile is jute. Plantation of agave along the slopes and adopting method of plantation of bigger trees developed in gunny bags would certainly help in reducing the soil erosion/ gully formation and ensure stability.
- Control of water pollution: To arrest the silt brought by surface runoff Catch drains will have to be constructed around the OB dumps which have their out let in siltation ponds made to collect these surface runoffs and mine water. At the toe of the dump Gabion wall need to be constructed to control siltation. A series of open drains will be provided on dump body to arrest surface run-off and prevent siltation. In order to discharge clean water outside the lease area provision for sedimentation tank within mine boundary is proposed. This sedimentation tank will arrest Total Suspended Solids (TSS) and other unwanted sediments. Siltation ponds will have to be properly designed and constructed to collect the runoff from the mine and allow its sedimentation. The water so collected can also be utilized for watering the mine area, roads, green belt development, etc.

- Surface Water Pollution Control Measures: Retaining walls will be provided at the toe of dumps to prevent wash off from dumps and sliding of material from benches. This will help in preventing siltation of water drains/channels;
    - Water channels/drains carrying the rain water from the mine will be provided with baffles and settling pits to arrest the suspended solids;

- Worked out slopes will be stabilized by planting appropriate shrub/grass species on the slopes. This will help in preventing wash-off of dump from these slopes;
- The mine water will be regularly tested and appropriate measures will be taken in case any element is found exceeding the limits prescribed by CPCB.
- Seepage water and rain water collected in the open pits will be pumped out and used for dust suppression, plantation and in beneficiation process. Excess water, if any, will be discharged into natural drainage system after de-silting in settling ponds.
- The probable cause of surface water pollution in the proposed mining area will be soil erosion and wash off from the waste dumps and mineral stock yards in monsoon season. The run-off water during monsoon season flows through natural water courses into nallas. The surface water entering into the mine during rainy season will be diverted through suitable drains to reduce the wash off of soil. The general drainage direction in the working area will be towards the mine sump, for collection of water. The water will be utilized for greenbelt development, mining operation, which will reduce the fresh water requirement.
- Adequate measures to protect the mine during rains will be taken by providing garland drains around the mine excavations and also providing suitable drainage gradients for mine benches. Sumps of adequate capacity will be provided on the quarry floor. Following control measures will be adopted to check the wash-off from soil erosion:
- Plantation of shrubs on down slope of overburden dump;
- Stabilizing road cutting
- Providing suitable drainage system to prevent surface water from entering into mines directly;
- Providing sufficient number of retaining walls/check walls at OB dump
- Diverting natural drains through the undisturbed areas and connecting to local natural nalla.

➢ Ground Water Pollution Control Measures: The domestic sewage from the canteen and toilets will be routed to Sewage Treatment Plant (STP). Adequate maintenance of the STP will be carried out to avoid choking with sludge. Regular monitoring of water levels and quality of water in the existing open wells and bore well in the project area to study the hydrology of the area. If necessary, additional observation wells will be sunk for monitoring the water table levels and water quality around the mine both in the upstream and downstream. Opencast mine will act as natural rain water harvesting structure. Rain water falling within the active mine area shall be collected in the mine sump and treated for reuse.

- Water Security Plan (WSP): Agriculture in the area is characterized by wasteful use of groundwater through low-efficiency irrigation practices, leading to drinking water shortage even in normal summers. The area with single crop farming, has failed to utilize its groundwater resources. The agricultural drought is often the result of cropping patterns, which are determined on anticipation of average rainfall and rarely factor rainfall variations. The pattern of rainfall indicates that there is rainfall of 50 60 days/year. 90% of the rainfall is received during the months of June-August of every year. The intensity of rainfall at this time is high leading to high surface run-off. There is considerable scope to improve the out-put per ha in agriculture sector in the project area by integrating the development of land and water resource. The water harvesting on the principles of watershed management and groundwater recharge techniques need to be implemented in these regions. It is proposed to prepare Water Security Plan for adjoining villages (three villages namely Bhendala, Savali, and Ruikot) WSP aims for drinking water security in selected villages by means of
    - Ensuring Quality and quantity of water supply, storage management (aquifer management, demand management), capacity building and training.
    - Providing futuristic plan in maintaining sustainable use of water for at least for next 10 years.
    - Avoid duplicity of different schemes and provide scope of participation of the local public for their self-reliance.
    - The objectives of WSP will include current requirement of water for the villages, practices of water management, and overall development of the selected village in terms of water management.
- Wildlife encounter in the project area: Small animals like squirrel, mongoose, and snakes may enter in to the area. The user agency will educate the labours and staff to protect these animals and not harm them. Contact details of snake rescuers in the area will be available with the security room. In case on snake encounter the staff will be trained to report the sighting to the security room.

**Strategies for area outside project boundary:**

- Plantation in Buffer Zone: Trees will be planted in the buffer zone also. This plantation will be done at selected places only and only local species will be used in the plantation. Some of the tree species included will be Saja (*Terminalia tomentosa*), Baheda (*Terminalia bellerica*), Bija (*Pterocarpus masupium*), Bargad (*Ficus benghalensis*), Peepal (*Ficus religiosa*), Mahua (*Madhuca latifolia*), Sal (*Shorea robusta*), etc. Care will be taken to include some fruit bearing trees like Gular (*Ficus glomerata*), Aonla (*Emblica officinalis*), Aam (*Mangifera indica*) and such trees to provide food to the herbivores which in turn will be the food source of the carnivores. Water, particularly during drier seasons, becomes the most important factor to all types of wild animals including the mammals, birds and reptiles. If water is available safely, then all other factors become secondary for the presence and survival of the wild life in any forested area. Places suitable for mini watersheds will be identified in the core as well as in the buffer zone to store rainwater. Further, to make water available at all the times, throughout the year, some of these water holes will be recharged through artificial means. Proper slope will be given to approach

these water sources so that the wild animals will be able to drink water without any difficulty. Proper cover through vegetation or any other type of even artificial cover will be developed near to these water sources so that the prey species will be able to hide themselves from the predators, at the time of approaching the water sources. To attract the birds, plants yielding food to the birds will be planted on priority basis. If water and food are available to the birds without any anthropogenic disturbances the area can become an ideal place for bird watching. Provision of water for the wild animals by creation of water body. Water is the most important for survival of all wild animals. A habitat having abundant food for wildlife will be of no use if water is not available close by. A good wildlife habitat should have well distributed water points. Animals' dependence on water and the way they replenish their water varies with the nature of habitat and the species. Therefore it is suggested that the user agency in association with the forest department will identify strategic locations for development of water holes atleast 1000m away from the mine lease boundary.

- Development of Grazing Land: Grass & fodder plantation will be taken up in the existing grazing areas in the nearby villages through women SHGs from those villages. This will help in avoiding cattle straying in forest area, thereby controlling spread of diseases in wild animals and will also help in providing employment to local women. Necessary financial assistance will be provided to the SHGs by the company.
- Animal movement: Habitat development for easy and undisturbed movement of animals in the wildlife corridor. The area will be developed by plantation of native fruit trees, shrubs, herbs and grasses at a distance of 1000m away from the boundary of mine lease area. Additionally, water holes at strategic locations with the provision of solar powered hand pumps needs to be developed.
- Forest Fire prevention: Fire hazard needs to be prevented for survival of Forest as well as Wildlife. Steps will be taken for prevention of forest fire. The user agency must create awareness among the truck drivers and their labours not to through cigarette of bidi butts in the forest area.
- Make special efforts to create awareness amongst the farmers/ cultivator to reduce the use of chemical in farming and adopt ecofriendly natural farming to create sustainable habitat for movement of wild life.
- Establishment of Joint Forest Management and Biodiversity Committees: No project is successful without the involvement of the locals. The sense of ownership of the forest and its resources amongst the villagers is very important. In order to make the make the plantation successful it is suggested to involve the locals. This can be done by establishing Joint Forest Management and Biodiversity Committees in the nearby villages. This will also help to understand the indigenous knowledge of the locals and accordingly the plantation of locally important trees and shrubs can be carried out.
- Nursery development: It is proposed to enhance the forest area around the mine by carrying out plantation of native trees and shrubs. This activity must be done simultaneously with the mining, so that by the end of mining operation good forest cover is developed adjacent to the mine. To carry out the plantation it is suggested to develop the nursery in the nearby area, and

also involve the locals by giving them employment opportunity for developing and maintaining the nursery.

**Measures for noise and light pollution, forest fire prevention and spread of invasive species**

- **Forest Fire prevention:**

  Fire hazard needs to be prevented for survival of Forest as well as Wildlife. Steps will be taken for prevention of forest fire. The user agency shall create awareness among the truck drivers and their labours not to through cigarette of bidi butts in the forest area.
  This being a tropical forest with open scrub dominant with grass and sparse shrubs and forest with moist deciduous and dry deciduous forest type, it is prone to fire each year between mid-February to June (until onset of rains). Fire lines are to be cleared around the project area, inside and along the forest boundaries, in addition to clearing along the roads, footpaths and nullahs to prevent fire. This can be part of the duties of the temporary guards mentioned in the section on tiger and previous section. It is important that these guards should be trained to fight fire and also carry out the fire line clearance/development and maintenance and use of different firefighting equipment. These fire fighters should be provided with appropriate firefighting equipment / tools including wireless sets. Based on discussion with the local people and forest department, forest fire map must be prepared so as to identify areas which are prone to frequent fire that are to be treated under the above said management plans. This can be a short project as part of research and monitoring.
- **Invasive Species Management:**

  An invasive species is an introduced species that harms its new environment. Invasive species adversely affect habitats and bioregions, causing ecological, environmental, and/or economic damage. The major invasive floral species found in the study area are ***Lantana camara, Parthenium hysterophorus* and *Prosopis juliflora*.** The most effective method of managing the these species are manual uprooting of Lantana and Parthenium in core and buffer areas and using heavy machinery for Prosopis removal, especially in grassland ecosystems. Post removal of invasive it is important to replant native species to restore ecosystem balance and assisted natural regeneration in degraded areas. Community Participation & Awareness also plays an important role in controlling the invasive species. Engaging local communities, especially through eco-development committees, will help in invasive species removal. Conducting awareness programs on the ecological impacts of invasive plants.

- **Control of Light pollution:**

  Light pollution near mining areas can negatively impact local wildlife, human health, and even the efficiency of mining operations. To mitigate these effects, the following measures can be implemented- Use fully shielded, downward-facing lights to prevent light from scattering into the sky and surrounding environment, Use low-intensity, warm-colored LED lights to reduce blue light emissions, which are more disruptive to wildlife, Focus lighting only on necessary work areas and avoid over-illumination of roads and non-essential spaces, Use glare-reducing fixtures and visors to limit excessive brightness that can disturb workers and animals, Plant trees and vegetation buffers around the site to block light from spreading to nearby habitats, Limit artificial lighting during late-night hours in non-essential areas, Educate workers and nearby communities on the importance of reducing light pollution.

- **Control of Noise pollution:**

  Operation of heavy machinery and blasting in the mining area produces large amount of sound which may cause disturbance to wild animals. Periodic maintenance of these machines is important to control the noise levels. No mining, blasting or transportation will be allowed from 7 pm to 7 am. Control Blasting may be resorted and need to be monitoring on daily basis and keep record for surveillance. Development of green belt along the project area is an effective strategy to control the noise pollution. It is suggested that a green belt needs to be developed in the safety zone of 7.5m along the mine lease area. Only native trees must be planted in the safety area. No mining operation must be carried out in this zone; rather dense plantation of evergreen trees must be carried out. This will provide a natural screen between the mine and the adjoining area thus reducing the nuisance caused by noise and dust in the vicinity of the mine. Some additional measures to reduce noise pollution are as follows:
    - Secondary blasting will be minimized to the extent possible;
    - Systematic blasting with proper spacing, burden and stemming will be carried out;
    - Minimum quantity of detonating fuse will be consumed by using non-electrical initiation system;
    - Blasting will be carried out during favorable atmospheric conditions and also when human activities are at their minimum;
    - Prime movers/diesel engines will be properly maintained;
    - A buffer barrier of tree belt will be provided in phased manner along the periphery of the mine to attenuate noise;

- At transfer points, free fall material will be minimized and suitable lining material will be provided
- Isolation/enclosure of noisy machines/equipment, wherever possible.
- Reducing idling time of machines/equipments.
- Provision of enclosures, silencers, etc to the possible extent to control noise propagation.
- Use of adequate silencers and practicing speed limit for material transport vehicles

**Environment Monitoring Programme for Key Parameters (Water)**

The details of the suggested Environment Monitoring Programme for Marki Mangli II Coal Mining Project are provided in Table below:

| SN | Particular | Monitoring Frequency | Sampling Duration | Monitoring Parameters |
|---|---|---|---|---|
| 1. | Surface Water :<br>1) Dadhani Nala (D/S) | Once in 3 month | Grab | As per the parameters specified under IS: 2296 (Class-C) As per the parameters specified under IS: 10500 – 2012. |
| 2. | 2) Dadhani Nala(U/S) | Once in 3 month | Grab | |
| 3. | 3) Penganga River | One/ month | One time | |
| 4. | Ground water : 5 Stations in Adjoining Villages | Once in 3 month | One time | Ground water quality parameters |
| 5. | Well or Bore Wells or piezometers in Mine Lease (2 locations) and surrounding areas (5 locations). | Once in a season | One time | Static water level, pumped water level, seasonal fluctuation and other relevant parameters |
| 6. | Mine Effluents | Once in a month | 24 hour composite | As per EPA guidelines, 1986 |

# Chapter 10: Action Plan for Conservation Plan

Habitat is natural home for wildlife confined in forest areas. Habitat or natural home is territory in which wild animal can walk without fear, enjoy independent breeding activities with availability of food/fodder and water even in Pinch Period and also take rest without disturbance. In the degraded forest, planting in open patches have to be taken to develop the forest areas. Anicuts will be constructed for water availability in forest areas under the guidance of Forest department. To overcome soil erosion, check dams and Guli pluging have to be constructed in the buffer area. It is observed that Village Forest Protection Committees are playing a good role in protection of flora and fauna. It communicates with the local people to protect wild animals because wild animals are our friends and good wealth. Wild animals provide us a healthy environment. VFPMC's supports local people in uplifting their economy, health and livelihood. These committees watch the forest day and night and protect against fire and hunting of wild animals in the area.

Non-formal Education:

Conservation education and awareness will be imparted both at the formal and non-formal levels. At the formal level, it will be given at school, colleges and university levels. Formal education, in spite of all the curriculum development and introduction of the study of ecology, wildlife and conservation at the school and college levels, however, largely remains text book and examination oriented. Because of the situation, non-formal education becomes all the more necessary for creating the right kind of awareness and attitude among people at all levels- children, teenagers, adults, family groups, teachers, administrators, politicians and policymakers. To achieve this some local tours of school and college students will be arranged to nearby National Parks.

Institutional Infrastructure:

The prime requisite for building up an understanding and awareness about wildlife and conservation is to develop an appreciation, respect and love for nature. Most people lack the curiosity to know even the names of animals and plants they come across in their day-to-day life. Development of an inquisitive mind, a keen sense of observation and curiosity about the fauna and flora are, therefore, very important. Concern for conservation can only emanate from a love for nature and awareness about the interdependence of all species of animals and plants, including the man. To arouse curiosity about the wildlife in the young mind some quiz and essay competitions will be arranged in the schools and colleges of the buffer zone and some nearby areas.

Indian Tradition of Conservation:

The theme of conservation, wildlife and reverence for life is reflected in some of the exquisite images in Indian art paintings, sculpture, architecture and decorative art. The most wide-ranging wild life imagery is found in Indian miniature paintings. Early literatures like the Panchatantra and Hitopadesha contain

animal fables that have been used to preach both wisdom and morals. The long-term tradition and abiding faith in conservation of nature is vividly seen in recent times also like the Chipko and Appiko movements. These conservation themes will be popularized through pamphlets and posters.

Role of the Individual:

Each individual should develop a personal ethic towards nature and wildlife which could pave the way for commitment and conviction not to destroy wildlife particularly that of not considering hunting as a sport, nor to use products made out of skins or other parts of endangered animals. Unless these products are boycotted by their users, the clandestine killing and poaching of wildlife at the hands of unscrupulous people will continue. Everyone can play important role in spreading the message of conservation among their friends, family and community at the large.

Improvement of Water availability:

"Water" is the daily requirement of all wild animals. The scarcity of water leads to the migration of wild animals from forest area towards population and thus increasing dangers to their life by way of man animal conflict and attracts poaching also. This includes Repair of existing Anicuts, Talai and water pond will be provided every year before rainy season in consultation with forest department. Development of small mud ponds and ensuring the availability of water in pond and tankis (Drinking Water body for Cattle) should be ensured during the pinch period.

Eco-Development Works:

People in and around the forest area generally are hostile against the forest department and its staff, because they are prevented from taking out timber and other forest products illegally. Such antagonistic behaviour is mainly because little effort is made to meet their genuine demands either from outside the forest area or from the forest area but in a sustainable manner. Regular interaction with them with agreement for sustainable utilization of forest resources combined with some incentives can completely change their indifferent or even un-concerned attitude to conservative attitude.

Horticultural Nursery:

There will be demand for seedling for horticultural species in and around Wani/Mukutban. Nurseries can be raised by villagers for selling the same to different farmers and also to the people in the nearby townships. For this purpose, skill of grafting and budding can also be developed. Ornamental tree species can also be grown for beautification.

Controlled grazing:

Over grazing affects the habitat of wild animals, hence controlled grazing is must to conserve and preserve the habitats of the wild animals. For this, villagers will be made educated regarding the negative impacts of over grazing under the guidance of Forest department.

Protection against fire:

Generally, fire occurs in summer season. The local people use to take smoking bidi and cigarettes into the forest & throw them there which cause fire. The dry grass catches the fire and in no time, fire spreads in the area. However, fire accidents in forest is severe, it destroys the forest as well as the habitat of wild animals. Fire kills the innocent wild animals and their cubs and chinks specially in nesting and breeding season.

Salt is a very important requirement of most wildlife, which they often meet from natural salt licks available in different forests. A survey of the area revealed that such salt licks are badly needed in the area. Hence, artificial Salt licks must be provided at suitable locations, preferably near water holes, where proper watch & ward is possible. Otherwise these spots shall be misused for poaching animals.

Protection against hunting:

Hunting of the wild animals is prohibited in forest and also outside the forest. The local people hunt this wild animal which is a punishable offence. Hunting must not be allowed in the study area. Awareness Camps will be arranged under the guidance of Forest department for labors working in the industry regarding offences against wild animals such as trapping, driving, snaring, capturing, killing, poisoning. They will be made aware that taking any part of the body of wild animals is restricted and is a nonbailable offense. Offended person could be punished with an imprisonment of 7 years. One cause of depletion of wildlife status is due to poaching by local people. Hence, it is necessary both to improve enforcement and create awareness among the people for eliminating poaching and consequently improve the status of wild animals. For this the protection has to be strengthened at project cost. Towards this end the project proponents may need to send their staff to be properly trained by the forest department and also help local forest protection committee youths'. Necessary equipment like a walkie talkie or mobile handsets would also need to be provided to mine security-men to report to the forest department of any poachers or unsocial looking elements in the jungle or its surroundings. The Project staff should also help the Forest staff to prevent poaching and illicit felling whenever needed.

Checks and control on the Movement of Vehicle:

Due to movement of vehicles injury to animals and reptiles may take place. For this reason, speed limit of vehicles will be fixed and operators will be educated and advised regularly to drive vehicle safely and slowly. All operators will also be advised to stop the vehicle on seeing such reptiles or animals and let it go away before moving the vehicle further.

Pressure horn:

Noise generated by pressure horn disturbs the wildlife and forces them to leave the place. No pressure horn will be fixed on vehicle plying in the area. All the drivers will be advised to make minimum use of horn while working hours.

Vehicles head lights:

Efforts will be made to cover the lights suitably with paint so that strong beam of head light is not formed and light falls in front of the vehicle only.

People Participation:

With the help of the local people and employees of the Company watch will be kept on the wild life as well as illegal tree felling. Forest and police department will be informed if such incident occurs, to take legal action against the offenders. For this they will be trained for motivation. Organizing awareness activities for the wildlife and nature during Wildlife Week (1st Oct to 7th Oct.), on 21 st March (The World Forestry day) and on 5th June (The Environment day) every year, Activities may include painting, photography competition, Essay Writing, Slogan writing, trees and bird's identification etc. ¬ During the Camps, Publication of Brochure/ Pamphlets regarding Nature and wild life Protection shall be distribution and guidance for protection of Wildlife and environment shall be provided. ¬ Display of slogans and signage in the entire core zone and 10-km radius shall be provided and displayed especially along road side regarding Wildlife and Nature.

Encourage local villagers to grow trees on their on their field bounds/court yards:

In consultation with Forest Department the company will provide some finance, to grow saplings of tree species, having importance for wood, small timber and fuel wood to distribute to the villagers. Bamboo will be another important species with a lot of environmental and economic value. This no doubt will help reduce dependence of people on RF forest; as a result, the ecological condition of the area will improve so the wild life will be attracted to this area.

Reducing Environmental Pollution:

To keep the environment frees from smoke, cooking gas cylinders will be provided to all the project workers particularly. To control pollution from project measure outlined in EMP will be followed.

Provide employment to the villagers:

On the basis of their suitability, jobs in project will be provided to the nearby villagers. As a result, their economic condition will improve. This well keep them busy also, so they will not be tempted/compelled to cause destruction to forest which will help improve the status of wildlife.

# Annexure 1: Vesting Order

**GOVERNMENT OF INDIA**

**MINISTRY OF COAL**

**OFFICE OF THE NOMINATED AUTHORITY**

**(Constituted under Section 6 of The Coal Mines (Special Provisions) Act, 2015)**

Shastri Bhawan, New Delhi

**VESTING ORDER**

**(under clause (b) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13 of the Coal Mines (Special Provisions) Rules 2014 read with clause (b) of sub-section (3) of Section 6 and sub-section (3) of Section 8 of the Coal Mines (Special Provisions) Act, 2015)**

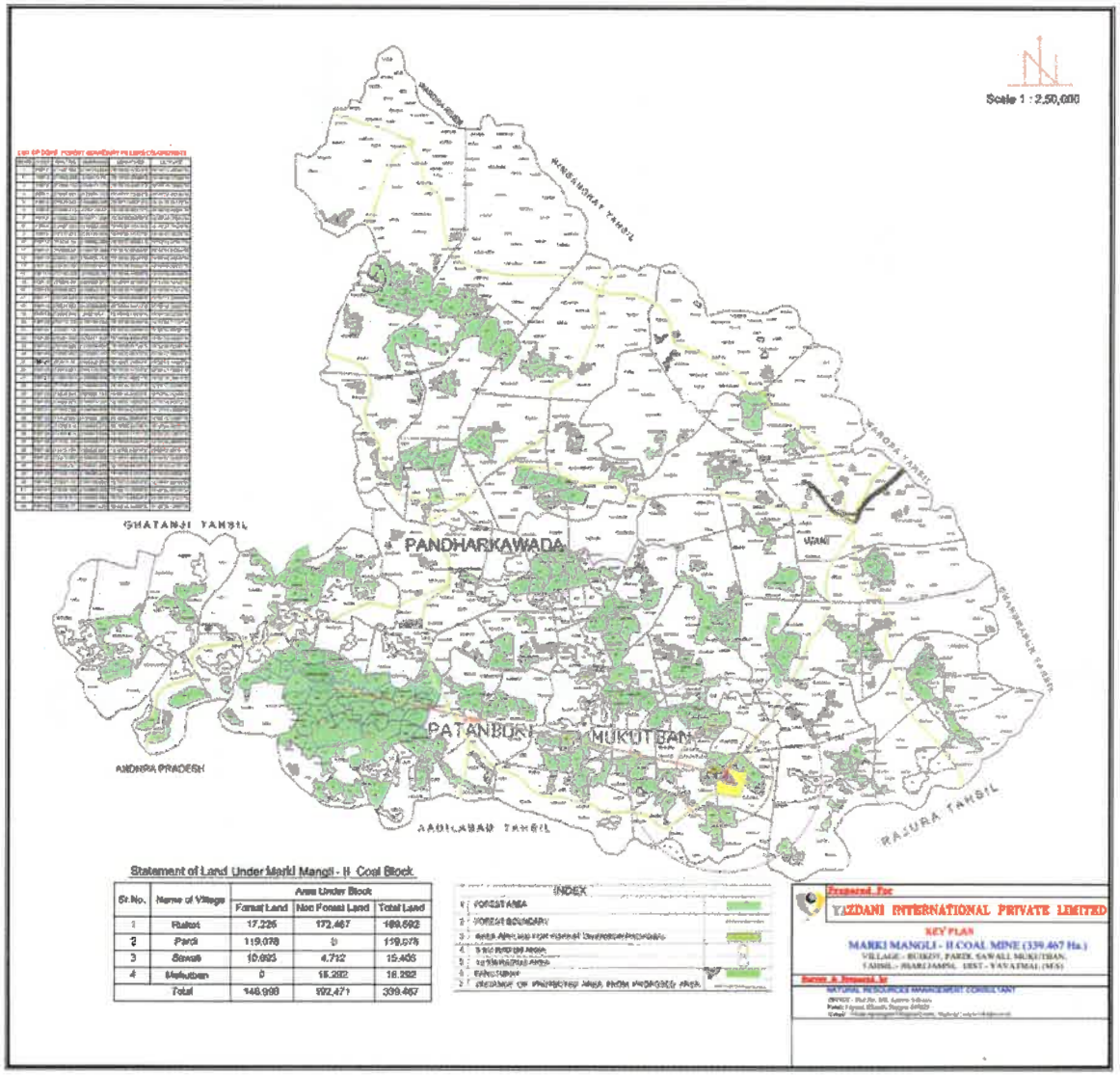
| | |
|---|---|
| In re: | **Marki Mangli II Coal Mine** (the "mine") particulars of which is specified in **Annexure I** |
| Order no.: | NA-104/3/2020-NA |
| Date: | March 03, 2021 |
| In favour of: | **Yazdani International Private Limited**, incorporated in India under the Companies Act, 1956 with corporate identity number U13209OR2006PTC009009, whose registered office and principal place of business is at 7th Floor, C-Wing, Fortune Towers, Chandrasekharpur, Bhubaneswar, Odisha 751023, India(the "successful bidder") |
| For the purpose of: | Sale of coal, including sale to Affiliates and related parties, utilisation of coal for any purpose including but not limited to captive consumption, Coal Gasification, Coal Liquefaction and export of coal. |

WHEREAS, the nominated authority has, in accordance with provisions of the Coal Mines (Special Provisions) Act, 2015 (the "Act") and the Coal Mines (Special Provisions) Rules 2014 (the "Rules") conducted the auction of the mine;

AND WHEREAS the successful bidder is eligible to receive this vesting order with respect to the mine including, inter-alia, -

(a) the coal bearing land acquired by the prior allottee and the lands, in or adjacent to the coal mines used for coal mining operations acquired by the prior allottee; and

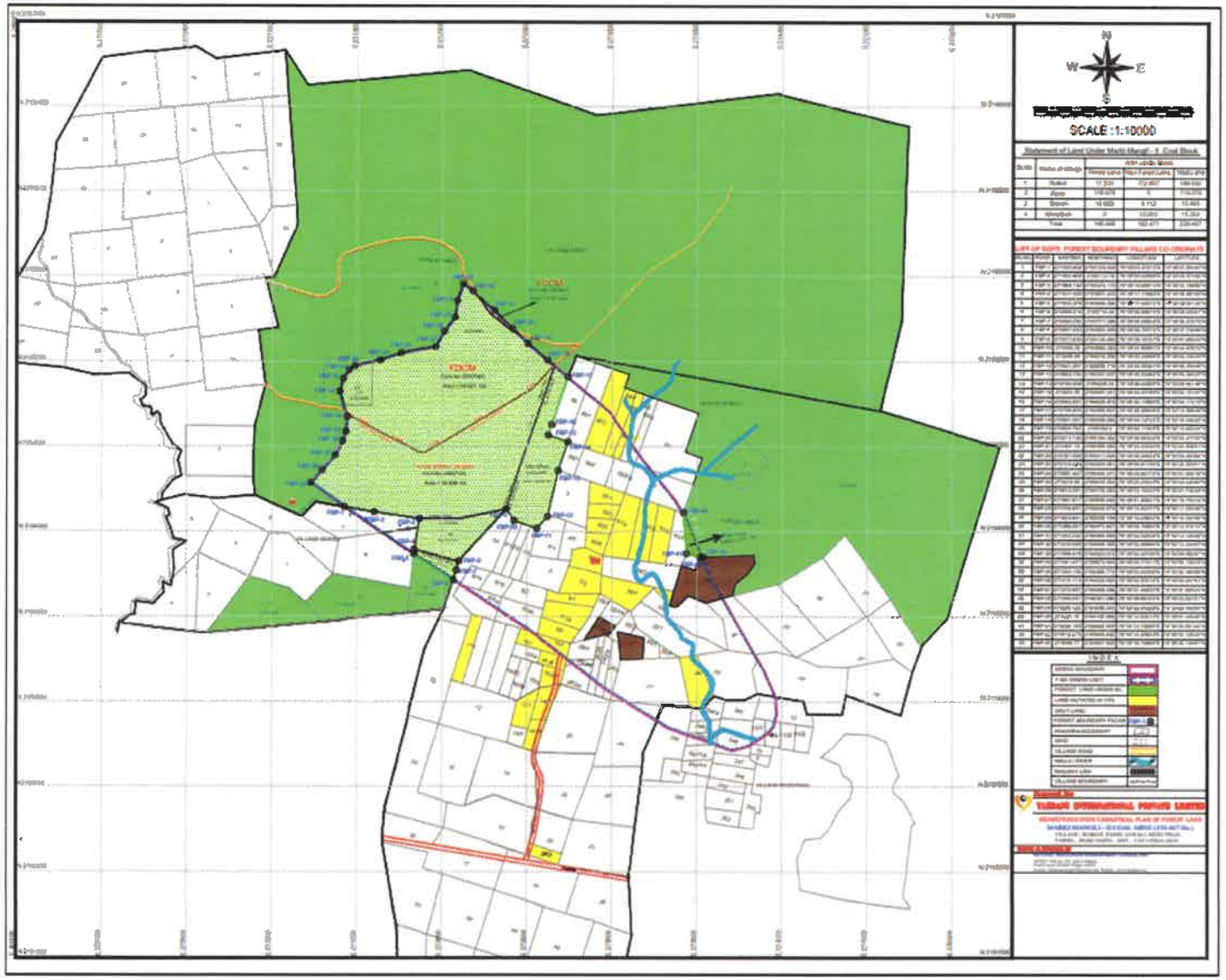
# Annexure 2: Location of Marki Mangli II Mine



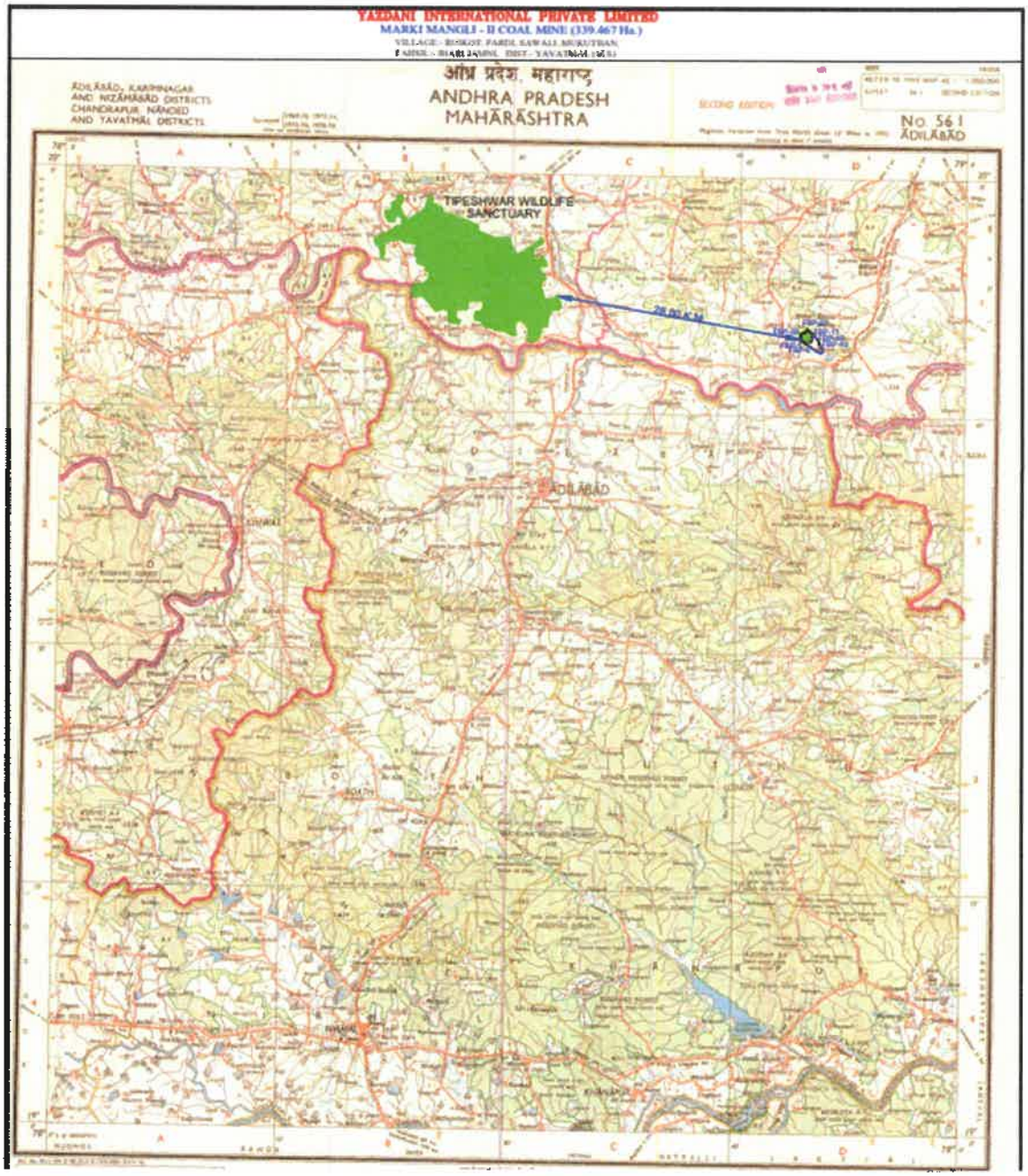

Statement of Land Under Marki Mangli - II Coal Block

| Sr.No. | Name of Village | Area Under Block | | |
|---|---|---|---|---|
| | | Forest Land | Non Forest Land | Total Land |
| 1 | Rukot | 17.226 | 172.467 | 189.693 |
| 2 | Parsi | 119.078 | 0 | 119.078 |
| 3 | Sawali | 10.993 | 4.712 | 15.405 |
| 4 | Mukutban | 0 | 15.292 | 15.292 |
| | Total | 148.999 | 192.471 | 339.467 |

# Annexure 3: Existing Land Ownership of Marki Mangli II Mine



## Annexure 4: Distance of Marki Mangli II Mine from Wildlife Sanctuary



# Annexure 5: Mine Closure Landuse

**Area Statement**

| Sr.No | Type | Land use (proposed) | Land Use (End of Life) | Land Use (Post Closure) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Agriculture land | Plantation | Water Body | Public/ Comp any Use | Forest Land (Returned) | Undisturbed | Total |
| 1 | Excavation Area | 215.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | Backfilled Area | 0.00 | 163.43 | 126.37 | 0.00 | 0.00 | 0.00 | 37.06 | 0.00 | 163.43 |
| 3 | Excavated Void | 0.00 | 51.78 | 0.00 | 0.00 | 51.78 | 0.00 | 0.00 | 0.00 | 51.78 |
| 4 | Without Plantation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | Top Soil Dump | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | External Dump | 52.00 | 52.00 | 0.00 | 0.00 | 0.00 | 0.00 | 52.00 | 0.00 | 52.00 |
| 7 | Safty Zone | 6.06 | 6.06 | 0.00 | 0.00 | 0.00 | 0.00 | 6.06 | 0.00 | 6.06 |
| 8 | Haul Road between quarries | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9 | Road diversion | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10 | Diversion OR Below River Or Nala Or Canal | 0.669 | 0.669 | 0.00 | 0.00 | 0.669 | 0.00 | 0.00 | 0.00 | 0.67 |
| 11 | Setting Pond | 2.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 2.00 |
| 12 | Road and Infrastructure Area | 12.20 | 12.20 | 0.00 | 0.00 | 0.00 | 0.00 | 12.20 | 0.00 | 12.20 |
| 13 | Rationalization Area | 42.797 | 42.797 | 3.121 | 0.00 | 0.00 | 0.00 | 39.676 | 0.00 | 42.80 |
| 14 | Guriand Drains | 3.011 | 3.011 | 0.00 | 0.00 | 3.011 | 0.00 | 0.00 | 0.00 | 3.01 |
| 15 | Embankment | 5.52 | 5.52 | 0.00 | 0.00 | 0.00 | 5.52 | 0.00 | 0.00 | 5.52 |
| 16 | Green Belt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 17 | Water Reservoir Near Pit | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 18 | UG Entry | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 19 | Undisturbed or Mining Right For UG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 20 | Resettlement | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 21 | Pit Head Powar Plant | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 22 | Water Harvesting | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 23 | Agricultural Land, Undist urbed OR Mining Right For UG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | **Total** | **339.47** | **339.47** | **129.49** | **0.00** | **57.46** | **5.52** | **147.00** | **0.00** | **339.47** |

**Annexure 6:**

## Certified budget from the DFO

| Sr. No. | Particulars | Cost (Rs. lacs) | | | | | |
|---|---|---|---|---|---|---|---|
| | Wildlife Conservation / Mitigation Plan | 1st Year | 2nd Year | 3rd Year | 4th Year | 5th Year | Total |
| 1 | Fencing (2.5m height ) 5200 meter | 13 | | | | | 13 |
| 2 | Cattle trench along the mine boundary with departmental HEMM | 12 | | 5 | | 5 | 22 |
| 3 | Habitat development and plantation | 20 | 20 | 20 | 15 | 10 | 85 |
| 4 | Nursery development and maintenance of safety zone including green belt development along the lease area | 10 | 5 | 5 | 3 | 2 | 25 |
| 5 | Watch tower | 10 | 0 | 0 | 0 | 0 | 10 |
| 6 | Soil moisture conservation works | 2 | 2 | 1 | 1 | 1 | 7 |
| 7 | Construction of waterholes maintenance | 5 | 5 | 1 | 1 | 1 | 13 |
| 8 | Well with solar pumps | 0 | 10 | | | | 10 |
| 9 | 4% of the project cost to be deposited with wildlife trust as per State Government norm | 372 | 0 | 0 | 0 | 0 | 372 |
| 10 | Awareness and training of JFM and Biodiversity committee for wildlife protection and fire control | 3 | 3 | 3 | 3 | 3 | 15 |
| | Total | | | | | | 572 |

**Annexure 6**

## Certified budget from the DFO

| Sr. No. | Particulars | Cost Rs.(lakhs) | | | | | |
|---|---|---|---|---|---|---|---|
| | Wildlife Conservation / Mitigation Plan | 1st Year | 2nd Year | 3rd Year | 4th Year | 5th Year | |
| 1 | Fencing (2.5m height ) 5200 meter | 80 | | | | | 80 |
| 2 | Cattle trench along the mine boundary with departmental HEMM | 12 | | 5 | | 5 | 22 |
| 3.1 | Habitat development and plantation | 500 | 200 | 100 | 100 | 100 | 1000 |
| 3.2 | Removal ofinvegetive species | 50 | 20 | 10 | 10 | 10 | 100 |
| 4 | Nursery development and maintenance of safety zone including green belt development along the lease area | 10 | 5 | 5 | 3 | 2 | 25 |
| 5 | Watch tower | 10 | 0 | 0 | 0 | 0 | 10 |
| 6 | Soil moisture conservation works | 50 | 20 | 10 | 10 | 10 | 100 |
| 7 | Construction of waterholes maintenance | 5 | 5 | 1 | 1 | 1 | 13 |
| 8 | Well with solar pumps | 0 | 10 | | | | 10 |
| 9 | 4% of the project cost to be deposited with wildlife trust as per State Government norm | 372 | 0 | 0 | 0 | 0 | 372 |
| 10 | Awareness and training of JFM and Biodiversity committee for wildlife protection and fire control | 3 | 3 | 3 | 3 | 3 | 15 |
| | Total | 1092 | 263 | 134 | 127 | 131 | 1747 |

Sharad Satramwar
Dy. General Manager (Lease & Law)
Yazdani International Pvt Limited

DahanjayWaybhase
Dy. Conservator of Forests (T)
Pandharkawda Forest Division

**APPENDIX 1: Faunal Diversity from study area (Core zone & Buffer Zone)**

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 1. | *Anathana ellioti* | Indian/Madras Tree Shrew | LC /II |
| 2. | *Antilope cervicapra* | Blackbuck | VU / I |
| 3. | *Axis axis* | Spotted Deer | LC / II |
| 4. | *Bos gaurus* | Indian Gaur / Bison | VU / I |
| 5. | *Boselaphus tragocamelus* | Blue Bull / Nilgai | LC / II |
| 6. | *Canis aureus* | Golden Jackal | LC / I |
| 7. | *Canis lupus pallipes* | Indian Wolf | VU /I |
| 8. | *Rusa unicolor* | Sambar | LC / I |
| 9. | *Felis chaus* | India Jungle Cat | NT / I |
| 10. | *Funambulus pennanti* | Five striped Squirrel | LC /NL |
| 11. | *Herpestes auropunctatus* | Small Indian mongoose | LC / I |
| 12. | *Herpestes edwardsi* | Common mongoose | LC / I |
| 13. | *Hipposideros ater* | Dusky Leaf-nosed bat | LC /NL |
| 14. | *Hyaena hyaena* | **Striped Hyaena** | DD / I |
| 15. | *Hystrix indica* | Indian crested porcupine | LC / I |
| 16. | *Lepus nigricollis* | Indian Hare | LC / II |
| 17. | *Megaderma lyra* | Indian false vampire bat | LC /NL |
| 18. | *Melursus ursinus* | Sloth Bear | VU /I |
| 19. | *Miniopterus schreibersi* | Schreiber's Long-fingered bat | LC /NL |
| 20. | *Moschiola meminna* | Mouse Deer | VU / I |
| 21. | *Muntiacus muntjak* | Barking Deer | LC / I |
| 22. | *Mus phillipsi* | Wroughton's small spiny Mouse | LC / NL |
| 23. | *Mus platythrix* | Indian Brown spiny mouse | LC / NL |
| 24. | *Panthera pardus* | Leopard | VU /I |
| 25. | *Panthera tigris* | Tiger | EN /I |
| 26. | *Paradoxurus hermaphroditus* | **Common Palm civet** | LC /I |
| 27. | *Pipistrellus dormeri* | Dormer's bat | LC /NL |
| 28. | *Pipistrellus coromandra* | Coromandel Pipistrelle | LC /NL |
| 29. | *Prionailurus bengalensis* | Leopard Cat | NT / I |
| 30. | *Pteropus giganteus* | Indian flying fox | LC /II |
| 31. | *Rhinolophus lucius* | Great Eastern Horseshoe bat | NT / NL |
| 32. | *Rhinopoma hardwickei* | Mouse-tailed bat | LC /NL |
| 33. | *Semnopithecus entellus* | Hanuman Langur | LC / II |
| 34. | *Tatera indica* | Indian Antelope Rat | LC / NL |
| 35. | *Tetracerus quadrieornis* | Four Horned Antilope | VU / I |
| 36. | *Vandeleuria oleracea* | Indian Long-tailed Tree Mouse | LC / NL |
| 37. | *Viverricula indica* | **Small Indian civet** | NT / I |
| 38. | *Vulpes bengalensis* | Bengal Fox | LC / I |

**AVES:**

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 1 | *Accipiter badius* | Shikra | LC / I |
| 2 | *Actitis hypoleucos* | Common Sandpiper | LC / II |
| 3 | *Alauda gulgula* | Small Skylark | LC / II |
| 4 | *Alcedo atthis* | Small Blue Kingfisher | LC / II |
| 5 | *Amandava amandava* | Red Munia | LC / II |
| 6 | *Amandava formosa* | Green Munia | LC / I |
| 7 | *Amaurornis phoenicurus* | White-breasted Waterhen | LC / II |
| 8 | *Anas crecca* | Common Teal | LC / II |
| 9 | *Anas poecilorhyncha* | Spot-billed Duck | LC / II |
| 10 | *Anastomus oscitans* | Asian Open Bill Stork | LC / II |
| 11 | *Anhinga melanogaster* | Darter/Snake Bird | LC / II |
| 12 | *Anthus rufulus* | Paddy-field Pipit | LC / II |
| 13 | *Apus affinis* | Indian House Swift | LC / II |
| 14 | *Ardea cinerea* | Grey Heron | LC / II |
| 15 | *Ardea purpurea* | Purple Heron | LC / II |
| 16 | *Ardeola grayii* | Indian Pond Heron | LC / II |
| 17 | *Aythya fuligula* | Tufted Pochard | LC / II |
| 18 | *Aythya nyroca* | Ferruginous Pochard | LC / II |
| 19 | *Bubulcus ibis* | Cattle Egret | LC / II |
| 20 | *Burhninus oedicnemus* | Stone-Curlew | LC / II |
| 21 | *Cacomantis passerinus* | Plaintive Cuckoo | LC / II |
| 22 | *Casmerodius albus* | Eastern Large Egret | LC / II |
| 23 | *Celeus brachyurus* | Rufous Woodpecker | LC / II |
| 24 | *Ceryle rudis* | Lesser Pied Kingfisher | LC / II |
| 25 | *Charadrius dubius* | Little -Ringed Plover | LC / II |
| 26 | *Chrysomma sinense* | Yellow-eyed Babbler | LC / II |
| 27 | *Ciconia episcopus* | White-necked Stork | LC / II |
| 28 | *Cisticola juncidis* | Streaked Fantail Warbler | LC / II |
| 29 | *Clamator jacobinus* | Pied-Crested Cuckoo | LC / II |
| 30 | *Columba livia* | Blue Rock Pigeon | LC / II |
| 31 | *Copsychus saularis* | Oriental Magpie-Robin | LC / II |
| 32 | *Coracias benghalensis* | Indian Roller | LC / II |
| 33 | *Coracina macei* | Large Cuckoo Shrike | LC / II |
| 34 | *Corvus macrorhynchos* | Indian Jungle Crow | LC / II |
| 35 | *Corvus splendens* | Indian House Crow | LC / II |
| 36 | *Coturnix coromandelica* | Rain Quail | LC / II |
| 37 | *Coturnix coturnix* | Common Quail | LC / II |
| 38 | *Cuculus canorus* | Common Cuckoo | LC / II |
| 39 | *Cuculus micropterus* | Indian Cuckoo | LC / II |
| 40 | *Cypsiurus batasiensis* | Palm Swift | LC / II |
| 41 | *Dendrocopos mahrattensis* | Yellow fronted Pied | LC / II |

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| | | Woodpecker | |
| 42 | *Dendrocopos nanus* | Brown-capped Pygmy Woodpecker | LC / II |
| 43 | *Dendrocygna javanica* | Lesser Whistling Duck | LC / II |
| 44 | *Dicrurus macrocercus* | Black Drongo | LC / II |
| 45 | *Dinopiun benghalense* | Lesser Golden-backed Woodpecker | LC / II |
| 46 | *Dumetia hyperythra* | Rufous bellied Babbler | LC / II |
| 47 | *Egretta garzetta* | Little Egret | LC / II |
| 48 | *Eremopterix grisea* | Ashy-crowned Sparrow Lark | LC / II |
| 49 | *Eudynamys scolopacea* | Asian Koel | LC / II |
| 50 | *Falco tinnunculus* | Common Kestrel | LC / II |
| 51 | *Francolinus pictus* | Painted Francolin | LC / II |
| 52 | *Francolinus pondicerianus* | Grey Francolin | LC / II |
| 53 | *Fulica atra* | Common Coot | LC / II |
| 54 | *Galerida cristata* | Crested Lark | LC / II |
| 55 | *Galerida deva* | Sykes's Crested Lark | LC / II |
| 56 | *Gallicrex cinerea* | Water Cock | LC / II |
| 57 | *Gallinago gallinago* | Common Snipe | LC / II |
| 58 | *Gallinula chloropus* | Common Moorhen | LC / II |
| 59 | *Galloperdix spadicea* | Red Spur-Fowl | LC / II |
| 60 | *Gallus sonneratii* | Grey Jungle Fowl | LC / I |
| 61 | *Halcyon capensis* | Stork-billed Kingfisher | LC / II |
| 62 | *Halcyon smyrnensis* | White-breasted Kingfisher | LC / II |
| 63 | *Hemiprocne coronata* | Crested Tree Swift | LC / I |
| 64 | *Hierococcyx varius* | Common hawk-cuckoo | LC / II |
| 65 | *Himantopus himantopus* | Black-winged Stilt | LC / II |
| 66 | *Hirundo concolor* | Dusky Crag Martin | LC / II |
| 67 | *Hirundo daurica* | Red rumped Swallow | LC / II |
| 68 | *Hirundo fluvicola* | Streak -throated Swallow | LC / II |
| 69 | *Hirundo rusttea* | Common Swallow | LC / II |
| 70 | *Hirundo smithii* | Wire-tailed Swallow | LC / II |
| 71 | *Hydrophasianus chirurgus* | Pheasant-tailed Jacana | LC / II |
| 72 | *Ammomanes phoenicurus* | Rufous-tailed Finch-Lark | LC / II |
| 73 | *Lonchura punctulata* | Spotted Munia | LC / II |
| 74 | *Megalaima haemacephala* | Coppersmith Barbet | LC / II |
| 75 | *Megalaima zeylanica* | Brown-headed Barbet | LC / II |
| 76 | *Merops orientalis* | Small Bee- eater | LC / II |
| 77 | *Merops philippinus* | Blue-Tailed bee-eater | LC / II |
| 78 | *Mesophoyx internledia* | Median Egret | LC / II |
| 79 | *Metopidius indicus* | Bronze-winged Jacana | LC / II |
| 80 | *Milvus migrans* | Black kite | LC / II |

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 81 | *Motacilla alba* | White Wagtail | LC / II |
| 82 | *Motacilla cinerea* | Grey Wagtail | LC / II |
| 83 | *Motacilla maderaspatensis* | Large Pied Wagtail | LC / II |
| 84 | *Muscicapa dauriea* | Asian Brown Flycatcher | LC / II |
| 85 | *Nectarinia asiatica* | Indian Purple Sunbird | LC / II |
| 86 | *Nettapus coromandelianus* | Cotton Teal | LC / II |
| 87 | *Numenius arquata* | Curlew | LC / II |
| 88 | *Ocyceros birostris* | Indian Grey Hornbill | LC / II |
| 89 | *Orthotomus sutorius* | Indian Tailor Bird | LC / II |
| 90 | *Passer domesticus* | Indian House Sparrow | LC / II |
| 91 | *Pavo cristatus* | Peacock | LC / I |
| 92 | *Perdicula asiatica* | Jungle Bush Quail | LC / II |
| 93 | *Pericrocotus cinnaimomeus* | Small Minivet | LC / I |
| 94 | *Pericrocotus lammeus* | Scarlet Minivet | LC / II |
| 95 | *Phalacrocorax niger* | Little Cornorant | LC / II |
| 96 | *Phylloscopus collybita* | Common Chiff Chaff | LC / II |
| 97 | *Pitta brachyura* | Indian Pitta | LC / II |
| 98 | *Ploceus philippinus* | Baya Weaver | LC / II |
| 99 | *Porphyrio porphyrio* | Purple Moorhen | LC / II |
| 100 | *Prinia socialis* | Ashy Prinia | LC / II |
| 101 | *Psittacula krameri* | Rose-Ringed Parakeet | LC / II |
| 102 | *Pterocles indicus* | Painted Sandgrouse | LC / II |
| 103 | *Pycnonotus cafer* | Red-vented Bulbul | LC / II |
| 104 | *Pycnonotus jocosus* | Red-whiskered Bulbul | LC / II |
| 105 | *Rhipidura albicollis* | White-throated Fantail Flycatcher | LC / II |
| 106 | *Netta rufina* | Red-crested Pochard | LC / II |
| 107 | *Rostra/uta benghalensis* | Greater Painted Snipe | LC / II |
| 108 | *Sarkidiornis melanotus* | Comb Duck | LC / II |
| 109 | *Saxicola caprata* | Pied Bushchat | LC / II |
| 110 | *Saxicoloides julicata* | Indian Robin | LC / II |
| 111 | *Sireptopelia decaocto* | Eurasian Collared Dove | LC / II |
| 112 | *Sterna aurantia* | River Tern | LC / I |
| 113 | *Streplopelia chinensis* | Spotted dove | LC / II |
| 114 | *Streptopelia senegalensis* | Little brown Dove | LC / II |
| 115 | *Sturnus pagodarum* | Brahminy Starling | LC / II |
| 116 | *Tactybaptus rujicollis* | Little Grebe | LC / II |
| 117 | *Tadorna ferruginea* | Brahminy Shelduck | LC / II |
| 118 | *Tephrodornis pondicerianus* | Common Wood shrike | LC / II |
| 119 | *Terpsiphone paradisi* | Asian Paradise- Flycatcher | LC / II |
| 120 | *Tringa glareola* | Wood Sandpiper | LC / II |
| 121 | *Tringa nebularia* | Common Green Shank | LC / II |

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 122 | *Tringa ochropus* | Green Sandpiper | LC / II |
| 123 | *Tringa totanus* | Common Red Shank | LC / II |
| 124 | *Turdoides caudatus* | Common Babbler | LC / II |
| 125 | *Turdoides malcolmi* | Large Grey Babbler | LC / II |
| 126 | *Turdoides striatus* | Peninsular Jungle Babbler | LC / II |
| 127 | *Turnix suscitator* | Common Buttonquail | LC / II |
| 128 | *Upupa epops* | Common Hoopoe | LC / II |
| 129 | *Vanellus indicus* | Red -wattled Lapwing | LC / II |
| 130 | *Vanellus malabaricus* | Yellow-wattled Lapwing | LC / II |
| 131 | *Zoothera citrina* | Orange-headed Thrush | LC / II |
| 132 | *Zosterops palpebrosa* | Oriental White Eye | LC / II |

**HERPETOFAUNA:**

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 1. | *Argyrogena fasciolatus* | Banded racer | NT /NL |
| 2. | *Boiga trigonala* | Cat snake | NT /NL |
| 3. | *Bungarus caeruleus* | Common Indian Krait | LC / NL |
| 4. | *Caloles versicolor* | Indian garden lizard | LC / NL |
| 5. | *Cyrtodactylus collegalensis* | South Indian Rock Gecko | NT /NL |
| 6. | *Elaphe helena* | Trinket Snake | NT / NL |
| 7. | *Hemidactylus frenatus* | Ticticky House Gecko | LC / NL |
| 8. | *Lycodon aulicus* | Common wolf snake | LC / IV |
| 9. | *Mabuya beddomii* | Common skink | LC / NL |
| 10. | *Mabuya carinata* | Common Indian skink | LC / NL |
| 11. | *Mabuya innotata* | Bronzy-olive skink | LC / NL |
| 12. | *Mabuya macularia* | Little skink | DD/ NL |
| 13. | *Naja naja* | Spectacled Cobra | LC / I |
| 14. | *Psammophilus blanfordanus* | Common Indian rock lizard | LC / NL |
| 15. | *Ptyas mucosus* | Rat Snake | LC / I |
| 16. | *Python molurus* | Rock Python | NT / I |
| 17. | *Ramphotyphlops braminus* | Common Blind snake | VU / II |
| 18. | *Varanus bengalensis* | Bengal Monitor Lizard | LC / I |
| 19. | *Vipera russelli* | Russel's Viper | VU / I |
| 20. | *Fowlea piscator* | Checkered keelback snake | NT / I |

**Amphibians**

| Sr. No. | Scientific name | Common name | Schedules of Wildlife Act/ IUCN Status |
|---|---|---|---|
| 1. | *Bufo melanostictus* | Common Indian Toad | NE / NL |
| 2. | *Bufo stomlaticus* | Marbled toad | NE / NL |
| 3. | *Euphlyctis cyanophlyctis* | Skipper Frog | NE / NL |
| 4. | *Hoplobatrachus crassus* | Jerdon's Bull Frog | NE / NL |
| 5. | *Hoplobatrachus tigerinus* | Indian Bull Frog | NE / II |
| 6. | *Limnonectes limnocharis* | Indian Cricket Frog | NE / NL |
| 7. | *Microhyla ornata* | Ornate Microhylid | NE / NL |
| 8. | *Polypedates maculatus* | Common Tree Frog | NE / NL |

**PISCES:**

| Sr. No. | Scientific name | Common name | IUCN STATUS |
|---|---|---|---|
| 1. | *Ambasis nama* | Indian glassy fish | NA |
| 2. | *Ambasis ranga* | Indian glassy fish | NA |
| 3. | *Barilius barna* | River carp baril | LC |
| 4 | *Catla catla* | Major Carp | LC |
| 5. | *Channa striatus* | Banded snake head | LC |
| 6 | *Cirrhinus mrigala* | Major Carp | LC |
| 7 | *Clarius batracus* | Magur | NA |
| 8 | *Cyprinus carpio* | Cipla | VU |
| 9 | *Gambusia affinis* | Mosquito fish | LC |
| 10 | *Glossogobius giurs* | Tank gobi | NA |
| 11. | *Heteropneustes fossilis* | Stinging cat fish | LC |
| 12. | *Labeo rohita* | Common carp | LC |
| 13. | *Labeo calbasu* | Calbasu | LC |
| 14. | *Mastacembelus armatus* | Spiny eel | LC |
| 15. | *Mystus cavasius* | Cat fish | LC |
| 16. | *Mystus seenghala* | Gangatic mystus | LC |
| 17. | *Nandus nandus* | Leaf fish | LC |
| 18. | *Osteobrama cotio* | Cotio | LC |
| 19. | *Punctius amphibious* | Scarlet Banded barb | NA |
| 20. | *Rita rita* | Rita | LC |
| 21. | *Salmostoma bacaila* | Silver fish | LC |
| 22. | *Tor khudree* | Deccan Mahaseer | LC |
| 23. | *Xenentodon cancilla* | Needle fish | LC |

**BUTTERFLIES:**

| Sr. No. | Scientific name | Common Name | Family | IUCN STATUS |
|---|---|---|---|---|
| 1. | *Ariadne merione* | Common caster | Nymphalidae | NA |
| 2. | *Catopsillia piranthe* | Mottled emigrant | Pieridae | NA |
| 3. | *Catopsillia pomona* | Common emigrant | Pieridae | NA |
| 4. | *Cepora nerissa* | Common gul | Pieridae | NA |
| 5. | *Chilades pandav* | Plain cupid | Hesperiidae | NA |
| 6. | *Danaus chrysippus* | Plain tiger | Nymphalidae | LC |
| 7. | *Euploea core* | common indian crow | Nymphalidae | LC |
| 8. | *Eurema hecabe* | Common grass Yellow | Pieridae | NA |
| 9. | *Hypolimnas misippus* | DANNAID EGG FLY | Nymphalidae | NA |
| 10. | *Junoniya arithya* | Blue pansy | Nymphalidae | NA |
| 11. | *Junoniya iphita* | Chocolate pansy | Nymphalidae | NA |
| 12. | *Junoniya lemonias* | Lemon pansy | Nymphalidae | NA |
| 13. | *Leptotes plinius* | Zebra blue | Lycaenidae | NA |
| 14. | *Melanitis leda* | Common evening brown | Nymphalidae | LC |
| 15. | *Pachliopta aristolochiae* | Common rose | Papilionidae | LC |
| 16. | *Papilio demoleus* | Lime | Papilionidae | NA |
| 17. | *Papilio polytes* | Common mormon | Papilionidae | NA |
| 18. | *Prosotas nora* | common line blue | Hesperiidae | NA |
| 19. | *Tirumala limniace* | Blue tiger | Nymphalidae | NA |
| 20. | *Pachliopta hector* | Crimson Rose | Papilionidae | LC |
| 21. | *Virachola Isocrates* | Guava Blue | Lycaenidae | II |
| 22. | *Castalius rosimon* | Common pierrot | Lycaenidae | NA |
| 23. | *Rapala manea* | Slate Flash | Lycaenidae | LC |
| 24. | Synthia cardui | Painted Lady | Nymphalidae | NA |
| 25. | Ypthima asterope | Common Three Ring | Nymphalidae | NA |
| 26. | Catopsilia pomona | Common emigrant | Pieridae | NA |
| 27. | Cepora nerissa | Common Gull | Pieridae | NA |
| 28. | Eurema hecabe | Common Grass yellow | Pieridae | NA |
| 29. | Danaus chrysippus | Plain Tiger | Nymphalidae | NA |
| 30. | Danaus genutia | Striped Tiger | Nymphalidae | NA |
| 31. | Euploea core | Common crow | Nymphalidae | NA |
| 32. | Junonia lemonias | Lemon Pansy | Nymphalidae | NA |
| 33. | Junonia orithya | Blue Pansy | Nymphalidae | NA |
| 34. | Melanitis leda | Common evening brown | Nymphalidae | NA |
| 35. | Hypolimnas bolina | Great eggfly | Nymphalidae | NA |
| 36. | Tirumala septentrionis | Dark Blue Tiger | Nymphalidae | NA |

**INSECTS**

| Sr. No. | Scientific name | Common name | IUCN Status |
|---|---|---|---|
| 1 | *Poduridae* | Podura | LC |
| 2 | *Blatta orientalis* | Cockroach | LC |
| 3 | *Mantodea* | Mantis | LC |
| 4 | *Chinavia hilaris* | Green Stink Bugs | LC |
| 5 | *Pyrrhocoridae* | Red Bugs | LC |
| 6 | *Formucidae* | Ant | LC |
| 7 | *Solenopsis spp.* | Red Ant (Fire Ant) | LC |
| 8 | *Paraponera clavata* | Bullet Ant | LC |
| 9 | *Apis dorsata* | Giant Honey Bee | LC |
| 10 | *Apis dorsata* | Rock Bee | LC |
| 11 | *Apis spp.* | Honey Bee | LC |
| 12 | *Andrenidae* | Bee | LC |
| 13 | *Bombus spp.* | Black Bee | LC |
| 14 | *Vespidae* | Yellow Wasps | LC |
| 15 | *Ichneumonidae* | Wasps | LC |
| 16 | *Chilomenes s. maculate* | Ladybird | LC |
| 17 | *Meloidae* | Blister Beetle | LC |
| 18 | *Honotricha serrate* | Grubs | LC |

## Annexure 9: Timeline for implementing wildlife mitigation plan

| Sr. No | Activities under WMP | TIME LINE FOR IMPLEMENTATION OF WILDLIFE MITIGATION PLAN | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year 1 | | | Year 2 | | | | | Year 3 | | | | Year4 | | | | Year 5 | | | | Continue till mine closure |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| 1 | Fensing of proposed mine boundary | | | | | | | | | | | | | | | | | | | | | |
| 2 | Maintainance and Repairing of Fensing | | | | | | | | | | | | | | | | | | | | | |
| 2 | Establishing Nursery for saplings , maitalance and propogation | | | | | | | | | | | | | | | | | | | | | |
| 3 | Construction of Waterholes and its maintainance | | | | | | | | | | | | | | | | | | | | | |
| 4 | Habitat development and plantation away from the mine boundary | | | | | | | | | | | | | | | | | | | | | |
| 5 | Plantation in safety zone including green belt development along the lease area | | | | | | | | | | | | | | | | | | | | | |
| 6 | Watch tower Construction | | | | | | | | | | | | | | | | | | | | | |
| 7 | Soil moisture conservation works | | | | | | | | | | | | | | | | | | | | | |
| 8 | Construction of waterholes maintenance | | | | | | | | | | | | | | | | | | | | | |
| 9 | Well with solar pumps | | | | | | | | | | | | | | | | | | | | | |
| 10 | 4% of the project cost to be deposited with wildlife trust as per State Government norm | | | | | | | | | | | | | | | | | | | | | |
| 11 | Awareness and training of JFM and Biodiversity committee for wildlife protection and fire control. Workshops and campaign in cosultation with stakeholder | | | | | | | | | | | | | | | | | | | | | |
| 12 | Monitoring of Environmental Parameters as per approved | | | | | | | | | | | | | | | | | | | | | |

# Annexure 7: Issues to be addressed during Plantation and Species to be planted

| Issues to be Addressed | Species to be Planted |
|---|---|
| 1. Soil and water conservation<br>2. Full protection from grazing and fire<br>3. Safe disposal of run off<br>4. Grassland development<br>5. Afforestation<br>6. Contour bunding, trenching | *Dalbergia Sissoo, Albizzia lebbek, Acacia niloteca, Acacia catechu, Azadirachta indica, Eulaliopsis binata, Dendrocalamus strictus, Madhuca indica, Bombax ceiba, Soymida febrifuga, Cleistanthus collinus, Shorea robusta, Lagerstroemia parviflora, Albizzia lebbek, Agave spp., Hardwickia binata, Acacia nilotica, Derris indica, Tamarindus indica, Eulaliopsis binata, Ailanthus excelsa. Bauhinia acuminate, Grewia subinaequalis, Morus alba, Ziziphus jujuba, Cynodon dactylon, Bambusa bambos, Apluda mutica, Cymbopogon martini, Amaranthus sp,* |

# Annexure 8: Authenticated list of flora and fauna for the study area

**MARKI MANGLI OPENCAST COAL MINING PROJECT,**
**Project Area 339.467 Ha Village(s): Savli, Ruikot, Pardi and Mukutban**
**Tehsil – Jhari Jamni, District – Yavatmal, Maharashtra,**

**LIST OF FLORA WITHIN CORE AND BUFFER ZONE**

**TREES:**

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 1 | *Acacia catechu* (L.f.) Willd. | Khair | Fabaceae | * | * |
| 2 | *Acacia concinna* (Willd.) DC. | Sikakai | Fabaceae | * | * |
| 3 | *Acacia leucophloea* (Roxb.) Willd. | Hiwar/Reunjha | Fabaceae | * | * |
| 4 | *Aegle marmelos* (L.) Corrêa | Bel | Rutaceae | - | * |
| 5 | *Ailanthus excelsa* Roxb. | Maharukh/ Mahaneem | Simarubiaceae | * | * |
| 6 | *Albizia lebbeck* (L.) Benth. | Kala siris | Fabaceae | * | * |
| 7 | *Albizia odoratissima* (L.f.) Benth. | Chichwa | Fabaceae | * | * |
| 8 | *Albizia procera* (Roxb.) Benth. | Safed Siris/ Karahi | Fabaceae | * | * |
| 9 | *Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Guillem. & Perr. | Dhaora/Dhawd a | Combretaceae | * | * |
| 10 | *Azadirachta indica* A.Juss. | Neem | Meliaceae | * | * |
| 11 | *Balanites aegyptiaca* (L.) Del. | Hingot | Balanitaceae | * | * |
| 12 | *Bauhinia malabarica* Roxb. | Amti | Fabaceae | | * |
| 13 | *Bauhinia purpurea* L. | Kcolar | Fabaceae | * | * |
| 14 | *Bauhinia racemosa* Lam. | Asta/Aapta | Fabaceae | * | * |
| 15 | *Bauhinia variegata* L. | Kachnar | Fabaceae | * | * |
| 16 | *Bombax ceiba* L. | Semal | Malvaceae | * | * |
| 17 | *Boswellia serrata* Roxb. ex Colebr. | Salai/ Saliha | Burseraceae | * | * |
| 18 | *Bridelia retusa* (L.) A.Juss. | Kasai/Kasahi | Euphorbiaceae | * | * |
| 19 | *Buchanania lanzan* (Lour.) M.R.Almeida | Achar/ Char Chiraonji | Anacardiaceae | * | * |
| 20 | *Butea monosperma* (Lam.) Taub. (Butea Manosperma Kuntze) | Palash/ Parsa/Padas | Fabaceae | * | * |
| 21 | *Careya arborea* Roxb. | Kumbhi/ Bhui | Myrtaceae | - | * |
| 22 | *Caryota urens* L. | Fish tail palm | Arecaceae | - | * |
| 23 | *Casearia graveolens* Dalzell | Gilchi | Samydaceae | * | * |
| 24 | *Casearia tomentosa* Roxb. | Tondri | Samydaceae | * | * |

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| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 25 | *Cassia fistula* L. | Amaltas/Bahawa | Fabaceae | * | * |
| 26 | *Cassine glauca* (Rottb.) Kuntze | Jamrasi | Celastraceae | * | * |
| 27 | *Catunaregam spinosa* (Thunb.) Tirveng. | Mainphal | Rubiaceae | * | * |
| 28 | *Chloroxylon swietenia* DC. | Bhirra | Meliaceae | * | * |
| 29 | *Cochlospermum religiosum* (L.) Alston | Galgala | Bixaceae | * | * |
| 30 | *Cocos nucifera* L. | Nariyal | Arecaceae | | * |
| 31 | *Cordia macleodii* | Bhokar | Boraginaceae | * | * |
| 32 | *Dalbergia latifolia* Roxb. | Shisham | Fabaceae | - | * |
| 33 | *Dalbergia paniculata* (Roxb.) Thoth. | Dhobin | Fabaceae | * | * |
| 34 | *Dalbergia sissoo* DC. | Sissoo/Sisham | Fabaceae | - | * |
| 35 | *Diospyros melanoxylon* Roxb. | Tendu | Ebenaceae | * | * |
| 36 | *Diospyros montana* Roxb. | Bistendu | Ebenaceae | * | * |
| 37 | *Dolichandrone falcata* | Medsing | Bignoniaceae | * | * |
| 38 | *Ehretia laevis* Roxb. | Datranga | Boraginaceae | * | * |
| 39 | *Emblica officinalis* | Amla | Phyllanthaceae | * | * |
| 40 | *Erythrina indica* Lam. | Pangra | Fabaceae | * | * |
| 41 | *Eucalyptus sp.* | Nilgiri | myrtaceae | - | * |
| 42 | *Ficus benghalensis* L. | Bad | Moraceae | * | * |
| 43 | *Ficus mollis* Vahl | Gular | Moraceae | - | * |
| 44 | *Ficus racemosa* L. | Gular | Moraceae | - | * |
| 45 | *Ficus religiosa* L. | Pipal | Moraceae | * | * |
| 46 | *Gardenia latifolia* Aiton | Papra | Rubiaceae | - | * |
| 47 | *Garuga pinnata* Roxb. | Kekad | Burseracea | - | * |
| 48 | *Gmelina arborea* Roxb. | Khamhar | Verbenaceae | - | * |
| 49 | *Grewia tiliifolia* Vahl | Dhaman | Tiliaceae | * | * |
| 50 | *Haldina cordifolia* (Roxb.) Ridsdale | Haldu/Kalmi | Rubiaceae | - | * |
| 51 | *Hymenodictyon orixense* (Roxb.) Mabb. | Bhanwarmal | Rubiaceae | * | * |
| 52 | *Kydia calycina* Roxb. | Baranga | Malvaceae | * | * |

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 53 | *Lagerstroemia parviflora* Roxb. | Lendia | Lythraceae | * | * |
| 54 | *Lannea coromondelica* | Jhingan/Movei | Anacardiaceae | * | * |
| 55 | *Limonia acidissima* | Kawat | Rutaceae | * | * |
| 56 | *Madhuca longifolia* | Mahua | Sapotaceae | * | * |
| 57 | *Mallotus philippensis* (Lam.) Müll. Arg. | Sinduri/ Rori | Euphorbiacea | - | * |
| 58 | *Mitragyna parvifolia* (Roxb.) Korth. | Kalam/Kadamb | Rubiaceae | * | * |
| 59 | *Neolamarckia cadamba* (Roxb.) Bosser | Kadamb | Combretaceae | - | * |
| 60 | *Ougenia oojeinesis* | Tiwas | Fabaceae | * | * |
| 61 | *Peltophorum ferrugineum* (Decne.) Benth. | Peltaphorum | Fabaceae | * | * |
| 62 | *Phoenix sylvestris* (L.) Roxb. | Khajur | Palmae | * | * |
| 63 | *Polyalthia longifolia (Sonn.) Thwaites* | China ashok | Annonaceae | | * |
| 64 | *Pongamia pinnata* (L.) Pierre | Karanj | Fabaceae | * | * |
| 65 | *Prosopis juliflora* (Sw.) DC. | Khejdi | Fabaceae | * | * |
| 66 | *Psidium guajava* L. | Jam | myrtaceae | - | * |
| 67 | *Pterocarpus marsupium* Roxb. | Bija | Fabaceae | * | * |
| 68 | *Saccopetalum tomentosum* Hook.f. & Thomson | Kari | Annonaceae | * | * |
| 69 | *Schleichera oleosa* (Lour.) Merr. | Kusum | Sapindaceae | * | * |
| 70 | *Schrebera swietenioides* Roxb. | Mokha | Oleaceae | * | * |
| 71 | *Semecarpus anacardium* L.f. | Bibba | Anacardiaceae | * | * |
| 72 | *Senna occidentalis* (L.) Link | Kasondi | Fabaceae | * | * |
| 73 | *Senna siamea* (Lam.) H.S. Irwin & Barneby | Acacia | Fabaceae | * | * |
| 74 | *Soymida febrifuga* (Roxb.) A. Juss. | Rohan | Meliaceae | * | * |
| 75 | *Sterculia urens* Roxb. | Kulu | Sterculiaceae | - | * |
| 76 | *Stereospermum suaveolens* (Roxb.) DC. | Badapadar | Bignoniaceae | * | * |
| 77 | *Syzygium cumini* (L.) Skeels | Jamun | Myrtaceae | * | * |
| 78 | *Tamarindus indica* L. | Imli | Fabaceae | * | * |
| 79 | *Tamilnadia uliginosa* (Retz.) Tirveng. & Sastre | Kala Phetra | Rubiaceae | * | * |
| 80 | *Tectona grandis* L.f. | Sagaun | Verbenaceae | * | * |

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| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 81 | *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn. | Arjun | Combretaceae | • | • |
| 82 | *Terminalia tomentosa* | Ain/Saja | Combretaceae | • | • |
| 83 | *Trema orientalis* (L.) Blume | Jivan | Urticaceeae | - | • |
| 84 | *Vitex negundo* L. | Morphal | Verbenaceae | - | • |
| 85 | *Ziziphus jujuba* Mill. | Ber | Rhamnaceae | • | • |
| 86 | *Alangiun lamarckii, Lamk.* | Ankura | Cornaceae | | • |
| 87 | *Terminalia bellirica, Linn.* | Bahera | Combretaceae | | • |
| 88 | *Fraxinus* | Ash Tree | Oleaceae | | • |
| 89 | *Mangifera indica* | Aam | Anacardiaceae | • | • |
| 90 | *Terminalia Chebula* | Hirda | Combretaceae | | • |
| 91 | *Salvadora persica* | Kharijal | Salvadoraceae | | • |
| 92 | *Turnera ulmifolia* | Holly | Passifloraceae | | • |
| 93 | *Ceiba pentandra* | Cotton | Malvaceae | • | • |
| 94 | *Casuarina equisetifolia* | Jhau | Casuarinaceae | | • |
| 95 | *Streblus asper, Lour.* | Sheora | Moraceae | | • |
| 96 | *Salix willow* | Osiers | Salicaceae | | • |
| 97 | *Phyllanthus emblica, Linn.* | Amla | Phyllanthaceae | • | • |
| 98 | *Spondias mangifera, Linn.* | Amra | Anacardiaceae | | • |
| 99 | *Hardwickia binata, Roxb.* | Anjan | Fabaceae | | • |
| 100 | *Ficus hispida, Linn.* | Dumur | Moraceae | | • |
| 101 | *Cochlospermum gossypium, Kunth.* | Gabdi | Cochlospermaceae | | • |
| 102 | *Cordia myxa, Linn.* | Lashora | Boraginaceae | | • |
| 103 | *Erythrina stricta, Linn.* | Madar | Fadaceae | | • |
| 104 | *Aglaia roxburghiana, Lour.* | Priyangu | Meliaceae | | • |
| 105 | *Cassia siamea, Linn.* | Minijiri | Fabaceae | | • |
| 106 | *Holoppelia integrifolia planch.* | Paperi | Ulmaceae | | • |
| 107 | *Trewia nudiflora, Linn.* | Pitali | Euphorbiaceae | | • |
| 108 | *Diospyros tomentose, Linn.* | Tamal | Ebenaceae | | • |
| Total | | | | 68 | 108 |

Note: (•) indicates presence of species & (-) indicates absence

**SHRUBS:**

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 1 | *Achyranthes aspera* L. | Chirchira | Amaranthaceae | * | * |
| 2 | *Balanites aegyptiaca* (L.) Del. | Hingot | Balanitaceae | * | * |
| 3 | *Calotropis gigantea* (L.) Dryand. | Aak | Asclepiadaceae | * | * |
| 4 | *Colebrookea oppositifolia* Sm. | Kalabans | Labiatae | * | * |
| 5 | *Dodonaea viscosa subsp. Angustifolia (L.f.) J.G. WEST* | sadabahar | Apocynaceae | * | * |
| 6 | *Eranthemum pulchellum* Andrews | Bantulsi | Acanthceae | * | * |
| 7 | *Flacourtia indica* (Burm.f.) Merr. | Kakai | Bixaceae | * | * |
| 8 | *Gardenia gummifera* L.f. | Dikamali | Rubiaceae | * | * |
| 9 | *Grewia hirsuta* Vahl | Gutdukri | Tiliaceae | * | * |
| 10 | *Grewia rothii* DC. | Bansuli | Tiliaceae | * | * |
| 11 | *Gymnosporia spinosa* (Blanco) Merr. & Rolfe | Baikal | Celastraceae | * | * |
| 12 | *Helicteres isora* L. | Marophali | Sterculiaceae | * | * |
| 13 | *Hibiscus rosa-sinensis* L. | Gudhal | mALVACEAE | * | * |
| 14 | *Holarrhena antidysenterica* (Roth) Wall. ex A.DC. | Dhudh | Apocynanceae | * | * |
| 15 | *Hyptis suaveolens* (L.) Poit. | Van Tulsi | Meliaceae | * | * |
| 16 | *Indigofera cassioides* DC. | Girol | Fabaceae | * | * |
| 17 | *Ixora parviflora* | Lokhandi | Rubiaceae | * | * |
| 18 | *Jasminum sambac* (L.) Aiton | Bela | Oleaceae | * | * |
| 19 | *Justicia adhatoda* L. | Adusa | acanthaceae | * | * |
| 20 | *Martynia annua* L. | Baghanakha | Martiniaceae | * | * |
| 21 | *Mimosa pudica* L. | Chhuimui | Fabaceae | * | * |
| 22 | *Morinda tinctoria* | Bartondi/Aali | Rubiaceae | * | * |
| 23 | *Mucuna pruriens* (L.) DC. | Beeja | Fabaceae | * | * |
| 24 | *Nerium oleander* L. | Lal Kaner | Apocynaceae | * | * |
| 25 | *Phoenix acaulis* Roxb. | Chhind | Palmae | * | * |
| 26 | *Pithecellobium dulce* (Roxb.) Benth. | Bilayati Imli | Fabaceae | * | * |
| 27 | *Prosopis cineraria* (L.) Druce | Sami/Gugurali | Fabaceae | * | * |
| 28 | *Ricinus communis* L. | Arand | Euphorbiaceae | * | * |
| 29 | *Senna auriculata* (L.) Roxb. | Takhad | Fabaceae | * | * |
| 30 | *Solanum virginianum* L. | Bhatkataiya | Solanaceae | * | * |
| 31 | *Tephrosia purpurea* L. | Sarphonka | Fabaceae | * | * |
| 32 | *Triumfetta rhomboidea* Jacq. | Chipti | Malvaceae | * | * |
| 33 | *Urena lobata* L. | Chikti | Malvaceae | * | * |
| 34 | *Wrightia tinctoria* | Dudhi | Apocynaceae | * | * |

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| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 35 | *Xanthium strumarium* L. | Okharu | Asteraceae | * | * |
| 36 | *Ziziphus mauritiana* | Ber | Rhamnaceae | * | * |
| 37 | *Zizyphus xylopyrus* | Ghoti | Rhamnaceae | * | * |
| 38 | *Sapindus emarginatus* | Rithaz | Sapindaceae | | * |
| 39 | *Calotropis giganteun* | Akanda | Apocynaceae | | * |
| 40 | *Bauhini vahlii Linn* | Maljan | Fabaceae | | * |
| 41 | *Lantana camera* | Common lantana | Verbenaceae | | * |
| 42 | *Lawsonia inermis* | Mehandi | Lythraceae | | * |
| 43 | *Cleridebdryn* | Bhant | Lamiaceae | | * |
| 44 | *Asparagus racemosus, Linn.* | Satamuli | Asparageeae | | * |
| 45 | *Dalbergia volubilis Linn.* | Birmunga | Fabaceae | | * |
| 46 | *Ephedra gerardiana* | Somlata | Ephedraceae | | * |
| 47 | *Flacourtia cataphracta* | Common Sainchi | Salicaceaae | | * |
| 48 | *Jatropa curcus* | Poison nut | Euphorbiaceae | | |
| 49 | *Cardenia qummifera* | Bhurur | Rubiaceae | | * |
| 50 | *Ipemeca biloba* | Changalkhuri | Rubiceae | | * |
| 51 | *Cassia pumila,Linn.* | Chota aura | Caesalpiniacae | | * |
| 52 | *Abutilon hirtum, Goertn.* | Jhampi | Malvaceae | | * |
| 53 | *Carissa spinarum, Linn.* | Karamcha | Apocynaceae | | * |
| 54 | *Croton oblongifoliusm, Linn.* | Putri | Euphorbiaceae | | * |
| 55 | *Flemingia strobilifera, Roxb.* | Stimbusak | Fabaceae | | * |
| 56 | *Desmodium latifolium, Desy.* | Sunmathasura | Fabaceae | | * |
| 57 | *Acacia pennata, Willd.* | Shembi | Fabaceae | | * |
| 58 | *Milletia auriculata, W & A.* | Gaj | Fabaceae | | * |
| 59 | *Vitis pedata, Linn.* | Colilata | Vitaceae | | * |
| 60 | *Acacia caesia (L.) Willd.* | Kendrojanum | Mimosaceae | | * |
| Total | | | | 37 | 59 |

Note: (*) indicates presence of species & (-) indicates absence

**HERBS:**

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 1 | *Alternanthera sessilis* (L.) R.Br. ex DC. | Phool ghans | Amaranthaceaea | * | * |
| 2 | *Alysicarpus vaginalis* (L.) DC. | Chipti | Fabaceae | * | * |
| 3 | *Antidesma acidum* Retz. | Khatus | Euphorbiaceae | * | * |
| 4 | *Azanza lampas* (Cav.) Alef. | Bankapas | Malvaceae | | * |
| 5 | *Boerhavia diffusa* L. | Punarnava | Nictaginaceae | * | * |
| 6 | *Senna tora* (L.) Roxb. | Panwar | Fabaceae | * | * |

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 7 | *Andrographis paniculata (Burm.f.) Wall. Ex Nees* | Kalmegh | Acanthaceae | * | * |
| 8 | *Curculigo orchioides* Gaertn. | Kali mushli | Hypoxidaceae | | * |
| 9 | *Cyperus scariosus* R.Br. | Motha | Cyparaceae | * | * |
| 10 | *Cyperus dubius* Rottb. | Motha | Cyparaceae | * | * |
| 11 | *Desmodium gangeticum* (L.) DC. | Chapti | Fabaceae | * | * |
| 12 | *Desmodium laxiflorum* DC. | Latkani | Fabaceae | * | * |
| 13 | *Desmodium triflorum* (L.) DC. | Tinpatiya | Fabaceae | * | * |
| 14 | *Enicostemma littorale* Blume. | Naibuti | Gentianaceae | * | * |
| 15 | *Euphorbia hirta* L. | Dudhi | Euphorbiaceae | * | * |
| 16 | *Euphorbia thymifolia* L. | Choti dudhi | Euphorbiaceae | * | * |
| 17 | *Jatropha gossypiifolia* L. | Jamal ghota | Euphorbiaceae | | * |
| 18 | *Merremia emarginata* (Burm. f.) Hallier f. | Muskani | Fabaceae | | * |
| 19 | *Ocimum basilicum* L. | Barbari tulsi | Meliaceae | * | * |
| 20 | *Ocimum sanctum* L. | RamaTulsi | Meliaceae | | * |
| 21 | *Petalidium angustitubum* P.G. Mey. | Indrajata | Acanthaceae | | * |
| 22 | *Phyllanthus amarus* Schumach. & Thonn. | Bhui Aonla | Phyllanthaceae | * | * |
| 23 | *Sida acuta* Burm.f. | Khakhara | Malvaceae | * | * |
| 24 | *Sida cordifolia* L. | Bariyari | Malvaceae | * | * |
| 25 | *Sida rhombifolia* L. | Vishkhapadi | Malvaceae | * | * |
| 26 | *Tagetes erecta* L. | Genda | Asteraceae | * | * |
| 27 | *Tephrosia purpurea* (L.) Pers. | Sarphonka | Fabaceae | * | * |
| 28 | *Tridax procumbens* (L.) L. | Ghamara | Asteraceae | * | * |
| 29 | *Trigonella sp.* | Ban methi | Fabaceae | * | * |
| 30 | *Agave spp* | Moraba | Asparagaceae | | * |
| 31 | *Aloe Vera* | Guar bhata | Aspodelaceae | | * |
| 32 | *Rauwolfia serpentine* | White Sarpagandha | Apocynaceae | | * |
| 33 | *Dioscorea humbularia Linn.* | Shora alu | Dioscoreaceae | | * |
| 34 | *Martynia diandra. Linn.* | Bagnoki | Martyniaceae | | * |
| 35 | *Datura stramonium. Linn.* | Dhutura | Solanaceae | | * |

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Pandharkawada Division,Pandharkawada

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 36 | *Abrus precotorius Linn.* | Kunxh | Fabaceae | | * |
| 37 | *Girardinia zeylanica* | Gand Bichua | Urticaceae | | * |
| 38 | *Cassia absus, Linn* | Chaksubanar | Fabaceae | | * |
| 39 | *Cassis tora, Linn.* | Chakunda | Fabaceae | | * |
| 40 | *Euphorbia microphylla, Linn.* | Chotakerui | Euphorbiaceae | | * |
| 41 | *Euphorbia drocunculoides, Linn. Jychi* | Khachar Dudhi | Euphorbiaceae | | * |
| 42 | *Indigofera enneaphylla, Linn.* | Bhingule | Fabaceae | | * |
| 43 | *Drosera burmanni, Linn.* | Mukhajali | Fabaceae | | * |
| 44 | *Curcuma angustifolia* | Tikhur | Zingiberaceae | | * |
| 45 | *Cuscuta reflexa, Linn.* | Algusi | Convolvulaceae | | * |
| 46 | *Vitis latifolia, Linn.* | Gobila | Vitaceae | | * |
| 47 | *Spartholobus roxburghii, Hassk.* | Maula | Fabaceae | | * |
| Total | | | | 23 | 46 |

Note: (*) indicates presence of species & (-) indicates absence

**CLIMBERS:**

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 1 | *Ampelocissus latifolia* (Roxb.) Planch. | Jangli angur | Vitaceae | * | * |
| 2 | *Antigonon leptopus* Hook. & Arn. | | Polygonaceae | * | * |
| 3 | *Asparagus racemosus* Willd. | Stawar | Liliaceae | | * |
| 4 | *Spatholobus parviflorus* (DC.) Kuntze | Nasbel | Fabaceae | * | * |
| 5 | *Butea superba* Roxb. | Palas bel | Fabaceae | * | * |
| 6 | *Capparis zeylanica* | Waghati | Capparidaceae | * | * |
| 7 | *Celastrus paniculatus* Willd. | Mal Kangni | Celastraceae | * | * |
| 8 | *Cocculus hirsutus* (L.) W.Theob. | Jaljamni | Menispermaceae | * | * |
| 9 | *Cryptolepis dubia* (Burm.f.) M.R.Almeida | Karanta | Asclepiadaceae | * | * |
| 10 | *Dioscorea bulbifera* L. | | Dioscoreaceae | * | * |
| 11 | *Dioscorea hispida* Dennst. | Baichandi | Dioscoreaceae | * | * |
| 12 | *Dioscorea pentaphylla* L. | Musalkand | Dioscoreaceae | * | * |
| 13 | *Diploclyclos palmatus* (L.) C. Jeffrey | | Cucurbitaceae | * | * |
| 14 | *Hemidesmus indicus* (L.) R. Br. ex Schult. | | Apocynaceae | * | * |
| 15 | *Ichnocarpus frutescens* (L.) W.T.Aiton | Dhimar Bel | Apocynaceae | * | * |
| 16 | *Ipomoea pes-tigridis* L. | | convolvulaceae | * | * |
| 17 | *Pergularia daemia* (Forssk.) Chiov. | Kadukand | Apocynaceae | * | * |
| 18 | *Rhynchosia minima* (L.) DC. | Ban sem | Fabaceae | * | * |
| 19 | *Tinospora cordifolia* (Willd.) Miers | Giloy | Menispermaceae | * | * |
| 20 | *Tylophora indica* (Burm. f.) Merr. | Dambela | Apocynaceae | * | * |

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 21 | *Vallaris solanacea* (Roth) Kuntze | Dudhbela | Apocynaceae | * | * |
| 22 | *Ventilago denticulata* Willd. | Keoti | Rhamnaceae | * | * |
| 23 | *Ampelocissus indica* (L.) Planch. | Jangli angur | vitaceae | * | * |
| 24 | *Ziziphus oenopolia* (L.) Mill. | Makor | Rhamnaceae | * | * |
| Total | | | | 23 | 24 |

Note: (*) indicates presence of species & (-) indicates absence

**GRASSES & BAMBOOS:**

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 1 | *Aristida setacea* Retz. | Bargi Ronda | Poaceae | * | * |
| 2 | *Arundinella setosa* Trin. | Sidi | Poaceae | * | * |
| 3 | *Bothriochloa pertusa* (L.) A.Camus | Bhond grass | Poaceae | * | * |
| 4 | *Cenchrus purpureus* (Schumach.) Morrone | | Poaceae | * | * |
| 5 | *Cynodon dactylon* L. | Doob | Poaceae | * | * |
| 6 | *Dichanthium annulatum* (Forssk.) Stapf | Chhoti Marbel | Poaceae | * | * |
| 7 | *Eragrostis amabilis* (L.) Wight & Arn. | Bhurbhusi | Poaceae | * | * |
| 8 | *Eulaliopsis binata* (Retz.) C.E.Hubb. | Bagai | Poaceae | * | * |
| 9 | *Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult. | Kushal, lampa | Poaceae | * | * |
| 10 | *Imperata cylindrica* (L.) Raeusch. | Chhir | Poaceae | * | * |
| 11 | *Eulaliopsis binata* (Retz.) C.E.Hubb. | Sabai | Poaceae | * | * |
| 12 | *Iseilema laxum* Hack. | Mushan | Poaceae | * | * |
| 13 | *Schima nervosum* (Rottler) Stapf | Munsel | Poaceae | * | * |
| 14 | *Panicum antidotale* Retz. | Kosra | Poaceae | * | * |
| 15 | *Panicum sumatrense* Roth | Chire Kutik | Poaceae | * | * |
| 16 | *Panicum repens* L. | | Poaceae | * | * |
| 17 | *Saccharum spontaneum* L. | Kans | Poaceae | * | * |
| 18 | *Schima nervosum* (Rottler) Stapf | Sheda | Poaceae | * | * |
| 19 | *Setaria verticillata* (L.) P.Beauv. | Latkani | Poaceae | * | * |
| 20 | *Sorghum halepense* (L.) Pers. | Baru | Poaceae | * | * |
| 21 | *Themeda quadrivalvis* (L.) Kuntze | Gunher | Poaceae | * | * |
| 22 | *Bambusa bambos* (L.) Voss | Kanta bans | Graminaeae | * | * |
| 23 | *Dendrocalamus strictus* (Roxb.) Nees | Bans | Graminaeae | * | * |
| 24 | *Echinochloa colona* | Sama | Poaceae | | * |
| 25 | *Deschampsia* | Chhi | Poaceae | | * |
| 26 | *Saccharum bengalense* | Munj | Poaceae | | * |
| 27 | *Bambusa balcooa* | Baro bans | Poaceae | | * |
| 28 | *Thysanolaena agrostis* | Jharu/Broom grass | Poaceae | | * |
| Total | | | | 23 | 28 |

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**AQUATIC FLORA :**

| S. No | Botanical Name | Local Name | Family | Core | Buffer |
|---|---|---|---|---|---|
| 1. | Pistia stratiotes | Water lettuce | Araceae | | * |
| 2. | Lemnoideae | Duckweeds | Araceae | | * |
| 3. | Nelumbo nucifera | Indian lotus | Nelumbonaceae | | * |
| 4. | Nymphaea | Water lillies | Nymphaeceae | | * |
| | Total | | | - | 4 |

Note: (*) indicates presence of species & (-) indicates absence

(Source: Primary Survey Data)

**MARKI MANGLI OPENCAST COAL MINING PROJECT,**
**Project Area 339.467 Ha Village(s): Savli, Ruikot, Pardi and Mukutban**
**Tahsil – Jhari Jamni, District – Yavatmal, Maharashtra,**

**LIST OF FAUNA WITHIN CORE AND BUFFER ZONE**

**MAMMALS:**

| Sr. No. | Scientific name | Vernacular name | Common name | Schedules of Wildlife Act/ IUCN Status | Core Zone | Buffer Zone |
|---|---|---|---|---|---|---|
| 1 | *Antilope cervicapra* | Blackbuck | Deer | I | * | * |
| 2 | *Axis axis* | Cheetal | Deer | III/LC | | * |
| 3 | *Boselaphus tragocamelus* | Nilgai | Blue bull | III/LC | | * |
| 4 | *Canis aureus* | Kolha | Jackal | II/LC | | * |
| 5 | *Canis lupus pallipes* | Indian Wolf | Kolha | I | * | * |
| 6 | *Cervus unicolor* | Sambar | Sambar | III/VU | | * |
| 7 | *Cuon alpinus* | Dhol | Wild Dog | II/EN | | * |
| 8 | *Felis chaus* | Ranmanjar | Jungle cat | II/LC | * | * |
| 9 | *Funambulus tristriatus* | Khar | Five striped palm squirrel | IV/LC | * | * |
| 10 | *Gazella bennettii* | Chinkara | Hiran | I | * | * |
| 11 | *Herpestes edwardsi* | Mongoose | Common mongoose | LC | * | * |
| 12 | *Hyaena hyaena* | Hyaena | Wild dog | III | * | * |
| 13 | *Hystrix indica* | Indian Porcupine | Salunki | II | * | * |
| 14 | *Lupus nigricollis* | Sasa | Indian hare | IV/LC | | * |
| 15 | *Melursus ursinus* | Sloth bear | Bear | I | * | * |
| 16 | *Panthera tigris* | Tiger | Tiger | I | | * |
| 17 | *Panthera pardus* | Tendua | Panther | I | | * |
| 18 | *Presbytis entellus* | Langur | Bandar | II | * | * |
| 19 | *Presbytis pileatus* | Common langur | Bandar | II | * | * |
| 20 | *Rhesus macaque* | Bandar | Monkey | II/LC | | * |
| 21 | *Sus scrofa cristatus* | Randukkar | Wild boar | III/LC | * | * |
| 22 | *Tetracerus quadricornis* | Four Horned Antilope | Hiran | I | * | * |
| 23 | *Vulpes bengalnesis* | Indian Fox | Indian Fox | II/LC | | * |
| 24 | *Funambulus palmarum* | Indian Palm Squirrel | Khar | IV | * | * |
| 25 | *Muntiacus muntjak* | Barking Deer | Harin | III | * | * |
| 26 | *Manis crassicaudata* | Indian Pangolin | Ant eater | I | * | * |

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| Sr. No. | Scientific name | Vernacular name | Common name | Schedules of Wildlife Act/ IUCN Status | Core Zone | Buffer Zone |
|---|---|---|---|---|---|---|
| 27 | *Cynopterus sphinx* | Bat, short-nosed fruit | Bat | IV/LC | * | * |
| 28 | *Pteropus giganteus* | Bat, Indian Flying Fox | Bat | IV/LC | * | * |
| 29 | *Tatera indica* | Gerbille, India | Rat | IV/LC | * | * |
| 30 | *Lepus nigricollis* | Hare, Indian | Sasa | IV/LC | * | * |
| 31 | *Macaca mulatta* | Monkey | Macaque Rhesus | II/LC | * | * |
| 32 | *Herpestes javanicus* | Mongoose | Mongoose, Small Indian | II/LC | * | * |
| 33 | *Mus booduga* | Mouse | Mouse, Indian Field | II/LC | * | * |
| 34 | *Bandicota indica* | Rat | Rat, Bandicoot | IV/LC | * | * |
| 35 | *Golunda ellioti* | Rat | Rat, Indian Bush | IV/LC | * | * |
| Total | | | | | 25 | 35 |

**AVES:**

| Sr. No. | Scientific name | Vernacular name | Common name | Schedules of Wildlife Act/ IUCN Status | Core | Buffer |
|---|---|---|---|---|---|---|
| 1 | *Acridotheres tristis* | Salunki | Indian myna | IV | * | * |
| 2 | *Alauda gulgula* | Turrebaj chandol | Oriental skylark | IV/LC | | * |
| 3 | *Ardeola grayii* | Vanchak | Pond heron | IV/LC | * | * |
| 4 | *Columba livia* | Parva | Blue rock pigeon | LC | * | * |
| 5 | *Corvus splendens* | Kawala | House crow | LC | * | * |
| 6 | *Coturnix coturnix* | Rakhi durlav | Grey quail | IV/LC | | * |
| 7 | *Francolinus pondicerianus* | Chitur | Grey francolin | IV/LC | | * |
| 8 | *Lanius vittatus* | Khatik | Baybacked shrike | LC | | * |
| 9 | *Passer domesticus* | Chimni | House sparrow | LC | * | * |
| 10 | *Pavo cristatus* | mor | Peacock | I | * | * |
| 11 | *Psittacula krameri* | Popat | Roseringed parakeet | IV/LC | * | * |
| 12 | *Saxicoloides fulicata* | Chirak | Indian robin | LC | * | * |

| Sr. No. | Scientific name | Vernacular name | Common name | Schedules of Wildlife Act/ IUCN Status | Core | Buffer |
|---|---|---|---|---|---|---|
| 13 | *Streptopelia senegalensis* | Hola | Laughing dove | IV/LC | | * |
| 14 | *Phasianidae* | | Jungle Fowl | IV/LC | * | * |
| 15 | *Estrildidae* | | Munias | IV/LC | * | * |
| 16 | *Pycnonotidae* | Bulbul | Bulbul | IV/LC | * | * |
| 17 | *Cuculidae* | Cuckoo | Cuckoo | IV/LC | * | * |
| 18 | *Eudynamys* | Koel | Koel | IV/LC | * | * |
| 19 | *Milvus migrans* | Kite | Kite | IV/LC | * | * |
| 20 | Anser anser | Goose | Goose | IV/LC | * | * |
| 21 | *Anatidae* | Duck | Duck | IV/LC | * | * |
| 22 | *Turdoides caudata* | Common Babbler | Common Babbler | IV/LC | * | * |
| 23 | *Oriole oriolidae* | Golden Oriole | Haldya | IV/LC | * | * |
| 24 | *Picidae* | Woodpecker | Woodpecker | IV/LC | * | * |
| 25 | *Meropidae* | Bee-eater | Bee-eater | IV/LC | * | * |
| 26 | *Glaucidium radiatum* | Jungle Owlet | Jungle Owlet | IV/LC | * | * |
| 27 | *Neophron percnopterus* | Vulture | Egyptian Vulture | IV/LC | * | * |
| 28 | *Anatidae* | Teal | Teal | IV/LC | * | * |
| 29 | *Sterna aurantia* | River Tern | River Tern | VU | | * |
| Total | | | | | 23 | 29 |

**HERPATOFAUNA:**

| Sr. No. | Scientific name | Vernacular name | Common name | Schedules of Wildlife Act/IUCN Status | Core | Buffer |
|---|---|---|---|---|---|---|
| 1 | *Calotes versicolor* | Sargota | Common garden lizard | LC | * | * |
| 2 | *Eryx conicus* | Red sand boa | Ghonas | IV | * | * |
| 3 | *Mabuya carinata* | Sapsoli | Common skink | LC | * | * |
| 4 | *Naja naja* | Nag | Cobra | II/LC | | * |
| 5 | *Ptyas mucosa* | Dhaman | Common rat snake | II/LC | | * |
| 6 | *Python molurus* | Rock python | Ajgar | I | * | * |
| 7 | *Rana hexadactyla* | Beduk | Indian Pond Frog | IV/NA | * | * |
| 8 | *Rana tigerinus* | Beduk | Indian Bull Frog | IV/LC | * | * |

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| Sr. No. | Scientific name | Vernacular name | Common name | Schedules of Wildlife Act/IUCN Status | Core | Buffer |
|---|---|---|---|---|---|---|
| 9 | *Varanus bengalnesis* | Monitor Lizard | Large Bengal Monitor Lizard | I | * | * |
| 10 | *Daboia russelii* | Viper | Russels Viper | II | * | * |
| 11 | *Bungarus fasciatus* | Krait | Banded Krait | IV | * | * |
| 12 | *Chamelean calcarata* | Lizard | Chameleon | II | * | * |
| 13 | *Bungarus caeruleus* | Snake | Common Krait | II/VU | * | * |
| otal | | | | | 11 | 13 |

(Source: Primary Survey & Secondary Data)
Note:- NA= Not yet assessed, LC=Least Concern, VU= Vulnerable.

**PISCES:**

| Sr. No. | Scientific name | Vernacular Name | Common Name | Iucn status | Core | Buffer |
|---|---|---|---|---|---|---|
| 1 | *Ambasis nama* | Zanjad | Indian glassy fish | NA | | * |
| 2 | *Ambasis ranga* | Zanjad | Indian glassy fish | NA | | * |
| 3 | *Barilius barna* | Batri | River carp baril | LC | | * |
| 4 | *Catla catla* | Katla | Major Carp | LC | | * |
| 5 | *Channa striatus* | Dhadak | Banded snake head | LC | | * |
| 6 | *Cirrhinus mrigala* | Naren | Major Carp | LC | * | * |
| 7 | *Clarius batracus* | Mangur | Magur | NA | | * |
| 8 | *Cyprinus carpio* | Cipla | Cipla | VU | | * |
| 9 | *Gambusia affinis* | Machar Machli | Mosquito fish | LC | | * |
| 10 | *Glossigobius giius* | Kaddu | Tank gobi | NA | | * |
| 11 | *Heteropneustes fossilis* | Ingur | Stinging cat fish | LC | | * |
| 12 | *Labeo rohita* | Rohu | Common carp | LC | * | * |
| 13 | *Labeo calbasu* | Black rohu | Calbasu | LC | | * |
| 14 | *Mastacembelus armatus* | Bamb | Spiny eel | LC | | * |
| 15 | *Mystus cavasius* | Singara | Cat fish | LC | | * |

| Sr. No. | Scientific name | Vernacular Name | Common Name | Iucn status | Core | Buffer |
|---|---|---|---|---|---|---|
| 16 | *Mystus seenghala* | Katwa | Gangatic mystus | LC | | * |
| 17 | *Nandus nandus* | Dukkar | Leaf fish | LC | | * |
| 18 | *Osteobrama cotio* | Bhondu | Cotio | LC | | * |
| 19 | *Punctius amphibious* | Ghuruti | Scarlet Banded barb | NA | | * |
| 20 | *Rita rita* | Bhokhi | Rita | LC | | * |
| 21 | *Salmostoma bacaila* | Chal | Silver fish | LC | | * |
| 22 | *Tor khudree* | Mahseer | Deccan Mahaseer | LC | | * |
| 23 | *Xenentodon cancilla* | Chocha | Needle fish | LC | | * |
| Total | | | | | 2 | 23 |

(Source: Primary Survey & Secondary Data) Note: NA= Not yet assessed, LC=Least Concern, VU= Vulnerable.

**BUTTERFLIES:**

| Sr. No. | Scientific name | Vernacular name | Family | Iucn status | Core | Buffer |
|---|---|---|---|---|---|---|
| 1 | *Ariadne merione* | Common castor | Nymphalidae | NA | * | * |
| 2 | *Catopsillia pirunthe* | Mottled emigrant | Pieridae | NA | | * |
| 3 | *Catopsillia pomona* | Common emigrant | Pieridae | NA | * | * |
| 4 | *Cepora nerissa* | Common gul | Pieridae | NA | | * |
| 5 | *Chilades pandav* | Plain cupid | Hesperiidae | NA | * | * |
| 6 | *Danaus chrysippus* | Plain tiger | Nymphalidae | LC | | * |
| 7 | *Euploea core* | common indian crow | Nymphalidae | LC | | * |
| 8 | *Eurema hecabe* | Common grass Yellow | Pieridae | NA | | * |
| 9 | *Hypolimnas misippus* | DANNAID EGG FLY | Nymphalidae | NA | * | * |
| 10 | *Junoniya orithya* | Blue pansy | Nymphalidae | NA | | * |
| 11 | *Junoniya iphita* | Chocolate pansy | Nymphalidae | NA | | * |
| 12 | *Junoniya lemonias* | Lemon pansy | Nymphalidae | NA | | * |
| 13 | *Leptotes plinius* | Zebra blue | Lycaenidae | NA | | * |
| 14 | *Melanitis leda* | Common evening brown | Nymphalidae | LC | | * |
| 15 | *Pachliopta aristolochiae* | Common rose | Papilionidae | LC | | * |



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| Sr. No. | Scientific name | Vernacular name | Family | Iucn status | Core | Buffer |
|---|---|---|---|---|---|---|
| 16 | *Papilio demoleus* | Lime | Papilionidae | NA | | * |
| 17 | *Papilio polytes* | Common mormon | Papilionidae | NA | * | * |
| 18 | *Prosotas nora* | common line blue | Hesperiidae | NA | | * |
| 19 | *Tirumala limniace* | Blue tiger | Nymphalidae | NA | * | * |
| 20 | *Pachliopta hector* | Crimson Rose | Papilionidae | LC | | * |
| 21 | *Virachola Isocrates* | Guava Blue | Lycaenidae | II | | * |
| 22 | *Castalius rosimon* | Common pierrot | Lycaenidae | NA | | * |
| 23 | *Rapala manea* | Slate Flash | Lycaenidae | LC | | * |
| 24 | Synthia cardui | Painted Lady | Nymphalidae | NA | * | * |
| 25 | Ypthima asterope | Common Three Ring | Nymphalidae | NA | * | * |
| 26 | Catopsilia pomona | Common emigrant | Pieridae | NA | * | * |
| 27 | Cepora nerissa | Common Gull | Pieridae | NA | * | * |
| 28 | Eurema hecabe | Common Grass yellow | Pieridae | NA | * | * |
| 29 | Danaus chrysippus | Plain Tiger | Nymphalidae | NA | * | * |
| 30 | Danaus genutia | Striped Tiger | Nymphalidae | NA | * | * |
| 31 | Euploea core | Common crow | Nymphalidae | NA | * | * |
| 32 | Junonia lemonias | Lemon Pansy | Nymphalidae | NA | * | * |
| 33 | Junonia orithya | Blue Pansy | Nymphalidae | NA | * | * |
| 34 | Melanitis leda | Common evening brown | Nymphalidae | NA | * | * |
| 35 | Hypolimnas bolina | Great eggfly | Nymphalidae | NA | * | * |
| 36 | Tirumala septentrionis | Dark Blue Tiger | Nymphalidae | NA | * | * |
| Total | | | | | 19 | 36 |

(Source: Primary Survey & Secondary Data)

INSECTS :

| Sr. No. | Scientific name | Common name | Iucn status | Core | Buffer |
|---|---|---|---|---|---|
| 1 | Poduridae | Podura | LC/UNS | * | * |
| 2 | Blatta orientalis | Cockroach | LC/UNS | * | * |
| 3 | Mantodea | Mantis | LC/UNS | * | * |
| 4 | Chinavia hilaris | Green Stink Bugs | LC/UNS | * | * |
| 5 | Pyrrhocoridae | Red Bugs | LC/UNS | * | * |
| 6 | Formucidae | Ant | LC/UNS | * | * |
| 7 | Solenopsis spp. | Red Ant (Fire Ant) | LC/UNS | * | * |
| 8 | Paraponera clavata | Bullet Ant | LC/UNS | * | * |
| 9 | Apis dorsata | Giant Honey Bee | LC/UNS | * | * |
| 10 | Apis dorsata | Rock Bee | LC/UNS | * | * |
| 11 | Apis spp. | Honey Bee | LC/UNS | * | * |
| 12 | Andrenidae | Bee | LC/UNS | * | * |
| 13 | Bombus spp. | Black Bee | LC/UNS | * | * |
| 14 | Vespidae | Yellow Wasps | LC/UNS | * | * |
| 15 | Ichneumonidae | Wasps | LC/UNS | * | * |
| 16 | Chilomenes s. maculate | Ladybird | LC/UNS | * | * |
| 17 | Meloidae | Blister Beetle | LC/UNS | * | * |
| 18 | Honotricha serrate | Grubs | LC/UNS | * | * |
| | Total | | | 18 | 18 |

Note:- NA= Not yet assessed, LC=Least Concern, VU= Vulnerable, UNS=Unscheduled

| Class | Core Zone | Buffer Zone | TOTAL |
|---|---|---|---|
| Mammals | 23 | 33 | 33 |
| Herpntofauna | 11 | 13 | 13 |
| Aves | 23 | 29 | 29 |
| Pisces | 2 | 23 | 23 |
| Butterfly | 19 | 36 | 36 |
| Insects | 18 | 18 | 18 |
| TOTAL | 96 | 152 | 152 |

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**LIST OF SCHEDULE –I SPECIES AS PER WPA, 1972**

| S. No. | Scientific Name | English / vernacular Name | WPA 72 Schedule | Class |
|---|---|---|---|---|
| 1 | *Panthera tigris* | Tiger | Schedule-I | *Mammals* |
| 2 | *Panthera pardus* | Leopard | Schedule-I | Mammals |
| 3 | *Pavo cristatus* | Indian Peafowl | Schedule-I | Aves |
| 4 | *Antilope cervicapra* | Blackbuck | Schedule-I | Mammals |
| 5 | *Canis lupus pallipes* | Indian Wolf | Schedule-I | Mammals |
| 6 | *Gazella bennettii* | Chinkara | Schedule-I | Mammals |
| 7 | *Melursus ursinus* | Sloth bear | Schedule-I | Mammals |
| 8 | *Tetracerus quadricornis* | Four Horned Antilope | Schedule-I | Mammals |
| 9 | *Python molurus* | Rock python | Schedule-I | Herpatofauna |
| 10 | *Varanus bengalnesis* | Large Bengal Monitor Lizard | Schedule-I | Herpatofauna |
| 11 | *Manis crassicaudata* | Indian Pangolin | Schedule-I | Mammals |

# Annexure 10: Undertaking for not establishing labour camps in mine lease and well as well as forest land

Yazdani International (P) Ltd.
*Steering success, anchoring credibility*

Sub: Diversion of 146.996 ha forest land under section 2(1) (ii) of the Van (Sanrakshn Evam Sawadhan) Adhiniyam 1980 for Integrated Coal Mining including post mine reclamation in Marki Mangli II coal Block in Yavatmal District, Maharashtra State in favor of Yazdani International Private Limited (Online number FP/MH/145510/2021).

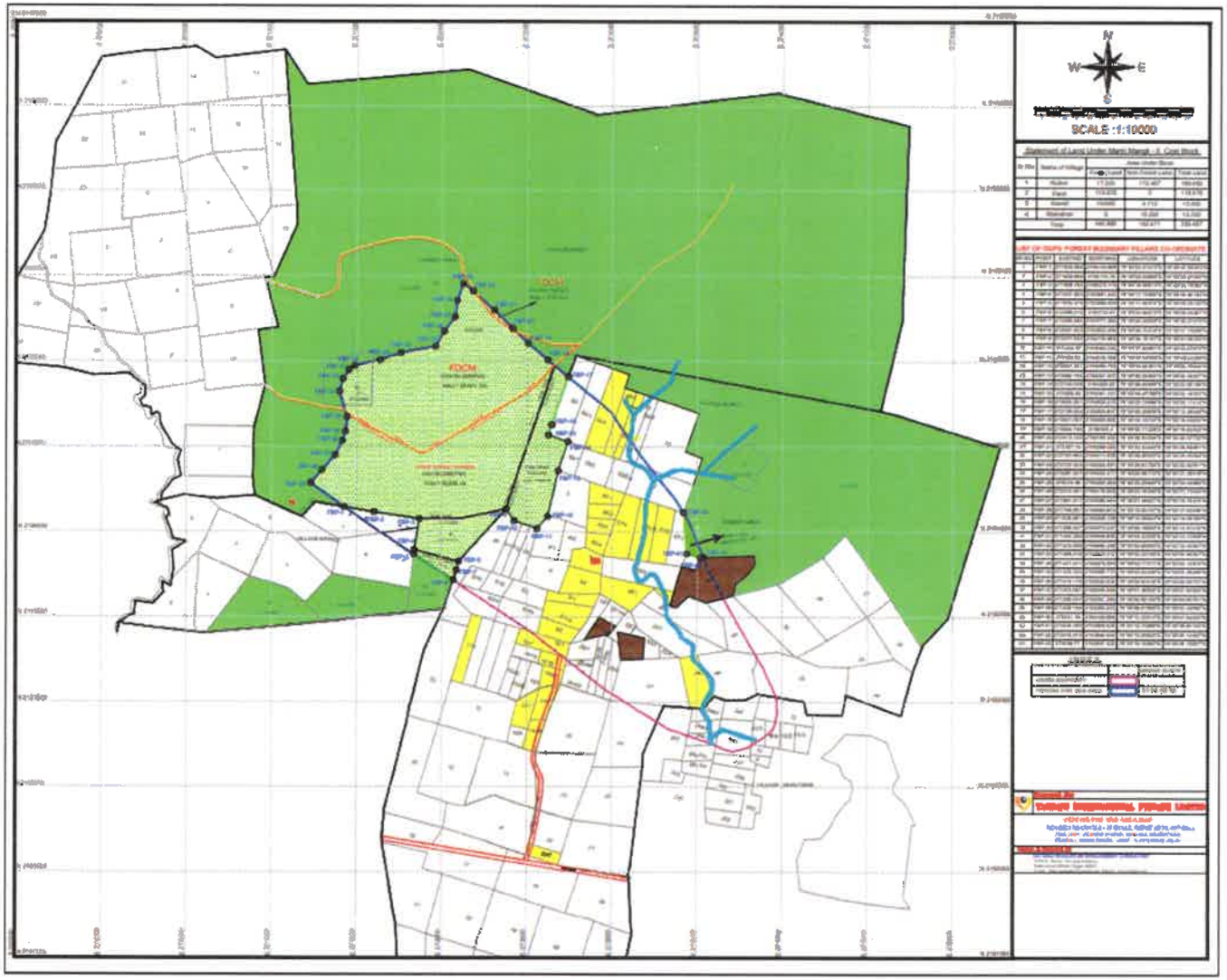
UNDERTAKING OF USER AGENCY

User Agency M/s Yazdani International Private Limited, hereby give and undertaking that no labour camps would be established either in the lease area nor any of the forest land outside the lease area to ensure that there is no ilicit felling of trees and disturbing the wildlife habitat.

03.03.2025

Ashok Kumar Pani
Vice President
Authorized Signatory

# Annexure 11: Proposed fence between mine and forest area



**Annexure 7**

**Certified copy of approved mine closure plan from DFO**

Mining Plan along with the mine closer plan enclosed herewith the WMPhas been approved by Ministry of Coaland vetted by the DFO, Pandhrakawda.

Enclosed: Mine Closer Plan of Marki Mangli II approved by competent authority

Yazdani International (P) Ltd. WANI 445304

Sharad Satramwar
Dy. General Manager (Lease & Law)
Yazdani International Pvt Limited

Dy. Conservator of Forests (T)
Pandharkawda Forest Division
Dist. YAVATMAL

# Annexure 12: Mine Closure Plan

**Annexure-V : Bar Chart showing schedule of implementation of Mine Closure activities of Marki Mangli-II Coal Mine**

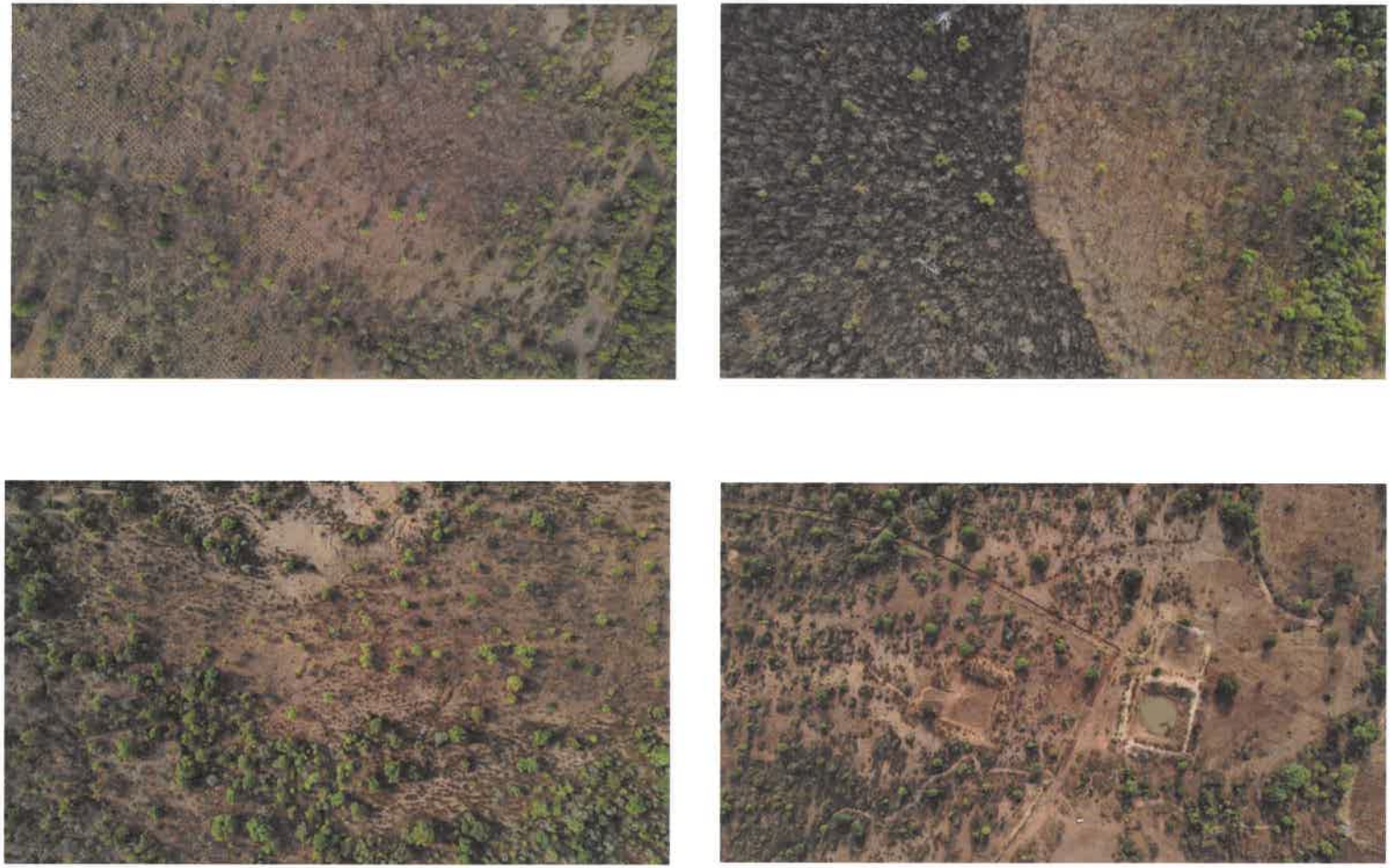
**(Progressive & Final closure period) with duration of important activities.**

| Sl. No. | Head | | Year |
|---|---|---|---|
| | Progressive closure | | |
| 1 | | Water quality management | |
| 2 | | Air quality management | |
| 3 | | Waste Management | |
| 4 | | Barbed wire fencing around dump | |
| 5 | | Barbed wire fencing around the Pit | |
| 6 | | Filling of Void - Reloading of Crown Dump | |
| 7 | | Top Soil management | |
| 8 | | Technical & Biological reclamation of Mines out land & OB dump plantation | |
| 9 | | Plantation over virgin area including green belt | |
| 10 | | Manpower Cost and supervision | |
| 11 | | Toe Wall around the dump | |
| 12 | | Garland drain | |
| 13 | | Garland drain around the dump | |
| 14 | | Any other Activity | |
| | | | |
| 1 | Dismantling of Infrastructure & Disposal / rehabilitation of Mining machinery | Dismantling of workshop/CHP/Mine facilities etc | |
| 2 | | Rehabilitation of the dismantled facilities | |
| 3 | | Dismantling of pumps and Pipes / HEMM/P & M | |
| 4 | | Dismantling of stowing bunkers, provisions for bore well pumping arrangement | |
| 5 | | Dismantling of UG equipment | |
| 6 | | Rearranging water pipelines to dump top park / Agricultural land | |
| 7 | | Dismantling of Power lines | |
| 8 | | Any other Activity(Misc) | |
| 9 | | Barbed wire fencing around dump | |
| 10 | | Manpower Cost and supervision | |
| 11 | | Toe Wall around the dump | |
| 12 | | Garland drain | |
| 13 | | Garland drain around the dump | |
| 14 | | Any other Activity | |
| | | | |
| 1 | Dismantling of Infrastructure & Disposal / rehabilitation of Mining machinery | Dismantling of workshop/CHP/Mine facilities etc | |
| 2 | | Rehabilitation of the dismantled facilities | |
| 3 | | Dismantling of pumps and Pipes / HEMM/P & M | |
| 4 | | Dismantling of stowing bunkers, provisions for bore well pumping arrangement | |
| 5 | | Dismantling of UG equipment | |
| 6 | | Rearranging water pipelines to dump top park / Agricultural land | |
| 7 | | Dismantling of Power lines | |
| 8 | | Any other Activity(Misc) | |
| 9 | Safety and security | Barbed wire fencing around dump | |
| 10 | | Barbed wire fencing around pit | |
| 11 | | Barbed wire fencing with masonary pillar | |
| 12 | | Concrete wall with masonary pillar around the pit | |
| 13 | | Concrete wall fencing around the water body | |
| 14 | | Stabilization (benching,pitching )side walls of water body | |
| 15 | | Toe Wall around the dump | |
| 16 | | Garland drain | |
| 17 | | Garland Drain around the dump | |
| 18 | | Drainage Channel from main OB dump | |
| 19 | | Filling of Void | |
| 20 | | Top Soil management | |

| | | | |
|---|---|---|---|
| 21 | Technical & Biological Reclamation of Mined out area and OB Dump | OB rehandling for back filling | 4.71 |
| 22 | | Terracing, Benching with soil and vegetation for Ex. OB dump | 1.30 |
| 23 | | Peripheral road, gates, view point, cemented steps on bank | 1.89 |
| 24 | | Expenditure on development of Agriculture land | 8.49 |
| 25 | | Landscaping and Plantation | 0.35 |
| 26 | Aestheatic-V: Post Closure management and supervision | Power cost | 0.10 |
| 27 | | Post Mining Water quality management | 0.04 |
| 28 | | Post Mining Air quality management | 0.05 |
| 29 | | Subsidence monitoring for 5 years | 0.33 |
| 30 | | Waste Management | 32.80 |
| 31 | | Manpower Cost and supervision | 2.10 |
| 32 | | Any other Activity(Misc) | 1.50 |
| 33 | Others activities | Entrepreneurships development, vocational / skill development training for sustainable income of affected people | 2.50 |
| 34 | | Golden Handshake / Retrenchment benefits to employees of OC | 2.50 |
| 35 | | Golden Handshake / Retrenchment benefits to employees of UG | 6.00 |
| 36 | | One time financial grant to Society / Institutions / Organisations which is dependent upon the project | 1.75 |
| 37 | | Provide jobs in other areas of the company | 1.62 |
| 38 | | Continuation of other services like running of schools etc. | 2.25 |
| 39 | Any other Activity(Misc) | | 2.50 |

**Dy. Conservator of Forest (T)**
**Pandharkawda Forest**

## Plate 1: Drone Images of the Proposed Site for Marki Mangli II Coal Mine



**********

**Annexure 7**

**Certified copy of approved mine closure plan from DFO**

Mining Plan along with the mine closer plan enclosed herewith the WMPhas been approved by Ministry of Coaland vetted by the DFO, Pandhrakawda.

Enclosed: Mine Closer Plan of Marki Mangli II approved by competent authority

Yazdani International (P) Ltd. WANI 445304

Sharad Satramwar
Dy. General Manager (Lease & Law)
Yazdani International Pvt Limited

Dy. Conservator of Forests (T)
Pandharkawda Forest Division
Dist. YAVATMAL

# Mine Plan and Mine Closure Plan

(First Modification/Revision)

**For**

## MARKI MANGLI II COAL MINE

WARDHA VALLEY Coal Field
(Under Rule 22E of MCR 1960)
Yavatmal
Maharashtra

Project area 339.467 ha

**Targeted Capacity 0.30 MTPA**
**Peak Rated Capacity -0.4500MTPA**


Prepared By

**INDIAN MINE PLANNERS AND CONSULTANTS**

Contact No. - 7909060885
Email ID - impcon.kolkata@gmail.com


APPLICANT

**YAZDANI INTERNATIONAL PRIVATE LIMITED**

Yezdani International Pvt Ltd
7th Floor, C-Wing, Fortune Towers, Chandrasekhpur
Bhubneswar-Odisha 751023

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| | | Annexure-2B | Annex Certificate MPPA.PDF | 51 - 60 |
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| 3 | Approval of the Company Board Approval | Annexure-3A1 | Annexure -3A1-R.pdf | 61 - 62 |
| 4 | Copy of earlier approval of mining plan. | Annexure-4 | Annexture MP.pdf | 63 |
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# PLANS / PLATES

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# CHECKLIST

| | Details | Status |
|---|---|---|
| Chapter-1 | Project Information | ✓ |
| Chapter-2 | Exploration,Geology, Seam Sequence, Coal Quality and Reserve | ✓ |
| Chapter-3 | Mining | ✓ |
| Chapter-4 | Safety Management | ✓ |
| Chapter-5 | Infrastructure Facilities proposed and their Location | ✓ |
| Chapter-6 | Land Requirement | ✓ |
| Chapter-7 | Environment Management | ✓ |
| Chapter-8 | Progressive & Final Mine Closure Plan | ✓ |
| Annexure | Copy of allotment order /Vesting order. | ✓ |
| Annexure | Certificate of Qualified person/ Accredited Mining Plan preparing agency (MPPA)if the project area is confined within the vested/allotted block boundary/existing mining lease and<br><br>Where the project area extends beyond the block boundary, a certificate of Qualified person/ Accredited Mining Plan preparing agency (MPPA)should be supported with a certificate of State Government mines and Geology department must be attached, which should specify<br><br>(a) intent of the state government for grant of lease beyond the vested geological boundary/existing mining lease (b)non-existence of Coal/ Lignite in the area beyond the vested/allotted geological block boundary/existing mining lease to rule out the issue of encroachment and use of coal bearing area (beyond the vested/alfotted block boundary/existing mining lease) in the mining plan | ✓ |
| Annexure | Approval of the Company Board | ✓ |
| Annexure | Copy of earlier approval of mining plan. | ✓ |
| Annexure | Plan / chart showing schedule of Implementation of Mine closure activities (progressive and final closure) with duration of important activities | ✓ |
| Annexure | Expert-Review Report carried out be an Accredited Mining Plan Preparing Agency (MPPA) | ✓ |
| Annexure | Other document (if any) | ✓ |
| Plates | Location plan | ✓ |
| Plates | Plan certified by Qualified person/ Accredited Mining Plan preparing agency (MPPA)if the project area is confined within the vested/allotted block boundary/existing mining lease and where the project area extends beyond the block boundary, a Plan certified by Qualified person/ Accredited Mining Plan preparing agency (MPPA)should be supported with a plan with cardinal co-ordinates duly certified by theMines and Geology Department of the concerned State Government.<br>Plan in support of Annexure - II | ✓ |
| Plates | Printed copy of the KML file superimposed in the recent (not older than one year from the base date) dated satellite Image duly certified by Accredited Agency should also be attached.<br>Note: The soft copy of the KML file shall also be part of the Soft copy of the mining Plan. | ✓ |
| Plates | Cadastralplan showing approved block boundary vis-A-vis proposed/existing mining lease & Mine boundary superimposed over it in distinct color, showing land use and infrastructure etc. | ✓ |
| Plates | Geological plan showing all the boreholes drilled and proposed to be drilled showing allotted block boundary and required lease area. | ✓ |
| Plates | Representative Graphic Litholog | ✓ |
| Plates | Surface Plan showing drainage system, Contour, preferably at 3m interval, location of BH (borehole) | ✓ |
| Plates | Conceptual plan showing infrastructure facilities including colony, boundary of mining area, mine entries, roads including road diversion alignment etc. | ✓ |

| | | |
|---|---|---|
| Plates | Tentative land use plan showing land type (Govt., forest and tenancy land) with its data source. | ✓ |
| Plates | Floor contour plan and seam folio plan, iso-grade plan | ✓ |
| Plates | Cross-section showing coal/lignite seam(s) | ✓ |
| Plates | Plan showing existing and proposed surface layout(s) | ✓ |
| Plates | Plan showing total coal thickness and overburden thickness and stripping ratio (in case of opencast (OC) Mines) | ✓ |
| Plates | Final stage quarry plan showing haul road alignment (in case of OC Mines) | ✓ |
| Plates | Plan showing mode and location of entries and surface layouts (in case of underground (UG) Mines) | ✗ |
| Plates | Layout of the panel for each system (like Longwall, Continuous Miner, Bord & Pillar, road header etc.) should be given (in case of UG Mines) | ✗ |
| Plates | Layout of pillar extraction (in case of UG Mines) | ✗ |
| Plates | Support system (in case of UG Mines) | ✗ |
| Plates | Haulage and transport system (in case of UG Mines) | ✗ |
| Plates | Post mining land use plan | ✓ |
| Plates | Progressive mine closure plan/ stage plans | ✓ |
| Plates | Reclamation plan | ✓ |

# Chapter-1: Project Information

1.1 Introduction

| S.No | Parameters | Details |
|---|---|---|
| 1.1.1 | Name of the Coal/Lignite Block | MARKI MANGLI II COAL MINE |
| 1.1.2 | Name of the Coalfield/ Lignite Field. | WARDHA VALLEY Coal Field |
| 1.1.3 | Base date of Mining Plan/ Mine Closure Plan. | 04/07/2022 |
| 1.1.4 | Linked End Use Plant. | For the purpose of Sale of Coal, including sale to Affiliates and related parties, utilization of coal for any purpose including but not limited to captive consumption, Coal Gasification, Coal Liquefaction and Export of coal. |
| 1.1.5 | Distance of End Use Plant from the pit head of the project in âkmâ. | Being a Commercial coal Block , the distance of end use will depend on the various location of the customer. |
| 1.1.6 | Mode of Coal Transport | By Rail or Road |

1.2 Location, Topography & Communication:

| S.No | Parameters | Details |
|---|---|---|
| 1.2.1 | Location of coal deposit. | Marki-Mangli-II coal block is located 3 km NW of Mukutban village 35 km south of Wani town in Tehsil Jhari-Jammi, Dist Yavatmal, Maharastra State. It lies in Wardha Valley Coal field and falling in Toposheet No 56I/13 ( E44A13). (Plate-1) |
| | State | Maharashtra |
| | District | Yavatmal |
| 1.2.2 | Communication | The mining block can be accessed through the all-weather tar top road leading to village sawali and before reaching village sawali taking a diversion through a cart track to the east passing through the forest .The block can also be approached from Mukutban after travelling a distance of 3 km on Wani Patan State Highway no. 234 and then accessing the mine through a cart track covering a distance of about 1.5 km. |
| 1.2.3 | Availability of power supply & water etc. | Power supply will be available from 11kVA substation of Maharashtra State Electricity Development Corporation Ltd ( MSEDCL), located nearly 1.2 kms from project site .Water from the reservoir and nalla and mine water can completely cater to the water requirement. However, if required the drinking/domestic water supply can also be arranged through the existing borewell. |
| 1.2.4 | Prominent physiographic features, drainage pattern, natural water courses, rainfall data, highest flood level. | Marki Mangli-II block is in the slopping terrain of Vithal-Rukmai (Highest elevation 301m above MSL) which marks the NW fringe of the block and slopes towards SE ( RL of lowest elevation is 225m). The block is drained by a seasonal stream (nala) which flows North to South. The upstream portion of the stream has been blocked by an embankment to form a water tank for the purpose of irrigation and recharge of underground aquifers. Average annual rainfall is 1135.7 mm. Monsoon season lasts from mid June to mid September. During summer, temperature rises to a maximum of 46Deg C and humidity falls to a minimum of 10 percent. Winter is mild between November to January and temperature generally does not fall below 10DegC. |
| 1.2.5 | Important surface features within the project area and major diversion or shifting involved. | A small seasonal nala flowing from north to south shall be diverted all along the northern boundary of the block and shall meet at the southern part of the block. This nala may be used as garland drain during the mining operation. |

1.3 Details of the Allotment Agreement:

| S.No | Parameters | Details |
|---|---|---|
| 1.3.1 | Name of the Allottee | YAZDANI INTERNATIONAL PRIVATE LIMITED |
| 1.3.2 | Details of allotment/vesting Order. | NA-104/3/20-NA |
| 1.3.2(B) | Allocation/Vesting Order Date | 2021-03-03 |
| 1.3.3 | Name and address of the Applicant | Yezdani International Pvt Ltd<br>7th Floor, C-Wing, Fortune Towers, Chandrasekhpur<br>Bhubneswar-Odisha 751023 |
| 1.3.4 | Name of the previous Allottee of the Block. | Ms VIRANGANA STEELS Ltd |
| 1.3.5 | Starting date of the Mine as per CMDPA/CBDPA | 06/06/2026 |

| | | |
|---|---|---|
| 1.3.6 | Rated capacity as per CMDPA/CBDPA | 0.30 |
| 1.3.7 | Production Schedule as per opening permission (meeting provisions of CMDPA if any). | Opening permission form CCO and DGMS shall be obtained a fresh in due course, after approval of MP-MCP, lease, EC, and other statutory approvals , clearances and permissions . The Production schedule -- Year-1 -0.10 Mty coal, Year-2 - 0.20 Mty coal , Year 3- 0.30 Mty coal form 4th year to 32 years 0.30 Mty coal , year -33 - 0.20 Mty coal, Year 34 0.08 Mty coal . |
| 1.3.8 | End Use of Coal/ Lignite as per allotment order if any | For the purpose of Sale of Coal, including sale to Affiliates and related parties, utilization of coal for any purpose including but not limited to captive consumption, Coal Gasification, Coal Liquefaction and Export of coal. |
| 1.3.9 | Cardinal points coordinates of the Block Boundary | Cardinal Points files data shown below |

## Cardinal Points co-ordinates of the Block boundary :

| Points | Longitude (WGS84) | Latitude (WGS84) |
|---|---|---|
| A | 78°48'56.00"E | 19°49'2.00"N |
| B | 78°48'56.00"E | 19°50'31.00"N |
| C | 78°50'32.00"E | 19°50'31.00"N |
| D | 78°50'32.00"E | 19°49'2.00"N |
| | | |
| ID | WGS84 Logitude | WGS84 Latitude |
| BP-1 | 78°50'22.44158"E | 19°49'02.17812"N |
| BP-2 | 78°50'20.84824"E | 19°49'02.71673"N |
| BP-3 | 78°50'19.18051"E | 19°49'03.33199"N |
| BP-4 | 78°50'17.56788"E | 19°49'03.86044"N |
| BP-5 | 78°50'15.96069"E | 19°49'04.35098"N |
| BP-6 | 78°50'14.30872"E | 19°49'04.89431"N |
| BP-7 | 78°50'12.68041"E | 19°49'05.37911"N |
| BP-8 | 78°50'11.29696"E | 19°49'05.86080"N |
| BP-9 | 78°50'09.68702"E | 19°49'06.33155"N |
| BP-10 | 78°50'08.20180"E | 19°49'07.16873"N |
| BP-11 | 78°50'06.73473"E | 19°49'07.98046"N |
| BP-12 | 78°50'05.29908"E | 19°49'08.83228"N |
| BP-13 | 78°50'03.72256"E | 19°49'09.66452"N |
| BP-14 | 78°50'02.28290"E | 19°49'10.53789"N |
| BP-15 | 78°50'00.87418"E | 19°49'11.37602"N |
| BP-16 | 78°49'59.42288"E | 19°49'12.20811"N |
| BP-17 | 78°49'57.96266"E | 19°49'13.07335"N |
| BP-18 | 78°49'56.26104"E | 19°49'14.04311"N |
| BP-19 | 78°49'54.89470"E | 19°49'15.04303"N |
| BP-20 | 78°49'53.55614"E | 19°49'15.99963"N |
| BP-21 | 78°49'52.17269"E | 19°49'16.99190"N |
| BP-22 | 78°49'50.80926"E | 19°49'17.99298"N |
| BP-23 | 78°49'49.41188"E | 19°49'18.94747"N |
| BP-24 | 78°49'48.03724"E | 19°49'19.98392"N |
| BP-25 | 78°49'46.47097"E | 19°49'21.05896"N |
| BP-26 | 78°49'45.33330"E | 19°49'21.88776"N |
| BP-27 | 78°49'43.92729"E | 19°49'22.86153"N |
| BP-28 | 78°49'41.95390"E | 19°49'24.33881"N |
| BP-29 | 78°49'40.50876"E | 19°49'25.22968"N |
| BP-30 | 78°49'39.05586"E | 19°49'26.09563"N |
| BP-31 | 78°49'37.61077"E | 19°49'26.96956"N |
| BP-32 | 78°49'36.19510"E | 19°49'27.81745"N |
| BP-33 | 78°49'34.76190"E | 19°49'28.69941"N |
| BP-34 | 78°49'33.30458"E | 19°49'29.54954"N |
| BP-35 | 78°49'31.84750"E | 19°49'30.45537"N |
| BP-36 | 78°49'30.43705"E | 19°49'31.32794"N |
| BP-37 | 78°49'28.89699"E | 19°49'32.24046"N |
| BP-38 | 78°49'27.45068"E | 19°49'33.12378"N |
| BP-39 | 78°49'25.99036"E | 19°49'34.01573"N |
| BP-40 | 78°49'24.58323"E | 19°49'34.92717"N |
| BP-41 | 78°49'23.20797"E | 19°49'35.71496"N |
| BP-42 | 78°49'21.75272"E | 19°49'36.52100"N |
| BP-43 | 78°49'20.33783"E | 19°49'37.39987"N |
| BP-44 | 78°49'18.85180"E | 19°49'38.25672"N |
| BP-45 | 78°49'17.38226"E | 19°49'39.16938"N |
| BP-46 | 78°49'15.83269"E | 19°49'40.03811"N |
| BP-47 | 78°49'14.46645"E | 19°49'40.88482"N |
| BP-48 | 78°49'13.00624"E | 19°49'41.91160"N |
| BP-49 | 78°49'11.58855"E | 19°49'42.75220"N |

| Points | Longitude (WGS84) | Latitude (WGS84) |
|---|---|---|
| BP-50 | 78°49'10.39532"E | 19°49'43.43629"N |
| BP-51 | 78°49'08.98799"E | 19°49'44.36478"N |
| BP-52 | 78°49'07.65194"E | 19°49'45.22563"N |
| BP-53 | 78°49'06.23943"E | 19°49'46.13618"N |
| BP-54 | 78°49'04.77672"E | 19°49'47.11034"N |
| BP-55 | 78°49'03.43862"E | 19°49'47.97688"N |
| BP-56 | 78°49'02.00897"E | 19°49'48.91739"N |
| BP-57 | 78°49'00.60130"E | 19°49'49.81616"N |
| BP-58 | 78°48'59.17200"E | 19°49'50.77366"N |
| BP-59 | 78°48'57.75234"E | 19°49'51.66171"N |
| BP-60 | 78°48'56.61658"E | 19°49'52.45892"N |
| BP-61 | 78°48'57.75941"E | 19°49'53.67155"N |
| BP-62 | 78°48'58.88125"E | 19°49'54.92761"N |
| BP-63 | 78°49'00.01134"E | 19°49'56.15417"N |
| BP-64 | 78°49'00.89113"E | 19°49'57.15467"N |
| BP-65 | 78°49'01.48934"E | 19°49'57.82924"N |
| BP-66 | 78°49'02.25396"E | 19°49'59.26160"N |
| BP-67 | 78°49'02.93216"E | 19°50'00.55791"N |
| BP-68 | 78°49'03.52336"E | 19°50'02.38068"N |
| BP-69 | 78°49'03.64572"E | 19°50'03.45508"N |
| BP-70 | 78°49'03.77311"E | 19°50'05.13874"N |
| BP-71 | 78°49'03.21194"E | 19°50'06.64777"N |
| BP-72 | 78°49'02.96841"E | 19°50'07.44058"N |
| BP-73 | 78°49'02.22749"E | 19°50'09.99267"N |
| BP-74 | 78°49'02.86890"E | 19°50'12.43967"N |
| BP-75 | 78°49'04.02208"E | 19°50'14.12858"N |
| BP-76 | 78°49'05.18893"E | 19°50'14.91012"N |
| BP-77 | 78°49'06.09083"E | 19°50'15.15788"N |
| BP-78 | 78°49'07.77360"E | 19°50'15.66080"N |
| BP-79 | 78°49'10.29653"E | 19°50'16.09799"N |
| BP-80 | 78°49'11.85776"E | 19°50'16.70181"N |
| BP-81 | 78°49'14.50747"E | 19°50'17.53346"N |
| BP-82 | 78°49'16.22052"E | 19°50'17.91017"N |
| BP-83 | 78°49'17.91529"E | 19°50'18.21564"N |
| BP-84 | 78°49'19.67704"E | 19°50'18.53320"N |
| BP-85 | 78°49'21.46621"E | 19°50'18.78474"N |
| BP-86 | 78°49'22.28188"E | 19°50'20.27218"N |
| BP-87 | 78°49'23.16345"E | 19°50'21.73044"N |
| BP-88 | 78°49'24.03731"E | 19°50'22.89597"N |
| BP-89 | 78°49'25.25949"E | 19°50'24.44989"N |
| BP-90 | 78°49'25.51021"E | 19°50'26.05991"N |
| BP-91 | 78°49'25.66172"E | 19°50'27.58018"N |
| BP-92 | 78°49'26.26177"E | 19°50'29.21805"N |
| BP-93 | 78°49'26.81726"E | 19°50'30.82991"N |
| BP-94 | 78°49'27.55353"E | 19°50'30.41364"N |
| BP-95 | 78°49'28.88520"E | 19°50'29.45064"N |
| BP-96 | 78°49'30.14270"E | 19°50'28.33444"N |
| BP-97 | 78°49'31.41722"E | 19°50'27.26454"N |
| BP-98 | 78°49'33.23545"E | 19°50'25.83891"N |
| BP-99 | 78°49'34.43222"E | 19°50'24.73469"N |
| BP-100 | 78°49'35.58659"E | 19°50'23.67131"N |
| BP-101 | 78°49'36.92334"E | 19°50'22.47700"N |
| BP-102 | 78°49'38.11969"E | 19°50'21.45990"N |
| BP-103 | 78°49'39.33885"E | 19°50'20.34293"N |
| BP-104 | 78°49'40.11029"E | 19°50'19.62522"N |
| BP-105 | 78°49'41.45504"E | 19°50'18.60692"N |
| BP-106 | 78°49'42.83323"E | 19°50'17.54799"N |
| BP-107 | 78°49'44.14722"E | 19°50'16.53622"N |
| BP-108 | 78°49'45.48386"E | 19°50'15.50965"N |
| BP-109 | 78°49'46.86487"E | 19°50'14.47971"N |
| BP-110 | 78°49'48.26606"E | 19°50'13.36649"N |
| BP-111 | 78°49'49.57085"E | 19°50'12.36023"N |
| BP-112 | 78°49'50.89725"E | 19°50'11.37433"N |
| BP-113 | 78°49'52.23522"E | 19°50'10.35569"N |
| BP-114 | 78°49'53.57138"E | 19°50'09.38951"N |
| BP-115 | 78°49'55.17122"E | 19°50'08.22662"N |
| BP-116 | 78°49'56.10302"E | 19°50'07.42868"N |
| 17 | 78°49'57.02719"E | 19°50'06.73814"N |

| Points | Longitude (WGS84) | Latitude (WGS84) |
|---|---|---|
| BP-118 | 78°49'58.02731"E | 19°50'05.30781"N |
| BP-119 | 78°49'58.98282"E | 19°50'04.01377"N |
| BP-120 | 78°50'00.01041"E | 19°50'02.69917"N |
| BP-121 | 78°50'01.01347"E | 19°50'01.35641"N |
| BP-122 | 78°50'02.01498"E | 19°49'59.98879"N |
| BP-123 | 78°50'03.41815"E | 19°49'58.13983"N |
| BP-124 | 78°50'04.48300"E | 19°49'56.89850"N |
| BP-125 | 78°50'05.57807"E | 19°49'55.64762"N |
| BP-126 | 78°50'06.63833"E | 19°49'54.39360"N |
| BP-127 | 78°50'07.37908"E | 19°49'53.50036"N |
| BP-128 | 78°50'08.88519"E | 19°49'51.82602"N |
| BP-129 | 78°50'10.40376"E | 19°49'50.04787"N |
| BP-130 | 78°50'11.26186"E | 19°49'48.71834"N |
| BP-131 | 78°50'12.25153"E | 19°49'47.26923"N |
| BP-132 | 78°50'13.14279"E | 19°49'45.92176"N |
| BP-133 | 78°50'13.80171"E | 19°49'44.38453"N |
| BP-134 | 78°50'14.48797"E | 19°49'42.91881"N |
| BP-135 | 78°50'15.08597"E | 19°49'41.53088"N |
| BP-136 | 78°50'15.85264"E | 19°49'39.88420"N |
| BP-137 | 78°50'16.44889"E | 19°49'38.46273"N |
| BP-138 | 78°50'17.13668"E | 19°49'36.92090"N |
| BP-139 | 78°50'17.63632"E | 19°49'35.77593"N |
| BP-140 | 78°50'18.46811"E | 19°49'34.44267"N |
| BP-141 | 78°50'19.33374"E | 19°49'33.02101"N |
| BP-142 | 78°50'20.15733"E | 19°49'31.62286"N |
| BP-143 | 78°50'21.03121"E | 19°49'30.24202"N |
| BP-144 | 78°50'22.38445"E | 19°49'28.00625"N |
| BP-145 | 78°50'23.28435"E | 19°49'26.57285"N |
| BP-146 | 78°50'24.14622"E | 19°49'25.16817"N |
| BP-147 | 78°50'25.06664"E | 19°49'23.74780"N |
| BP-148 | 78°50'25.93622"E | 19°49'22.35058"N |
| BP-149 | 78°50'26.85202"E | 19°49'20.88447"N |
| BP-150 | 78°50'27.74250"E | 19°49'19.50013"N |
| BP-151 | 78°50'28.81851"E | 19°49'17.76541"N |
| BP-152 | 78°50'29.52644"E | 19°49'16.25255"N |
| BP-153 | 78°50'30.25463"E | 19°49'14.81084"N |
| BP-154 | 78°50'31.34346"E | 19°49'12.54062"N |
| BP-155 | 78°50'31.40772"E | 19°49'10.99402"N |
| BP-156 | 78°50'31.54299"E | 19°49'09.63526"N |
| BP-157 | 78°50'30.95518"E | 19°49'07.05644"N |
| BP-158 | 78°50'30.17125"E | 19°49'06.03261"N |
| BP-159 | 78°50'28.61152"E | 19°49'04.85802"N |
| BP-160 | 78°50'27.08866"E | 19°49'03.93322"N |
| BP-161 | 78°50'25.73048"E | 19°49'03.02563"N |
| BP-162 | 78°50'24.11737"E | 19°49'02.62934"N |

1.4 Details of the Previous Approval of Mining Plan:

| S.No | Parameters | Details |
|---|---|---|
| 1.4.1 | Date of approval : | 05/02/2008 |
| | Copy of earlier approval of mining plan Upload document | Annexure 4 : Document shown in annexure section. |

| | | |
|---|---|---|
| 1.4.2 | Conditions, if any | |

| S.No. | Conditions | Compliance Status |
|---|---|---|
| 1 | Mining company shall take all necessary precautions regarding safety of mine workings, persons deployed therewith. | Shall be Compiled |
| 2 | The approval of the mining plan is without prejudice to the requirement of approvals from competent / prescribed authority under the relevant rules/ regulations etc. | Noted shall be complied |
| 3 | Mining company shall take all necessary precautions regarding safety of mine workings, persons deployed therewith. | Shall be Complied |
| 4 | The approval of the mining plan is without prejudice to the requirement of approvals from competent / prescribed authority under the relevant rules/ regulations etc. | Noted |
| 5 | Mining company shall take all necessary precautions regarding safety of mine workings, persons deployed therewith. | Shall be Complied |
| 6 | The approval of the mining plan is without prejudice to the requirement of approvals from competent / prescribed authority under the relevant rules/ regulations etc. | Noted |

| | | |
|---|---|---|
| 1.4.3 | Scheduled year of start of production. | 2012-13 |
| 1.4.4 | Proposed year of achieving the targeted production | 4th Year 2016 |
| 1.4.5 | Date of actual commencement of mining operations, if operations already started. | 02/04/2013 |
| 1.4.6 | Likely date of mining operations, if operations not yet started & reasons for non-commencement of operations. | Non Operational<br><br>The mine was operational till 2014 prior to deallocation of the block . Coal produced by prior allottee is 99775 metric Tonne coal and total waste (OB , top soil) excavated volume is 421661cum. The Coal block is now allocated as a commercial block and now categorized in Schedule-III coal block as per MoC letter dated 07.03.2022 (enclosed as Annexure-VIII) and 51 months time allowed for complying the efficiency parameters. please refer compliance report of Scrutiny Committee Annexure-12. |
| 1.4.8 | Statutory obligations vis-à-vis compliance status in a tabular form | |

| S.No | Clearance Type (Mining Plan, Mining Lease Environment, Forest, CTO etc) | Conditions | Compliance Status |
|---|---|---|---|
| 1 | Coal Mines Act and Mines Regulation 2017 | Mining company shall take all necessary precautions regarding safety of mine workings, persons deployed therewith | Shall be Complied |
| 2 | Mining Plan -Mine Closure Plan | The approval of the mining plan is without prejudice to the requirement of approvals from competent / prescribed authority under the relevant rules/ regulations etc. | Shall be followed and complied |
| 3 | Others | All conditions of approving and statutory bodies as applicable for making the mine block operation . | Shall be complied |

| | | |
|---|---|---|
| 1.4.9 | Reasons for difference between the planned and actual production levels | Only one year coal has been produced during the year 2013-14 to the tune of 99775 metric tonne. Subsequently ,the coal block deallocated form prior allottee. |

1.5 PARAMETERS OF APPROVED MINING PLAN VIS-Ã-VIS PROPOSED MINING PLAN :

| S.No | Block Area | Approved Mining Plan | Proposed Mining Plan |
|---|---|---|---|
| 1.5.1 | Geological Block Area HA | 330.70 | 339.4670 |
| 1.5.2 | Geological Block Area Projectised HA | 273.00 | 339.467 |
| 1.5.3 | Lease area HA | 261.00 | 339.4670 |
| 1.5.4 | Project area HA | 273 | 339.4670 |
| 1.5.5 | Life of the Project Yrs. | 24 | 34 |
| 1.5.6 | Minimum and Maximum Depth of working | Min 10m Max 70m | Min 11.85 Max 125 |
| 1.5.7 | Geological Block Area yet to be projectised "Ha" | 330.70 | 0.00 |
| 1.5.8 | Production Target MTP | 0.30 | 0.3000 |
| 1.5.9 | Seams Available As per GR | Seam Top and Bottom | Seam -Top,Seam-Bott |

| | | | |
|---|---|---|---|
| 1.5.10 | Seams not considered for Mining with Reasons | | S. No: 1 — Seams: Seam-Bott — Reason: Seam Bottom not considered as it has not developed and impersistent in major part of the area. |
| 1.5.11 | Gross Geological Reserve Mte | 12.82 | 12.82 |
| 1.5.12 | Net Geological Reserve Mte | 11.54 | 11.5400 |
| 1.5.13 | Blocked Reserve Mte | | 1.3500 |
| 1.5.14 | Minable Reserve Mte | | 10.1900 |
| 1.5.15 | Extractable Reserve Mte | 6.73 | 9.6800 |
| 1.5.16 | % of Extraction/ recovery | 58.32% | 83.8820% |
| 1.5.17 | Reserve Depleted (till the base date) Reserves Mte | 0.10 | 0.1000 |
| 1.5.18 | Balance Extractable Reserve Mte | 6.63 | 9.5800 |
| 1.5.19 | Average Grade | E F | 4707.0000 |
| 1.5.20 | OB in MM3 | 50.78 | 87.0600 |
| 1.5.21 | SR M3/te | 7.55 | 9.0877 |
| 1.5.22 | Mining Technology | OC mining with Shovel Dumper for OBR Shovel Dumper for coal | OC mining with Shovel Dumper for OBR Shovel Dumper Surface miner for coal |
| 1.5.23 | Coal Beneficiation envisaged | | |
| 1.5.24 | Handling of Rejects | NIL | Not Applicable |
| 1.5.25 | Land use pattern " Ha" | | |
| 1 | Excavation Area | 145.00 | 215.2100 |
| 2 | Top Soil Dump | 21.50 | 0.0000 |
| 3 | External Dump | 73.50 | 52.0000 |
| 4 | Safety Zone | | 6.0600 |
| 5 | Other Use | 12.50 | 53.9970 |
| 6 | Infrastructure area | 20.50 | 12.2000 |
| 7 | Green Belt | | 0.0000 |
| 8 | Undisturbed Area | | 0.0000 |
| | Total | 273.0000 | 339.4670 |
| 1.5.26 | Reasons for revision | | i) Change in ML area from 261Ha to 339.467 Ha ii) Change in extractable reserves due to change in depth of working ( from 70m to 125m) for higher percentage of extraction 58.32 to 83.88 by adopting scientific mining. [( MoC guidelines dated 29.5.2020, item no 1.3 (A)(c) (d)]iii)Environment Clearance was obtained for Marki Mangli-II,III IV blocks combinedly as cluster of mines. As per directives, fresh Environment Clearance to be accorded based on Revised Mining Plan Mine Closure Plan.(Revision-01)iv)No forest clearance was obtained for 146.966 Ha of Forest land. v ) No Mine Closure Plan was prepared as per Guidelines of MoC dated 2009/2013. |

# Chapter-2: Exploration,Geology, Seam Sequence, Coal Quality and Reserve

2.1 Details of the block

| S.No | Parameters | Details | |
|---|---|---|---|
| 2.1.1 | Particulars of adjacent blocks: North, South, East, West | North | Fault F1-F1/Talchir Formation |
| | | East | Fault F4-F4,F2-F2 and Incrop of coal seam. |
| | | South | Incrop of coal seam |
| | | West | Lease Boundary and Lameta Formation |
| 2.1.2 | Location of the Block | Marki-Mangli-II coal block is located 3 kms NW of Mukutban village 35 Kms south of Wani town in Tehsil Jhari-Jammi, Dist Yavatmal, Maharastra State. It lies in Wardha Valley Coal field and falling in Toposheet No 56I/13 ( E44A13). | |
| | State | Maharashtra | |
| | District | Yavatmal | |
| 2.1.3 | Area of the Block "Ha" | 339.467 | |
| 2.1.4 | Area of the geological block projectized in "Ha" (Area of the geological block considered for liquidation of coal reserve) | 339.467 | |
| 2.1.5 | Balance area yet to be projectized "Ha" | 0.00 | |
| 2.1.6 | Likely Reserve in the area yet to be projectized "Mte" | 0.00 | |
| 2.1.7 | Cardinal Point Co-ordinates of the non-coal/lignite bearing area/existing mining lease outside the allotted Geological Coal/Lignite block | No out side lease area is proposed | |
| | (Duly certified in line with para 1.9 of the Guideline, if fresh minning lease required) | Cardinal Points files data shown below | |
| 2.1.8 | Certificate of Qualified person/ Accredited Mining Plan preparing agency (MPPA)if the project area is confined within the vested/allotted block boundary/existing mining lease and Cardinal Points Co-ordinates of the Proposed area outside the non-coal/lignite bearing area outside the allotted Geological Coal/Lignite block | Annexure 2A | Document shown in annexure section. |
| | | Annexure 2B | Document shown in annexure section. |
| | | The Project area, Lease area and geological block area in Ha shall also be envisaged. | Certificate attached as Annexure-II (Plate-II) . The project area is confined within the vested/allotted block boundary as notified by Ministry of Coal, Govt of India vide its vesting order No NA-104/3/2020-NA dated 03.03.2021.The cardinal point co-ordinates considered for preparation of the Mining Plan Mine Closure Plan (1stRevision) of MarkiMangli-II. Coal Mine are in line with the vesting /allotment order and does not encroach any other adjacent block. Geological Block Area- 339.467 ha Project Area- 339.467 ha |
| 2.1.9 | KML file of the Proposed lease area, Project Area and geological block. | File attached in Plates section below. | |
| 2.1.10 | Whether the proposed project area is confined within the allotted block boundary/existing mining lease, If not, the reason for deviation from allotted block boundary, may be given. | Yes | |
| 2.1.11 | If the project area extends outside the allotted block boundary/existing mining lease, confirmation about non-occurrence of coal/lignite in the area under reference needs to be furnished | Not applicable. Project area does not extend outside the allotted block boundary. | |
| 2.1.12(1) | Year of Starting. | 2022 | |
| 2.1.12(2) | Type of the Project. | Under Implementation. Coal production to start from 06.06.2026 considering base date of proposed revision of mining plan as per MoC letter dated 07.03.2022 (Annexure-VIII) | |

## (Duly certified in line with para 1.9 of the Guideline, if fresh minning lease required) :

| BOUNDARY AS PER VESTING ORDER | | | | |
|---|---|---|---|---|
| Pints | Longitude (WGS84) | Latitude (WGS84) | | |
| | 78°48'56.00"E | 19°49'2.0[illegible] | | |
| | 78°48'56.00"E | 19°50'31. | | |

| BOUNDARY AS PER VESTING ORDER | | | | |
|---|---|---|---|---|
| C | 78°50'32.00"E | 19°50'31.00"N | | |
| D | 78°50'32.00"E | 19°49'2.00"N | | |
| Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Logitude | WGS84 Latitude |
| BP-1/162 | 273706.215 | 2192707.681 | 78°50'22.44158"E | 19°49'02.17812"N |
| BP-2/162 | 273660.051 | 2192724.839 | 78°50'20.84824"E | 19°49'02.71673"N |
| BP-3/162 | 273611.751 | 2192744.383 | 78°50'19.18051"E | 19°49'03.33199"N |
| BP-4/162 | 273565.021 | 2192761.236 | 78°50'17.56788"E | 19°49'03.86044"N |
| BP-5/162 | 273518.435 | 2192776.921 | 78°50'15.96069"E | 19°49'04.35098"N |
| BP-6/162 | 273470.566 | 2192794.247 | 78°50'14.30872"E | 19°49'04.89431"N |
| BP-7/162 | 273423.363 | 2192809.764 | 78°50'12.68041"E | 19°49'05.37911"N |
| BP-8/162 | 273383.286 | 2192825.094 | 78°50'11.29696"E | 19°49'05.86080"N |
| BP-9/162 | 273336.612 | 2192840.173 | 78°50'09.68702"E | 19°49'06.33155"N |
| BP-10/162 | 273293.712 | 2192866.474 | 78°50'08.20180"E | 19°49'07.16873"N |
| BP-11/162 | 273251.331 | 2192891.986 | 78°50'06.73473"E | 19°49'07.98046"N |
| BP-12/162 | 273209.881 | 2192918.72 | 78°50'05.29908"E | 19°49'08.83228"N |
| BP-13/162 | 273164.323 | 2192944.904 | 78°50'03.72256"E | 19°49'09.66452"N |
| BP-14/162 | 273122.764 | 2192972.302 | 78°50'02.28290"E | 19°49'10.53789"N |
| BP-15/162 | 273082.092 | 2192998.605 | 78°50'00.87418"E | 19°49'11.37602"N |
| BP-16/162 | 273040.179 | 2193024.738 | 78°49'59.42288"E | 19°49'12.20811"N |
| BP-17/162 | 272998.019 | 2193051.894 | 78°49'57.96266"E | 19°49'13.07335"N |
| BP-18/162 | 272948.875 | 2193082.355 | 78°49'56.26104"E | 19°49'14.04311"N |
| BP-19/162 | 272909.501 | 2193113.618 | 78°49'54.89470"E | 19°49'15.04303"N |
| BP-20/162 | 272870.919 | 2193143.539 | 78°49'53.55614"E | 19°49'15.99963"N |
| BP-21/162 | 272831.044 | 2193174.573 | 78°49'52.17269"E | 19°49'16.99190"N |
| BP-22/162 | 272791.756 | 2193205.872 | 78°49'50.80926"E | 19°49'17.99298"N |
| BP-23/162 | 272751.461 | 2193235.75 | 78°49'49.41188"E | 19°49'18.94747"N |
| BP-24/162 | 272711.861 | 2193268.14 | 78°49'48.03724"E | 19°49'19.98392"N |
| BP-25/162 | 272666.698 | 2193301.789 | 78°49'46.47097"E | 19°49'21.05896"N |
| BP-26/162 | 272633.913 | 2193327.705 | 78°49'45.33330"E | 19°49'21.88776"N |
| BP-27/162 | 272593.376 | 2193358.18 | 78°49'43.92729"E | 19°49'22.86153"N |
| BP-28/162 | 272536.523 | 2193404.353 | 78°49'41.95390"E | 19°49'24.33881"N |
| BP-29/162 | 272494.814 | 2193432.293 | 78°49'40.50876"E | 19°49'25.22968"N |
| BP-30/162 | 272452.87 | 2193459.469 | 78°49'39.05586"E | 19°49'26.09563"N |
| BP-31/162 | 272411.156 | 2193486.888 | 78°49'37.61077"E | 19°49'26.96956"N |
| BP-32/162 | 272370.288 | 2193513.496 | 78°49'36.19510"E | 19°49'27.81745"N |
| BP-33/162 | 272328.923 | 2193541.158 | 78°49'34.76190"E | 19°49'28.69941"N |
| BP-34/162 | 272286.844 | 2193567.85 | 78°49'33.30458"E | 19°49'29.54954"N |
| BP-35/162 | 272244.794 | 2193596.255 | 78°49'31.84750"E | 19°49'30.45537"N |
| BP-36/162 | 272204.089 | 2193623.62 | 78°49'30.43705"E | 19°49'31.32794"N |
| BP-37/162 | 272159.626 | 2193652.263 | 78°49'28.89699"E | 19°49'32.24046"N |
| BP-38/162 | 272117.881 | 2193679.972 | 78°49'27.45068"E | 19°49'33.12378"N |
| BP-39/162 | 272075.732 | 2193707.952 | 78°49'25.99036"E | 19°49'34.01573"N |
| BP-40/162 | 272035.139 | 2193736.512 | 78°49'24.58323"E | 19°49'34.92717"N |
| BP-41/162 | 271995.424 | 2193761.257 | 78°49'23.20797"E | 19°49'35.71496"N |
| BP-42/162 | 271953.389 | 2193786.593 | 78°49'21.75272"E | 19°49'36.52100"N |
| BP-43/162 | 271912.557 | 2193814.154 | 78°49'20.33783"E | 19°49'37.39987"N |
| BP-44/162 | 271869.646 | 2193841.065 | 78°49'18.85180"E | 19°49'38.25672"N |
| BP-45/162 | 271827.238 | 2193869.686 | 78°49'17.38226"E | 19°49'39.16938"N |
| BP-46/162 | 271782.483 | 2193896.986 | 78°49'15.83269"E | 19°49'40.03811"N |
| BP-47/162 | 271743.055 | 2193923.541 | 78°49'14.46645"E | 19°49'40.88482"N |
| BP-48/162 | 271700.963 | 2193955.668 | 78°49'13.00624"E | 19°49'41.91160"N |
| BP-49/162 | 271660.036 | 2193982.054 | 78°49'11.58855"E | 19°49'42.75220"N |
| BP-50/162 | 271625.579 | 2194003.542 | 78°49'10.39532"E | 19°49'43.43629"N |
| BP-51/162 | 271584.988 | 2194032.628 | 78°49'08.98799"E | 19°49'44.36478"N |
| BP-52/162 | 271546.445 | 2194059.606 | 78°49'07.65194"E | 19°49'45.22563"N |
| BP-53/162 | 271505.696 | 2194088.141 | 78°49'06.23943"E | 19°49'46.13618"N |
| BP-54/162 | 271463.512 | 2194118.653 | 78°49'04.77672"E | 19°49'47.11034"N |
| BP-55/162 | 271424.912 | 2194145.807 | 78°49'03.43862"E | 19°49'47.97688"N |
| BP-56/162 | 271383.677 | 2194175.271 | 78°49'02.00897"E | 19°49'48.91739"N |
| BP-57/162 | 271343.065 | 2194203.443 | 78°49'00.60130"E | 19°49'49.81616"N |
| BP-58/162 | 271301.847 | 2194233.429 | 78°48'59.17200"E | 19°49'50.77366"N |
| BP-59/162 | 271260.882 | 2194261.276 | 78°48'57.75234"E | 19°49'51.66171"N |
| BP-60/162 | 271228.144 | 2194286.223 | 78°48'56.61658"E | 19°49'52.45892"N |
| BP-61/162 | 271261.887 | 2194323.088 | 78°48'57.75941"E | 19°49'53.67155"N |
| BP-62/162 | 271295.037 | 2194361.296 | 78°48'58.88125"E | 19°49'54.92761"N |
| BP-63/162 | 271328.416 | 2194398.594 | 78°49'00.01134"E | 19°49'56.15417"N |
| 64/162 | 271354.419 | 2194429.0 | 78°49'00.89113"E | 19°49'57.15467"N |
| 65/162 | 271372.097 | 2194449.5 | 78°49'01.48934"E | 19°49'57.82924"N |

| BOUNDARY AS PER VESTING ORDER | | | | |
|---|---|---|---|---|
| BP-66/162 | 271394.921 | 2194493.321 | 78°49'02.25396"E | 19°49'59.26160"N |
| BP-67/162 | 271415.174 | 2194532.935 | 78°49'02.93216"E | 19°50'00.55791"N |
| BP-68/162 | 271433.105 | 2194588.772 | 78°49'03.52336"E | 19°50'02.38068"N |
| BP-69/162 | 271437.094 | 2194621.77 | 78°49'03.64572"E | 19°50'03.45508"N |
| BP-70/162 | 271441.471 | 2194673.504 | 78°49'03.77311"E | 19°50'05.13874"N |
| BP-71/162 | 271425.739 | 2194720.127 | 78°49'03.21194"E | 19°50'06.64777"N |
| BP-72/162 | 271418.967 | 2194744.602 | 78°49'02.96841"E | 19°50'07.44058"N |
| BP-73/162 | 271398.418 | 2194823.372 | 78°49'02.22749"E | 19°50'09.99267"N |
| BP-74/162 | 271418.059 | 2194898.389 | 78°49'02.86890"E | 19°50'12.43967"N |
| BP-75/162 | 271452.292 | 2194949.899 | 78°49'04.02208"E | 19°50'14.12858"N |
| BP-76/162 | 271486.557 | 2194973.557 | 78°49'05.18893"E | 19°50'14.91012"N |
| BP-77/162 | 271512.908 | 2194980.777 | 78°49'06.09083"E | 19°50'15.15788"N |
| BP-78/162 | 271562.077 | 2194995.672 | 78°49'07.77360"E | 19°50'15.66080"N |
| BP-79/162 | 271635.681 | 2195008.109 | 78°49'10.29653"E | 19°50'16.09799"N |
| BP-80/162 | 271681.352 | 2195026.153 | 78°49'11.85776"E | 19°50'16.70181"N |
| BP-81/162 | 271758.801 | 2195050.674 | 78°49'14.50747"E | 19°50'17.53346"N |
| BP-82/162 | 271808.801 | 2195061.677 | 78°49'16.22052"E | 19°50'17.91017"N |
| BP-83/162 | 271858.245 | 2195070.435 | 78°49'17.91529"E | 19°50'18.21564"N |
| BP-84/162 | 271909.643 | 2195079.54 | 78°49'19.67704"E | 19°50'18.53320"N |
| BP-85/162 | 271961.817 | 2195086.544 | 78°49'21.46621"E | 19°50'18.78474"N |
| BP-86/162 | 271986.141 | 2195132.045 | 78°49'22.28188"E | 19°50'20.27218"N |
| BP-87/162 | 272012.381 | 2195176.503 | 78°49'23.16345"E | 19°50'21.73044"N |
| BP-88/162 | 272038.27 | 2195212.082 | 78°49'24.03731"E | 19°50'22.89597"N |
| BP-89/162 | 272074.46 | 2195259.354 | 78°49'25.25949"E | 19°50'24.44989"N |
| BP-90/162 | 272082.39 | 2195308.838 | 78°49'25.51021"E | 19°50'26.05991"N |
| BP-91/162 | 272087.407 | 2195355.477 | 78°49'25.66172"E | 19°50'27.58018"N |
| BP-92/162 | 272105.515 | 2195405.686 | 78°49'26.26177"E | 19°50'29.21805"N |
| BP-93/162 | 272122.325 | 2195454.991 | 78°49'26.81726"E | 19°50'30.82991"N |
| BP-94/162 | 272143.587 | 2195441.912 | 78°49'27.55353"E | 19°50'30.41364"N |
| BP-95/162 | 272181.955 | 2195411.855 | 78°49'28.88520"E | 19°50'29.45064"N |
| BP-96/162 | 272218.113 | 2195376.993 | 78°49'30.14270"E | 19°50'28.33444"N |
| BP-97/162 | 272254.78 | 2195343.61 | 78°49'31.41722"E | 19°50'27.26454"N |
| BP-98/162 | 272307.13 | 2195299.082 | 78°49'33.23545"E | 19°50'25.83891"N |
| BP-99/162 | 272341.521 | 2195264.673 | 78°49'34.43222"E | 19°50'24.73469"N |
| BP-100/162 | 272374.695 | 2195231.535 | 78°49'35.58659"E | 19°50'23.67131"N |
| BP-101/162 | 272413.125 | 2195194.302 | 78°49'36.92334"E | 19°50'22.47700"N |
| BP-102/162 | 272447.539 | 2195162.573 | 78°49'38.11969"E | 19°50'21.45990"N |
| BP-103/162 | 272482.577 | 2195127.763 | 78°49'39.33885"E | 19°50'20.34293"N |
| BP-104/162 | 272504.744 | 2195105.4 | 78°49'40.11029"E | 19°50'19.62522"N |
| BP-105/162 | 272543.477 | 2195073.578 | 78°49'41.45504"E | 19°50'18.60692"N |
| BP-106/162 | 272583.167 | 2195040.494 | 78°49'42.83323"E | 19°50'17.54799"N |
| BP-107/162 | 272621.007 | 2195008.885 | 78°49'44.14722"E | 19°50'16.53622"N |
| BP-108/162 | 272659.501 | 2194976.812 | 78°49'45.48386"E | 19°50'15.50965"N |
| BP-109/162 | 272699.285 | 2194944.619 | 78°49'46.86487"E | 19°50'14.47971"N |
| BP-110/162 | 272739.624 | 2194909.857 | 78°49'48.26606"E | 19°50'13.36649"N |
| BP-111/162 | 272777.199 | 2194878.421 | 78°49'49.57085"E | 19°50'12.36023"N |
| BP-112/162 | 272815.412 | 2194847.602 | 78°49'50.89725"E | 19°50'11.37433"N |
| BP-113/162 | 272853.948 | 2194815.773 | 78°49'52.23522"E | 19°50'10.35569"N |
| BP-114/162 | 272892.453 | 2194785.558 | 78°49'53.57138"E | 19°50'09.38951"N |
| BP-115/162 | 272938.553 | 2194749.195 | 78°49'55.17122"E | 19°50'08.22662"N |
| BP-116/162 | 272965.357 | 2194724.306 | 78°49'56.10302"E | 19°50'07.42868"N |
| BP-117/162 | 272991.98 | 2194702.723 | 78°49'57.02719"E | 19°50'06.73814"N |
| BP-118/162 | 273020.522 | 2194658.359 | 78°49'58.02731"E | 19°50'05.30781"N |
| BP-119/162 | 273047.82 | 2194618.203 | 78°49'58.98282"E | 19°50'04.01377"N |
| BP-120/162 | 273077.207 | 2194577.388 | 78°50'00.01041"E | 19°50'02.69917"N |
| BP-121/162 | 273105.869 | 2194535.716 | 78°50'01.01347"E | 19°50'01.35641"N |
| BP-122/162 | 273134.477 | 2194493.281 | 78°50'02.01498"E | 19°49'59.98879"N |
| BP-123/162 | 273174.585 | 2194435.891 | 78°50'03.41815"E | 19°49'58.13983"N |
| BP-124/162 | 273205.086 | 2194397.316 | 78°50'04.48300"E | 19°49'56.89850"N |
| BP-125/162 | 273236.463 | 2194358.436 | 78°50'05.57807"E | 19°49'55.64762"N |
| BP-126/162 | 273266.826 | 2194319.472 | 78°50'06.63833"E | 19°49'54.39360"N |
| BP-127/162 | 273288.033 | 2194291.724 | 78°50'07.37908"E | 19°49'53.50036"N |
| BP-128/162 | 273331.206 | 2194239.667 | 78°50'08.88519"E | 19°49'51.82602"N |
| BP-129/162 | 273374.701 | 2194184.413 | 78°50'10.40376"E | 19°49'50.04787"N |
| BP-130/162 | 273399.152 | 2194143.203 | 78°50'11.26186"E | 19°49'48.71834"N |
| BP-131/162 | 273427.384 | 2194098.266 | 78°50'12.25153"E | 19°49'47.26923"N |
| 32/162 | 273452.792 | 2194056.4 | 78°50'13.14279"E | 19°49'45.92176"N |
| 33/162 | 273471.364 | 2194008.9 | 78°50'13.80171"E | 19°49'44.38453"N |



Prepared By INDIAN MINE PLANNERS AND CONSULTANTS On 05/07/2022

| BOUNDARY AS PER VESTING ORDER | | | | |
|---|---|---|---|---|
| BP-134/162 | 273490.76 | 2193963.633 | 78°50'14.48797"E | 19°49'42.91881"N |
| BP-135/162 | 273507.618 | 2193920.725 | 78°50'15.08597"E | 19°49'41.53088"N |
| BP-136/162 | 273529.283 | 2193869.794 | 78°50'15.85264"E | 19°49'39.88420"N |
| BP-137/162 | 273546.076 | 2193825.855 | 78°50'16.44889"E | 19°49'38.46273"N |
| BP-138/162 | 273565.487 | 2193778.179 | 78°50'17.13668"E | 19°49'36.92090"N |
| BP-139/162 | 273579.578 | 2193742.779 | 78°50'17.63632"E | 19°49'35.77593"N |
| BP-140/162 | 273603.262 | 2193701.464 | 78°50'18.46811"E | 19°49'34.44267"N |
| BP-141/162 | 273627.896 | 2193657.418 | 78°50'19.33374"E | 19°49'33.02101"N |
| BP-142/162 | 273651.316 | 2193614.111 | 78°50'20.15733"E | 19°49'31.62286"N |
| BP-143/162 | 273676.207 | 2193571.317 | 78°50'21.03121"E | 19°49'30.24202"N |
| BP-144/162 | 273714.713 | 2193502.052 | 78°50'22.38445"E | 19°49'28.00625"N |
| BP-145/162 | 273740.341 | 2193457.632 | 78°50'23.28435"E | 19°49'26.57285"N |
| BP-146/162 | 273764.874 | 2193414.11 | 78°50'24.14622"E | 19°49'25.16817"N |
| BP-147/162 | 273791.104 | 2193370.084 | 78°50'25.06664"E | 19°49'23.74780"N |
| BP-148/162 | 273815.864 | 2193326.788 | 78°50'25.93622"E | 19°49'22.35058"N |
| BP-149/162 | 273841.942 | 2193281.357 | 78°50'26.85202"E | 19°49'20.88447"N |
| BP-150/162 | 273867.316 | 2193238.45 | 78°50'27.74250"E | 19°49'19.50013"N |
| BP-151/162 | 273897.951 | 2193184.698 | 78°50'28.81851"E | 19°49'17.76541"N |
| BP-152/162 | 273917.962 | 2193137.906 | 78°50'29.52644"E | 19°49'16.25255"N |
| BP-153/162 | 273938.59 | 2193093.295 | 78°50'30.25463"E | 19°49'14.81084"N |
| BP-154/162 | 273969.389 | 2193023.069 | 78°50'31.34346"E | 19°49'12.54062"N |
| BP-155/162 | 273970.651 | 2192975.479 | 78°50'31.40772"E | 19°49'10.99402"N |
| BP-156/162 | 273974.055 | 2192933.64 | 78°50'31.54299"E | 19°49'09.63526"N |
| BP-157/162 | 273955.932 | 2192854.547 | 78°50'30.95518"E | 19°49'07.05644"N |
| BP-158/162 | 273932.713 | 2192823.35 | 78°50'30.17125"E | 19°49'06.03261"N |
| BP-159/162 | 273886.853 | 2192787.806 | 78°50'28.61152"E | 19°49'04.85802"N |
| BP-160/162 | 273842.165 | 2192759.93 | 78°50'27.08866"E | 19°49'03.93322"N |
| BP-161/162 | 273802.277 | 2192732.522 | 78°50'25.73048"E | 19°49'03.02563"N |
| BP-162/162 | 273755.169 | 2192720.934 | 78°50'24.11737"E | 19°49'02.62934"N |

## 2.2 EXPLORATION, GEOLOGY AND ASSESSMENT OF RESERVE

| S.No | Parameters | Details |
|---|---|---|
| 2.2.1 | Regional geological set up of the area, local geology, structure, stratigraphic sequence, characteristics of the litho-logical units (coal seams /partings/overburden). | |

The stratigraphic sequence in the block as worked out from borehole intersection and the thickness range of different formations are given below:

| | Formation | Thickness Range (m) | | Lithology |
|---|---|---|---|---|
| | | Minimum | Maximum | |
| Recent to Sub Recent | Soil/Alluvium | 0.00 | 9.15 | Soil is black cotton soil derived from lava flows. Soil derived from Talchir is greenish and earthy. |
| Lameta Group (Middle cretaceous) | Infra-trappean | 0.00 | 15.25 | Variegated clay, siltstones, limestone and subordinate calcareous sandstone. Sandstone is fine to medium grained and calcareous |
| Up Permian to Lower Traiassic | Kamthi | Not Encountered | | Coarse gritty pinkish, reddish sandstone and red shales |
| Uncorformity | | | | |
| Middle Permian | Motur | Not Encountered | | Brown reddish and greenish clay, siltstone and lenticular sandstone bands |
| Lower Permian | Barakar | 21.35 | 150.55 | White to grey, fine to coarse grained sandstone with inter-banded grey shale carb shale and coal seams. |
| Up carboniferous to Lower Permian | Talchir | 0.30 | 12.20 | Khaki green shale and boulder bed |
| Uncorformity | | | | |
| Pre-Cambrian | Pengana Group | Not Encountered | | Purple shale, limestone , calc-dolomite, dolomite |

| | | |
|---|---|---|
| 2.2.2 | Local geology, Structure, Stratigraphic sequence, Cha | tics of the litho-logical units (coal seams /partings/overburc |

**Local Geology:**
In the MarkiMangli-II Coal block, the Barakars are resting on the uneven eroded surface of the Talchirs observed from the two boreholes In MK-17 & MK-14. The area is significantly free from igneous intrusions.

**Structure:**

**Strike & Dip:**
The strike of the coal seams is WNW-ESE to NW-SE direction. The gradient is 1 in 7.5 to 1 in 9 due North to NE. Four Faults have been deciphered as per the revalidated geological structure prepared from sub surface information of boreholes by Minex Software . Fault F1-F1 brings Barakar sandstone in direct contact with Talchir and causes steep dip.

**Fault:**
Structurally the block is complex. Nine faults F1- F9 have been interpreted as per Geological Report prepared by DGM, Maharastra (1991-92). The trend of faults is NW-SE and southerly/south westerly throw. The throw varies between 5 to 40 m and are shown in Floor contour of Seam and Geological plan.

**Sequence of Coal seams/Parting**
A prominent and persistent coal seam ranges from 0.40m (MK-19) to 8.35 m ( MK-17) exist within the block. The seam is divisible into top and bottom section with a parting of carb shale, sandstone, sandy shale . The thickness range of top section and bottom section and parting are as under:

| Coal Seams / Parting / OB | Seam Thickness (m) | | No. of Borehole Intersection |
|---|---|---|---|
| | Minimum | Maximum | |
| Top | 0.40(MK-19) | 8.35(MK-17) | 33 |
| Parting / OB | 6.72(MK-40) | 43.50(MK-5) | |
| Bottom | 0.15(MK-5) | 0.50(MK-40) | 3 |

Seam Bootom is impersistent no reserves has been estimated.

| | | |
|---|---|---|
| 2.2.3 | Geological Block Area "Ha" | 339.467 Ha |
| 2.2.4 | Status of Exploration of the block | |
| The block has been fully explored with 39 BH and 3389.5 m by DGM Maharashtra . | | |
| 2.2.5 | Area covered by "detailed" exploration within the block (sq. km) | 3.39467 |
| 2.2.6 | Whether entire area has been covered by a detailed exploration. | Yes The area is fully explored |
| 2.2.7 | No. of boreholes drilled within the block | 39 |
| 2.2.8 | Whether any further exploration/study is required or suggested and time frame in which it is to be completed | No, |
| 2.2.9 | Year wise future programme of exploration | NA |
| 2.2.10 | Overall borehole density within the block (no./ sq. km) approx | 11 |
| 2.2.11 | No of Seams available as per GR (Geological Report) | Seam -Top,Seam-Bott |
| 2.2.12 | Seams not considered for Mining with Reasons | Bottom Seam, not considered due to non-persistence nature in major part of the area and intersection in three boreholes only. |
| 2.2.13 | Dip of the Seam | 6 Deg. to 7 Deg. ( I in 7.5 to 1 in 9 ) towards North and NE |

2.2.14 Seam wise thickness, depth and reserve

| Seamm | Thickness Range 'm' | Depth Range 'm | Net Geological Res "Mte" | Block Reserve Below "Mte" | | | | | Min Res "Mte" | | Mining Losses | Ext Res "Mte" | | | As on base date "Mte" | | | | | | | Reason (For seams not considered for mining) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | High wall/ Batter | Nala/ River /Road | Barrier | Un-economic | Total Blocked | UG | OC | | UG | OC | High wall | Depletion of Reserve | | | Balance Reserve | | | | |
| | | | | | | | | | | | | | | | UG | OC | High wall | UG | OC | High wall | Total | |
| Seam - Top | 0.40-8.35 | 11.85-120.45 | 11.54 | 1.20 | 0.00 | 0.15 | 0.00 | 1.3500 | 0.00 | 10.19 | 0.51 | 0.00 | 9.68 | 0.00 | 0.00 | 0.1 | 0.00 | 0.00 | 9.58 | | | |
| Parting | 6.72-43.50 | | | | | | | 0.0000 | | | | | | | | | | 0.00 | 0.00 | | | |

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seam-Bott | 0.15-0.50 | | 0.00 | | | | | 0.0000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | Seam Bottom not considered as it has not developed and impersistent in major part of the area. |
| Total | | | 11.5400 | 1.2000 | | 0.1500 | | 1.3500 | 10.1900 | | 0.5100 | | 9.6800 | | | 0.1000 | | | 9.5800 | | 9.5800 | |

| S.No | Parameters | Details |
|---|---|---|
| 2.2.15 | Methodology of reserves estimation (also mention if any software package has been used). | |
| Geological Reserves was estimated by DGM, Maharastra using polygon method with Digital Planimeter ( Planix-7).<br>GCV values were calculated by Majumder formula (GCV= 7115.197 - 123.971*M - 81.3121*A + 20.7421*FC) and seam wise borehole wise GCV was plotted and grade wise reserves estimated..<br>The reserves of Seam Bottom has not been estimated at it has been intersected in only three Boreholes. Seam Folio and Seam Floor Contour plan has also not been given in GR. | | |
| 2.2.16 | Average GCV "KCal/kg" | |

4707, Grade- G-9

| Coal Seam/ Section | Thickness range (m) | Type of Sample | Depth Range (m) | At 60% RH & 40°C | | | Grade | Average GCV & Grade |
|---|---|---|---|---|---|---|---|---|
| | | | | M % | Ash % | GCV (K.cal. / kg.) | | |
| Top Seam | 1.80-7.35 | BCS | 11.85-120.45 | 3.9-12.8 | 18.7-40.8 | 3816-6057 | G5-G12 | 4707(G9) |
| | 1.80-7.35 | I30 | 11.85-120.45 | 3.7-12.8 | 18.7-42.4 | 3694-6057 | G5-G13 | |
| | 1.80-7.35 | I100 | 11.85-120.45 | 3.7-12.8 | 18.7-42.4 | 3694-6057 | G5-G13 | |

| | | |
|---|---|---|
| 2.2.17 | Gross Geological Reserve of the block "Mte" | 12.82 |
| 2.2.18 | Net Geological Reserve of the block "Mte" | 11.5400 |
| 2.2.19 | Minable Reserve of the block "Mte" | 10.19 |
| 2.2.20 | Blocked Reserve "Mte" | 1.3500 |
| 2.2.21 | Corresponding extractable reserve of the block "Mte" | 9.68 |
| 2.2.22 | Percentage of Extraction | 83.882 |
| 2.2.23 | Reserve already depleted (Base date of Mining Plan) | 0.1 |
| 2.2.24 | Balance Reserve (as on Base Date)) | 9.5800 |

# Chapter-3: Mining

## 3.1 Mining Method

| S.No | Parameters | Details |
|---|---|---|
| 3.1.1 | Existing method of mining if the mine is under operation | The coal block was in operational for a very short period during 2013-14 and OC mining was in practice. After deallocation of block the is no mining operation is carried out till date. The present mine owner shall carry out the mine operation as per directives of allocation and complying statutory approvals as applicable through this revised mine plan. |
| 3.1.2 | Proposed method of mining with justification on suitability of method of mining | |

**Existing Method of Mining**

Approved mining plan of Marki Mangli-II(2006) envisaged three isolated quarries as East, Central and West quarry leaving barriers in between considering geological structure of the block as per GR prepared by DGM, Maharashtra State.

The opencast was earlier planned upto a depth of 70m with an extractable reserves of 6.73 Mt and overburden removal of 50.78 Mm3 with a rated production of 0.30Mtpa at an average stripping ratio of 7.55 m3/te. The mine was planned for a life of 24 years

Shovel-Dumper with blasting was envisaged for winning of coal and overburden.removal.

**Mine is an operational mine and Prior allottee extracted 99775 metric tonnes of coal (0.1Mt) and overburden removed to the tune of 421661 cum (OB +Top Soil) up to 2014.**

However, the mine closure plan which is an integral part of mining plan as per Guidelines 2013 was not prepared and Environment Clearance was obtained for Marki Mangli-II/III & IV blocks combinedly. No Forest Clearance was obtained for 146.996 Ha of forest land. MoC, vide letter dated 7.3.2022, communicated that since the statutory clearances are needed to be obtained afresh by the allocattee, the efficiency parameter for coal mines other than schedule -II coal mines would be applicable for Marki Mangli-II coal mine and 51 months for Milestones MS-2 to MS-5 have been agreed to. ( Annexure-VIII). Production start envisaged in 2026-27 and base year as 2025-26 or 2026.

for Pre–Mining activities to complete validation of Geological Report, Preparation, Submission and Approval of Revised Mining Plan & Mine closure Plan, Environment Clearance, Forest Clearance Stage-I & stage-II, Land Acquisition and Grant of Mining Lease etc.

**Proposed Method of Mining**

Considering the favorable geo-mining characteristics of the block like 1 No. of Coal Horizons of varying thickness, 2.30 km strike length, moderate gradient of about 60-120, and for conservation of resource, it is proposed to extract the coal reserves within the block using open cast mining technology. The entire block is found suitable for exploitation by opencast mining method.

Coal will be mined using Combination of Surface Miner and payloader combination for coal winning and wherever the geo-mining condition does not permit application of surface miner , Shovel – Dumper method with drilling and blasting may also be used for coal winning. The OBR would be removed using conventional shovel dumper method with drilling & blasting. Drilling & blasting shall be conducted in scientific way using environment friendly technology.

**Strategy of Mining Quarriable areas**

Strike length of the block is about 2.3 km. A non-coal bearing patch of 52.00 Ha in the southern and eastern corner beyond incrop of seam-ST, is proposed to have the external dump which will be utilized till 10 years.

The external dump shall be merged with internal back filling dump from 1st year onwards taking the advantage of shallow depth of de-coaling (less than 30 meter).

**Mine Boundaries**

It is proposed to mine maximum area leaving a barrier of 7.5 m on surface from block boundary, which is a statutory requirement.

The diversion of road is not required and left as it is in the area named as undisturbed area. Nala diversion is proposed from northern side of block with maintaining 45-meter safety distance as per CMR (119)., 2017

The mine boundaries of the OC mine are as follows: -

**North: Fault F1-F1/Talchir Formation.**

**East: Fault F4-F4,F2-F2 and Incrop of coal seam.**

**South: Talchir Formation and Savali & Mukutban Villages.**

**West: Lease Boundary and Lameta Formation**

**Life of Mine**

The rated capacity of the mine is 0.30Mty with a life of the mine being estimated as 34 years.

**Mining System**

The geo-mining condition as given below :

| Sl No | Particulars | Unit | Value |
|---|---|---|---|
| 1 | Average Gradient of coal seams. | Degree | 6 to 12 |
| 2 | No of coal seam (workable) | No | One |
| 3 | Coal seam thickness | m | 1.80-7.35 |
| 4 | Thickness of OB | m | 11.85-120.45 |
| 5 | Faults. | No | Nine |
| 6 | Throw of Faults | m | 10-40 |
| 7 | Quarry Perimeter | | |
| i) | Perimeter along Surface | m | 7344 |
| ii) | Perimeter along Floor | m | 6918 |
| 8 | Excavation area at Surface | Ha | 215.21 |
| 9 | Excavation area at floor | Ha | 180.61 |
| 10 | Mineable Reserves | Mt | 10.39 |
| 11 | Extractable Reserves | Mt | 9.58 |
| 12 | Overburden | Mm3 | 87.06 |
| 13 | Stripping Ratio | m3/te | 9.09 |
| 14 | Capacity | Mtpa | 0.30 (Rated capacity) |
| 15 | Life of the mine | Yrs | 34 |
| 16 | Strike length( Along Floor) | m | |
| i) | Maximum | m | 2250 |
| ii) | Minimum | m | 600 |
| 17 | Strike length( Along Surface) | m | |
| i) | Maximum | m | 2300 |
| ii) | Minimum | m | 650 |
| 18 | Dip-Rise Length | m | |
| | Along Floor | m | 985 |

| | | | |
|---|---|---|---|
| ii) | Along surface | m | 1100 |
| 19 | Quarry depth | | |
| i) | Maximum | m | 125 |
| ii) | Minimum | m | 11.85 |
| 20 | Haul Road/Access Trench | | |
| i) | Total Length | m | 1860 |
| ii) | Total Width ( Dumper Movement 35Te+Drain both side +Berm both side) | m | 20 |

**Coal Winning & OB Removal**

Coal will be mined using Combination of Surface Miner and payloader combination for coal winning and wherever the geo-mining condition does not permit application of surface miner, Shovel – Dumper method with drilling and blasting may also be used for coal winning. The OBR would be removed using conventional shovel dumper method with drilling & blasting. Drilling & blasting shall be conducted in scientific way using environment friendly technology.

**Bench Height**

OBR (2.5 m3 Hyd. Shovel) 8-10 m
Top Soil/Alluvium (0.9 m3 Backhoe/Pay Loader) 3-6m
Coal As per thickness

**Proposed Bench Width**

1. Working Bench Width (for 2.5 m3 Hyd. Shovel ) 30m
2. Non-Working Bench Width (for 1.7 m3 Hyd. Shovel) 15m
3. Width of the permanent haul road 30m
4. Width of the temporary transport ramp 20m
5. Usual height of the Top soil dump bench 3m
6. Usual height of the Hard Rock dump bench 30m
7. Bench Slope
   a) OB Bench 70 Deg
   b) Coal Bench 60 Deg
   c) Dump bench 37 Deg
8. Overall (Ultimate) pit slope 40 Deg

**Mining Sequence**

Marki Mangala II opencast is proposed to be developed by the access trench of 20 m width. The access trench is to be graded from 233 m R.L.
at 1 in 16 to the mine floor of about 225 m R.L. This would also facilitate extension of coal and OB bench for full development of mine. The mine will advance towards dip direction exposing the floor of Seam-ST. After creation of sufficient de-coaled area of about 100m, internal backfilling of OB will be started.
For better accessibility and to Optimize the lead, the quarry has been divided into two parts (western side and eastern side) by a central access named as Haul road. Both Western side and Eastern side part will be worked simultaneously. During working of the quarry, permanent haul road
along the floor of the quarry will be developed at 1 in 16 gradient.

**Mineable Reserves**

Only One seam, namely, Top seam to be worked in this OC mine. The mineable and extractable reserves are 10.19 Mte and 9.68 Mte respectively.
The total volume of external dump has been estimated as 9.95 Mm3 . Rest of the OB will be placed as internal dumps(76.99 Mm3 )
and a small volume shall be used in embankment along nala diversion ( 0.12Mm3 ).
The year wise dump volume is shown below.

| Yr | Calendar year | External Dump | | Internal Dump | | Total OB | |
|---|---|---|---|---|---|---|---|
| | | Prog (Mcum) | Cum (Mcum) | Prog (Mcum) | Cum (Mcum) | Prog (Mcum) | Cum (Mcum) |
| upto base year 2026 | | 0.42 | 0.42 | 0.00 | 0.00 | 0.42 | 0.42 |
| 1 | 2026-27 | 1.55 | 1.55 | 0.52 | 0.52 | 2.07 | 2.07 |
| 2 | 2027-28 | 1.16 | 2.71 | 0.39 | 0.91 | 1.55 | 3.62 |
| 3 | 2028-29 | 1.24 | 3.95 | 0.41 | 1.32 | 1.65 | 5.27 |
| 4 | 2029-30 | 1.40 | 5.35 | 0.25 | 1.57 | 1.65 | 6.92 |
| 5 | 2030-31 | 1.39 | 6.74 | 0.24 | 1.81 | 1.63 | 8.55 |
| 6 | 2031-32 | 1.30 | 8.04 | 0.23 | 2.04 | 1.53 | 10.08 |
| 7 | 2032-33 | 1.16 | 9.20 | 0.21 | 2.24 | 1.37 | 11.45 |
| 8 | 2033-34 | 0.25 | 9.46 | 1.43 | 3.67 | 1.68 | 13.13 |
| 9 | 2034-35 | 0.30 | 9.76 | 1.71 | 5.38 | 2.01 | 15.14 |
| 10 | 2035-36 | 0.32 | 10.07 | 1.79 | 7.17 | 2.10 | 17.24 |
| 11 | 2036-37 | - | 10.07 | 2.18 | 9.35 | 2.18 | 19.42 |
| 12 | 2037-38 | - | 10.07 | 2.26 | 11.61 | 2.26 | 21.68 |
| 13 | 2038-39 | - | 10.07 | 2.34 | 13.95 | 2.34 | 24.02 |
| 14 | 2039-40 | - | 10.07 | 2.43 | 16.38 | 2.43 | 26.45 |
| 15 | 2040-41 | - | 10.07 | 2.51 | 18.89 | 2.51 | 28.96 |
| 16 | 2041-42 | - | 10.07 | 2.60 | 21.49 | 2.60 | 31.56 |
| 17 | 2042-43 | - | 10.07 | 2.67 | 24.16 | 2.67 | 34.23 |
| 18 | 2043-44 | - | 10.07 | 2.76 | 26.92 | 2.76 | 36.99 |
| | 2044-45 | - | 10.07 | 2.84 | 29.76 | 2.84 | 39.83 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 20 | 2045-46 | - | 10.07 | 3.13 | 32.89 | 3.13 | 42.96 |
| 21 | 2046-47 | - | 10.07 | 3.40 | 36.29 | 3.40 | 46.36 |
| 22 | 2047-48 | - | 10.07 | 3.40 | 39.69 | 3.40 | 49.76 |
| 23 | 2048-49 | - | 10.07 | 3.40 | 43.09 | 3.40 | 53.16 |
| 24 | 2049-50 | - | 10.07 | 3.40 | 46.49 | 3.40 | 56.56 |
| 25 | 2050-51 | - | 10.07 | 3.40 | 49.89 | 3.40 | 59.96 |
| 26 | 2051-52 | - | 10.07 | 3.40 | 53.29 | 3.40 | 63.36 |
| 27 | 2052-53 | - | 10.07 | 3.40 | 56.69 | 3.40 | 66.76 |
| 28 | 2053-54 | - | 10.07 | 3.40 | 60.09 | 3.40 | 70.16 |
| 29 | 2054-55 | - | 10.07 | 3.40 | 63.49 | 3.40 | 73.56 |
| 30 | 2055-56 | - | 10.07 | 3.40 | 66.89 | 3.40 | 76.96 |
| 31 | 2056-57 | - | 10.07 | 3.30 | 70.19 | 3.30 | 80.26 |
| 32 | 2057-58 | - | 10.07 | 3.30 | 73.49 | 3.30 | 83.56 |
| 33 | 2058-59 | - | 10.07 | 2.50 | 75.99 | 2.50 | 86.06 |
| 34 | 2059-60 | - | 10.07 | 1.00 | 76.99 | 1.00 | 87.06 |
| **Total** | | **10.07** | | **76.99** | | **87.06** | |

**Note: A small volume of 0.12Mm3 shall be utilized for Earthen Embankment along Nala diversion and is included in External Dump Volume**

of 10.07 Mm3 Overburden waste to be removed from Marki Mangli-II coal mine may produce about 70-75% of Fine , medium and coarse grained sandstone which may be crushed to sand particle by setting up a suitable crushing plant nearby places .
This shall have following advantages :

1.Infrastructure and road construction besides other use.
2.This shall meet the statutory requirement of sand production from overburden material as generally stipulated in Environment Clearance Conditions.
3.The height of external and internal dumps may be maintained at ground level so that major mart of the area may be converted to agricultural land.
4.Production of sand from sandstone by crushing as the amount of sand likely to be produced shall not be used for backfilling.

**Top Soil Management**

Top soil will be excavated and segregated separately. Top soil will be scrapped by dozer before the ground preparation for drilling and blasting.

**Topsoil details:**

1. Height of Topsoil dump : 3-6 meters.
2. Year of reclamation : After 6th year of mine operation.

| | | |
|---|---|---|
| 3.1.3 | Coal production capacity proposed MTPA | 0.3000 |
| 3.1.4 | Justification for optimization Coal production capacity : | |
| Considering the strike length of about 2.30 km and Dip-rise width of about 1km and single seam working, the rated capacity of 0.30 Mty is considered to be optimum. | | |
| 3.1.5 | Calendar year from which the production will start | 2026-27 |
| 3.1.6 | Year of Achieving rated production | 2028-29 |

3.1.7 Tentative Coal production Plan MT

| Year | | Coal Production Schedule | | | OB MM3 | SR |
|---|---|---|---|---|---|---|
| Year of Operation | Calendar Year | UG | OC | Total | | |
| 1 | 2026-27 | 0.00 | 0.10 | 0.1000 | 2.07 | 20.7000 |
| 2 | 2027-28 | 0.00 | 0.20 | 0.2000 | 1.55 | 7.7500 |
| 3 | 2028-29 | 0.00 | 0.30 | 0.3000 | 1.65 | 5.5000 |
| 4 | 2029-30 | 0.00 | 0.30 | 0.3000 | 1.65 | 5.5000 |
| 5 | 2030-31 | 0.00 | 0.30 | 0.3000 | 1.63 | 5.4333 |
| 6 | 2031-32 | 0.00 | 0.30 | 0.3000 | 1.53 | 5.1000 |
| 7 | 2032-33 | 0.00 | 0.30 | 0.3000 | 1.37 | 4.5667 |
| 8 | 2033-34 | 0.00 | 0.30 | 0.3000 | 1.68 | 5.6000 |
| 9 | 2034-35 | 0.00 | 0.30 | 0.3000 | 2.01 | 6.7000 |
| 10 | 2035-36 | 0.00 | 0.30 | 0.3000 | 2.10 | 7.0000 |
| 11 | 2036-37 | 0.00 | 0.30 | 0.3000 | 2.18 | 7.2667 |
| 12 | 2037-38 | 0.00 | 0.30 | 0.3000 | 2.26 | 7.5333 |
| 13 | 2038-39 | 0.00 | 0.30 | 0.3000 | 2.34 | 7.8000 |
| 14 | 2039-40 | 0.00 | 0.30 | 0.3000 | 2.43 | 8.1000 |
| 15 | 2040-41 | 0.00 | 0.30 | 0.3000 | 2.51 | 8.3667 |
| 16 | 2041-42 | 0.00 | 0.30 | 0.3000 | 2.60 | 8.6667 |
| 17 | 2042-43 | 0.00 | | 0.3000 | 2.67 | 8.9( |

| | | | | | | |
|---|---|---|---|---|---|---|
| 18 | 3043-44 | 0.00 | 0.30 | 0.3000 | 2.76 | 9.2000 |
| 19 | 2044-45 | 0.00 | 0.30 | 0.3000 | 2.84 | 9.4667 |
| 20 | 2045-46 | 0.00 | 0.30 | 0.3000 | 3.13 | 10.4333 |
| 21 | 2046-47 | 0.00 | 0.30 | 0.3000 | 3.40 | 11.3333 |
| 22 | 2047-48 | 0.00 | 0.30 | 0.3000 | 3.40 | 11.3333 |
| 23 | 2048-49 | 0.00 | 0.30 | 0.3000 | 3.40 | 11.3333 |
| 24 | 2049-50 | 0.00 | 0.30 | 0.3000 | 3.40 | 11.3333 |
| 25 | 2050-51 | 0.00 | 0.30 | 0.3000 | 3.40 | 11.3333 |
| 26 | 2051-52 | 0.00 | 0.30 | 0.3000 | 3.40 | 11.3333 |
| 27 | 2052-53 | 0.00 | 0.30 | 0.3000 | 3.40 | 11.3333 |
| 28 | 2053-54 | 0.00 | 0.30 | 0.3000 | 3.40 | 11.3333 |
| 29 | 2054-55 | 0.00 | 0.30 | 0.3000 | 3.40 | 11.3333 |
| 30 | 2055-56 | 0.00 | 0.30 | 0.3000 | 3.40 | 11.3333 |
| 31 | 2056-57 | 0.00 | 0.30 | 0.3000 | 3.30 | 11.0000 |
| 32 | 2057-58 | 0.00 | 0.30 | 0.3000 | 3.30 | 11.0000 |
| 33 | 2058-59 | 0.00 | 0.20 | 0.2000 | 2.50 | 12.5000 |
| 34 | 2059-60 | 0.00 | 0.08 | 0.0800 | 1.00 | 12.5000 |
| Note: Calendar Plan/Production Plan for the entire life of the mine. | | | | | | |

| | | |
|---|---|---|
| 3.1.8 | Rated Capacity Mtpa | By OC : 0.30<br>By UG : 0<br>Overall : 0.3000 |
| 3.1.9 | Life of the mine: Years | By OC : 34<br>By UG : 0.00<br>Overall : 34 |
| 3.1.10 | Whether the proposed external OB dump site is coal/ lignite bearing: If so, whether coal/lignite below waste disposal area is extractable | No |
| 3.1.11 | Whether the proposed external OB dump site is coal/ lignite bearing: If so, whether coal/lignite below waste disposal area is extractable | Yes, OB dumping has has been propose in the non coal bearing area and falls within the allocated block area lying beyond the incrop of the workable seam. four boreholes (MK-13,14,25 36) has been drilled beyond the incrop of the bottom most base seam Bottom proving the area to be non-coal bearing. Moreover ,exposures of lameta beds in the west, also confirm the non-coal bearing nature of the zone. The Geological Report has been prepaed by Directorate of Geology and Mining Maharashtra State and conforming the non coal bearing in the block. With reference to the Geological Plan (Plate-5) and Conceptual Plan (Plate- VIII), it can be seen that the proposed OB dump and infrastructure area are falling in non-coal bearing zone, beyond the incrops of both the coal seams.The lithologs of all the above four boreholes are provided in plate no- 6A, 6B. It is further proposed that during actual mine operation and making access to the seam few shallow bore holes shall be drilled for exact delineation of coal seam incrop. |
| 3.1.12 | Results of any investigation carried out for scientific mining, conservation of minerals and protection of environment; future proposals | No |
| 3.1.13 | Type of Equipment/ HEMM proposed | |
| 3.1.14 | Upload Require Document | OC : OC files data shown below<br>UG : NA |

| S.No. | Type of Equipment | Capacity | Unit | Population |
|---|---|---|---|---|
| 1 | Diesel Blackhoe | 0.93 | Cubic Meter | 3 |
| 2 | Tipping Truck | 8 | tonn | 2 |
| 3 | Diesel Shovel | 2.5 | Cu. M | 5 |
| 4 | Diesel Drill | 250 | mm | 3 |
| 5 | Dozer | 320 | HP | 6 |
| 6 | Rear Discharge Dumper | 25 | tonn | 4 |
| 7 | Diesel Drill | 100 | mm | 2 |
| 8 | Wheel Dozer | 180 | HP | 2 |
| 9 | Motor Grader | 145 | HP | 1 |
| 10 | Mobile Crane | 10 | tonn | 1 |
| 11 | Explosive Van | 3 | tonn | 1 |
| 12 | Dump Truck | 15 | tonn | 6 |

## OC Document :

## Type of Equipment/HEMM proposed

| | | | | |
|---|---|---|---|---|
| | **Coal(M.tes)** | 0.3 | | |
| | **Lead for Coal(Km)** | 0.9 to 2.30 | | |
| | **OBR(Mm3)** | 1.29 to 3.27 | | |
| | **Lead for OBR(Km)** | 1.65 to 1.80 | | |
| | | | | |
| **SL No** | **Type of HEMM** | **Size/Cap** | **Total Provision** | |
| | **A. For Soil** | | | |
| 1 | Diesel Backhoe | 0.9 $m^3$ | 1 | |
| 2 | Tipping Truck | 8 t | 2 | |
| | **B For Overburden Rock** | | | |
| 1 | Diesel Backhoe | 0.9 $m^3$ | 1 | |
| 2 | Diesel Shovel | 2.5 $m^3$ | 5 | |
| 3 | Diesel Drill 250mm | 250mm | 3 | |
| 4 | Dozer | 320 HP | 6 | |
| 5 | Rear Discharge Dumper | 35 t | 23 | |
| | **C. For Coal** | | | SM option |
| | Surface Miner | SM2200 | | 1 |
| | Diesel Backhoe | 0.9 $m^3$ | 1 | |
| | FE Loader | 2-3 $m^3$ | | 1 |
| 2 | Rear Dis Charge Dumper | 25 t | 4 | 4 |
| 3 | Diesel Drill 100mm dia | 100mm | 2 | - |
| 4 | Wheel Dozer | 180 HP | 2 | 2 |
| | **D. For Common** | | | |
| 1 | Motor Grader | 145 HP | 1 | |
| 2 | Front End loader | 2.5 m3 | 1 | |
| 3 | Tractor with trailor | | 2 | |
| 4 | Mobile Crane | 10T | 1 | |
| 5 | Mobile Crane | 5 T | 1 | |
| 6 | Explosive Van | 3T | 1 | |
| 7 | Water Sprinkler | 10 Kl | 2 | |
| 8 | Water Sprinkler mist spray | 28 Kl | 1 | |
| 9 | Wheel Dozer | 180 HP | 2 | |
| 10 | Dump Truck | 12-15T | 6 | |
| 11 | Diesel Browser | 16 Kl | 2 | |
| 12 | Fire Tender | | 2 | |
| 13 | Hyd. Rock Breaker | | 1 | |
| 14 | Cable Handler | | 2 | |
| 15 | Tyre Handler | | 2 | |
| | **E. For Reclamation** | | | |
| 1 | F E Loader | 2.5 cum | 1 | |
| 2 | Dozer | 180 HP | 1 | |
| 3 | Grader | 145 HP | 1 | |
| 4 | Water sprinkler 28 kl | 28 Kl | 2 | |
| 5 | Dumper | 35T | 3 | |

**Note:** Since coal winning is proposed to be done by Shovel and expected size of coal shall be +1200, which will be down sized to (-)250mm size for which surface crushing arrangement is required may be by Feeder breaker with hopper system. After crushing, the coal will be loaded on to trucks through hoppers for transportation to nearest Railway siding/ consuming point.

As the area for infrastructure being less, CHP with Feeder Breaker arrangement may be avoided by deploying Surface Miner which shall be more beneficial as it is a environment friendly,

and may be deployed by contractual means

However, this option may be explored if a less productive Surface Miner is made available in next 4-5 years when mining operation is likely to be commenced.

# Chapter-4: Safety Management

4.1 Safety Management

| S.No | Parameters | Details |
|---|---|---|
| 4.1.1 | Major Risks and uncertainties to the project viz. Proximity to river, adjacent working, geo-mining disturbances, slope stability and remedial measures suggested. It should also include proposed overall slope of the quarry and OB dump, dump height, strata control, fire and spontaneous heating, gas monitoring, disaster management, danger from inrush of water etc. | |

**Nala Diversion :**

A seasonal nala originates in the north central part of the block and is flowing from north to south in the eastern part of the block. This nala needs to be diverted and may be utilized as garland drain all along the quarry in the north and east .A safety zone of 45m from the diverted nala/garland drain has been kept as per Reg. 119 of CMR 2017.

In addition , in view of flood protection from this nala (converted into garland drain of 5m wide) an adequate earthen embankment has been proposed to be constructed along the nala/garland drain to prevent any possible inundation.

The earthen embankment shall be made/designed at least 3m height above HFL of 5m width in the top and 25m width at the base all along the diversion length of 3679 m of nala as per Regulation 149(2) of CMR 2017.The said embankment shall be constructed under supervision of a civil engineer considered expert in this regard. The design of embankment is illustrated as given below:

HFL of nala is to be determined by detailed survey during high flood session all along the route length of nala diversion.
This is a seasonal nala originating from north out side of block where no HFL is available. During the mine opening in 2026 and topographical survey of mine area by the project proponent mark/extend and cooperate the authority for such determination of HFL in diverted route . All statutory precautions as required under CMR'2017 and other statutory provisions shall be complied.
The position of original nala and diverted nala /garland drain route have been shown in the relevant plans.

**Adjacent Working**

There is no adjacent operational mine.

**Geo-mining Disturbances:**

Geo-mining parameters are favorable. Gradient of seams are 1 in 5 to 1 in 10 (60-120), Strike length along floor is 600m to 2250 m. Quarry depth is varying from 11.85 m to 125 m. Dip rise length along floor is 985m to 1100 m.
Block is traversed by four nos of major strike and oblique faults of varying magnitude of throw from 10 to 50m. Mine block is divided into two mining sectors initially upto 5th year such that uniform targeted coal production as well as maintaining smooth coal: OB ratio during the life of the mine is attained. Geo Mining Parameters is given in Chapter-3.

**Slope stability& remedial measures:**

i) Scientific study on optimum slope angle for stability of quarry benches, highwalls/ slope batter and spoil dumps along with hydro-geological study shall be done.

ii)During actual mining operations systematic observations of the conditions of benches, highwall slopes and spoil dumps should be carried out and the dimensions as given in Chapter-3 (Mining) be modified if necessary to suit the conditions.

iii) Other provisions as laid down in Reg106 & 108 of CMR 2017 shall be strictly adhered.

iv) As the gradient of floor of quarry is gentle (8-120) As such floor blasting is not necessary.

**Overall slope of the quarry & OB dumps. Height of OB dumps**

i) External dump height is 60 m above surface level with an individual bench slope angle of 37deg. and overall dump slope angle of 27 deg or less. After 5 years , this external dump will be merged with internal dump with top RL being maintained as same.

ii) Overall Slope of the quarry at the final stage is maintained at 40 deg with individual OB & Coal bench at 70 deg & 60 deg respectively.

iii) Height of External dump upto 4 years shall be maintained at 40m height. This external dump shall be merged with internal dump which shall be maintained at maximum 60m height from actual ground surface.

**Strata control**

All strata control measures shall be taken up. If needed a slope stability study shall be carried out by an authorized scientific organization.

**Generation of fines and spontaneous heating, gas monitoring.**

No blasting is proposed within 100m of the Vithal Rukmani Temple situated at the hilltop in the west of the block area. Controlled blasting will be done within a range of 300m from the temple so that the intensity of vibration is reduced to the minimum permissible limit..

No crushing and sizing are required. Generation of fines if any beyond -100mm size shall be sprinkled by water in the enclosed CHP upto railway loading site. No spontaneous heating is expected to occur.

**Disaster management**

i)Fencing of mine workings, landslides & cracks between benches to be monitored at close intervals.

ii) No working or construction is proposed within 100m toe of OB dump.

)OB is proposed to be stacked in Internal Dump and external Dump (Upto 5 years) with a total maximum height of 60m. in three ti

| | | |
|---|---|---|
| iii) Slope of the backfilled dump is dynamic. Dump Slope shall be properly maintained with Grass beds for stability.<br><br>iv) Slope stability analysis shall be done for any slope failure along high walls, External Dumps and Internal Dumps.<br><br>v) Adequate fire-fighting arrangements to be made.<br><br>vi)Sufficient pumping arrangements to be made for preventing mine inundation.<br><br>vi)Garland drain have been proposed around the mine pit to intercept surface run off. | | |
| 4.1.2 | A Commitment from the Company Board that entire mining operation will be carried out as per the Statutory provision given under Mines Act 1952, Coal Mine Regulation 2017 and & wherever specific permission will be required the company will approach the concerned authorities | Commitment from the company board is attached as Annexure- 3A1 |

# Chapter-5: Infrastructure Facilities proposed and their Location

5. Infrastructure Facilities

<table>
<tr><th>S.No</th><th>Parameters</th><th colspan="3">Details</th></tr>
<tr><td>5.1</td><td>Mine infrastructure required</td><td colspan="3"><table>
<tr><th>S.No</th><th>Infrastructure to be reatin to be public use</th><th>Infrastructure to be dismantle/reclaimed</th></tr>
<tr><td>1</td><td>Approach roads</td><td>Sub Station,</td></tr>
<tr><td>2</td><td>Settling Pond</td><td>Coal Handling arrangement</td></tr>
<tr><td>3</td><td>Garland Drain</td><td>HEMM , E&M workshop</td></tr>
<tr><td>4</td><td>Diverted Nalla</td><td>Project Store, All service buildings like PO office, VTC, First Aid Centre, Canteen Rest shelter etc.</td></tr>
<tr><td>5</td><td>Garland Drain</td><td>HEMM , E&M workshop</td></tr>
<tr><td>6</td><td>Diverted Nalla</td><td>Project Store, All service buildings like PO office, VTC, First Aid Centre, Canteen Rest shelter etc.</td></tr>
<tr><td>7</td><td>Approach roads</td><td>Sub Station,</td></tr>
<tr><td>8</td><td>Settling Pond</td><td>Coal Handling arrangement</td></tr>
</table></td></tr>
<tr><td>5.2</td><td>Power supply & illumination</td><td colspan="3"></td></tr>
</table>

**Source of Power**

Power shall be drawn to the proposed 33kV Sub Station located at the project site from nearest sub station of Maharastra State Electricity Development Corporation
located at a distance of 1.2 kM by 33 kV over head line for meeting the power requirement of the project. It is also proposed a solar park to be installed in the stabilized
dump area to draw power for its internal use.

**Proposed Power Supply & Distribution Arrangement**

Connected load & maximum demand of OCP are as follows
Connected Load = 1770 kW
Maximum Demand = 1280 kW / 1300 kVA
The demand for the project comes to 1300 KVA after improving the power factor to 0.98 by 2 nos. of delta connected capacitor bank of (3 x 105) kVAr.
Two nos. 1600 kVA, 33/6.6KV outdoor type transformers have been selected to cater to the demand. Proper earthing system shall be provided to
keep the earth resistance below 1 ohm. Transformer secondary should be earthed through Neutral Grounding Resistor with fail safe relay to restrict
the earth current below 50 A as per statute. Sub statation shall be earthed by earthing grid. Proper lightning protection shall be provided.

**6.6 KV Indoor type Switch Boards :**

One number 6.6 KV In door type switchboard energized from the secondary of the transformer would feed the power supply to all the power consumers
of the project. 2 nos 500 kVA DG sets with 6.6 kV switch panel as per requirement shall be provided for meeting up emergency requirements.
The Annual Energy Consumption of the project for the targeted year of production is 7.19 Mkwh and the specific Energy Consumption is 23.98Kwh/Te.
(Annexure-IX)
The supply voltages are as under :

| | | |
|---|---|---|
| Incoming supply voltage | - | 33 KV |
| Supply voltage to workshop | - | 6.6 KV |
| Quarry power supply | - | 6.6 kV |

**Power factor Improvement**
In order to improve power factor to a value of 0.98, two delta connected capacitor bank of 3 x 105kVAr at 6.6 KV have been provided in the sub-station.

**Power Supply to CHP & Workshop :**
CHP will be fed from OCP Sub Station at 6.6kV by cable feeder where power shall be stepped down as per requirement to feed the CHP and miscellaneous surface loads. The workshop will be fed power at 6.6kV from OCP sub station by cable feeder. At the workshop power
at 3.3KV would be stepped down to 0.415KV by 1 no. 315kVA 6.6/0.415kV transformer for further distribution to different power receivers.

**Illumination**
250W HPSV lamps with all accessories at suitable intervals has been provided for Haul road lighting. High mast lighting with adequate light fittings and all accessories has been provided for flood lighting of entire quarry area. One no. 250kVA 6.6/0.230 kV (L-L) lighting transformer shall feed the lighting loads of the OCP.

**Proposed Communication System :**
The proposed communication system should cater to the need of voice communication among personnel related to mine operation, administration
and equipment maintenance. The system also takes into account the data communication requirement for mine operation and planning along with
the latest office automation facilities.

While preparing the system, due consideration has been given to the state-of-art networking architecture involving the communication of voice, data
and multimedia over the same network path, so as to avoid duplicated investment in network and proper conservation of bandwidth.

**Surface / Administrative Communication :**
To meet all the requirements of data and voice communication, 100 lines of IP Enable Exchange is proposed having the following main features :

**IP Enable Exchange :**
A 100 line automatic telephone exchange has been envisaged for the effective communication between the various units on the surface.

**BSNL Communication :**
It is proposed to provide 20 nos. BSNL telephone extensions to the mine office in order to facilitate external communication and to link the mine with the BSNL's national telephone network. The BSNL telephones shall be provided at the offices and residences of important officials.

**Other facilities:**
Mobile Telephone sets with internet facility shall be provided to important project personnel. Personal computers shall be provided in the administrative building at important locations with Wi Fi connection. Walkie Talkiies shall be provided to key personnel for operational purposes.

| | |
|---|---|
| 5.3 | Drainage & Pumping : Assessment of Volume of Water for Pumping, Pumping Capacity and Pump Selection |

**Assessment of Volume of water for pumping**

**BASIC DATA**

- Water level in adjacent Marki Mangli-I mine is shallow in pre monsoon 4.0m to 11.0m below GL (Source : Secondary data from Approved EIA report of Marki Mangli-III/III/IV Coal Mine, Yavatmal District, Maharashtra)
- Water level in adjacent Marki Mangli-I mine is shallow in post monsoon 1.5m to 10.5m below GL (Source : Secondary data from Approved EIA report of Marki Mangli-III/III/IV Coal Mine, Yavatmal District, Maharashtra)
- Fluid potential fluctuation between the two extreme climate is around 2.5m
- Average annual rainfall based on rainfall data recorded at Yavatmal for last 10 years has been observed as 1135.7 mm. Maximum Rainfall in a month: 305mm (July )
- Maximum rainfall in a day: 12.30 mm (5.8.2021)
- Maximum depth of proposed mine: 120m
- Run off coefficient: (i) Mined out area= 0.5, (ii) Internal dump=0.10, (iii) Beyond excavation=0.10
- Inflow of water to the quarry due to seepage and UG precipitation: 10% of probable water accumulation in Nala
- Source of rainfall data: IMD, Yavatmal District.
- Recharge of aquifers: 15 % of annual rainfall
- Mode of occurrence of ground water: unconfined, semi-confined and confined condition.

**CALCULATION AND ASSESSMENT OF VOLUME OF WATER TO BE PUMPED**

As per Meteorological data, annual average rainfall in the region is 1135.7 mm and monsoon period is between Mid-June and Mid-October. An attempt has been made to estimate volume of water to be pumped out of the OC mine, on the basis of surface precipitation, Volume of rain water entering the mine and accumulating in the quarry (make of water) may be assessed on the basis of the following formula:

**Q = A x H x m3 /day**
where, A = Catchment area in m2
H = Maximum daily precipitation in m
= Run-off co-efficient

Run-off co-efficient () has been adopted as below:

i. For mined out area : 0.50
ii. For internal dump area : 0.10
iii. For area beyond excavation : 0.10
iv. Normally external dump area is considered as the area beyond excavation. Further, garland drains around the quarry excavation will preclude entry of rain water from area beyond excavation entering the mine.

**Rainfall Data, Mine Parameters and Excavated Area**

| | | |
|---|---|---|
| i. | Average annual rainfall | 1135.7 mm |
| ii. | Rainy season [mid-June to Mid-October] | 120 days |
| iii. | Maximum rainfall in 24 Hrs. [rainy season] | 12.30 mm |

| Year | Cumulative area for pumping | | |
|---|---|---|---|
| | Pit Area ( Ha) | Void Area(Ha) | Backfill Area( Ha) |
| 1 | 14.10 | 13.13 | 0.97 |
| 2 | 20.06 | 16.85 | 3.21 |
| 3 | 28.26 | 23.29 | 4.97 |
| 4 | 30.35 | 24.00 | 6.35 |
| 5 | 44.87 | 37.76 | 7.11 |
| 6 | 66.08 | 55.86 | 10.22 |
| 7 | 73.92 | 40.93 | 32.99 |
| 8 | 89.60 | 51.60 | 38.00 |
| 9 | 96.46 | 51.73 | 44.73 |
| 10 | 103.32 | 51.85 | 51.47 |
| 11 | 110.18 | 51.98 | 58.20 |
| 12 | 117.04 | 52.11 | 64.93 |
| 13 | 123.90 | 52.23 | 71.67 |
| 14 | 130.76 | 52.36 | 78.40 |
| 15 | 137.62 | 52.49 | 85.13 |
| 16 | 144.48 | 52.61 | 91.87 |
| 17 | 151.34 | 52.74 | 98.60 |
| 18 | 158.20 | 52.87 | 105.33 |
| 19 | 165.06 | 52.99 | 112.07 |
| 20 | 171.92 | 53.12 | 118.80 |

| | | | |
|---|---|---|---|
| 21 | 178.78 | 53.25 | 125.53 |
| 22 | 185.64 | 53.37 | 132.27 |
| 23 | 192.50 | 53.50 | 139.00 |
| 24 | 192.50 | 53.50 | 139.00 |
| 25 | 196.67 | 50.11 | 146.56 |
| 26 | 200.83 | 46.72 | 154.11 |
| 27 | 205.00 | 43.33 | 161.67 |
| 28 | 209.17 | 45.74 | 163.43 |
| 29 | 210.11 | 46.68 | 163.43 |
| 30 | 211.12 | 47.69 | 163.43 |
| 31 | 213.24 | 49.81 | 163.43 |
| 32 | 214.28 | 50.85 | 163.43 |
| 33 | 215.21 | 51.78 | 163.43 |
| 34 | 215.21 | 51.78 | 163.43 |

Water ingress in the mine during rainy season is estimated, considering the stage of the mine when maximum void has been created.

**(A) Quarry Excavation**

Water ingress(A) = 0.0123 m x [ (max void in Ha x 0.50) + (back-filled area in Ha x 0.10) ] x 104
= 0.0123 X [215.21 X 0.50 +(163.43+52) X 0.10] X 104 m3 / day
= 15885 m3 / day

**Sump Capacity**

Capacity of sump will be decided to accommodate rain water corresponding to maximum daily rainfall at 10% probability (once in every 10 years). It is assumed that sump will accommodate 70% of maximum rainfall in 24 Hrs (12.30 mm) plus 15% seepage.

| **(B)Sump Capacity [70 % of maximum rainfall in 24 Hrs.]** | |
|---|---|
| Quarry | 15885 x 0.70 =11120 m3 |

**Pumping Capacity**

Daily capacity of pumping has been kept as difference between ingress of water in the mine in a day and holding capacity of sump. Pump will work for 20Hrs /day.

| ( C) | Pumping duty |
|---|---|
| Quarry | [A – B] ÷ 20 m3 /Hr<br>= (15885-11120) ÷20 m3/Hr<br>= 4765/20 m3/Hr<br>= 238.25 **m3/Hr or say 240 m3/Hr** |

External Dump area is considered as the area beyond excavation. In this case, external dumps is merged with internal backfilled dump.

**Selection of Pumps**

Excavation operation of a quarry is a dynamic process. Gradually the depth of working increases. The duty of the pumps particularly the static head increases as the quarry goes deeper and deeper. Following stages are stated here:

1. When advance stripping of weathered mantle is to be done, water will accumulate on the lowest bench of OB, max 25 m below surface,
2. which will be drained to quarry floor sump.
3. Up to a depth of about 120 m, pumps will directly deliver to surface (80 lps x 150m head,.
   Details pumps are given below

| **Quarry (Peak pumping duty ; pumping load assumed 50 % of max. pumping duty)** | KW | Nos. |
|---|---|---|
| Slurry Pumps (Face) Pumps : 80 lps x 60 m | 60 | 2 |
| Main Pumps 80 lps x 120 m 6.6 KV electrical | 150 | 2 |
| Main Pumps 80 lps x 120 m 6.6 KV electrical( Spare Pump) | 150 | 1 |

| | | |
|---|---|---|
| 5.4 | Coal Handling Arrangement: Brief detail of the CHP/ Mode of Dispatch, Coal quality and Coal staking and handling arrangement | Brief details of CHP/Mode of DispatchCoals from the face shall be transported by the central haul road of both the sectors and will be directly collected at the receiving hopper of the CHP complex. Coal from the Top Seam shall be transported through the horizontal flank road to quarry floor of same level along strike to reach central haul road laid on the quarry floor and carried to surface along the main haul road. Coal from the central part of the property shall be transported through flank road to surface. Since coal winning is proposed to be done by Shovel and expected size of coal shall be 1200, which will be down sized to (-)250mm size for which surface crushing arrangement is required may be by Feeder breaker with hopper system. After crushing, the coal will be loaded on to trucks through hoppers for transportation to nearest Railway siding/ consuming point.If Surface Miner option is adapted, no crushing arrangement is required as coal produced will (-) 100 mm size with average G-9 grade coal . However, no stacking of coal is suggested for spontaneous heating of coal. Coal shall be directly fed into the one no hopper/bunker of 300 TPH capacities. As the peak rated production is kept at 0.3 0Million tonnes per year, expected coal production per day is about 900 tonnes per day. Two days of coal production i.e 1800 te shall be kept on ground stock for emergency transportation directly by road. |
| 5.5 | Coal washing and the proposed handling/ disposal of rejects | Coal washing is envisaged to reduce the sulphur content of coal and to improve quality of coal Rejects shall be dealt as per Govt policy and rules |

# Chapter-6: Land Requirement

6.1 Land requirement

| S.No | Parameters | Details |
|---|---|---|
| 6.1.1 | Total Land requirement for the mine in "Ha". Indicative source of data. | |

The Land details required for the block 339.467 Ha ,is given as below:

| Land Type | | Area ( Ha) |
|---|---|---|
| Private/Tenancy | Agricultural | 185.041 |
| ( 185.041 Ha) | Township/Village | - |
| | Grazing | - |
| | Barren | - |
| | Water bodies | - |
| | Road | - |
| | Community /Other use | - |
| Govt Non Forest | Agricultural | - |
| (7.43 Ha) | Township | - |
| | Grazing (Govt Land) | 7.430 |
| | Road | - |
| | Water bodies | 0.000 |
| | Barren/Other use | - |
| Forest | Jungle Jhari | 27.918 |
| (146.996Ha) | Reserve | 119.078 |
| | Protected | - |
| Freehold | | - |
| Total ( Vested Block) | | 339.467 |

(Source: RS Map from District Authorities, Forest Survey Map & DGPS survey by Project proponent)

Break up of pre-mining land type (indicative) and source of data.

| S.No | Land Type | Exisiting/pre-Mining Use | Area |
|---|---|---|---|
| 1 | Forest | Jangle Jhari | 27.918 |
| 2 | Forest | Reserve | 119.078 |
| 3 | Pvt/Tenancy land | Agricultural | 185.041 |
| 4 | Govt Non Forest | Grazing | 7.43 |

6.1.2 During mining Land use details:

| Type | Land use (Proposed) | Land Use (End of Life) | Land Use (Post Closure) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Agricultural land | Plantation | Water Body | Public/Company Use | Forest Land (Returned) | Undisturbed | Total |
| Excavation Area | 215.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Backfilled Area | 0.00 | 163.43 | 126.370 | 0.00 | 0.00 | 0.00 | 37.06 | 0.00 | 163.4300 |
| Excavated Void | 0.00 | 51.78 | 0.00 | 0.00 | 51.78 | 0.00 | 0.00 | 0.00 | 51.7800 |
| Without Plantation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Top Soil Dump | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| External Dump | 52.00 | 52.00 | 0.00 | 0.00 | 0.00 | 0.00 | 52.00 | 0.00 | 52.0000 |
| Safety Zone | 6.06 | 6.06 | 0.00 | 0.00 | 0.00 | 0.00 | 6.06 | 0.00 | 6.0600 |
| Haul Road between aries | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Road diversion | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Diversion Or Below River Or Nala Or Canal | 0.669 | 0.669 | 0.00 | 0.00 | 0.669 | 0.00 | 0.00 | 0.00 | 0.6690 |
| Settling Pond | 2.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 2.0000 |
| Road And Infrastructure Area | 12.20 | 12.20 | 0.00 | 0.00 | 0.00 | 0.00 | 12.20 | 0.00 | 12.2000 |
| Rationalization Area | 42.797 | 42.797 | 3.121 | 0.00 | 0.00 | 0.00 | 39.676 | 0.00 | 42.7970 |
| Garland Drains | 3.011 | 3.011 | 0.00 | 0.00 | 3.011 | 0.00 | 0.00 | 0.00 | 3.0110 |
| Embankment | 5.52 | 5.52 | 0.00 | 0.00 | 0.00 | 5.52 | 0.00 | 0.00 | 5.5200 |
| Green Belt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Water Reservoir Near Pit | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| UG Entry | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Undisturbed OR Mining Right For UG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Resettlement | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Pit Head Power Plant | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Water Harvesting | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Agricultural Land,Undisturbed OR Mining Right For UG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Total | 339.47 | 339.47 | 129.49 | 0.00 | 57.46 | 5.52 | 147.00 | 0.00 | 339.47 |

| S.No | Parameters | Details |
|---|---|---|
| 6.1.3 | Surface features over the block area | The block is free from habitation, a seasonal nala flows form north to south . |
| 6.1.4 | No. of villages/Houses to be shifted | NIL |
| 6.1.5 | Population to be affected by the project | NIL |
| 6.1.6 | Proposed Rehabilitation programme | No rehabilitation is involved , |

6.2 DETAILS OF LEASE

| S.No | Parameters | Details |
|---|---|---|
| 6.2.1 | Status of Lease | |
| Lease to be applied | | |
| 6.2.2 | Existing Lease Area "Ha" | Nil |
| 6.2.3 | Period for which Mining Lease has been granted/is to be renewed/ is to be applied. for. | 34 years and to be renewed as per requirement applicable in MMDR Act 1957. |
| 6.2.4 | Date of expiry of earlier Mining Lease, if any . | NA |
| 6.2.5 | Whether the lease boundary/ required boundary is same as mentioned in the allotment order. | Yes |
| 6.2.6 | Lease Area (applied/ required) as per the Mining Plan under consideration (Ha) | 339.467 includes forest land of 146.996 ha. |
| 6.2.7 | Whether the applied lease area falls within the allotted block. | Yes |

| | | |
|---|---|---|
| 6.2.8 | Area (Ha) of lease which falls outside the delineated Block Boundary/Existing Mining Lease. | Nil |
| 6.2.8 | Area (Ha) of lease which falls outside the delineated Block Boundary/Existing Mining Lease. | Nil |
| 6.2.9 | Details of outside area | Not Applicable |
| | Whether forms part of any other coal block | NA |
| | Whether it contains any coal/lignite reserves. | Nil |
| | Purpose for which it is required, e.g. roads/ OB dumps/ service buildings/ colony/ safety zone/ others (specify). | Not applicable |
| 6.2.10 | Whether some part(s) of the allotted block has not been applied for mining lease | Not Applicable |
| | Total area in Ha of such part(s). | Nil |
| | Total reserves in such part(s). (Mt). | Nil |
| | Brief reasoning for leaving such part(s). | Not applicable |

# Chapter-7: Environment Mangement

7. Environment Mangement

| S.No | Parameters | Details |
|---|---|---|
| 7.1 | Commitment from the project proponent that the company will comply Environment and Forest Condition stipulated in the respective clearances | The Commitment from the Company Board for compliance of the Environmental and Forest conditions and all prevalent statutory provisions as applicable has been be made and appended as Annexure 3A1. May please refer item 5 of the resolution. |

# Chapter-8: Progressive & Final Mine Closure Plan

8.1.1 Land Degradation and restoration Schedule

| Tentative Land Degradation and Technical Reclamation (Commutative Area Ha) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year/Stage | | Land Degraded | | | | Technically Reclaimed Area | | | |
| (Life of the mine plus post closure period) | | Excav | Dump (Extn + Top Soil) | Infra/others | Total | Backfill | Dump (Extn + Top Soil) | Others | Total |
| Up to Base year | 2026 | 7.37 | 6.65 | 0 | 14.0200 | 0.00 | 0.00 | 0.00 | 0.0000 |
| Y-1 | 2026-27 | 14.10 | 21.17 | 29.459 | 64.7290 | 0.97 | 0.00 | 0.00 | 0.9700 |
| Y-3 | 2028-29 | 28.26 | 33.74 | 72.257 | 134.2570 | 4.97 | 0.00 | 0.00 | 4.9700 |
| Y-5 | 2030-31 | 44.87 | 37.17 | 72.257 | 154.2970 | 7.11 | 0.00 | 6.06 | 13.1700 |
| Y-10 | 2034-35 | 103.32 | 52.00 | 72.257 | 227.5770 | 51.47 | 40.05 | 11.58 | 103.1000 |
| Y-15 | 2040-41 | 137.62 | 52.00 | 72.257 | 261.8770 | 85.13 | 52.00 | 11.58 | 148.7100 |
| Y-20 | 2045-46 | 171.92 | 52.00 | 72.257 | 296.1770 | 118.80 | 52.00 | 11.58 | 182.3800 |
| Y-25 | 2050-51 | 196.67 | 52.00 | 72.257 | 320.9270 | 146.56 | 52.00 | 11.58 | 210.1400 |
| Y-30 | 2055-56 | 211.12 | 52.00 | 72.257 | 335.3770 | 163.43 | 52.00 | 11.58 | 227.0100 |
| Y-34 | 2059-60 | 215.21 | 52.00 | 72.257 | 339.4670 | 163.43 | 52.00 | 11.58 | 227.0100 |
| Post Closure | | | | | | | | | |
| Y-39 | 2064-65 | 215.21 | 52.00 | 72.257 | 339.467 | 163.43 | 52.00 | 124.037 | 339.467 |

8.1.2 TentativeBiological Reclamation (Cumulative in "Ha")

| Year/Stage | | Biologically Reclaimed Area | | | | | Forest land (Return) | Un Disturbed/ To be left for Public/com Use | Total |
|---|---|---|---|---|---|---|---|---|---|
| (Life of the mine plus post closure period) | | Agriculture | Plantation | Water Body | Public/ Company Use | Total | | | |
| Up to Base year | 2026 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0000 | 0.00 | 0.00 | 0.0000 |
| Y-1 | 2026-27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0000 | 0.00 | 0.00 | 0.0000 |
| Y-3 | 2028-29 | 0.00 | 0.00 | 2.00 | 0.00 | 2.0000 | 0.00 | 0.00 | 2.0000 |
| Y-5 | 2030-31 | 0.00 | 6.059 | 5.680 | 0.000 | 11.7390 | 0.00 | 0.00 | 11.7390 |
| Y-10 | 2034-35 | 0.00 | 54.714 | 5.680 | 0.00 | 60.3940 | 0.00 | 0.00 | 60.3940 |
| Y-15 | 2040-41 | 0.00 | 85.00 | 5.68 | 5.52 | 96.2000 | 0.00 | 0.00 | 96.2000 |
| Y-20 | 2045-46 | 0.00 | 101.00 | 5.68 | 5.52 | 112.2000 | 0.00 | 0.00 | 112.2000 |
| Y-25 | 2050-51 | 0.00 | 110.00 | 5.68 | 5.52 | 121.2000 | 0.00 | 0.00 | 121.2000 |
| Y-30 | 2055-56 | 0.00 | 129.491 | 5.68 | 5.52 | 140.6910 | 0.00 | 0.00 | 140.6910 |
| Y-34 | 2059-60 | 0.00 | 129.491 | 5.68 | 5.52 | 140.6910 | 0.00 | 0.00 | 140.6910 |
| Post Closure | | | | | | | | | |
| Y-39 | 2064-65 | 0.00 | 129.491 | 57.460 | 5.52 | 192.471 | 146.996 | 0.00 | 339.467 |

| S.No | Parameters | Details |
|---|---|---|

| | | |
|---|---|---|
| 8.2 | Post Closure Water Quality management<br><br>(Existing water bodies available in the lease hold area; Measures to be taken for protection of the same including control of erosion, sedimentation, siltation, water. | A seasonal nala originates in the north central part of the block and is flowing from north to south in the eastern part of the block. This nala needs to be diverted and may be utilized as garland drain all along the quarry in the north and east .A safety zone of 45m from the diverted nala/garland drain has been kept as per Reg. 119 of CMR 2017. In addition, in view of flood protection from this nala (converted into garland drain of 5m wide) an adequate earthen embankment has been proposed to be constructed in the last ten years of mine operation along the nala/garland drain to prevent any possible inundation.The earthen embankment shall be made/designed at least 3m height in the top and 25m at the base, height not less than 1.5m of HFL all along the diversion length of 3679 m of nala as per Regulation 149(2) of CMR 2017.The said embankment shall be constructed under supervision of a civil engineer considered expert in this regard. Measures to be taken for protection of the same including control of erosion, sedimentation, siltation, water treatment, diversion of water course if any Nala needs to be diverted in the form of a suitable garland drain and is proposed to arrest the rainwater entering into the mine. Nala diversion is proposed at the originating point in the Northern part of block boundary maintaining 45m safety distance from the quarry boundary as per CMR (119). Diversion dams/bunding arrangement as part of water course diversions to prevent water entering into mine.Cross drainage structures where haul roads and access roads cross diversions Various inlet, outlet and erosion protection structures.The box cut is developed in such a manner so as to facilitate the proper drainage of water towards the sump Garland drain shall be developed in advance for each mine stage such that water is collected in these garland drains and discharged properly outside the pit.Working faces would be laid such that the water from the working areas will flow into the sump by gravity from where it would be pumped out to settling/sedimentation pond.From sedimentation pond/settling tank the overflown water shall be discharged to garland drains All along the external dump a suitable toe wall shall be constructed to arrest the fall of loose OB waste during rainy season. Slurry pumps shall be used to deal with the slurry formed during rainy season.Regular monitoring of water quality of mine discharges and ground water shall be done to observe any contamination of ground water.Additionally, there exists a number of ponds in the area. Care shall be taken so that no waste material from overflow from sedimentation pond or garland drain are admixed into the surface ponds.All measures shall be maintained to improve the quality of mine discharge water as per statute by provision of WETP, SETP and sludge cleaning in Settling Tank and by lime charging from time to time. |
| 8.3 | Post Closure Air Quality management. | Management of Air Quality during post closure of mineMine closure activities proposed for the project is oriented to Net Zero emission of the Govt of India. In addition to plantation development and biological and technical reclamation of degraded land, a Solar Park is envisaged in the reclaimed land. Floating Solar Park has also been envisaged for the final mine excavated area over reclaimed land. PPA and other formalities as per the requirement of Ministry of Power, MoEFCC with respect to Solar park shall be taken care of at the time of development of Solar Park. After cessation of mining and its related activities, there will be no effect on ambient air quality due to this project. All the proper mitigatory measures for air pollution control shall be taken in the mines so that there will be no effect on the ambient air quality. However, it is proposed that air quality and dust level is to be monitored at regular intervals. Necessary actions to check the air pollution from the closed mine in respect of air is to be taken after examining the local conditions then prevailing. |

8.4 Waste Management (Figures in MM3) (Tentative)

| Year/Stage (Life of the mine plus post closure period) | | OB Removal (Cumulative) | | | External Dump (Cumulative) | | Internal Backfilling (Cumulative) | | Embankment (Cumulative) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Top Soil | OB | Total | Top Soil | OB | Top Soil | OB | Top Soil | OB |
| Up to Base year | 2026 | 0.07 | 0.35 | 0.42 | 0.07 | 0.35 | 0.00 | 0.00 | 0.00 | 0.00 |
| Y-1 | 2026-27 | 0.22 | 1.85 | 2.07 | 0.22 | 1.33 | 0.00 | 0.52 | 0.00 | 0.00 |
| Y-3 | 2028-29 | 0.54 | 4.73 | 5.27 | 0.54 | 3.41 | 0.00 | 1.32 | 0.00 | 0.00 |
| Y-5 | 2030-31 | 1.03 | 7.52 | 8.55 | 0.54 | 5.71 | 0.49 | 1.81 | 0.00 | 0.00 |
| Y-10 | 2035-36 | 1.38 | 15.86 | 17.24 | 0.54 | 9.41 | 0.84 | 6.33 | 0.00 | 0.12 |
| Y-15 | 2034-35 | 1.72 | 27.24 | 28.96 | 0.54 | 9.41 | 1.18 | 17.71 | 0.00 | 0.12 |
| Y-20 | 2045-46 | 1.97 | 40.99 | 42.96 | 0.54 | 9.41 | 1.43 | 31.46 | 0.00 | 0.12 |
| Y-25 | 2050-51 | 2.00 | 56.71 | 58.71 | 0.54 | 9.41 | 1.46 | 47.18 | 0.00 | 0.12 |
| Y-30 | 2055-56 | 2.05 | 72.41 | 74.46 | 0.54 | 9.41 | 1.51 | 62.88 | 0.00 | 0.12 |
| Y-34 | 2059-60 | 2.15 | 84.91 | 87.06 | 0.54 | 9.41 | 1.61 | 75.38 | 0.00 | 0.12 |
| Post Closure | | | | | | | | | | |
| Y-39 | 2064-65 | 2.15 | 84.91 | 87.06 | 0.54 | 9.41 | 1.61 | 75.38 | 0.00 | 0.12 |

8.5 Top Soil Management – (Including Action plan for Top Soil management) (Tentative)

| Year/Stage (Life of the mine plus post closure period) | | Top Soil Removal Plan | Top Soil Used | | | | |
|---|---|---|---|---|---|---|---|
| | | | Spreading Over Embankment | Spreading Over Backfill area | Spreading Over External OB Dump area | Used in Green Belt area | Total Utilised |
| Up to Base year | 2026 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Y-1 | 2026-27 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Y-3 | 2028-29 | 0.54 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Y-5 | 2030-31 | 1.03 | 0.00 | 0.49 | 0.54 | 0.00 | 1.03 |
| Y-10 | 2035-36 | 1.38 | 0.00 | 0.84 | 0.54 | 0.00 | 1.38 |
| Y-15 | 2034-35 | 1.72 | 0.00 | 1.18 | 0.54 | 0.00 | 1.72 |
| Y-20 | 2045-46 | 1.97 | 0.00 | 1.43 | 0.54 | 0.00 | 1.97 |
| Y-25 | 2050-51 | 2.00 | 0.00 | 1.46 | 0.54 | 0.00 | 2.00 |
| | 2055-56 | 2.05 | 0.00 | | 0.54 | 0.00 | 2.05 |
| | 2059-60 | 2.15 | 0.00 | | 0.54 | 0.00 | 2.15 |

| Post Closure | | | | | | | |
|---|---|---|---|---|---|---|---|
| Y-39 | 2064-65 | 2.15 | 0.00 | 1.61 | 0.54 | 0.00 | 2.15 |

| S.No | Parameters | Details |
|---|---|---|
| 8.6 | Management of Coal Rejects. | Not Applicable |
| 8.7 | Restoration of Land used for Infrastructure. | Infrastructure to be retained and to be dismantled envisaging measures to be taken for their physical stability and maintenance for the retained infrastructure facilitiesMarkiMangli-II Coal mine shall develop lot of infrastructure for sustaining their mining operations. These include Workshop, CHP, Office Complex, Roads, Pipe lines and Transmission line, decommissioning of the infrastructure shall be planned in such a way that the land occupied by these infrastructure is released. Moreover, as the block area covers 146.996Ha of forest land which needs to be returned to forest authorities , most of the service structures are to be dismantled as under1. HEMM workshop2.E M workshop3.Project Store4.All Service Buildings5. Office , VTC, First Aid Centre6. Canteen, Rest Shelter etc7. Sub station8. CHP However, the following infrastructures are proposed to be retained for the public use for the neighboring common people in future.1. Garland Drain around dumps2. Diverted Nala and embankment after beautification3.Approach roads and connecting roads4.Settling tanksAll other service structures are to be dismantled. |
| 8.8 | Disposal of Mining Machinery. | The mine development and mining operation shall be done by engaging Mine Developer Operator (MDO). After the mine closure, all mining machinery shall be shifted to elsewhere by the mine developer. |
| 8.9 | Safety & Security. | After attaining the final stage dump, the remaining portion between dump toe and final stage Quarry floor should be fenced properly so that no human or stray animals should be trapped within as stipulated in CMR 108(6)2017. Internal dumps are proposed to be suitably re-graded to avoid deep trenches. Toe wall of all spoil dumps shall not be extended to any point within 100m of mine opening and public roads or building or other permanent structure not belonging to owner of mine as per CMR 108(5) 2017. |

8.10 Abandonment Cost and Financial Assurance.

8.10.1 Abandonment Cost: Cost of Activities to be taken up for closure of the mine

| Head | Activities | Unit | Quantity | Rate RS/Unit | Amount RS Cr |
|---|---|---|---|---|---|
| Progressive Closure | Water quality management | Ls | 34 | 150000 | 0.51 |
| | Air quality management | Ls | 34 | 300000 | 1.02 |
| | Waste Management | M CUM | 30 | 2500000 | 7.50 |
| | Barbed wire fencing around dump | m | 7165 | 250 | 1.79125 |
| | Barbed wire fencing around the pit | m | 7805 | 250 | 1.95125 |
| | Filling of Void - Rehanding of Crown dump | MM3 | | | |
| | Top Soil Management | MM3 | 2.1 | 1000000 | 0.21 |
| | Technical And Biological Reclamation of Mined out of land and OB Dump | Ha | 215 | 250000 | 5.375 |
| | Plantation over virgin area including green belt | Ha | 129.50 | 250000 | 3.2375 |
| | Manpower Cost and Supervision | Month | 1020 | 50000 | 5.10 |
| | Total wall around the dump | m | 7165 | 250 | 0.1791 |
| | Garland drain | m | 16482 | 300 | 0.4945 |
| | Garland drain around the dump | m | 7175 | 300 | 0.2153 |
| | Any other Activity | LS | | | 0.20 |
| | Any other Activity - 2 | | | | |
| | Any other Activity - 3 | | | | |
| | Any other Activity - 4 | | | | |
| | Any other Activity - 5 | | | | |
| Dismentaling of infrastrucure & Disposal/ rehabilitation of mining Machinery | Dismentaling of workshop | Ls | | | 0.15 |
| | Rehabilitation of the dismentaled fascilities | Ls | 0.00 | | 0.10 |
| | Dismentaling of pump and pipes/ other fascilities. | Ls | 0.00 | | 0.15 |
| | Dismentaling of stowing bunker, provisioning of pumps for borewell pumping arrangement. | Ls | 0.00 | | 0.00 |
| | Dismentaling of UG equipment | Ls | | | 0.0 |

| | | | | | |
|---|---|---|---|---|---|
| | Rearranging water pipeline to dump top park/Agriculture land | Ls | | | 0.10 |
| | Dismentaling of power lines. | Ls | | | 0.15 |
| | Any other Activity | LS | | | 0.10 |
| Safety and Security | Barbed wire fencing around dump | Ls | | | 0.35 |
| | Barbed wire fencing around the pit | m | 0.00 | 0.00 | 0.35 |
| | Barbed wire fencing with Masonalry piller | Ls | 0.00 | | 0.50 |
| | Concrete wall with Masonalry pillers around the pit | m | 7500 | 1000 | 0.75 |
| | Securing air shaft and installation of borewall pump | Ls | | | 0.00 |
| | Securing of incline | Cr | | | 0.00 |
| | Concrete wall fencing around the water body | m | 7500 | 1000 | 0.750 |
| | Boundary wall around the water body | m | | | 0.00 |
| | Stabilisation (viz benching, pitching etc) of side walls of the water body | Ls | | | 0.40 |
| | Toe wall around the dump | Ls | | | 0.30 |
| | Garland Drain | Ls | 0.00 | 0.00 | 0.25 |
| | Garland Drain around the dump | Ls | | | 0.00 |
| | Drainage channel from main Ob dump | Ls | | | 0.00 |
| | Any other Activity | | | | 0.00 |
| Technical and Biological Reclamation of mined out of land and OB Dump | Filling of Void | Ha | | | 0.50 |
| | Top soil management | MM3 | 2.1 | 7000000 | 1.505 |
| | OB Rehandling for backfilling | MM3 | 9.41 | 5000000 | 4.705 |
| | Terracing, blanketing with soil and vegetation of External OB Dump | Ha | 52 | 250000 | 1.30 |
| | Paripharel road, gates, view point, cemented steps on bank | Cr | | | 1.0 |
| | Expenditure on development of Agriculture land | Ha | 140 | 600000 | 8.40 |
| | Landscaping and Plantation | Ls | | | 0.75 |
| | Any other Activity | | | | 0.00 |
| Post Closure management and supervision | Power Cost | Ls | 5 | 200000 | 0.10 |
| | Post mining water quality management | Ls | 5 | 75000 | 0.0375 |
| | Post mining air quality management | Ls | 5 | 100000 | 0.050 |
| | Subsidence monitoring for 5 years | Ls | 5 | 660000 | 0.33 |
| | Waste management | Ls | 50 | 2500000 | 12.50 |
| | Manpower Cost and supervision | Ls | 350 | 60000 | 2.10 |
| | Manpower Cost and supervision | Misc | | | 1.50 |
| | Any other Activity - 2 | | | | |
| Others | Enterprenuership development(vocational/skil l development training for sustainable income of affected people) | LS | | | 2.5 |
| | Golden Handshake/Retrenchment benefits to 100 employees of OC | LS | | | 2.5 |
| | Golden Handshake/Retrenchment benefits to 200 employees of UG | Cr | | | 0.00 |
| | Onetime financial grant to societies/ institutions/ organisations which is dependent upon the project | Ls | | | 1.75 |
| | Provide Jobs in other mines of company | LS | | | 1.5 |

| | | | | | |
|---|---|---|---|---|---|
| | Continuation of other services like running of school etc. | LS | | | 2.25 |
| | Any other Activity | Miscellaneous | | | 2.5 |
| Total | | | | | 79.98 |

8.10.2 Financial Assurance : Amount to be deposited in Escrow account as a security against the mine activities to be carried out for the closure of the mine

| | | |
|---|---|---|
| WPI as on | Apr-19 | 121.10 |
| WPI as on base date | July2022 provn. | 153.80 |
| Escalation rate of Closure cost | | 1.27 |
| | UG | OC |
| Base Cost "Rs. Crs/Ha | 0 | 0.09 |
| Closure Cost "Rs. Crs/Ha" | 0 | 0.114 |
| Project Area "Ha" | 0 | 339.467 |
| Amount to be depostied into Escrow Account "Rs. in Crs | 0 | 38.699 |
| Amount already deposited into Escrow Account "Rs. in Crs | 0 | 0 |
| Net Amount to be depositied into Escrow Account "Rs. in Crs | 0 | 38.699 |
| Rate of componding of Annual Closure Cost | | 5.00% |
| Balance Life of the project "in Yrs | 0 | 34 |
| Annual Closure Cost "Rs. in Crs" | 0 | 1.138 |
| Amount to be deposited into Escrow Account after compounding @ of 5% "Rs. in Crs" | | 96.804 |

Amount to be deposited into Escrow

| Year | OC | Year | UG | Total |
|---|---|---|---|---|
| 1 | 1.138 | | | 1.138 |
| 2 | 1.195 | | | 1.195 |
| 3 | 1.255 | | | 1.255 |
| 4 | 1.317 | | | 1.317 |
| 5 | 1.383 | | | 1.383 |
| 6 | 1.452 | | | 1.452 |
| 7 | 1.525 | | | 1.525 |
| 8 | 1.601 | | | 1.601 |
| 9 | 1.681 | | | 1.681 |
| 10 | 1.765 | | | 1.765 |
| 11 | 1.854 | | | 1.854 |
| 12 | 1.946 | | | 1.946 |
| 13 | 2.044 | | | 2.044 |
| 14 | 2.146 | | | 2.146 |
| 15 | 2.253 | | | 2.253 |
| 16 | 2.366 | | | 2.366 |
| 17 | 2.484 | | | 2.484 |
| 18 | 2.608 | | | 2.608 |
| 19 | 2.739 | | | 2.739 |
| 20 | 2.876 | | | 2.876 |
| 21 | 3.019 | | | 3.019 |
| 22 | 3.17 | | | 3.17 |
| 23 | 3.329 | | | 3.329 |
| 24 | 3.495 | | | 3.495 |
| 25 | 3.67 | | | 3.67 |
| 26 | 3.854 | | | 3.854 |
| 27 | 4.046 | | | 4.046 |
| 28 | 4.249 | | | 4.249 |
| 29 | 4.461 | | | 4.461 |
| 30 | 4.684 | | | 4.684 |
| 31 | 4.918 | | | 4.918 |
| 32 | 5.164 | | | 5.164 |
| 33 | 5.423 | | | 5.423 |
| 34 | 5.694 | | | 5.694 |
| Total | 96.804 | | 0.000 | 96.804 |

# Annexures

## Annexure 1A1

**GOVERNMENT OF INDIA**

**MINISTRY OF COAL**

**OFFICE OF THE NOMINATED AUTHORITY**

**(Constituted under Section 6 of The Coal Mines (Special Provisions) Act, 2015)**

Shastri Bhawan, New Delhi

**VESTING ORDER**

**(under clause (b) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13 of the Coal Mines (Special Provisions) Rules 2014 read with clause (b) of sub-section (3) of Section 6 and sub-section (3) of Section 8 of the Coal Mines (Special Provisions) Act, 2015)**

| | |
|---|---|
| In re: | **Marki Mangli II Coal Mine** (the "mine") particulars of which is specified in **Annexure 1** |
| Order no.: | NA-104/3/2020-NA |
| Date: | March 03, 2021 |
| In favour of: | **Yazdani International Private Limited,** incorporated in India under the Companies Act, 1956 with corporate identity number U13209OR2006PTC009009, whose registered office and principal place of business is at 7th Floor, C-Wing, Fortune Towers, Chandrasekharpur, Bhubaneswar, Odisha 751023, India(the "successful bidder") |
| For the purpose of: | Sale of coal, including sale to Affiliates and related parties, utilisation of coal for any purpose including but not limited to captive consumption, Coal Gasification, Coal Liquefaction and export of coal. |

WHEREAS, the nominated authority has, in accordance with provisions of the Coal Mines (Special Provisions) Act, 2015 (the "Act") and the Coal Mines (Special Provisions) Rules 2014 (the "Rules") conducted the auction of the mine;

AND WHEREAS the successful bidder is eligible to receive this vesting order with respect to the mine including, inter-alia, -

(a) the coal bearing land acquired by the prior allottee and the lands, in or adjacent to the coal mines used for coal mining operations acquired by the prior allottee; and

(b) any existing mine infrastructure as defined in clause (j) of sub-section (1) of section 3 of the Act;

AND WHEREAS the successful bidder has furnished a performance bank guarantee dated February 18, 2021 for an amount equal to INR 20,17,06,066.40 (Indian Rupees Twenty Crore Seventeen Lakh Six Thousand Sixty Six and Forty Paise) issued by Punjab National Bank in accordance with the tender document and in accordance with the provisions of sub-section (6) of section 8 of the Act and sub-rule (4) of rule 13 of the rules.

AND WHEREAS the successful bidder has entered into a Coal Mine Development and Production Agreement dated January 11, 2021("CMDPA") (as amended) with the nominated authority in accordance with the provisions of sub-rule (5) of rule 13.

NOW, THE NOMINATED AUTHORITY DOES ORDER:

1. On and from March 03, 2021 ("vesting date") and in accordance with the provisions of sub-section (4) of section 8 of the Act, with respect to the mine, the following shall stand fully and absolutely transferred and vested in the successful bidder, namely: -

(a) all the rights, title and interest of the prior allottee in and over the land and mine infrastructure free from all encumbrances;

(b) entitlement to a prospecting license, mining lease or prospecting license-cum-mining lease to be granted by the State Government with the terms and conditions of CMDPA forming a part of it on making an application;

(c) all statutory licences, permits, permissions, approvals or consents as per rules, required to undertake coal mining operations in the mine, if already issued by the Central Government, to the prior allottee on the same terms and conditions as were applicable to the prior allottee, as listed in the **Annexure 2**;

(d) entitlement to any statutory licence, permit, permission, approval or consent required to undertake coal mining operations in the mine, if already issued by the Central Government, to the prior allottee on making an application on the same terms and conditions as were applicable to the prior allottee, as listed in the **Annexure 3**;

(e) entitlement to any statutory licence, permit, permission, approval or consent required to undertake coal mining operations in the mine, if already issued by the State Government, to

the prior allottee on making an application on the same terms and conditions as were applicable to the prior allottee, as listed in the **Annexure 4;**

(f) rights appurtenant to the approved mining plan of the prior allottee;

(g) any subsisting contract in relation to coal mining operations, to which the prior allottee was a party and which is assumed, adopted and continued by the successful bidder and listed in the **Annexure 5** shall stand novated (by virtue of a deemed consent from the relevant party(ies)), in accordance with the provisions of sub-section (1) of section 11 of the Act in favour of the successful bidder for the residual term or residual performance of such contract;

2. The successful bidder may seek any change in the terms and conditions attached to such licence, permit, permission, approval or consent by making an application in accordance with applicable laws;

3. Hereinafter, the successful bidder shall be entitled to take possession of the mine as specified in **Annexure 1** without let or hindrance;

4. This vesting order is liable to be cancelled in accordance with the provisions of sub-rule (6) of rule 13.

.....

**(By the nominated authority)**

**Annexures:**

**Annexure 1: Particulars of the mine**

Part A – Description of the mine

| Name of Coal Mine | Markí Mangli-II |
|---|---|
| Coal Field | Wardha Valley |
| Latitude | 19°49'2"N to 19°50'31"N (Provisional) |
| Longitude | 78°48'56"E to 78°50'32"E (Provisional) |
| Villages | Ruikot, Savli |
| Tehsil/ Taluka | Jhari-Jamni |
| District | Yavatmal |
| State | Maharashtra |

Part B – Description of Land in relation to the mine

| Sl | Mouza | Survey No | Area as in deed (hectares) | Deed No | Date of agreement |
|---|---|---|---|---|---|
| | 1. Sale Deeds of Land within ML Area of MM-II | | | | |
| 1 | Ruikot | 5/1 | 2.680 | 193/2013 | 16-03-2013 |
| 2 | Ruikot | 5/2 | 1.340 | 78/2013 | 14-02-2013 |
| 3 | Ruikot | 9/1 | 3.100 | 108/2013 | 08-06-2012 |
| 4 | Ruikot | 9/1 | 1.240 | 780/2009 | 30-11-2009 |
| 5 | Ruikot | 9/2 | 2.850 | 781/2009 | 30-11-2009 |
| 6 | Ruikot | 28/3 | 1.510 | 474/2008 | 23-09-2005 |
| 7 | Ruikot | 28/3 | 1.210 | 475/2008 | 23-09-2008 |
| 8 | Ruikot | 28/3 | 1.210 | 476/2008 | 23-09-2008 |
| 9 | Ruikot | 56/1 | 1.620 | 692/2013 | 01-10-2013 |
| 10 | Ruikot | 60/1 | 2.460 | 290/2008 | 26-05-2008 |
| 11 | Ruikot | 60/2 | 1.250 | 382/2013 | 17-05-2013 |
| 12 | Ruikot | 60/3 | 1.230 | 291/2013 | 23-04-2013 |
| 13 | Ruikot | 60/4 | 1.230 | 289/2013 | 23-04-2013 |
| 14 | Ruikot | 61/2 | 1.620 | 748/2010 | 27-10-2010 |
| 15 | Ruikot | 61/2 | 1.620 | 747/2010 | 27-10-2010 |
| 16 | Ruikot | 61/3 | 2.030 | 156/2010 | 25-02-2010 |
| 17 | Ruikot | 61/3 | 2.020 | 155/2010 | 25-02-2010 |
| 18 | Ruikot | 61/4-A | 2.330 | 693/2013 | 01-10-2013 |
| 19 | Ruikot | 61/4-B | 2.320 | 261/2013 | 09-04-2013 |
| 20 | Ruikot | 63 | 1.820 | 585/2012 | 26-07-2012 |
| 21 | Ruikot | 64/1 | 1.630 | 538/2008 | 12-11-2008 |
| 22 | Ruikot | 64/1 | 1.630 | 537/2008 | 12-11-2008 |
| 23 | Ruikot | 64/2 | 1.610 | 195/2009 | 26-03-2009 |
| 24 | Ruikot | 65/2 | 2.810 | 536/2008 | 26-03-2008 |
| | 2. Sale Deeds of Land outside ML Area of MM-II | | | | |
| 25 | Ruikot | 10/1 | 2.480 | 94/2014 | 05-02-2014 |

| Sl | Mouza | Survey No | Area as in deed (hectares) | Deed No | Date of agreement |
|---|---|---|---|---|---|
| 26 | Ruikot | 10/1-B | 1.240 | 217/2014 | 12-03-2014 |
| 27 | Ruikot | 10/2-A | 1.250 | 98/2014 | 06-02-2014 |
| 28 | Ruikot | 11/1 | 2.770 | 631/2009 | 02-09-2009 |
| 29 | Ruikot | 13/1 | 2.020 | 573/2009 | 29-07-2009 |
| 30 | Ruikot | 13/2 | 2.020 | 514/2009 | 03-06-2009 |
| 31 | Ruikot | 13/3-A | 1.760 | 99/2014 | 06-02-2014 |
| 32 | Ruikot | 20/2 | 1.210 | 689/2014 | 09-12-2014 |
| | 3. Agreement to Purchase - within ML Area of MM-II | | | | |
| 33 | Ruikot | 3 | 5.990 | Agreement to purchase | 09-04-2009 |
| 34 | Ruikot | 5/2 | 1.340 | Agreement to purchase | 27-11-2011 |
| 35 | Ruikot | 28 | 1.250 | Agreement to purchase | 05-01-2011 |
| 36 | Ruikot | 28 | 1.250 | Agreement to purchase | 05-01-2011 |
| 37 | Ruikot | 28 | 1.250 | Agreement to purchase | 05-01-2011 |
| 38 | Ruikot | 28 | 1.900 | Agreement to purchase | 05-01-2011 |
| 39 | Ruikot | 28 | 1.900 | Agreement to purchase | 05-01-2011 |
| 40 | Ruikot | 32 | 7.000 | Agreement to purchase | 15-07-2009 |
| 41 | Ruikot | 64/3 | 1.610 | Agreement to purchase | 22-07-2011 |
| | 4. Agreement to Purchase - outside ML Area of MM-II | | | | |
| 42 | Ruikot | 10/1-A | 1.240 | Agreement to purchase | 06-03-2014 |
| 43 | Ruikot | 10/2-K | 1.500 | Agreement to purchase | 13-05-2014 |
| 44 | Ruikot | 10/2-B | 1.500 | Agreement to purchase | 13-05-2014 |
| 45 | Ruikot | 10/2 | 1.500 | Agreement to purchase | 13-05-2014 |
| 46 | Ruikot | 14/1-B | 2.020 | Agreement to purchase | 29-12-2012 |
| 47 | Ruikot | 14/1-K | 2.020 | Agreement to purchase | 28-12-2012 |
| 48 | Ruikot | 20/1 | 2.770 | Agreement to purchase | 29-12-2012 |
| 49 | Ruikot | 20/1-A | 1.620 | Agreement to purchase | 28-12-2012 |
| 50 | Ruikot | 23/2 | 1.260 | Agreement to purchase | 29-12-2012 |
| 51 | Ruikot | 23/3 | 1.260 | Agreement to purchase | 29-12-2012 |
| 52 | Ruikot | 23/1-A | 1.310 | Agreement to purchase | 28-12-2012 |
| | | | **100.61** | | |

Part C – Description of Mine Infrastructure in relation to the mine

**C1- Mine Infrastructure: Immovable Assets**

| S. No. | Head of Assets | Description (Nature of Assets) |
|---|---|---|
| 1. | Buildings, Approach & Internal Roads | Approach & Internal Roads |
| 2. | Buildings, Approach & Internal Roads | Approach & Internal Road (Hume Pipes) |
| 3. | Buildings, Approach & Internal Roads | Fencing |
| 4. | Buildings, Approach & Internal Roads | Access Trench |
| 5. | Buildings, Approach & Internal Roads | Security Check Post |
| 6. | Electrical Installation | High Mast Towers - 2 nos. – 10 metres height each |

**Annexure 2: Particulars of statutory licences, permits, permissions, approvals or consents issued by the Central Government which are being transferred along with this vesting order.**

| S. No | Statutory Clearance | Ministry/ Agency | Letter No. | Date |
|---|---|---|---|---|
| 1. | Approval of Mining Plan and Mine Closure Plan | Ministry of Coal | 13016/9/2004-CA-I | 31.01.2008 /05.02.2008 |
| 2. | Mining Lease – Administrative Approval of the Central Government under Section 5 (1) and/ or Section 6 (1) of MMDR Act, 1957 | Ministry of Coal | 13016/9/2004-CA-I (Vol-III) | 16.12.2009 |

**Annexure 3: Particulars of statutory licences, permits, permissions, approvals or consents issued by the Central Government to be obtained on application by the successful bidder.**

| S. No | Statutory Clearance | Ministry/ Agency | Letter No. | Date |
|---|---|---|---|---|
| 1. | Environment Clearance | Ministry of Environment and Forests | J-11015/425/2007-IA.II (M) | 27.01.2011 |
| 2. | Mine opening permission | Ministry of Coal – CCO | CC/Tech/Open. Perm/Marki Mangli II OC/ '11-'12 | 28.11.2011 |
| 3. | Permission from DGMS for Mine Opening | Ministry of Labour – DGMS | Kshetra Sankhya - II/010980/C/B/08/ 2013 /730 | 24.05.2013 |

**Annexure 4: Particulars of statutory licences, permits, permissions, approvals or consents issued by the State Government to be obtained on application by the successful bidder.**

| S. No | Statutory Clearance | Ministry/ Agency | Letter No. | Date |
|---|---|---|---|---|
| 1. | Consent to Operate | State Pollution Control Board | BO/RO (P&P)/EIC No. CH-0166-09/E/CC-444 | 24.11.2009 |
| 2. | Grant of Mining Lease | Government of Maharashtra | MMN-1008/C.R.2431/IND-9 | 04.03.2010 |
| 3. | Land Ownership - Permission to purchase Agriculture Land for Mining Operation was granted by State Government under Mumbai Tenancy and Agriculture Land (BTAL) Act, 1958 for combined for Marki Mangli – II, III & IV Coal Blocks. Land purchased through Sale Deed by direct negotiation with land owners | Government of Maharashtra | DI/Land/Permission/68(2011)/2012/C-6069 | 06.07.2012 |

**Annexure 5: Particulars of the contracts adopted by the successful bidder**

The Successful Bidder does not intend to adopt and continue with any of the contracts of the Prior Allottee.

# Annexure 2A

| BOUNDARY AS PER VESTING ORDER | | | | |
|---|---|---|---|---|
| Pints | Longitude (WGS84) | Latitude (WGS84) | | |
| A | 78°48'56.00"E | 19°49'2.00"N | | |
| B | 78°48'56.00"E | 19°50'31.00"N | | |
| C | 78°50'32.00"E | 19°50'31.00"N | | |
| D | 78°50'32.00"E | 19°49'2.00"N | | |
| Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Logitude | WGS84 Latitude |
| BP-1/162 | 273706.215 | 2192707.681 | 78°50'22.44158"E | 19°49'02.17812"N |
| BP-2/162 | 273660.051 | 2192724.839 | 78°50'20.84824"E | 19°49'02.71673"N |
| BP-3/162 | 273611.751 | 2192744.383 | 78°50'19.18051"E | 19°49'03.33199"N |
| BP-4/162 | 273565.021 | 2192761.236 | 78°50'17.56788"E | 19°49'03.86044"N |
| BP-5/162 | 273518.435 | 2192776.921 | 78°50'15.96069"E | 19°49'04.35098"N |
| BP-6/162 | 273470.566 | 2192794.247 | 78°50'14.30872"E | 19°49'04.89431"N |
| BP-7/162 | 273423.363 | 2192809.764 | 78°50'12.68041"E | 19°49'05.37911"N |
| BP-8/162 | 273383.286 | 2192825.094 | 78°50'11.29696"E | 19°49'05.86080"N |
| BP-9/162 | 273336.612 | 2192840.173 | 78°50'09.68702"E | 19°49'06.33155"N |
| BP-10/162 | 273293.712 | 2192866.474 | 78°50'08.20180"E | 19°49'07.16873"N |
| BP-11/162 | 273251.331 | 2192891.986 | 78°50'06.73473"E | 19°49'07.98046"N |
| BP-12/162 | 273209.881 | 2192918.72 | 78°50'05.29908"E | 19°49'08.83228"N |
| BP-13/162 | 273164.323 | 2192944.904 | 78°50'03.72256"E | 19°49'09.66452"N |
| BP-14/162 | 273122.764 | 2192972.302 | 78°50'02.28290"E | 19°49'10.53789"N |
| BP-15/162 | 273082.092 | 2192998.605 | 78°50'00.87418"E | 19°49'11.37602"N |
| BP-16/162 | 273040.179 | 2193024.738 | 78°49'59.42288"E | 19°49'12.20811"N |
| BP-17/162 | 272998.019 | 2193051.894 | 78°49'57.96266"E | 19°49'13.07335"N |
| BP-18/162 | 272948.875 | 2193082.355 | 78°49'56.26104"E | 19°49'14.04311"N |
| BP-19/162 | 272909.501 | 2193113.618 | 78°49'54.89470"E | 19°49'15.04303"N |
| BP-20/162 | 272870.919 | 2193143.539 | 78°49'53.55614"E | 19°49'15.99963"N |
| BP-21/162 | 272831.044 | 2193174.573 | 78°49'52.17269"E | 19°49'16.99190"N |
| BP-22/162 | 272791.756 | 2193205.872 | 78°49'50.80926"E | 19°49'17.99298"N |
| BP-23/162 | 272751.461 | 2193235.75 | 78°49'49.41188"E | 19°49'18.94747"N |
| BP-24/162 | 272711.861 | 2193268.14 | 78°49'48.03724"E | 19°49'19.98392"N |
| BP-25/162 | 272666.698 | 2193301.789 | 78°49'46.47097"E | 19°49'21.05896"N |
| BP-26/162 | 272633.913 | 2193327.705 | 78°49'45.33330"E | 19°49'21.88776"N |
| BP-27/162 | 272593.376 | 2193358.18 | 78°49'43.92729"E | 19°49'22.86153"N |
| BP-28/162 | 272536.523 | 2193404.353 | 78°49'41.95390"E | 19°49'24.33881"N |
| BP-29/162 | 272494.814 | 2193432.293 | 78°49'40.50876"E | 19°49'25.22968"N |
| BP-30/162 | 272452.87 | 2193459.469 | 78°49'39.05586"E | 19°49'26.09563"N |
| BP-31/162 | 272411.156 | 2193486.888 | 78°49'37.61077"E | 19°49'26.96956"N |
| BP-32/162 | 272370.288 | 2193513.496 | 78°49'36.19510"E | 19°49'27.81745"N |
| BP-33/162 | 272328.923 | 2193541.158 | 78°49'34.76190"E | 19°49'28.69941"N |
| BP-34/162 | 272286.844 | 2193567.85 | 78°49'33.30458"E | 19°49'29.54954"N |
| BP-35/162 | 272244.794 | 2193596.255 | 78°49'31.84750"E | 19°49'30.45537"N |
| BP-36/162 | 272204.089 | 2193623.62 | 78°49'30.43705"E | 19°49'31.32794"N |
| BP-37/162 | 272159.626 | 2193652.263 | 78°49'28.89699"E | 19°49'32.24046"N |
| BP-38/162 | 272117.881 | 2193679.972 | 78°49'27.45068"E | 19°49'33.12378"N |
| BP-39/162 | 272075.732 | 2193707.952 | 78°49'25.99036"E | 19°49'34.01573"N |
| BP-40/162 | 272035.139 | 2193736.512 | 78°49'24.58323"E | 19°49'34.92717"N |
| BP-41/162 | 271995.424 | 2193761.257 | 78°49'23.20797"E | 19°49'35.71496"N |
| BP-42/162 | 271953.389 | 2193786.593 | 78°49'21.75272"E | 19°49'36.52100"N |
| BP-43/162 | 271912.557 | 2193814.154 | 78°49'20.33783"E | 19°49'37.39987"N |
| BP-44/162 | 271869.646 | 2193841.065 | 78°49'18.85180"E | 19°49'38.25672"N |
| BP-45/162 | 271827.238 | 2193869.686 | 78°49'17.38226"E | 19°49'39.16938"N |
| BP-46/162 | 271782.483 | 2193896.986 | 78°49'15.83269"E | 19°49'40.03811"N |
| BP-47/162 | 271743.055 | 2193923.541 | 78°49'14.46645"E | 19°49'40.88482"N |
| BP-48/162 | 271700.963 | 2193955.668 | 78°49'13.00624"E | 19°49'41.91160"N |
| BP-49/162 | 271660.036 | 2193982.054 | 78°49'11.58855"E | 19°49'42.75220"N |
| BP-50/162 | 271625.579 | 2194003.542 | 78°49'10.39532"E | 19°49'43.43629"N |
| BP-51/162 | 271584.988 | 2194032.628 | 78°49'08.98799"E | 19°49'44.36478"N |
| BP-52/162 | 271546.445 | 2194059.606 | 78°49'07.65194"E | 19°49'45.22563"N |
| BP-53/162 | 271505.696 | 2194088.141 | 78°49'06.23943"E | 19°49'46.13618"N |
| BP-54/162 | 271463.512 | 2194118.653 | 78°49'04.77672"E | 19°49'47.11034"N |
| BP-55/162 | 271424.912 | 2194145.807 | 78°49'03.43862"E | 19°49'47.97688"N |
| BP-56/162 | 271383.677 | 2194175.271 | 78°49'02.00897"E | 19°49'48.91739"N |
| BP-57/162 | 271343.065 | 2194203.443 | 78°49'00.60130"E | 19°49'49.81616"N |
| BP-58/162 | 271301.847 | 2194233.4 | 78°48'59.17200"E | 19°49'50.77366"N |



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| BOUNDARY AS PER VESTING ORDER | | | | |
|---|---|---|---|---|
| BP-59/162 | 271260.882 | 2194261.276 | 78°48'57.75234"E | 19°49'51.66171"N |
| BP-60/162 | 271228.144 | 2194286.223 | 78°48'56.61658"E | 19°49'52.45892"N |
| BP-61/162 | 271261.887 | 2194323.088 | 78°48'57.75941"E | 19°49'53.67155"N |
| BP-62/162 | 271295.037 | 2194361.296 | 78°48'58.88125"E | 19°49'54.92761"N |
| BP-63/162 | 271328.416 | 2194398.594 | 78°49'00.01134"E | 19°49'56.15417"N |
| BP-64/162 | 271354.419 | 2194429.034 | 78°49'00.89113"E | 19°49'57.15467"N |
| BP-65/162 | 271372.097 | 2194449.556 | 78°49'01.48934"E | 19°49'57.82924"N |
| BP-66/162 | 271394.921 | 2194493.321 | 78°49'02.25396"E | 19°49'59.26160"N |
| BP-67/162 | 271415.174 | 2194532.935 | 78°49'02.93216"E | 19°50'00.55791"N |
| BP-68/162 | 271433.105 | 2194588.772 | 78°49'03.52336"E | 19°50'02.38068"N |
| BP-69/162 | 271437.094 | 2194621.77 | 78°49'03.64572"E | 19°50'03.45508"N |
| BP-70/162 | 271441.471 | 2194673.504 | 78°49'03.77311"E | 19°50'05.13874"N |
| BP-71/162 | 271425.739 | 2194720.127 | 78°49'03.21194"E | 19°50'06.64777"N |
| BP-72/162 | 271418.967 | 2194744.602 | 78°49'02.96841"E | 19°50'07.44058"N |
| BP-73/162 | 271398.418 | 2194823.372 | 78°49'02.22749"E | 19°50'09.99267"N |
| BP-74/162 | 271418.059 | 2194898.389 | 78°49'02.86890"E | 19°50'12.43967"N |
| BP-75/162 | 271452.292 | 2194949.899 | 78°49'04.02208"E | 19°50'14.12858"N |
| BP-76/162 | 271486.557 | 2194973.557 | 78°49'05.18893"E | 19°50'14.91012"N |
| BP-77/162 | 271512.908 | 2194980.777 | 78°49'06.09083"E | 19°50'15.15788"N |
| BP-78/162 | 271562.077 | 2194995.672 | 78°49'07.77360"E | 19°50'15.66080"N |
| BP-79/162 | 271635.681 | 2195008.109 | 78°49'10.29653"E | 19°50'16.09799"N |
| BP-80/162 | 271681.352 | 2195026.153 | 78°49'11.85776"E | 19°50'16.70181"N |
| BP-81/162 | 271758.801 | 2195050.674 | 78°49'14.50747"E | 19°50'17.53346"N |
| BP-82/162 | 271808.801 | 2195061.677 | 78°49'16.22052"E | 19°50'17.91017"N |
| BP-83/162 | 271858.245 | 2195070.435 | 78°49'17.91529"E | 19°50'18.21564"N |
| BP-84/162 | 271909.643 | 2195079.54 | 78°49'19.67704"E | 19°50'18.53320"N |
| BP-85/162 | 271961.817 | 2195086.544 | 78°49'21.46621"E | 19°50'18.78474"N |
| BP-86/162 | 271986.141 | 2195132.045 | 78°49'22.28188"E | 19°50'20.27218"N |
| BP-87/162 | 272012.381 | 2195176.503 | 78°49'23.16345"E | 19°50'21.73044"N |
| BP-88/162 | 272038.27 | 2195212.082 | 78°49'24.03731"E | 19°50'22.89597"N |
| BP-89/162 | 272074.46 | 2195259.354 | 78°49'25.25949"E | 19°50'24.44989"N |
| BP-90/162 | 272082.39 | 2195308.838 | 78°49'25.51021"E | 19°50'26.05991"N |
| BP-91/162 | 272087.407 | 2195355.477 | 78°49'25.66172"E | 19°50'27.58018"N |
| BP-92/162 | 272105.515 | 2195405.686 | 78°49'26.26177"E | 19°50'29.21805"N |
| BP-93/162 | 272122.325 | 2195454.991 | 78°49'26.81726"E | 19°50'30.82991"N |
| BP-94/162 | 272143.587 | 2195441.912 | 78°49'27.55353"E | 19°50'30.41364"N |
| BP-95/162 | 272181.955 | 2195411.855 | 78°49'28.88520"E | 19°50'29.45064"N |
| BP-96/162 | 272218.113 | 2195376.993 | 78°49'30.14270"E | 19°50'28.33444"N |
| BP-97/162 | 272254.78 | 2195343.61 | 78°49'31.41722"E | 19°50'27.26454"N |
| BP-98/162 | 272307.13 | 2195299.082 | 78°49'33.23545"E | 19°50'25.83891"N |
| BP-99/162 | 272341.521 | 2195264.673 | 78°49'34.43222"E | 19°50'24.73469"N |
| BP-100/162 | 272374.695 | 2195231.535 | 78°49'35.58659"E | 19°50'23.67131"N |
| BP-101/162 | 272413.125 | 2195194.302 | 78°49'36.92334"E | 19°50'22.47700"N |
| BP-102/162 | 272447.539 | 2195162.573 | 78°49'38.11969"E | 19°50'21.45990"N |
| BP-103/162 | 272482.577 | 2195127.763 | 78°49'39.33885"E | 19°50'20.34293"N |
| BP-104/162 | 272504.744 | 2195105.4 | 78°49'40.11029"E | 19°50'19.62522"N |
| BP-105/162 | 272543.477 | 2195073.578 | 78°49'41.45504"E | 19°50'18.60692"N |
| BP-106/162 | 272583.167 | 2195040.494 | 78°49'42.83323"E | 19°50'17.54799"N |
| BP-107/162 | 272621.007 | 2195008.885 | 78°49'44.14722"E | 19°50'16.53622"N |
| BP-108/162 | 272659.501 | 2194976.812 | 78°49'45.48386"E | 19°50'15.50965"N |
| BP-109/162 | 272699.285 | 2194944.619 | 78°49'46.86487"E | 19°50'14.47971"N |
| BP-110/162 | 272739.624 | 2194909.857 | 78°49'48.26606"E | 19°50'13.36649"N |
| BP-111/162 | 272777.199 | 2194878.421 | 78°49'49.57085"E | 19°50'12.36023"N |
| BP-112/162 | 272815.412 | 2194847.602 | 78°49'50.89725"E | 19°50'11.37433"N |
| BP-113/162 | 272853.948 | 2194815.773 | 78°49'52.23522"E | 19°50'10.35569"N |
| BP-114/162 | 272892.453 | 2194785.558 | 78°49'53.57138"E | 19°50'09.38951"N |
| BP-115/162 | 272938.553 | 2194749.195 | 78°49'55.17122"E | 19°50'08.22662"N |
| BP-116/162 | 272965.357 | 2194724.306 | 78°49'56.10302"E | 19°50'07.42868"N |
| BP-117/162 | 272991.98 | 2194702.723 | 78°49'57.02719"E | 19°50'06.73814"N |
| BP-118/162 | 273020.522 | 2194658.359 | 78°49'58.02731"E | 19°50'05.30781"N |
| BP-119/162 | 273047.82 | 2194618.203 | 78°49'58.98282"E | 19°50'04.01377"N |
| BP-120/162 | 273077.207 | 2194577.388 | 78°50'00.01041"E | 19°50'02.69917"N |
| BP-121/162 | 273105.869 | 2194535.716 | 78°50'01.01347"E | 19°50'01.35641"N |
| BP-122/162 | 273134.477 | 2194493.281 | 78°50'02.01498"E | 19°49'59.98879"N |
| BP-123/162 | 273174.585 | 2194435.891 | 78°50'03.41815"E | 19°49'58.13983"N |
| BP-124/162 | 273205.086 | 2194397.316 | 78°50'04.48300"E | 19°49'56.89850"N |
| 25/162 | 273236.463 | 2194358.4 | 78°50'05.57807"E | 19°49'55.64762"N |
| 26/162 | 273266.826 | 2194319.4 | 78°50'06.63833"E | 19°49'54.39360"N |

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| BOUNDARY AS PER VESTING ORDER | | | | |
|---|---|---|---|---|
| BP-127/162 | 273288.033 | 2194291.724 | 78°50'07.37908"E | 19°49'53.50036"N |
| BP-128/162 | 273331.206 | 2194239.667 | 78°50'08.88519"E | 19°49'51.82602"N |
| BP-129/162 | 273374.701 | 2194184.413 | 78°50'10.40376"E | 19°49'50.04787"N |
| BP-130/162 | 273399.152 | 2194143.203 | 78°50'11.26186"E | 19°49'48.71834"N |
| BP-131/162 | 273427.384 | 2194098.266 | 78°50'12.25153"E | 19°49'47.26923"N |
| BP-132/162 | 273452.792 | 2194056.492 | 78°50'13.14279"E | 19°49'45.92176"N |
| BP-133/162 | 273471.364 | 2194008.968 | 78°50'13.80171"E | 19°49'44.38453"N |
| BP-134/162 | 273490.76 | 2193963.633 | 78°50'14.48797"E | 19°49'42.91881"N |
| BP-135/162 | 273507.618 | 2193920.725 | 78°50'15.08597"E | 19°49'41.53088"N |
| BP-136/162 | 273529.283 | 2193869.794 | 78°50'15.85264"E | 19°49'39.88420"N |
| BP-137/162 | 273546.076 | 2193825.855 | 78°50'16.44889"E | 19°49'38.46273"N |
| BP-138/162 | 273565.487 | 2193778.179 | 78°50'17.13668"E | 19°49'36.92090"N |
| BP-139/162 | 273579.578 | 2193742.779 | 78°50'17.63632"E | 19°49'35.77593"N |
| BP-140/162 | 273603.262 | 2193701.464 | 78°50'18.46811"E | 19°49'34.44267"N |
| BP-141/162 | 273627.896 | 2193657.418 | 78°50'19.33374"E | 19°49'33.02101"N |
| BP-142/162 | 273651.316 | 2193614.111 | 78°50'20.15733"E | 19°49'31.62286"N |
| BP-143/162 | 273676.207 | 2193571.317 | 78°50'21.03121"E | 19°49'30.24202"N |
| BP-144/162 | 273714.713 | 2193502.052 | 78°50'22.38445"E | 19°49'28.00625"N |
| BP-145/162 | 273740.341 | 2193457.632 | 78°50'23.28435"E | 19°49'26.57285"N |
| BP-146/162 | 273764.874 | 2193414.11 | 78°50'24.14622"E | 19°49'25.16817"N |
| BP-147/162 | 273791.104 | 2193370.084 | 78°50'25.06664"E | 19°49'23.74780"N |
| BP-148/162 | 273815.864 | 2193326.788 | 78°50'25.93622"E | 19°49'22.35058"N |
| BP-149/162 | 273841.942 | 2193281.357 | 78°50'26.85202"E | 19°49'20.88447"N |
| BP-150/162 | 273867.316 | 2193238.45 | 78°50'27.74250"E | 19°49'19.50013"N |
| BP-151/162 | 273897.951 | 2193184.698 | 78°50'28.81851"E | 19°49'17.76541"N |
| BP-152/162 | 273917.962 | 2193137.906 | 78°50'29.52644"E | 19°49'16.25255"N |
| BP-153/162 | 273938.59 | 2193093.295 | 78°50'30.25463"E | 19°49'14.81084"N |
| BP-154/162 | 273969.389 | 2193023.069 | 78°50'31.34346"E | 19°49'12.54062"N |
| BP-155/162 | 273970.651 | 2192975.479 | 78°50'31.40772"E | 19°49'10.99402"N |
| BP-156/162 | 273974.055 | 2192933.64 | 78°50'31.54299"E | 19°49'09.63526"N |
| BP-157/162 | 273955.932 | 2192854.547 | 78°50'30.95518"E | 19°49'07.05644"N |
| BP-158/162 | 273932.713 | 2192823.35 | 78°50'30.17125"E | 19°49'06.03261"N |
| BP-159/162 | 273886.853 | 2192787.806 | 78°50'28.61152"E | 19°49'04.85802"N |
| BP-160/162 | 273842.165 | 2192759.93 | 78°50'27.08866"E | 19°49'03.93322"N |
| BP-161/162 | 273802.277 | 2192732.522 | 78°50'25.73048"E | 19°49'03.02563"N |
| BP-162/162 | 273755.169 | 2192720.934 | 78°50'24.11737"E | 19°49'02.62934"N |

# Annexure 2B


**INDIAN MINE PLANNERS & CONSULTANTS**

(Geology, Mining and Environment Consultants)
ISO 9001:2015 Certified Company
An Accredited Prospecting Agency (APA), Mining Plan Preparing Agency (MPPA) & EIA Consultant Organisation by QCI-NABET


Annexure-II

**Certification of Project Area, Proposed Mining Lease area and Geological Block area**

Certified that the Cardinal Points considered for preparation of the Mining Plan and Mine Closure Plan (Revision-01) of Marki Mangli-II Coal Mine situated in Wardha Valley Coalfield, Dist.- Yavatmal, Maharastra State is in line with the vesting order No NA-104/3/2020-NA dated 03.03.2021 and does not encroach any other adjacent block. All proposed mining activities, overburden dumping area and infrastructure locations are within the cardinal point coordinates of vested geological block. The geological block area and the project area of Marki Mangli-II Coal Mine are as under:

1) Geological Block area – 339.467 Ha
2) Project area – 339.467 Ha

Vesting Order Coordinates vide order No NA-104/3/2020-NA dated 03.03.2021 and Cardinal Points Coordinates of the Geological Block Boundary by DGPS WGS_84 system are as under:

| BOUNDARY AS PER VESTING ORDER | |
|---|---|
| Longitude (WGS84) | Latitude (WGS84) |
| 78°48'56.00"E | 19°49'2.00"N |
| 78°48'56.00"E | 19°50'31.00"N |
| 78°50'32.00"E | 19°50'31.00"N |
| 78°50'32.00"E | 19°49'2.00"N |

| Geological Vested Block Boundary Coordinates by DGPS WGS_84 System | | | | | |
|---|---|---|---|---|---|
| Sl. No. | Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Longitude | WGS84 Latitude |
| 1 | BP-1/162 | 273706.215 | 2192707.681 | 78°50'22.44158"E | 19°49'02.17812"N |
| 2 | BP-2/162 | 273660.051 | 2192724.839 | 78°50'20.84824"E | 19°49'02.71673"N |


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| Geological Vested Block Boundary Coordinates by DGPS WGS_84 System | | | | | |
|---|---|---|---|---|---|
| Sl. No. | Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Longitude | WGS84 Latitude |
| 3 | BP-3/162 | 273611.751 | 2192744.383 | 78°50'19.18051"E | 19°49'03.33199"N |
| 4 | BP-4/162 | 273565.021 | 2192761.236 | 78°50'17.56788"E | 19°49'03.86044"N |
| 5 | BP-5/162 | 273518.435 | 2192776.921 | 78°50'15.96069"E | 19°49'04.35098"N |
| 6 | BP-6/162 | 273470.566 | 2192794.247 | 78°50'14.30872"E | 19°49'04.89431"N |
| 7 | BP-7/162 | 273423.363 | 2192809.764 | 78°50'12.68041"E | 19°49'05.37911"N |
| 8 | BP-8/162 | 273383.286 | 2192825.094 | 78°50'11.29696"E | 19°49'05.86080"N |
| 9 | BP-9/162 | 273336.612 | 2192840.173 | 78°50'09.68702"E | 19°49'06.33155"N |
| 10 | BP-10/162 | 273293.712 | 2192866.474 | 78°50'08.20180"E | 19°49'07.16873"N |
| 11 | BP-11/162 | 273251.331 | 2192891.986 | 78°50'06.73473"E | 19°49'07.98046"N |
| 12 | BP-12/162 | 273209.881 | 2192918.720 | 78°50'05.29908"E | 19°49'08.83228"N |
| 13 | BP-13/162 | 273164.323 | 2192944.904 | 78°50'03.72256"E | 19°49'09.66452"N |
| 14 | BP-14/162 | 273122.764 | 2192972.302 | 78°50'02.28290"E | 19°49'10.53789"N |
| 15 | BP-15/162 | 273082.092 | 2192998.605 | 78°50'00.87418"E | 19°49'11.37602"N |
| 16 | BP-16/162 | 273040.179 | 2193024.738 | 78°49'59.42288"E | 19°49'12.20811"N |
| 17 | BP-17/162 | 272998.019 | 2193051.894 | 78°49'57.96266"E | 19°49'13.07335"N |
| 18 | BP-18/162 | 272948.875 | 2193082.355 | 78°49'56.26104"E | 19°49'14.04311"N |
| 19 | BP-19/162 | 272909.501 | 2193113.618 | 78°49'54.89470"E | 19°49'15.04303"N |
| 20 | BP-20/162 | 272870.919 | 2193143.539 | 78°49'53.55614"E | 19°49'15.99963"N |
| 21 | BP-21/162 | 272831.044 | 2193174.573 | 78°49'52.17269"E | 19°49'16.99190"N |


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| Geological Vested Block Boundary Coordinates by DGPS WGS_84 System | | | | | |
|---|---|---|---|---|---|
| Sl. No. | Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Longitude | WGS84 Latitude |
| 22 | BP-22/162 | 272791.756 | 2193205.872 | 78°49'50.80926"E | 19°49'17.99298"N |
| 23 | BP-23/162 | 272751.461 | 2193235.750 | 78°49'49.41188"E | 19°49'18.94747"N |
| 24 | BP-24/162 | 272711.861 | 2193268.140 | 78°49'48.03724"E | 19°49'19.98392"N |
| 25 | BP-25/162 | 272666.698 | 2193301.789 | 78°49'46.47097"E | 19°49'21.05896"N |
| 26 | BP-26/162 | 272633.913 | 2193327.705 | 78°49'45.33330"E | 19°49'21.88776"N |
| 27 | BP-27/162 | 272593.376 | 2193358.180 | 78°49'43.92729"E | 19°49'22.86153"N |
| 28 | BP-28/162 | 272536.523 | 2193404.353 | 78°49'41.95390"E | 19°49'24.33881"N |
| **29** | **BP-29/162** | **272494.814** | **2193432.293** | **78°49'40.50876"E** | **19°49'25.22968"N** |
| 30 | **BP-30/162** | **272452.870** | 2193459.469 | 78°49'39.05586"E | **19°49'26.09563"N** |
| 31 | BP-31/162 | 272411.156 | 2193486.888 | 78°49'37.61077"E | 19°49'26.96956"N |
| 32 | BP-32/162 | 272370.288 | 2193513.496 | 78°49'36.19510"E | 19°49'27.81745"N |
| 33 | BP-33/162 | 272328.923 | 2193541.158 | 78°49'34.76190"E | 19°49'28.69941"N |
| 34 | BP-34/162 | 272286.844 | 2193567.850 | 78°49'33.30458"E | 19°49'29.54954"N |
| 35 | BP-35/162 | 272244.794 | 2193596.255 | 78°49'31.84750"E | 19°49'30.45537"N |
| 36 | BP-36/162 | 272204.089 | 2193623.620 | 78°49'30.43705"E | 19°49'31.32794"N |
| 37 | BP-37/162 | 272159.626 | 2193652.263 | 78°49'28.89699"E | 19°49'32.24046"N |
| 38 | BP-38/162 | 272117.881 | 2193679.972 | 78°49'27.45068"E | 19°49'33.12378"N |
| 39 | BP-39/162 | 272075.732 | 2193707.952 | 78°49'25.99036"E | 19°49'34.01573"N |
| 40 | BP-40/162 | 272035.139 | 2193736.512 | 78°49'24.58323"E | 19°49'34.92717"N |

| Geological Vested Block Boundary Coordinates by DGPS WGS_84 System | | | | | |
|---|---|---|---|---|---|
| Sl. No. | Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Longitude | WGS84 Latitude |
| 41 | BP-41/162 | 271995.424 | 2193761.257 | 78°49'23.20797"E | 19°49'35.71496"N |
| 42 | BP-42/162 | 271953.389 | 2193786.593 | 78°49'21.75272"E | 19°49'36.52100"N |
| 43 | BP-43/162 | 271912.557 | 2193814.154 | 78°49'20.33783"E | 19°49'37.39987"N |
| 44 | BP-44/162 | 271869.646 | 2193841.065 | 78°49'18.85180"E | 19°49'38.25672"N |
| 45 | BP-45/162 | 271827.238 | 2193869.686 | 78°49'17.38226"E | 19°49'39.16938"N |
| 46 | BP-46/162 | 271782.483 | 2193896.986 | 78°49'15.83269"E | 19°49'40.03811"N |
| 47 | BP-47/162 | 271743.055 | 2193923.541 | 78°49'14.46645"E | 19°49'40.88482"N |
| 48 | BP-48/162 | 271700.963 | 2193955.668 | 78°49'13.00624"E | 19°49'41.91160"N |
| 49 | BP-49/162 | 271660.036 | 2193982.054 | 78°49'11.58855"E | 19°49'42.75220"N |
| 50 | BP-50/162 | 271625.579 | 2194003.542 | 78°49'10.39532"E | 19°49'43.43629"N |
| 51 | BP-51/162 | 271584.988 | 2194032.628 | 78°49'08.98799"E | 19°49'44.36478"N |
| 52 | BP-52/162 | 271546.445 | 2194059.606 | 78°49'07.65194"E | 19°49'45.22563"N |
| 53 | BP-53/162 | 271505.696 | 2194088.141 | 78°49'06.23943"E | 19°49'46.13618"N |
| 54 | BP-54/162 | 271463.512 | 2194118.653 | 78°49'04.77672"E | 19°49'47.11034"N |
| 55 | BP-55/162 | 271424.912 | 2194145.807 | 78°49'03.43862"E | 19°49'47.97688"N |
| 56 | BP-56/162 | 271383.677 | 2194175.271 | 78°49'02.00897"E | 19°49'48.91739"N |
| 57 | BP-57/162 | 271343.065 | 2194203.443 | 78°49'00.60130"E | 19°49'49.81616"N |
| 58 | BP-58/162 | 271301.847 | 2194233.429 | 78°48'59.17200"E | 19°49'50.77366"N |
| 59 | BP-59/162 | 271260.882 | 2194261.276 | 78°48'57.75234"E | 19°49'51.66171"N |

| Geological Vested Block Boundary Coordinates by DGPS WGS_84 System | | | | | |
|---|---|---|---|---|---|
| Sl. No. | Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Longitude | WGS84 Latitude |
| 60 | BP-60/162 | 271228.144 | 2194286.223 | 78°48'56.61658"E | 19°49'52.45892"N |
| 61 | BP-61/162 | 271261.887 | 2194323.088 | 78°48'57.75941"E | 19°49'53.67155"N |
| 62 | BP-62/162 | 271295.037 | 2194361.296 | 78°48'58.88125"E | 19°49'54.92761"N |
| 63 | BP-63/162 | 271328.416 | 2194398.594 | 78°49'00.01134"E | 19°49'56.15417"N |
| 64 | BP-64/162 | 271354.419 | 2194429.034 | 78°49'00.89113"E | 19°49'57.15467"N |
| 65 | BP-65/162 | 271372.097 | 2194449.556 | 78°49'01.48934"E | 19°49'57.82924"N |
| 66 | BP-66/162 | 271394.921 | 2194493.321 | 78°49'02.25396"E | 19°49'59.26160"N |
| 67 | BP-67/162 | 271415.174 | 2194532.935 | 78°49'02.93216"E | 19°50'00.55791"N |
| 68 | BP-68/162 | 271433.105 | 2194588.772 | 78°49'03.52336"E | 19°50'02.38068"N |
| 69 | BP-69/162 | 271437.094 | 2194621.770 | 78°49'03.64572"E | 19°50'03.45508"N |
| 70 | BP-70/162 | 271441.471 | 2194673.504 | 78°49'03.77311"E | 19°50'05.13874"N |
| 71 | BP-71/162 | 271425.739 | 2194720.127 | 78°49'03.21194"E | 19°50'06.64777"N |
| 72 | BP-72/162 | 271418.967 | 2194744.602 | 78°49'02.96841"E | 19°50'07.44058"N |
| 73 | BP-73/162 | 271398.418 | 2194823.372 | 78°49'02.22749"E | 19°50'09.99267"N |
| 74 | BP-74/162 | 271418.059 | 2194898.389 | 78°49'02.86890"E | 19°50'12.43967"N |
| 75 | BP-75/162 | 271452.292 | 2194949.899 | 78°49'04.02208"E | 19°50'14.12858"N |
| 76 | BP-76/162 | 271486.557 | 2194973.557 | 78°49'05.18893"E | 19°50'14.91012"N |
| 77 | BP-77/162 | 271512.908 | 2194980.777 | 78°49'06.09083"E | 19°50'15.15788"N |
| 78 | BP-78/162 | 271562.077 | 2194995.672 | 78°49'07.77360"E | 19°50'15.66080"N |


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|---|---|---|---|---|---|
| Sl. No. | Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Longitude | WGS84 Latitude |
| 79 | BP-79/162 | 271635.681 | 2195008.109 | 78°49'10.29653"E | 19°50'16.09799"N |
| 80 | BP-80/162 | 271681.352 | 2195026.153 | 78°49'11.85776"E | 19°50'16.70181"N |
| 81 | BP-81/162 | 271758.801 | 2195050.674 | 78°49'14.50747"E | 19°50'17.53346"N |
| 82 | BP-82/162 | 271808.801 | 2195061.677 | 78°49'16.22052"E | 19°50'17.91017"N |
| 83 | BP-83/162 | 271858.245 | 2195070.435 | 78°49'17.91529"E | 19°50'18.21564"N |
| 84 | BP-84/162 | 271909.643 | 2195079.540 | 78°49'19.67704"E | 19°50'18.53320"N |
| 85 | BP-85/162 | 271961.817 | 2195086.544 | 78°49'21.46621"E | 19°50'18.78474"N |
| 86 | BP-86/162 | 271986.141 | 2195132.045 | 78°49'22.28188"E | 19°50'20.27218"N |
| 87 | BP-87/162 | 272012.381 | 2195176.503 | 78°49'23.16345"E | 19°50'21.73044"N |
| 88 | BP-88/162 | 272038.270 | 2195212.082 | 78°49'24.03731"E | 19°50'22.89597"N |
| 89 | BP-89/162 | 272074.460 | 2195259.354 | 78°49'25.25949"E | 19°50'24.44989"N |
| 90 | BP-90/162 | 272082.390 | 2195308.838 | 78°49'25.51021"E | 19°50'26.05991"N |
| 91 | BP-91/162 | 272087.407 | 2195355.477 | 78°49'25.66172"E | 19°50'27.58018"N |
| 92 | BP-92/162 | 272105.515 | 2195405.686 | 78°49'26.26177"E | 19°50'29.21805"N |
| 93 | BP-93/162 | 272122.325 | 2195454.991 | 78°49'26.81726"E | 19°50'30.82991"N |
| 94 | BP-94/162 | 272143.587 | 2195441.912 | 78°49'27.55353"E | 19°50'30.41364"N |
| 95 | BP-95/162 | 272181.955 | 2195411.855 | 78°49'28.88520"E | 19°50'29.45064"N |
| 96 | BP-96/162 | 272218.113 | 2195376.993 | 78°49'30.14270"E | 19°50'28.33444"N |
| 97 | BP-97/162 | 272254.780 | 2195343.610 | 78°49'31.41722"E | 19°50'27.26454"N |


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|---|---|---|---|---|---|
| Sl. No. | Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Longitude | WGS84 Latitude |
| 98 | BP-98/162 | 272307.130 | 2195299.082 | 78°49'33.23545"E | 19°50'25.83891"N |
| 99 | BP-99/162 | 272341.521 | 2195264.673 | 78°49'34.43222"E | 19°50'24.73469"N |
| 100 | BP-100/162 | 272374.695 | 2195231.535 | 78°49'35.58659"E | 19°50'23.67131"N |
| 101 | BP-101/162 | 272413.125 | 2195194.302 | 78°49'36.92334"E | 19°50'22.47700"N |
| 102 | BP-102/162 | 272447.539 | 2195162.573 | 78°49'38.11969"E | 19°50'21.45990"N |
| 103 | BP-103/162 | 272482.577 | 2195127.763 | 78°49'39.33885"E | 19°50'20.34293"N |
| 104 | BP-104/162 | 272504.744 | 2195105.400 | 78°49'40.11029"E | 19°50'19.62522"N |
| 105 | BP-105/162 | 272543.477 | 2195073.578 | 78°49'41.45504"E | 19°50'18.60692"N |
| 106 | BP-106/162 | 272583.167 | 2195040.494 | 78°49'42.83323"E | 19°50'17.54799"N |
| 107 | BP-107/162 | 272621.007 | 2195008.885 | 78°49'44.14722"E | 19°50'16.53622"N |
| 108 | BP-108/162 | 272659.501 | 2194976.812 | 78°49'45.48386"E | 19°50'15.50965"N |
| 109 | BP-109/162 | 272699.285 | 2194944.619 | 78°49'46.86487"E | 19°50'14.47971"N |
| 110 | BP-110/162 | 272739.624 | 2194909.857 | 78°49'48.26606"E | 19°50'13.36649"N |
| 111 | BP-111/162 | 272777.199 | 2194878.421 | 78°49'49.57085"E | 19°50'12.36023"N |
| 112 | BP-112/162 | 272815.412 | 2194847.602 | 78°49'50.89725"E | 19°50'11.37433"N |
| 113 | BP-113/162 | 272853.948 | 2194815.773 | 78°49'52.23522"E | 19°50'10.35569"N |
| 114 | BP-114/162 | 272892.453 | 2194785.558 | 78°49'53.57138"E | 19°50'09.38951"N |
| 115 | BP-115/162 | 272938.553 | 2194749.195 | 78°49'55.17122"E | 19°50'08.22662"N |
| 116 | BP-116/162 | 272965.357 | 2194724.306 | 78°49'56.10302"E | 19°50'07.42868"N |


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|---|---|---|---|---|---|
| Sl. No. | Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Longitude | WGS84 Latitude |
| 117 | BP-117/162 | 272991.980 | 2194702.723 | 78°49'57.02719"E | 19°50'06.73814"N |
| 118 | BP-118/162 | 273020.522 | 2194658.359 | 78°49'58.02731"E | 19°50'05.30781"N |
| 119 | BP-119/162 | 273047.820 | 2194618.203 | 78°49'58.98282"E | 19°50'04.01377"N |
| 120 | BP-120/162 | 273077.207 | 2194577.388 | 78°50'00.01041"E | 19°50'02.69917"N |
| 121 | BP-121/162 | 273105.869 | 2194535.716 | 78°50'01.01347"E | 19°50'01.35641"N |
| 122 | BP-122/162 | 273134.477 | 2194493.281 | 78°50'02.01498"E | 19°49'59.98879"N |
| 123 | BP-123/162 | 273174.585 | 2194435.891 | 78°50'03.41815"E | 19°49'58.13983"N |
| 124 | **BP-124/162** | **273205.086** | **2194397.316** | **78°50'04.48300"E** | **19°49'56.89850"N** |
| 125 | **BP-125/162** | **273236.463** | **2194358.436** | 78°50'05.57807"E | 19°49'55.64762"N |
| 126 | BP-126/162 | 273266.826 | 2194319.472 | 78°50'06.63833"E | 19°49'54.39360"N |
| 127 | BP-127/162 | 273288.033 | 2194291.724 | 78°50'07.37908"E | 19°49'53.50036"N |
| 128 | BP-128/162 | 273331.206 | 2194239.667 | 78°50'08.88519"E | 19°49'51.82602"N |
| 129 | BP-129/162 | 273374.701 | 2194184.413 | 78°50'10.40376"E | 19°49'50.04787"N |
| 130 | BP-130/162 | 273399.152 | 2194143.203 | 78°50'11.26186"E | 19°49'48.71834"N |
| 131 | BP-131/162 | 273427.384 | 2194098.266 | 78°50'12.25153"E | 19°49'47.26923"N |
| 132 | BP-132/162 | 273452.792 | 2194056.492 | 78°50'13.14279"E | 19°49'45.92176"N |
| 133 | BP-133/162 | 273471.364 | 2194008.968 | 78°50'13.80171"E | 19°49'44.38453"N |
| 134 | BP-134/162 | 273490.760 | 2193963.633 | 78°50'14.48797"E | 19°49'42.91881"N |
| 135 | BP-135/162 | 273507.618 | 2193920.725 | 78°50'15.08597"E | 19°49'41.53088"N |

| Geological Vested Block Boundary Coordinates by DGPS WGS_84 System | | | | | |
|---|---|---|---|---|---|
| Sl. No. | Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Longitude | WGS84 Latitude |
| 136 | BP-136/162 | 273529.283 | 2193869.794 | 78°50'15.85264"E | 19°49'39.88420"N |
| 137 | BP-137/162 | 273546.076 | 2193825.855 | 78°50'16.44889"E | 19°49'38.46273"N |
| 138 | BP-138/162 | 273565.487 | 2193778.179 | 78°50'17.13668"E | 19°49'36.92090"N |
| 139 | BP-139/162 | 273579.578 | 2193742.779 | 78°50'17.63632"E | 19°49'35.77593"N |
| 140 | BP-140/162 | 273603.262 | 2193701.464 | 78°50'18.46811"E | 19°49'34.44267"N |
| 141 | BP-141/162 | 273627.896 | 2193657.418 | 78°50'19.33374"E | 19°49'33.02101"N |
| 142 | BP-142/162 | 273651.316 | 2193614.111 | 78°50'20.15733"E | 19°49'31.62286"N |
| 143 | BP-143/162 | 273676.207 | 2193571.317 | 78°50'21.03121"E | 19°49'30.24202"N |
| 144 | BP-144/162 | 273714.713 | 2193502.052 | 78°50'22.38445"E | 19°49'28.00625"N |
| 145 | BP-145/162 | 273740.341 | 2193457.632 | 78°50'23.28435"E | 19°49'26.57285"N |
| 146 | BP-146/162 | 273764.874 | 2193414.110 | 78°50'24.14622"E | 19°49'25.16817"N |
| 147 | BP-147/162 | 273791.104 | 2193370.084 | 78°50'25.06664"E | 19°49'23.74780"N |
| 148 | BP-148/162 | 273815.864 | 2193326.788 | 78°50'25.93622"E | 19°49'22.35058"N |
| 149 | BP-149/162 | 273841.942 | 2193281.357 | 78°50'26.85202"E | 19°49'20.88447"N |
| 150 | BP-150/162 | 273867.316 | 2193238.450 | 78°50'27.74250"E | 19°49'19.50013"N |
| 151 | BP-151/162 | 273897.951 | 2193184.698 | 78°50'28.81851"E | 19°49'17.76541"N |
| 152 | BP-152/162 | 273917.962 | 2193137.906 | 78°50'29.52644"E | 19°49'16.25255"N |
| 153 | BP-153/162 | 273938.590 | 2193093.295 | 78°50'30.25463"E | 19°49'14.81084"N |
| 154 | BP-154/162 | 273969.389 | 2193023.069 | 78°50'31.34346"E | 19°49'12.54062"N |

| Geological Vested Block Boundary Coordinates by DGPS WGS_84 System | | | | | |
|---|---|---|---|---|---|
| Sl. No. | Point No. | Ground Easting (m) | Ground Northing (m) | WGS84 Longitude | WGS84 Latitude |
| 155 | BP-155/162 | 273970.651 | 2192975.479 | 78°50'31.40772"E | 19°49'10.99402"N |
| 156 | BP-156/162 | 273974.055 | 2192933.640 | 78°50'31.54299"E | 19°49'09.63526"N |
| 157 | BP-157/162 | 273955.932 | 2192854.547 | 78°50'30.95518"E | 19°49'07.05644"N |
| 158 | BP-158/162 | 273932.713 | 2192823.350 | 78°50'30.17125"E | 19°49'06.03261"N |
| 159 | BP-159/162 | 273886.853 | 2192787.806 | 78°50'28.61152"E | 19°49'04.85802"N |
| 160 | BP-160/162 | 273842.165 | 2192759.930 | 78°50'27.08866"E | 19°49'03.93322"N |
| 161 | BP-161/162 | 273802.277 | 2192732.522 | 78°50'25.73048"E | 19°49'03.02563"N |
| 162 | BP-162/162 | 273755.169 | 2192720.934 | 78°50'24.11737"E | 19°49'02.62934"N |

Plan showing the Geological Block boundary & Proposed ML boundary are given in **Plate-II & III** and Conceptual Plan envisaged in the mining plan depicting OB area, Infrastructure locations and cardinal point co-ordinates of the lease area, block area, project area are shown in Conceptual Plan (**Plate-VIII**)

(Pramod Prasad Gupta)
Coordinator (Mining)
Indian Mine Planners & Consultants (MPPA)
Mining Plan Preparing Agency (MPPA)
Certificate No. NABET/APA-MPPA/IA/002 dated Jan 13, 2024

# Annexure-3A1

Yazdani International (P) Ltd.
*Steering success, anchoring credibility*

**Annexure-III**

Company Board of Directors of Yazdani International Private Limited, CIN U13209OR2006PTC009009 having registered office at 7th Floor, C-wing, Fortune Towers, Chandrasekhpur, Bhubaneshwar, Odissa-751023, India, the block allottee of Marki Mangli-II Coal Mine as per Vesting Order No NA-104/3/2020-NA dated 3rd March 2021 by the Nominated Authority of Ministry of Coal, Govt of India hereby give the following undertakings and approved as follows:

1. The Mining Plan & Mine Closer Plan of Marki Mangli-II Coal mine (Revision-01) covering an area of 339.467 Ha (Geological Block) located in Wardha Valley Coalfield, Yavatmal district, Maharashtra state prepared by Indian Mine Planners & Consultants, a QCI-NABET accredited Mining Plan Preparing Agency (MPPA) and correctness of data used in preparation of the mining plan has been verified by us.
2. Details and eligibility of Indian Mine Planners & Consultants, a QCI-NABET accredited Mining Plan Preparing Agency (MPPA) has been verified.
3. Mining Plan and Mine Closure Plan (Revision-01) as prepared by Indian Mine Planners & Consultants, a QCI-NABET accredited Mining Plan Preparing Agency (MPPA) has been accepted by us.
4. Company gives undertakings that the mine will be developed as per the approval of the mining plan from Ministry of coal and all other approvals, as required will be obtained from relevant authorities
5. Commitment is given that entire mining operation will be carried out as per the Statutory provision given under Mines Act 1952, Coal Mine Regulation 2017, EP Act 1986 and FC Act 1980 and wherever specific permission will be required the company will approach the concerned authorities
6. Company confirms that entire Progressive and Final activities shall be implemented as per the approved mining plan and mine closure plan by the concerned competent authorities.
7. The Board hereby accepts and undertakes the financial assurance for implementation in accordance with the Approved Mining plan (Including mine Closure Plan) / Final Mine Closure Plan or any financial liability which may be incidental during implementation of MP-MCP due to change in prevailing laws and rules.

*Corporate Office :* 7th Floor, C-Wing, Fortune Towers, Chandrasekharpur, Bhubaneswar - 751023, Odisha, India
Phone : +91 674 6750200, 2301897, Fax : +91 674 2301898, Web : www.yazdaniinternational.com

Yazdani International (P) Ltd.
*Steering success, anchoring credibility*

8. Company gives undertakings that the reclamation & rehabilitation work shall be carried out in accordance with the approved Mine Closure Plan and any modification/ amendments which may be made in the mine Closure Plan by Ministry of Coal, from time to time.

9. Company give undertakings that the protective measures contained in the mine closure. plan including mine closure plan, reclamation and rehabilitation works will be carried out in accordance with the approved mine closure plan and final mine closure plan and undertake to submit a yearly report before 1st July of every year to the Coal Controller setting forth the extent of protective and rehabilitative works carried cut as envisaged in the approved mine closure plans (Progressive and Final Closure)

10. Company gives undertakings that they will obtain a mine closure certificate from Coal Controller to the effect that the protective, reclamation and rehabilitation works carried out in accordance with the approved mine closure plan/final mine closure plan and will surrender the reclaimed land to the State Government concerned.

For and on behalf of the Board of Directors of Yazdani International Private Limited

Authorized Signatory

Name: **Meraj Yusha**

Designation: Managing Director

YAZDANI INTERNATIONAL PVT. LTD. BBSR

***Corporate Office :*** 7th Floor, C-Wing, Fortune Towers, Chandrasekharpur, Bhubaneswar - 751023, Odisha, India
Phone : +91 674 6750200, 2301897, Fax : +91 674 2301898, Web : www.yazdaniinternational.com

# Annexure 4

No. 13016/9/2004-CA-I
Government of India
Ministry of Coal

New Delhi, dated 31st January, 2008.

To

M/s. Shree Virangana Steel Ltd.,
Office No. 126-128,
1st Floor, Shriram Tower,
Kingsway, Sadar,
Nr. NIT office,
Nagpur – 440 001.

Subject : Approval of Mining Plan for Marki-Mangli coal block II, III & IV, Tehsil-Jhari-Jamni, Taluk-Wani, Dist.-Yavatmal, Maharashtra.

Sir,

I am directed to refer to your letters No. SVSL/NGP/2007-2/0186 dated 01.01.2007 and No. SVSL/NGP/MDR/2007/009 dated 07.04.2007 submitting mining plan for Marki-Mangli coal block II, III & IV for approval of the Central Government and to state that the mining plan for Marki-Mangli coal block II (December, 2006) to be read with compliance report (May, 2007), Marki-Mangli coal block III (February, 2007) and Marki-Mangli IV (March, 2007) to be read alongwith compliance report (August, 2007 of Marki Mangli III & IV) of M/s. Shree Virangana Steel Ltd., has been considered and the approval of the Central Government thereon is hereby conveyed under Section 5 (2) (b) of the Mines & Minerals (Development & Regulation) Act, 1957 subject to the following condition :-

i) The mining company shall take all necessary precautions regarding safety of mine workings, persons deployed therein.

ii) The approval of the mining plan is without prejudice to the requirement of approvals from competent/prescribed authority under the relevant rules/regulations etc.

2. Two copies of the approved mining plans duly signed by the competent authority are returned herewith with the request that a copy of the approved mining plan may be submitted to the concerned State Government for necessary action and also a photocopy of the approved mining plan may be sent to the Coal Controller for monitoring of the block.

Yours faithfully,

( V.S [illegible] )
Under Secretary to the Govt. of India.

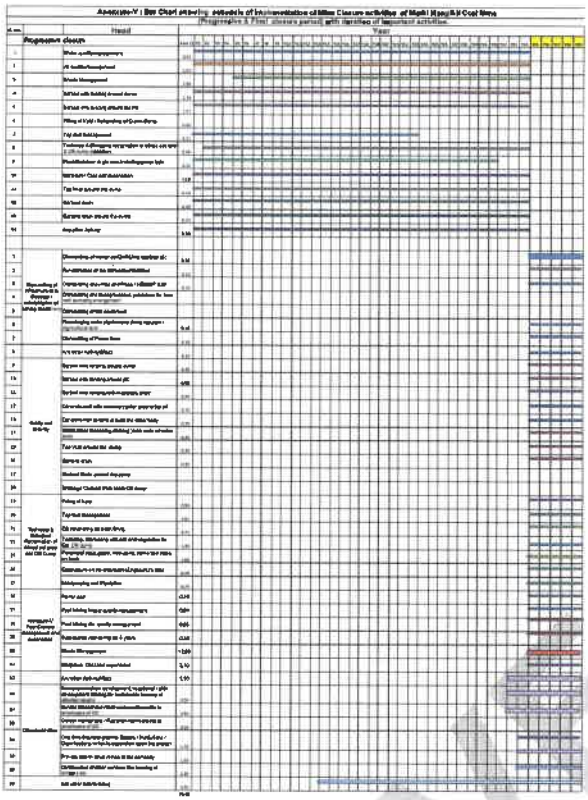
Encls. As above.

TOPWORTH URJA & METALS LTD. * NAGPUR

TOPWORTH URJA & METALS LTD.

Authorised Signatory

# Annexure-5





Prepared By INDIAN MINE PLANNERS AND CONSULTANTS On 05/07/2022

## Annexure 6

bharatkosh.gov.in
Government of India Receipt Portal

**RECEIPT**

Transaction Ref.No. 0507220007000 Dated: Jul 5 2022 12:01PM

Received from M/S. YAZDANI INTERNATIONAL PVT LTD with Transaction Ref.No.0507220007000

Dated Jul 5 2022 12:01PM the sum of INR 84967 (Eighty-Four Thousand Nine Hundred Sixty-Seven Only ) through Internet based Online payment in the account of

Coal and Lignite, , .

**Disclaimer:- This is a system generated electronic receipt, hence no physical signature is required for the purpose of authentication**

*Printed On: 07-07-2022 04:46:51*

**Courtesy :- Controller General of Accounts**

# Annexure 7

**TO WHOM IT MAY CONCERN**

The Mining Plan & Mine Closure Plan of MARKI MANGLI II COAL MINE Coal Mine formulated by Mining Plan Preparing Agency-INDIAN MINE PLANNERS AND CONSULTANTS, QCI Number- NABET/APA-MPPA/IA/002 Dated 28-01-2021 which was sent for expert review to Mining Plan Preparing Agency-Min Mec Consultancy Pvt Ltd, QCI Number- NABET/APA-MPPA/IA/004 .

The Mining Plan & Mine Closure Plan of MARKI MANGLI II COAL MINE Coal Mine has been review from Technical and administrative angle and has found to be prepared in line with the guideline for formulation, processing, scrutiny and approval of Mining Plan and Mine Closure Plan circulated vide OM dated 29th May 2020. The subject mining plan is found to be in order and is recommended for consideration of the Approving Authority for approval.

**Digital Signature**

**Min Mec Consultancy Pvt Ltd**

**A-121 Paryavaran Complex**

**IGNOU Road**

**New Delhi, 110030**

**NABET/APA-MPPA/IA/004**

**9811030881**

# Additional Annexure-8

**F.No.NA-104/3/2020-NA**
Government of India/ भारत सरकार
Ministry of Coal/ कोयला मंत्रालय
O/o Nominated Authority / नामनिर्दिष्ट प्राधिकारी का कार्यालय
*****

R.No.120- 1st Floor, F-Wing
Shastri Bhawan, New Delhi,
Dated: 07th March, 2022

To,

Shri Meraj Yusha,
Managing Director,
Yazdani International Private Limited,
Office Address: 7th Floor, C-Wing, Fortune Towers,
Chandrasekharpur, Bhubaneswar,
Odisha - 751023, India
Email: meraj@yazdaniinternational.com

**Subject:** Revised Mining Plan and Mine Closure Plan of Marki Mangli-II Coal Mine - reg.

Ref: Letter of even no dated 14.02.2022 from O/o NA (enclosed)

Sir,

This is in reference to the letter dated February 14, 2022 from the O/o Nominated Authority and subsequent communication received from M/s Yazdani International Pvt Ltd vide letter dated February 24, 2022, you are hereby informed that since the statutory clearances are needed to be obtained afresh by the allocattee, the efficiency parameters for coal mines other than Schedule-II coal mines would be applicable for the Marki Mangli-II Coal Mine. The same has been placed at **Annexure.**

Yours faithfully,

(Manish Uniyal)
Under Secretary to the Government of India
Tel: 011-23384106

## ANNEXURE I: EFFICIENCY PARAMETERS

**For Coal Mines other than Schedule II coal mines**

| Activities | Completion time | Milestone (MS) No. | % of Performance Security to be appropriated for delay in completion of MS |
|---|---|---|---|
| Prospecting Licence or Notification under section 4 of the CBA Act, 1957, as applicable | - | MS-1 | Not Applicable |
| Completion of Drilling/ Exploration in accordance with the provisions of Clause 14 | - | | |
| Preparation of Geological Report (GR) | Within 15 months from the date of allocation | | |
| | After 15 months upto 24 months from the date of allocation | | |
| | After 24 months upto 30 months from the date of allocation | | |
| Mining Lease Application | - | MS-2 | - |
| Submission of Mining Plan subject to the provisions of Clause 15 | - | | - |
| Approval of Mining Plan/Project Report subject to the provisions of Clause 15 | 6 months from the completion of previous MS/ If MS-1 is not applicable, 6 months from the date of allocation | | 10% |
| Forest Clearance Application | - | | - |

| | | | |
|---|---|---|---|
| Environment Clearance Application | - | MS-3 | - |
| Forest Clearance (FC)-stage 1 | - | | - |
| Forest Clearance (FC)-stage 2 | - | | - |
| Wildlife Clearance | - | | - |
| Approval under PESA | - | | - |
| Environment Clearance (EC) | 18 months from the completion of previous MS | | 10% |
| Approval for Nallah /River Diversion | - | MS-4 | - |
| Approval for diversion of Power line/Rail/Road | - | | - |
| Permission to draw Water | - | | - |
| Permission to draw Power | - | | - |
| Consent to Establish /Operate | - | | - |
| Grant of Mining Lease or order by the Central Government under section 11 of CBA Act, 1957, as applicable | - | | - |
| Land Acquisition & possession of land and R&R required to reach rated capacity as per approved mining plan | 21 months from the completion of previous MS | | 25% |
| Intimation to DGMS for Mine opening | - | MS-5 | - |
| Approval for use of Explosive & Licence for Storage of Petroleum | - | | - |
| Permission under Factories Act, 1948 | - | | - |
| Permission for use of Radio Frequency Communication System | - | | - |
| Labour related | - | | - |

| | | |
|---|---|---|
| **Permission Amount** | - | - |
| **Application for Opening permission** | - | - |
| **Mine Opening Permission** | 6 months from the completion of previous MS | 25% |

**Note:**

1. **Only the activity within the Milestone Number, against which percentage of appropriation of performance security has been assigned in the last column ('Main Activity'), will be monitored for the purpose of appropriation of performance security.**

2. Activities other than Main Activity, against which percentage of appropriation of performance security has not been assigned, will be monitored for the purpose of early development of mines. However, in case of default in such activities, penalty will not be imposed.

3. The completion time provided for the Milestones does not bar the successful bidder from obtaining clearances concurrently, if allowed under the Applicable Laws.

4. In ***bona fide*** cases of delays not attributable to the Successful Bidder the Nominated Authority will decide on case to case basis the extension of timeline in Efficiency Parameters from the total time granted for all the Milestones, i.e. 66 months in case of mine where GR is to be prepared (Partially Explored Mines) and 51 months in case of mines where GR is not required to be prepared (Fully Explored Mines). For the said purpose, the Nominated Authority may refer the matter to Scrutiny Committee which will consider the delay caused on case to case basis and furnish its recommendation to the Nominated Authority for taking a decision.

5. For Partially Explored Mines, appropriation for delay in completion of MS-1 and MS-2 shall be from the performance security submitted pursuant to clause 6.1.3 of the Agreement and appropriation for delay in completion of remaining milestones shall be from the revised performance security submitted pursuant the said clause.

6. If the Successful Bidder is able to complete the last Milestone (i.e. Mine Opening Permission/ MS-5) within the total time granted for all the Milestones, i.e. 66 months in case of mine where GR is to be prepared (partially explored mines) and 51 months in case of mines where GR is not required to be prepared (fully explored mines), then the amount of performance security appropriated for delay in completion of any previous Milestone (if any) may be refunded to the Successful Bidder.

# Additional Annexure-9

Annexure-XII

**MARKI MANGLI II OCP ( 0.3 MTY )**

**Power & Energy Balance for the Loads of Marki Mangli II OCP**

| | | | | | | kW | kVAr | kVA | kWh | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | OB | | | | | | | | | | |
| | Total (OB) | 0.00 | 0.00 | | | 0.00 | 0.00 | 0.00 | 0.00 | | |
| B | COAL | | | | | | | | | | |
| 1 | CHP | 200.00 | 200.00 | 0.70 | 0.70 | 140.00 | 142.00 | 200.00 | 0.69 | | |
| | TOTAL (COAL) | 200.00 | 200.00 | | | 140.00 | 142.00 | 200.00 | | | |
| C | COMMON | | | | | | | | | | |
| 1 | Workshop | 500.00 | 400.00 | 0.50 | 0.60 | 400.00 | 300.00 | 666.67 | 1.32 | | |
| 2 | Pumping | 570.00 | 420.00 | 0.60 | 0.80 | 336.00 | 252.00 | 420.00 | 1.63 | | |
| | 60 lps x 120 m hd main pump ( 2+1 ) - 150 kW each, 80 lps x 60 m hd slurry pump - 2 nos - 60 kW each | | | | | | | | | | |
| 3 | Quarry Lighting | 400.00 | 300.00 | 0.90 | 0.90 | 270.00 | 130.50 | 300.00 | 1.48 | | |
| 4 | Surface Lighting & Offices | 300.00 | 250.00 | 0.90 | 0.90 | 225.00 | 108.75 | 250.00 | 1.18 | | |
| 5 | Miscellaneous loads | 200.00 | 200.00 | 0.80 | 0.80 | 160.00 | 120.00 | 200.00 | 0.89 | | |
| | TOTAL ( COMMON ) | 1970.00 | 1570.00 | | | 1391.00 | 911.25 | 1662.91 | | | |
| | Total( A+B+C) | 2170.00 | 1770.00 | | | 1531.00 | 1053.25 | 1856.30 | | | |
| | Total (with 1.2 Diversity factor) | 2170.00 | 1770.00 | | | 1275.83 | 877.71 | 1546.59 | | | |
| | After Improving Power Factor to 0.98 | 2170.00 | 1770.00 | | | 1275.83 | 280.37 | 1306.87 | 7.19 | 23.98 | 143.89 |
| | Transformer Selected 2X 1.6 MVA 33/6.6 kV | | | | | | 617.33 | | | | |
| | | | | | | 2 nos (3 x 105) kVAr Capacitor Bank | | Assuming MSEB Tariff = 6 | | | |

## Annexure 10

List of PC, TAE and TM in the preparation of Mining Plan & Mine Closure Plan

1. Mr. P. P. Gupta (IH), Project Coordinator
2. Dr. N. B. Chanda (IH), TAE–ESH
3. Mr. B. N. Basu (IH), TAE–ME
4. Mr. D Bhadra (IH), TAE–CEM
5. Mr. A Chattopadhyay (EMP), TAE–CEM
6. Mr. A Choudhury (EMP), TAE–CEM
7. Mr. H. K. Sinha (EMP), TAE–SUR
8. Mrs. Bipasa Banerjee (IH), TAE–MG
9. Mrs. Monika Sarkar (IH), AutoCAD Drawings

# Additional Annexure-11

Annexure-11

**Observations made by Expert/Peer Reviewing MPPA(Min Mec ) and Compliance of the same by Mine Plan Project Proponent/Consultant(IMPCON) to Project Proponent**

| Item/Ref | Observations/Comments/Feedback by Expert Reviewing Agency(ERA) | Action | Compliance by PP/Consultant MPPA |
|---|---|---|---|
| 1.2.4 | i) A. Average annual rainfall is 1135.7 mm in monsoon season lasts from mid June to mid September - Pls check whether there will be full stop in place of "in". ii) highest flood level (HFL) of the seasonal nala may be. | Approve | Remarks complied. |
| Plate-1 | a. State map showing Districts - Should also show other districts besides YAVATMAL. b. India map showing States - Should also show other states besides Maharashtra. c. Direction - North may be marked | Approve | Complied. |
| | | | |
| 1.4.6 | Non operational as per 1.4.6 but it is written that "Mine is an operational mine" under para 3.1.2 - May be reconciled | Reject | Mine is non operational since 2014 and suitably modified in chapter 3. |
| 1.5.9 | Two seams Top and Bottom mentioned in Para 2.2.2. All the seams mentioned in GR shall be mentioned under para 1.5.9. | Approve | Complied |
| 1.5.10 | Seam Top written under column "Seam", though Seam Bottom is written under column "Reason" | Approve | Seems to be portal issue necessary correction made in Inputs |
| 1.5.11 | 1.5.11 & 1.5.12 - The Geological Block area and geological block area projected were less in AMP than present proposal, how does the Gross Reserve and Net reserves are same in AMP and present proposed MP ? | Reject | Nett geol. reserve taken 90% of gross GR , applicable for AMP and RMP |

| | | | |
|---|---|---|---|
| 2.2.5 | Area to be mentioned in Sq.Km | Approve | Complied |
| 2.2.11 | Two seams Top and Bottom mentioned in Para 2.2.2. All the seams mentioned in GR shall be mentioned | Approve | Complied |
| 2.2.14.1 | Seam Bottom may be mentioned also and "Reason not considered for mining" for seam bottom is to be written against seam bottom | Approve | Complied, part is portal issue |
| Plans/ Plates | i) Plate-3A - BHs and block boundary may be removed, only ML boundary may be kept. Keep bounding coordinates as such. ii) Plate-3B - Show only Project boundary and coordinates. Keep bounding coordinates as such. iii) Plate-3C - Show only Block boundary and coordinates. Keep bounding coordinates as such. | Approve | complied |
| Plans/ Plates | Plate-4 - Nothing may be shown outside the project boundary. Pit boundary, Dumps, Facilities etc may be shown. | Approve | Complied |
| Plans/Plates | Plate-5A1 - Title may be retained only "Geological Plan" | Approve | Complied |
| Plans/ Plates | Plate-10A1 - Some stray lines are there - Only floor contours, Faults and BHs no, may be retained, the other lines to be deleted. | Approve | Complied |
| Plans/ Plates | Plate-11 - Only longitudinal section is given - Cross sections along dip also may be given | Approve | Complied |
| Plans/ Plates | i) Plate-2A - Bore Holes and their coordinates Table given - BH and their coordinates Table not required. Pit boundary, Dumps, Facilities etc may be shown . In Index only Block boundary is mentioned, It may be Block/ project /ML boundary | Approve | Complied |

| | | | |
|---|---|---|---|
| 3.1.2 | i. Under heading "Proposed method of mining" gradient of seam is to be corre cted as 6° - 12°. ii. Parameters under heading "Mining System" a. Coal seam thickness mentioned as 1.80-7.35, though under para 2.2.2 & 2.2.14 it is 0.4 - 8.35 Pls correct. b. No. of Faults written as 4, though under para 2.2.2 F1-F9 nine faults are mentioned pls check. c. Please relook figures of 'Excavation ar ea at surface', Minable Reserve, Extractable reserves', 'OB", 'SR' 'Life' etc of the table and reconcile in line with figures mentioned at other paras. iii. Under heading "Mineable Reserve" the minable and extractable reserves are 10.19 m3 and 9.68 m3 , to be corrected as "MT" iv. Bench height For OBR (2.5 m3 Hyd. Shovel) 10-12m. Please review if it will be 8-10m | Approve | The corrected table repl aced. |
| Plans/Pla tes | Plate-13 - Title is "Total excavation Plan" - May be changed to "Total Coal, O B Ratio Plan" | Approve | Complied |
| 6.1.2 | 129.49 Ha "Agricultural land" should be booked under "Plantation" in line with table under para 8.1.2. Pls reconcile | Reject | It has been proposed to do plantation in the recl aimed area or other are a which shall be develo ped to agricultural land at the end use |
| 6.1.3 | Surface features over the block area may be mentioned and not only about th e diversions. | Approve | Complied |
| Plans/Pla tes | Plate-9 - Nothing may be shown outside the project boundary. Title may be "T entative Land use Plan" | Approve | Complied |
| Post Clos ure | Technically reclaimed land is less than degraded land | Approve | Complied(typo error) |
| 8.1.2 | 6.059 Ha Forest land return is mentioned in Y-5, if it is Safety zone area, it sh all be returned to forest department only after mine closure period. | Reject | Complied |

| | | | |
|---|---|---|---|
| 8.10.3 | 87.06 MM3 is mentioned in progressive and in post closure period also, pls re look. | Approve | Corrected suitably |
| 8.10.2.2 | WPI for May-2022 Provisional is adopted, March-22 final maybe considered f or escrow calculation | Reject | Present escrow amount is tentative based on pr evailing WPI (prov) Mo C directs to update eve n at approval stage and actual excrow amount s hall be on base date of opening. |
| Annexure / Plate | Plate-20 - Reclamation Plan has been put here - It should be replaced by "Post Mining Land use Plan" with relevant Tables ! | Approve | Complied |
| Annexure /Plate | Plate-21A to 21D - a. Road - Road connecting Pit mouth to Stack/ CHP, facilit ies not shown. b. Haul Road - Upto Dump top may be shown. c. Surface Cont ours - May not be shown within excavated area. d. Benches - Finishing may b e done. | Approve | Complied |
| Annexure /Plate | Plate-21E - Reclaimed /Planted area may also be shown | Approve | Complied |
| Annexure /Plate | Plate-22 - Forest area returned is not marked on Plate, The Table shows For est returned in 5th year, Pls check if it will be returned in Post Closure Stage. Technically reclaimed land is less than degraded land in Table. | Approve | Complied |
| Plate | Plate-23 - It seems to be same plan as Plate 14 | Approve | Noted and modified ,Pl ate 23 has been renam ed and uploaded as Du mp Plan. |

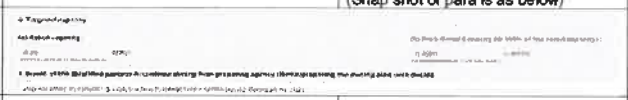
| | | | |
|---|---|---|---|
| Plate | Plate nos. I, II, III etc Should be 1, 2, 3 etc in Monogram/ Emblem | Approve | All the plans have been revised as suggested. |

(PC MPPA-IMPCON)

# Additional Annexure-12

Annexure-12

**Compliance of Observations of Hon'ble Scrutiny Committee Mine Plan & Mine Closure Plan of Marki Mangli-II Coal block ( Application APP00210).**

| Sl No | Parameters | Final Observation Details | Reply/Compliance |
|---|---|---|---|
| | **INPUT SHEET** | | |
| 6 | a. Targeted capacity<br>b. Peak rated capacity (150% of the rated capacity) | Rated capacity and Peak capacity shall be furnished. | In the input sheet the rated capacity and peak rated capacity have been furnished on portal, seems to be portal issue.<br>(Snap shot of para is as below) |
| | |  | |
| 1.1 | **Chapter 1 : Project Information** | | |
| 1.3.9 | Cardinal Points co-ordinates of the Block boundary | The table shall be as per the format given in the guidelines. | Revised table of the cardinal points as per guidelines has been uploaded . |
| 1.4.6 | Likely date of mining operations, if operations not yet started & reasons for non-commencement of operations | Has the stated coal excavated and overburden removed certified by any authority? | Yes<br>The production in the mine started in the year 2013-14 by the previous allocatee i.e M/s Shree Virangana Steels Ltd. The mine was operational till 2014 . The coal and OB production from the mine was 0.10 Mte and 0.42 MCUM respectively. The subject Coal and OB production from the mine have been certified by Ministry of Coal in |
| | | | the mine dossier received at the time of bidding. |
| 1.51 | Block Area in "Ha" | Geological Block area has increased as compared to the Earlier approved mining plan? To be explained. | As per approved Mining Plan geological block area mentioned is 330.70 Ha. However, prior to issuance of vesting order MoC has provided a file named "Mine Cardinal Points" to the project proponent through which the coordinates of the block cardinal points as well as block summary was available. Subsequently, DGPS survey has been carried out based on the boundary co-ordinates provided by MoC and it has been found that the block area is 339.467 Ha (~3.4 sq.km as per block summary document) . |
| 2.1 | **DETAILS OF THE BLOCK** | | |
| 2.2.12 | Seams not considered for Mining with reasons | Seam Follo plan and floor contour plan of Bottom Seam shall be furnished (If present in the GR) | Bottom Seam is impersistent and intersected in only 3 boreholes, In GR no seam follo and floor contour plan of bottom seam have been made/available. |
| 3.1 | **MINING METHOD** | | |
| 3.1.2 | Proposed method of mining with justification with justification on suitability of method of mining | (a) Sand from OB has been proposed to be mined. It shall be noted that necessary approvals/ permissions regarding extraction/ processing/ other details of sand extraction from OB shall be taken from the competent authority (as per statute).<br>(b) Height of top soil dump to be specified. | a) The Project proponent shall comply all the prevailing statutory clearances/ permissions and approvals as required during actual implementation of the proposed scheme of sand from OB.<br>b) The height of top shall be 3m for single tier and 6m for two tier maximum. This has also been |

| | | | |
|---|---|---|---|
| | | (c) Observations made by Accredited MPPA and point-wise compliance done by the project proponent, during Expert Review, shall be furnished.<br><br>(d) The project proponent shall submit an undertaking that the mine shall be operated as per the Environment Clearance (EC) & Forestry Clearance (FC) for the project (refer Para 1.16 of the Guidelines for preparation of Mining Plan of MoC dated 29.05.2020).<br>(e)The company board shall give financial assurance for implementation (refer Para III, Annexures of the Guidelines for preparation of Mining Plan of MoC dated 29.05.2020). | mentioned at para 3.1.2 ( appearing just before text of 3.1.3 para of the report).<br>c) The observations/feedback made by Expert Reviewing MPPA has been compiled online in swcs portal. The captured para wise observations/feedback and compliance made thereon by the Project Proponent and its MPPA consultant is now being annexed as **Annexure-11 .**<br>d) The undertakings required as per guideline is covered in Annexure 3A1 under item 5 of the Board's resolution which is already uploaded in the portal.<br><br>e) The contents of the para-III, Annexure of guideline have been fully covered and committed for compliance (Refer item 6,7,8 and 9 of the Board's resolution) which is uploaded as Annexure-3A1. |
| 3.1.11 | Whether negative proving for coal/lignite in the proposed site for OB dump /infrastructure has been done | Parameters should be according to the guidelines. To be corrected. | Yes<br>OB dumping has been proposed in the non coal bearing area and falls within the allocated block area lying beyond the incrop of the workable seam. Four boreholes MK-13,14,25 36 have been drilled beyond the incrop of the bottom most base Seam. Moreover, exposures of Lameta beds in the west, also confirm the non-coal bearing nature of the zone. The geological Report has been prepared by Directorate of Geology and Mining Department, Maharashtra State conforming the non coal bearing area within the geological block and proposed lease area. With reference to the Geological Plan (Plate-5) and Conceptual Plan (Plate- 8), it can be seen that the proposed OB dump and infrastructure area are falling in non-coal bearing zone, beyond the incrop of both the coal seams. The lithologs of all the above four boreholes are provided in plate no- 6A, 6B.<br>It is further proposed that during actual mine operation and making access to the seam few shallow bore holes shall be drilled for exact delineation of coal seam incrop. |
| 4.1 | **Safety Management** | | |
| | Important safety aspects: Major Risks and uncertainties to the project viz. Proximity to river, adjacent working, geo-mining disturbances, slope stability and remedial measures suggested. It should also include proposed overall | (a) Timeline for HFL determination of nala to be specified? All safety precautions shall be taken against inundation. | (a) This is a seasonal nala originating from north out side of block where no HFL is available. During mine opening in 2026 and topographical survey of mine area by the project, proponent shall mark/extend and cooperate the authority for such determination of HFL in the diverted |

| | | | |
|---|---|---|---|
| | slope of the quarry and OB dump, dump height, strata control, fire and spontaneous heating, gas monitoring, disaster management, danger from inrush of water etc. | (b) Nala diversion route and safety precaution taken against inundation to be elaborated /shown on plan | route. All statutory precautions as required under Coal Mines Regulation 2017 and other statutory provisions shall be complied and have been suitably addressed in the para 4.1.1 of Safety Chapter. The said para is further supplemented with this compliance .<br>(b) The Nala diversion route has been shown in all relevant plans of the mining plan |

# Additional Annexure-13

**ANNEXURE-13**

**COMPLIANCE TO THE OBSERVATIONS OF THE INTERNAL COMMITTEE ON MINUTES OF MEETING OF VIDEO CONFERENCE DATED 10-08-2022 FOR APPROVAL OF MINING PLAN MINE CLOSURE PLAN OF MARKI MANGLI-II COAL MINE(APP00210) OF M/s YAZDANI INTERNATIONAL PRIVATE LIMITED**

**A. After due deliberation the Mining Plan & Mine Closure Plan (Application No APP00210)was recommended for additional clarification from the project proponent.**

| ITEM | OBSERVATIONS | COMPLIANCES |
|---|---|---|
| 1 | Annexure 3A1: Company Board approval shall specify "Financial Assurance for implementation" (refer Parameter III. Annexures of the of the Guidelines for Preparation, Processing, Scrutiny, Approval and Revision of Mining Plan for the Coal and Lignite Blocks of MoC circulated vide OM F No. 34011/28/2019-CPAM dated 29.05.2020. | The updated Annexure3A1 covering the para of "financial Assurance for Implementation is being appended and uploaded as compliance. |
| 2 | Table 8.10.1: (a) Under Progressive Mine closure 50 mm3 has been proposed under "Filling ofVoid- rehandling of Crown dump" and 87.06 MCum have been considered under "Waste Management" . These shall be explained/ corrected.<br>(b) Under Corpus RR , 15 Cr. Expenditure has been proposed. This shall be explained/ corrected.<br>(In this regard it shall be noted that in Para 2.3 of the Guidelines for Preparation, Processing, Scrutiny, Approval and Revision of Mining Plan for the Coal and Lignite Blocks of MoC circulated vide OM F No. 34011/28/2019-CPAM dated 29.05.2020, it is stated that "where the backfilling of the mine void is being carried out as part of regular mining operations, it shall not be included in the list of progressive mine closure activities. However, in case, where the backfilling of mine voidis to be carried out specifically for closure of the mine, quantum of such overburden and the mineclosure fund earmarked for the purpose must be included in the list of activities to be taken up formine closure in the mining plan") | (a) Provisioning of 50 mm3 proposed under "Filling of void -rehandling of Crown Dump" and 87.06 mm3 "Waste Management under Progressive Mine Closure at para 8.10.1 was reconciled and rectified in line with the extent provisions made in para 2.3 of the Guidelines for preparation , Processing ,Scrutiny, Approval and Revision of the Mining Plan for the Coal and Lignite Blocks of MoC circulated vide OM F No 34011/28/2019-CPAM dated 29.05.2020.<br>Provisioning of 50 mm3 proposed under "Filling of Void-rehandling of Crown dump" and 87.06 mm3 under Waste management has been incorporated as a part of Post Mine Closure activities.<br>(b) A provisioning of Rs 15 Cr under RR has been incorporated for financial assistance post closure of mine for people likely to be affected directly or indirectly as a part of initiative of Govt. of India for "Just Transition" Policy. This provisioning has been made under the head "Post Closure activities". |

# Additional Annexure-14

Annexure-14

**Compliance of the Observations of the Internal Committee constituted under MMDR Act 1957 for approval of MiningPlan / Mine Closure Plan was held on 30/08/2022 through Video Conference (VC) to consider Mining Plan and Mine Closure Plan for MARKI MANGLI II COAL MINE of M/s YAZDANI INTERNATIONAL PRIVATE LIMITED**

**Following members of the Internal Committee attended the meeting:**

1. Shri. Joginder Singh, OSD , Member
2. Shri. MARAPALLY VENKATESHWARLU, Director Technical, Member
3. Shri. AJITESH KUMAR, Deputy Secretary (NA), Member

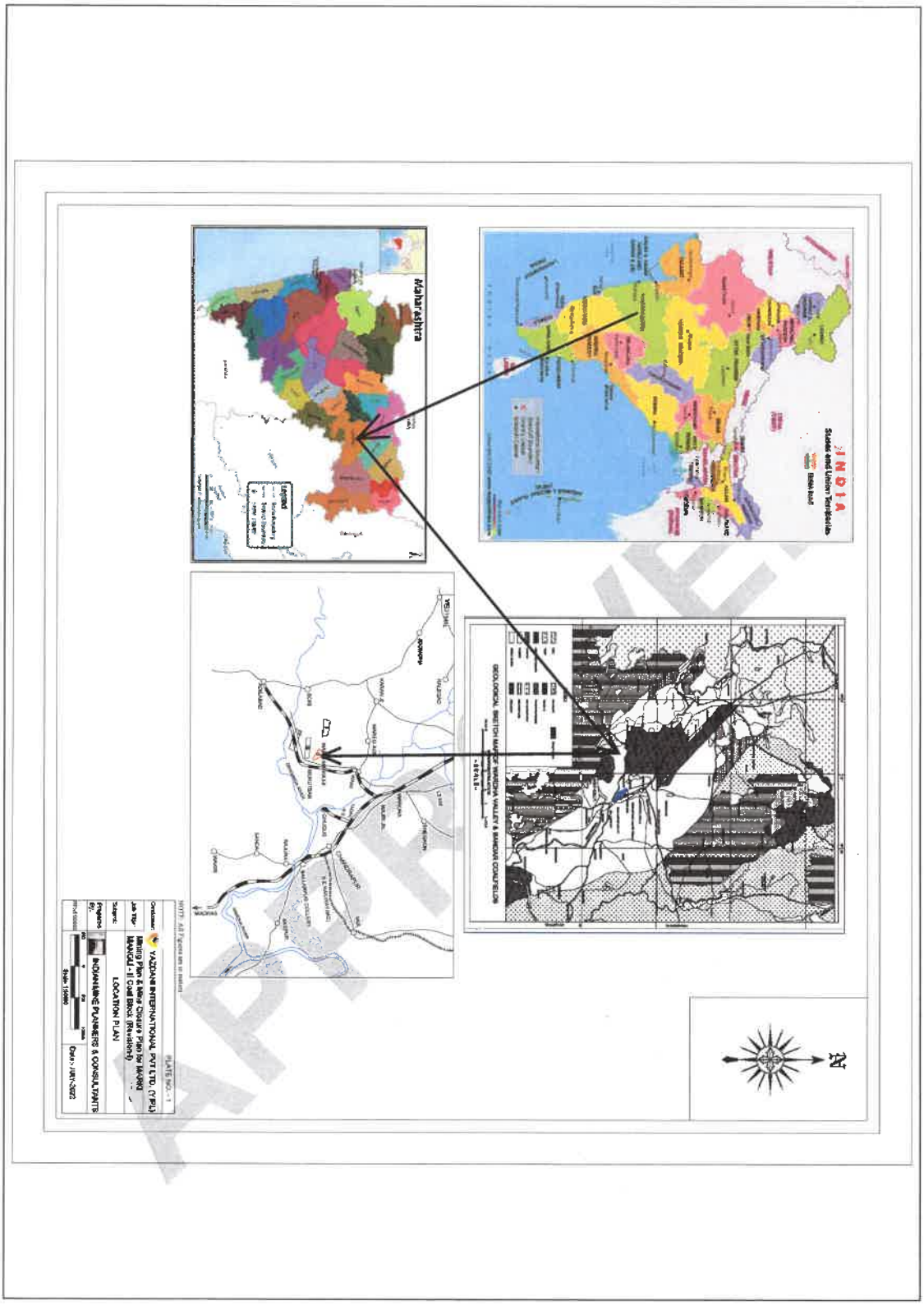
**After due deliberation the Mining Plan & Mine Closure Plan (Application No APP00210)was recommended for additional clarification from the project proponent.**

**The compliance of obeservations are given as below :**

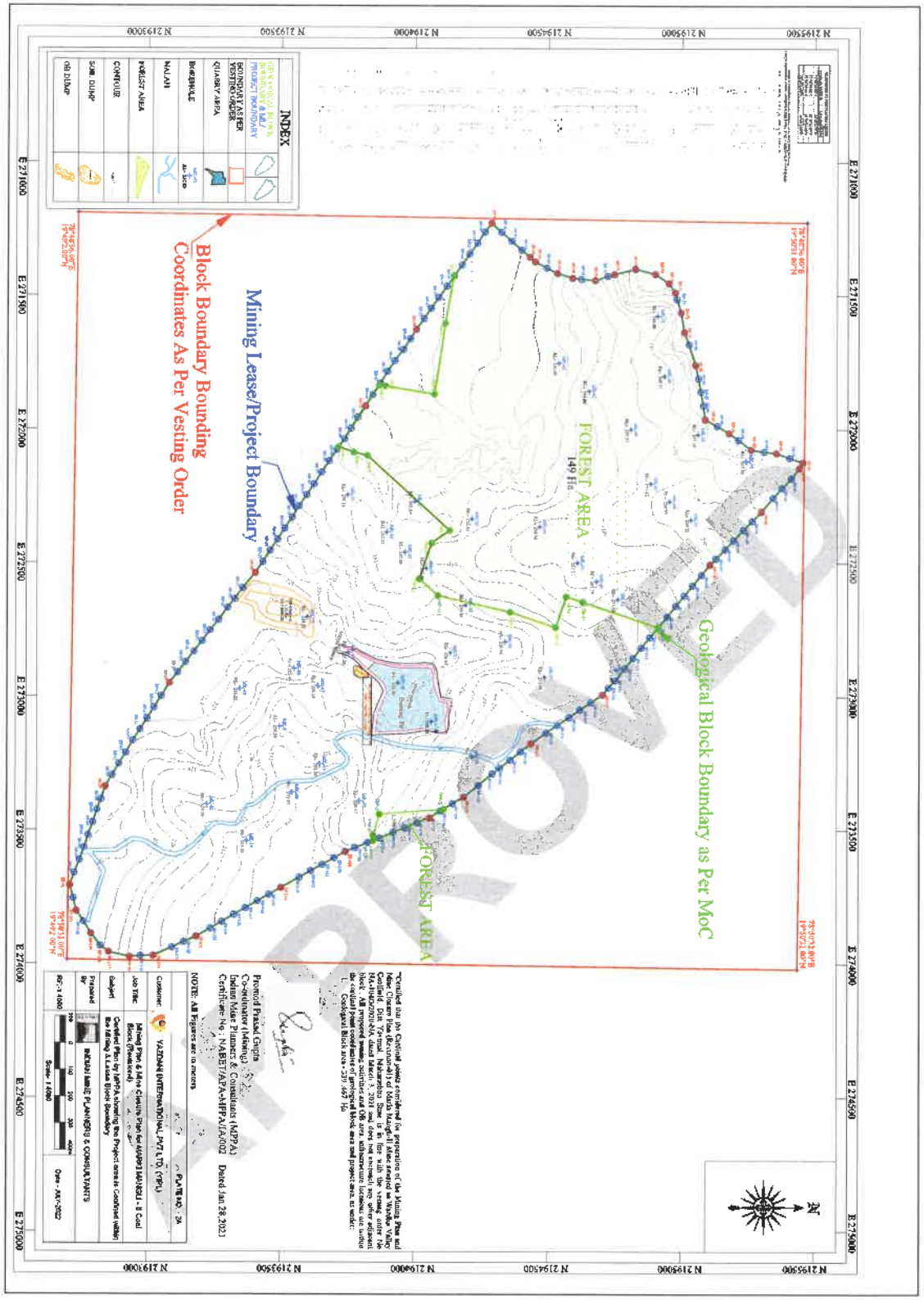
| Sl No | Observations | Compliance |
|---|---|---|
| 1 | It is observed that compliance to the following clarifications communicated vide MoM of Internal Committee for approval of Mining Plan and Mine Closure Plan held on 10.08.2022 through VC to consider Mining Plan and Mine Closure Plan (First modification) for Marki Mangli II Coal Mine have not been done by the project proponent: | It is submitted that the Compliance of the observations of Internal committee held on 10.08.22 communicated vide MoM has been submitted and uploaded as annexure-13 for kind consideration. However, as advised in the observations and communicated vide this MoM of the Internal committee held on 30.08.22 is being submitted a fresh with explanation and corrections in the relevant portions of the table and annexure for further kind consideration and approval. |
| | Table 8.10.1: (a) Under Progressive Mine closure 50 mm3 has been proposed under "Filling ofVoid- rehandling of Crown dump" and 87.06 MCum have been considered under "Waste Management" has been proposed. . These shall be explained/ corrected.<br>(In this regard it shall be noted that in Para 2.3 of the Guidelines for Preparation, Processing, Scrutiny, Approval and Revision of Mining Plan for the Coal and Lignite Blocks of MoC circulated vide | a) The quantity of 50mm3 earlier proposed for "Filling of Void- rehandling of crown dump"<br>Taking the note of observations of the Hon'ble committee members and prevailing guidelines OM F No. 34011/28/2019-CPAM dated 29.05.2020 , the activity is now placed as "Waste management" activity |
| | OM F No. 34011/28/2019-CPAM dated 29.05.2020, it is stated that "where the backfilling of the mine void is being carried out as part of regular mining operations, it shall not be included in the list of progressive mine closure activities. However, in case, where the backfilling of mine voidis to be carried out specifically for closure of the mine, quantum of such overburden and the mineclosure fund earmarked for the purpose must be included in the list of activities to be taken up formine closure in the mining plan")<br>(Note: The activities/ parameters along with the quantity and timing shall be in accordance withthe stage plans/ excavation schedules envisaged in the mining plan. The related bar chart shallalso be modified/ corrected) | at Post closure stage where quarry void of 125 m depth(max) shall be backfilled with existing waste (internal) dump and about 50 mm3 of waste will required be handled by dozing and grading as post closure activity, so that the depth of Void(water body) shall reduce to be about 30m or within statutory permissible safe depth. Since transportation of waste is not involved, a nominal provision of @INR 2.5/m3 has only been considered for the same .<br>Earlier 87.06mm3 of waste considered under "waste management" has been relooked and now assessed that only 30 mm3 of waste will be required to be rehandled and dozed from the internal dump to maintain permissible height of the backfilled area as a " Progressive mine closure activities -Waste management . The provision @INR 2.5/m3 has been made, and figures have been accordingly corrected/modified.<br>The related bar chart(Annexure-5) has been suitably corrected and modified. |
| | (b) Under Corpus RR, 15Cr. expenditure has been proposed. This shall be explained/ corrected (Note: The expenditure proposed shall be according to the list of activities/ parameters as shown in table 8.10.1, Appendix-I, of the Guidelines for Preparation, Formulation, Submission, processing, Scrutiny, Approval and Revision of Mining Plan for the Coal and Lignite Blocks of MoC circulated vide OM F No. 34011/28/2019-CPAM dated 29.05.2020. )<br>The project proponent shall make desired changes in the mining plan and upload on SWCS portalfor further processing | (b) Considering the prevailing guidelines and observations of the Committee figures have been relooked and corrected . The provisions meant for miscellaneous activities for the people who will be directly or indirectly affected due to operation and closure of mine and other unforeseen reasons, now the financial provision is made to take care of the same and the activities enlisted in the head "Other" of table 8.10.1 of the guideline. The total provision in this head now works out to Rs 13 Cr. After incorporating the modification and correction as mentioned above , the mining plan along with this compliance Annexure-14 being uploaded for further kind consideration and approval. |

# Plan/Plates

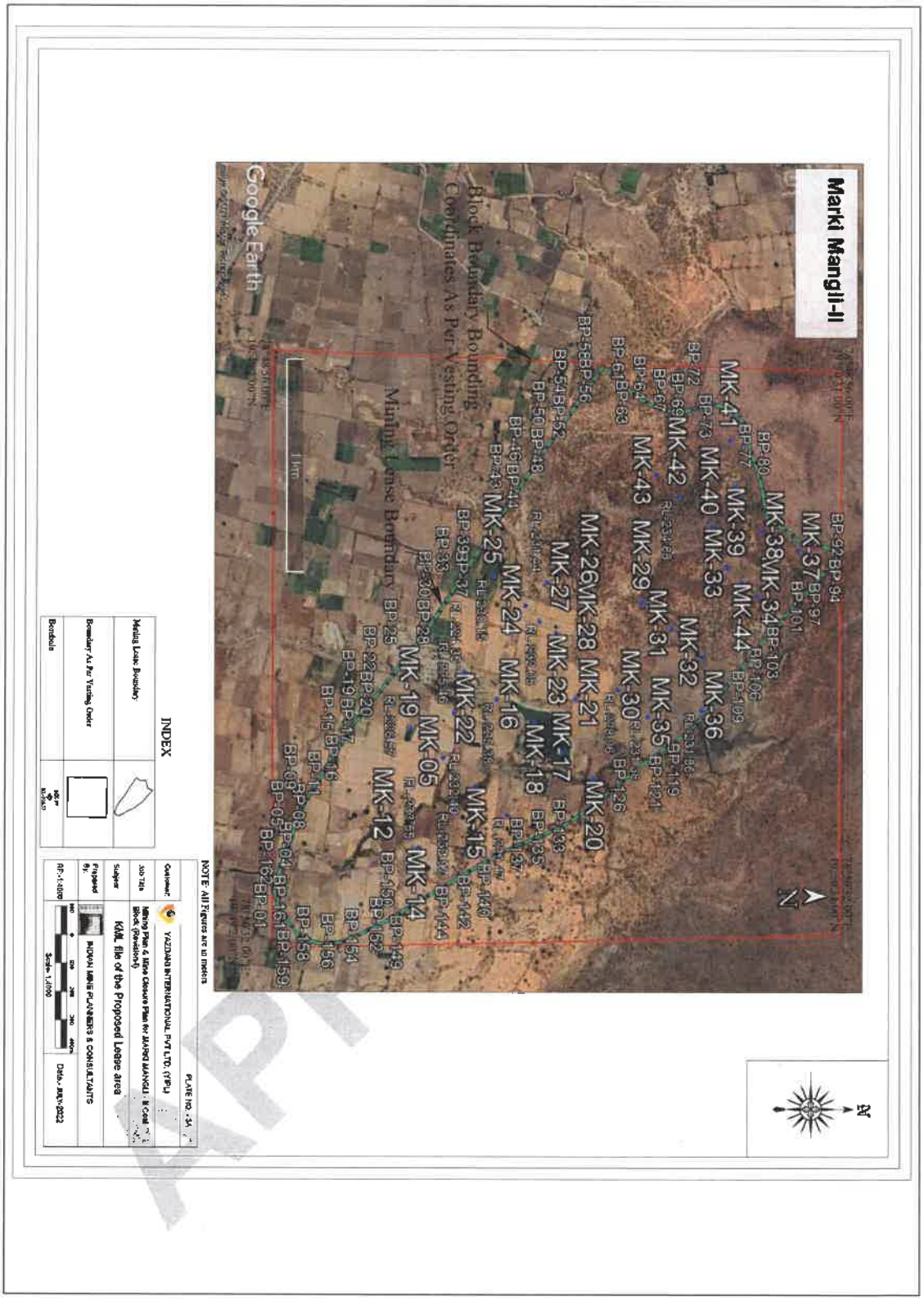
## Plate 1



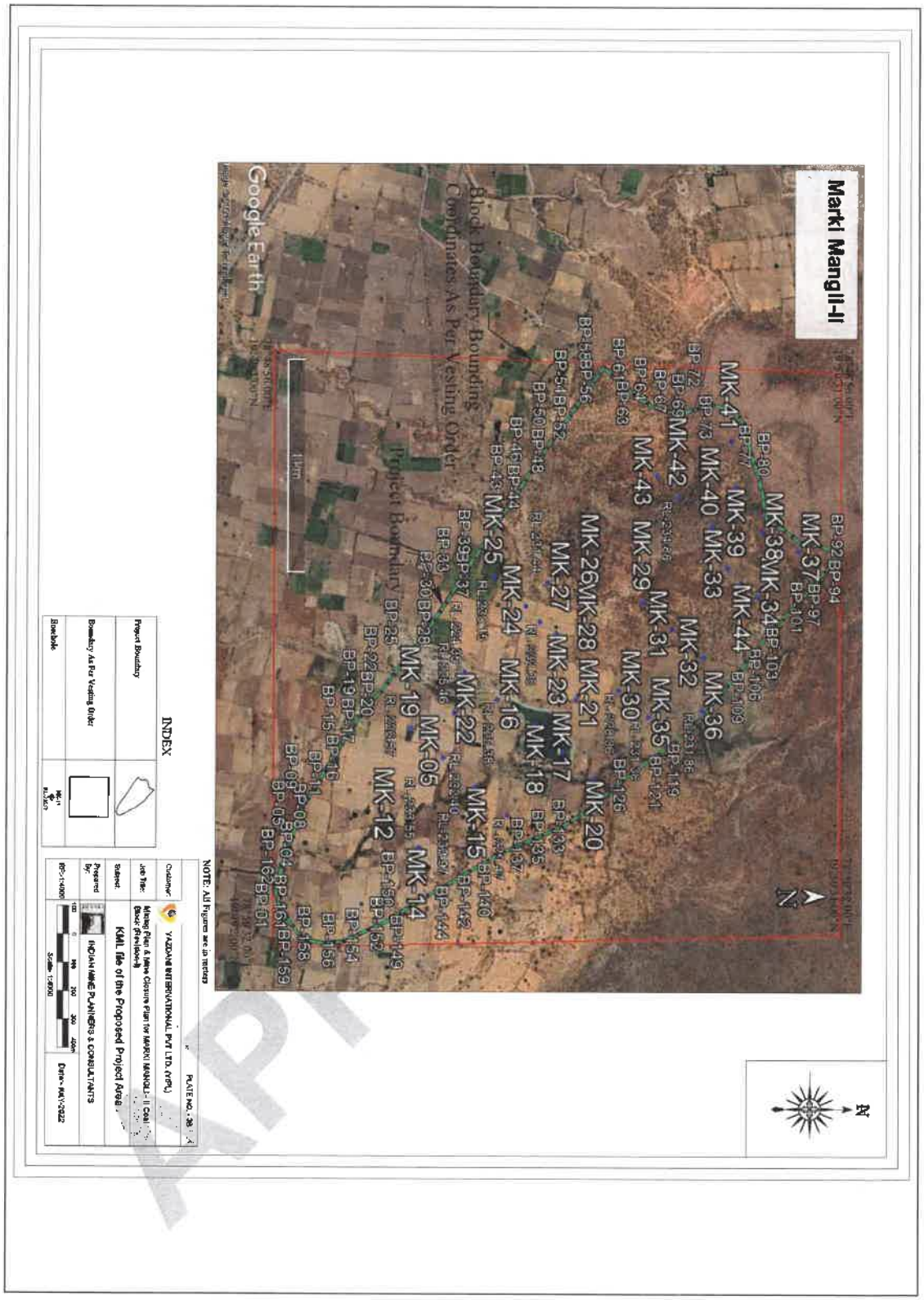
# Plan / Plate 2A



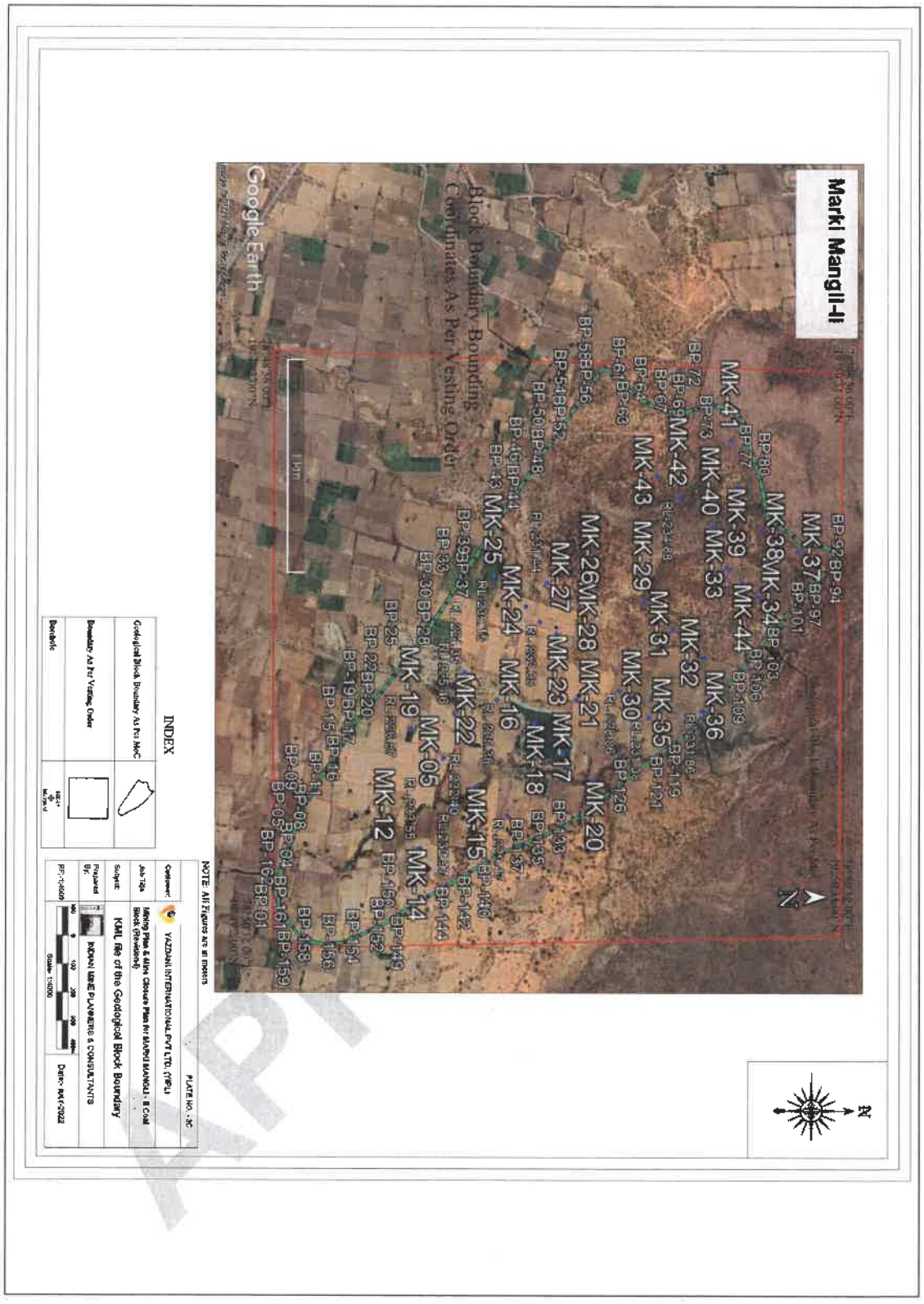
# Plan / Plate 3A (Lease Area)



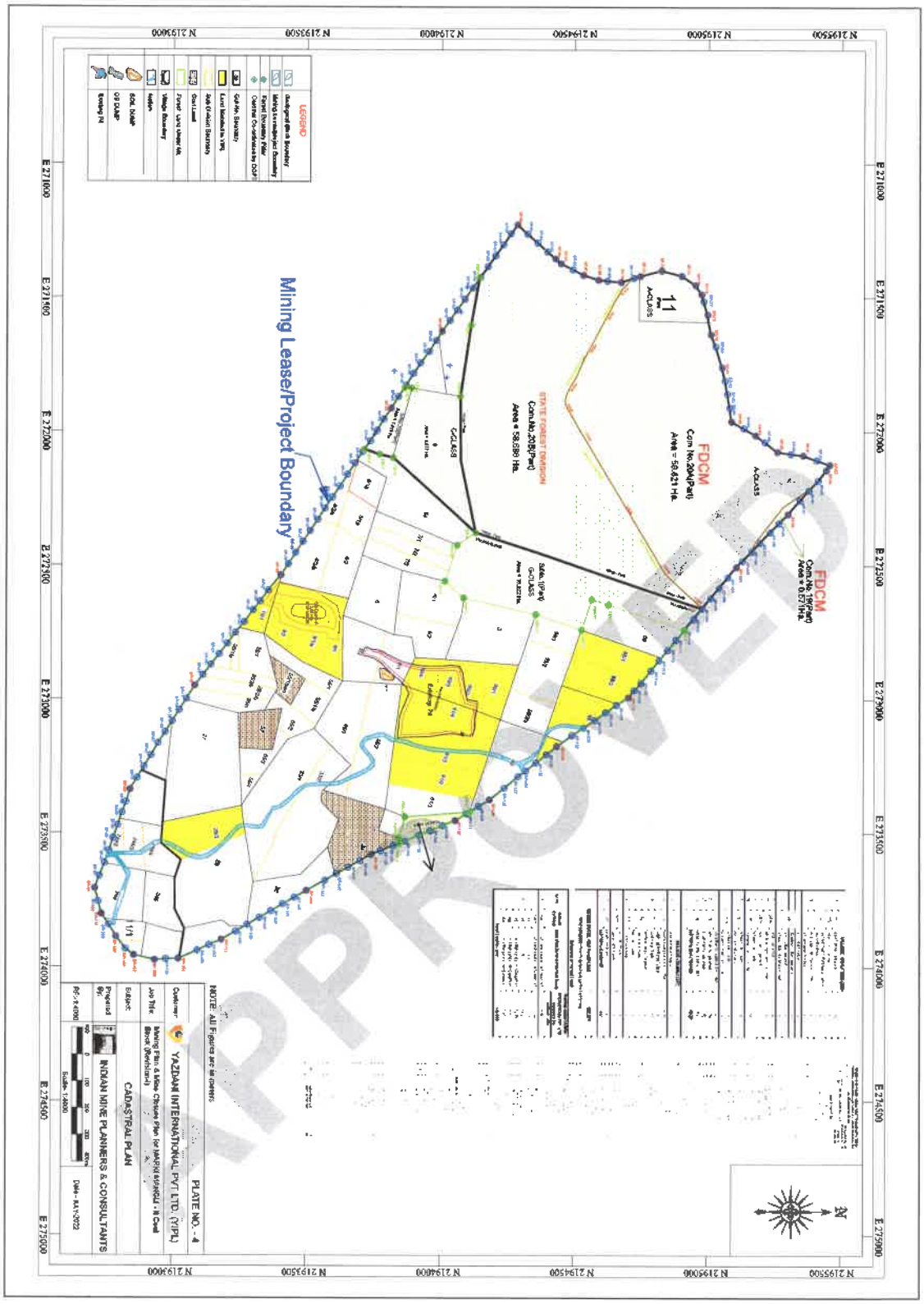
# Plan / Plate 3B (Project Area))



# Plan / Plate 3C (Geological Block))



# Plan / Plate 4



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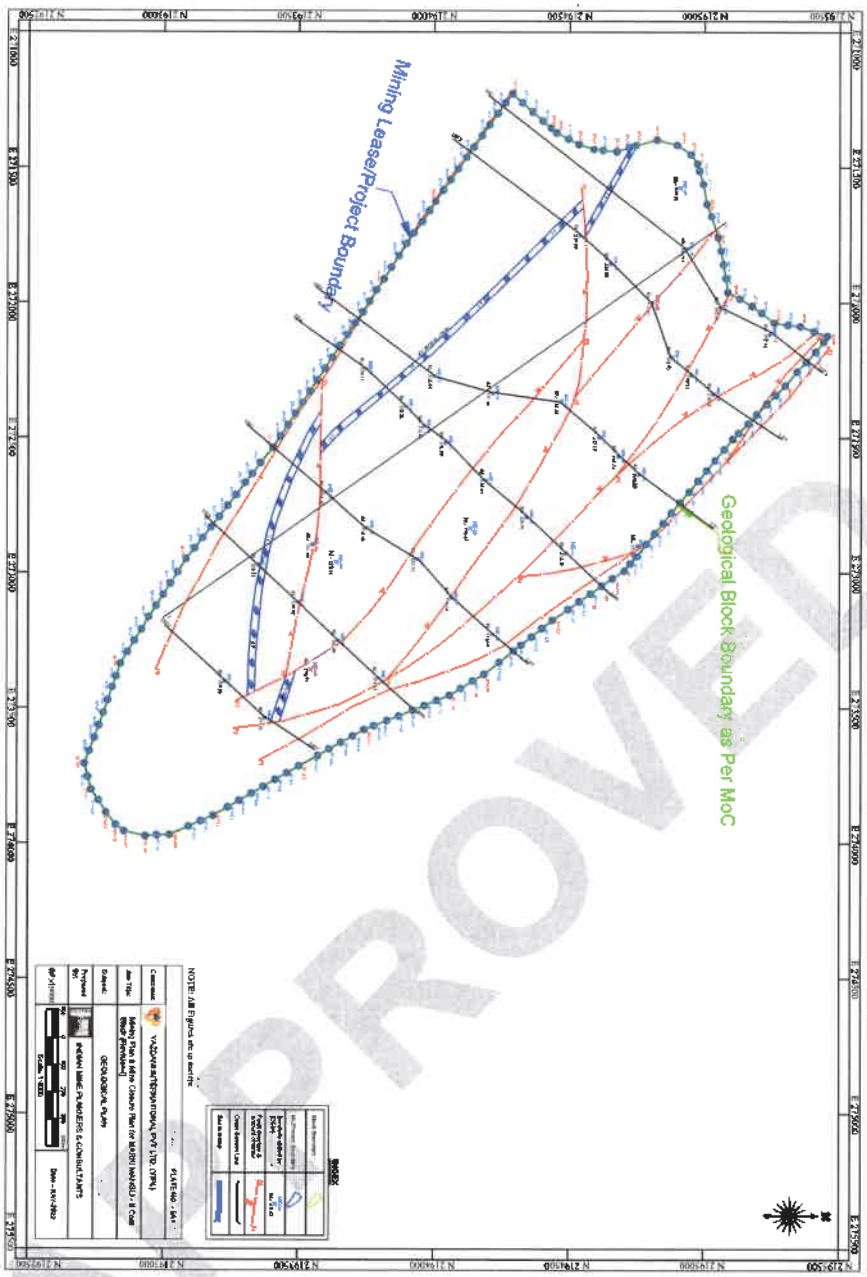
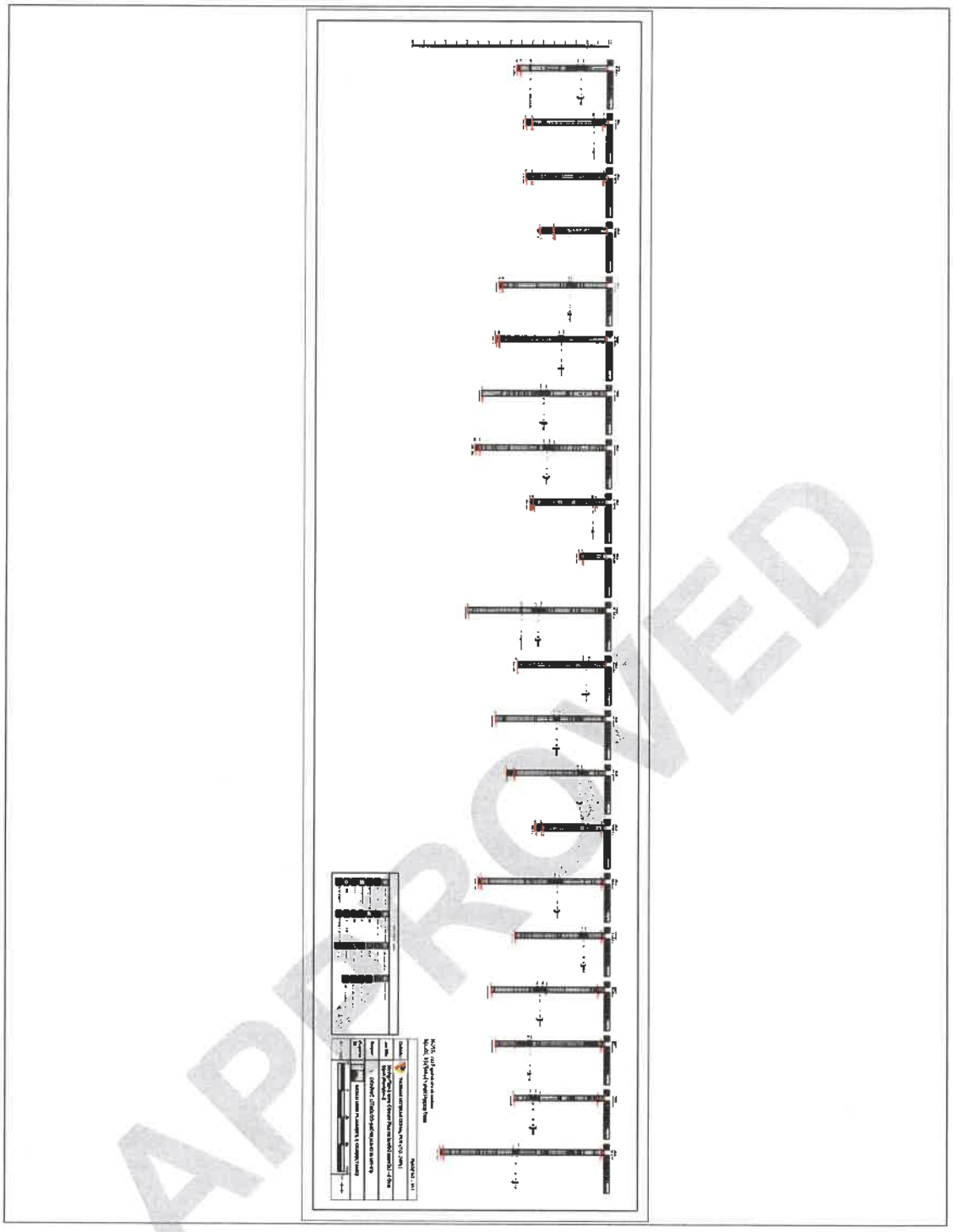
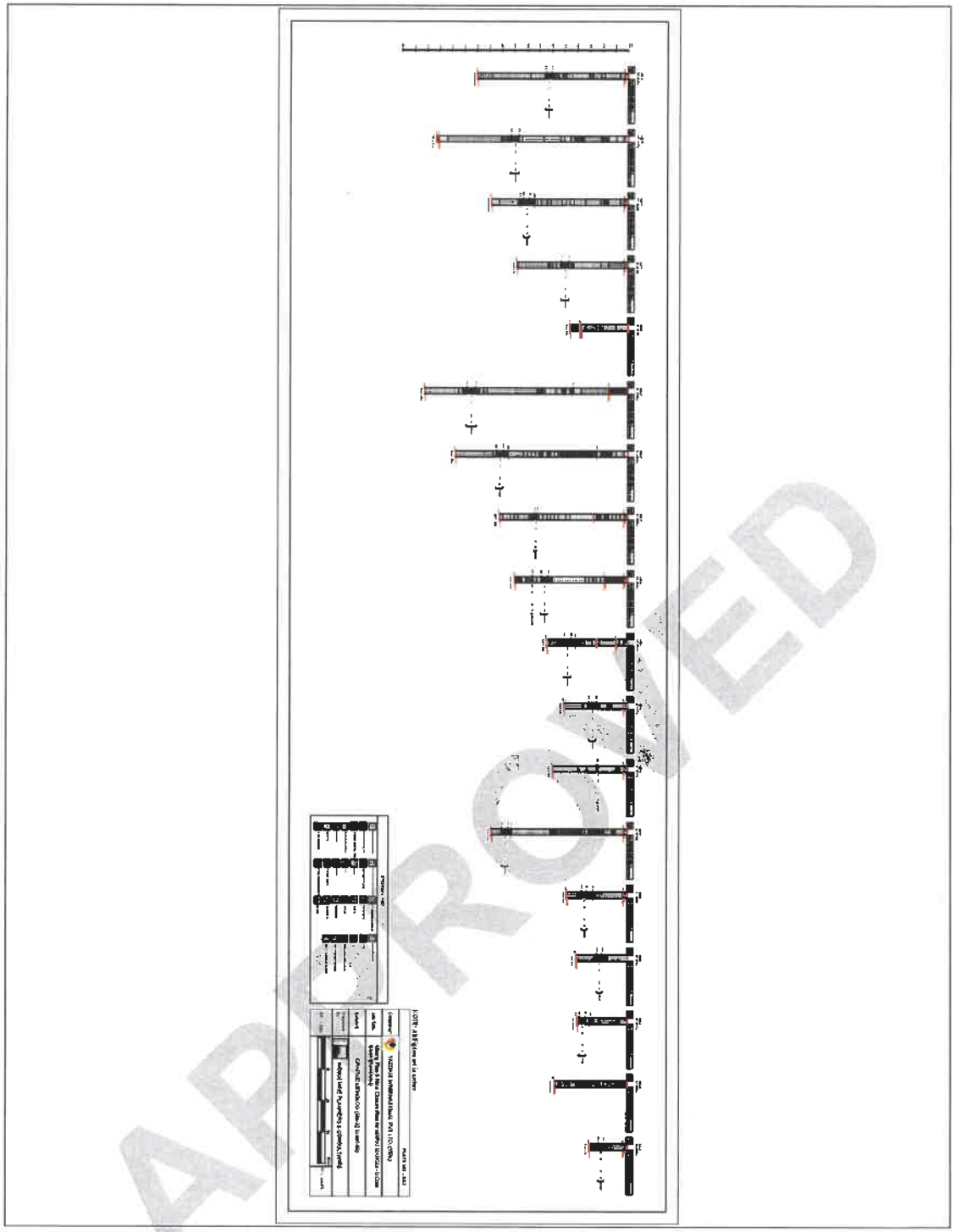
# Plan / Plate 5A1



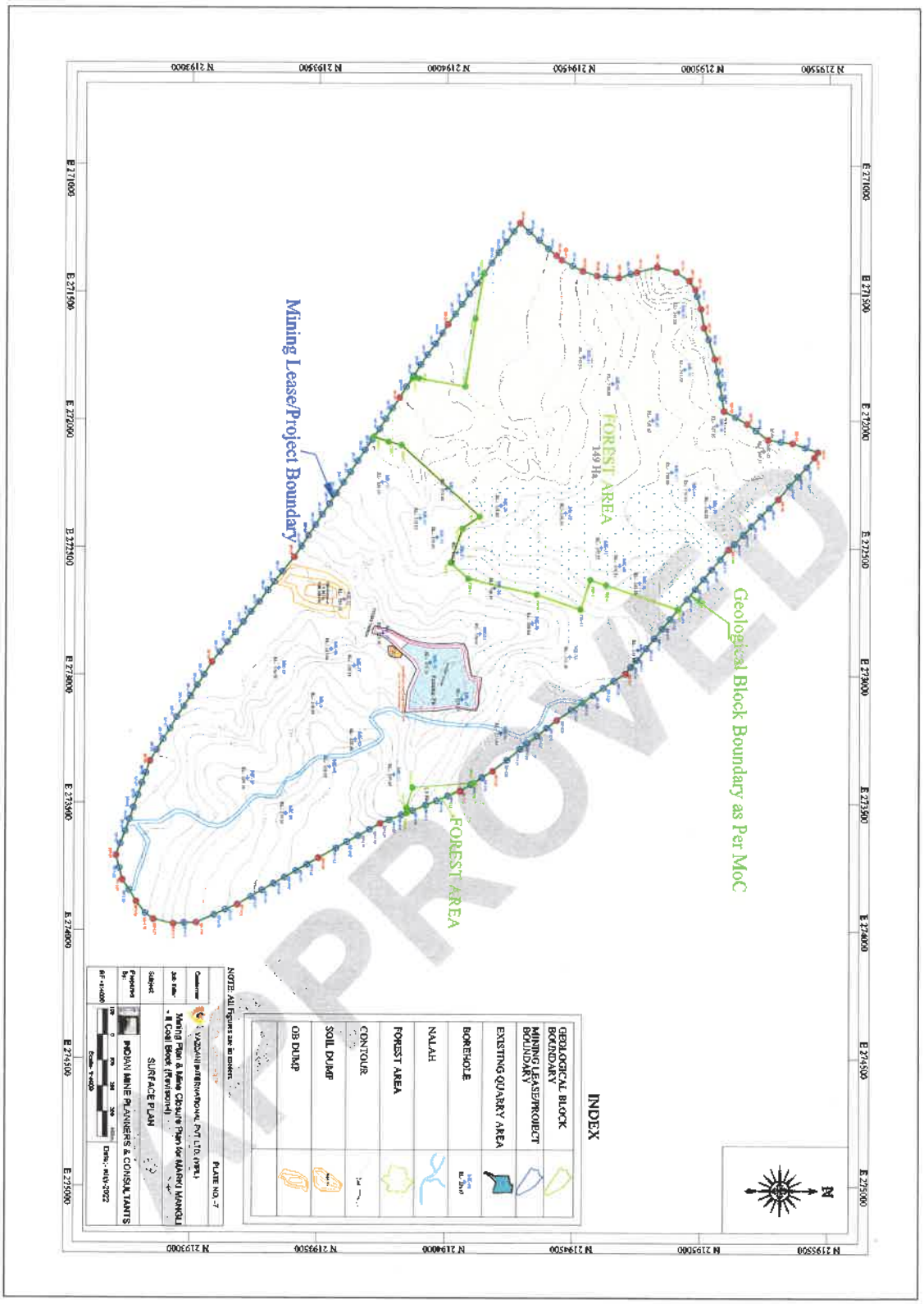
# Plan / Plate 6A1



# Plan / Plate 6A2



# Plan / Plate 7

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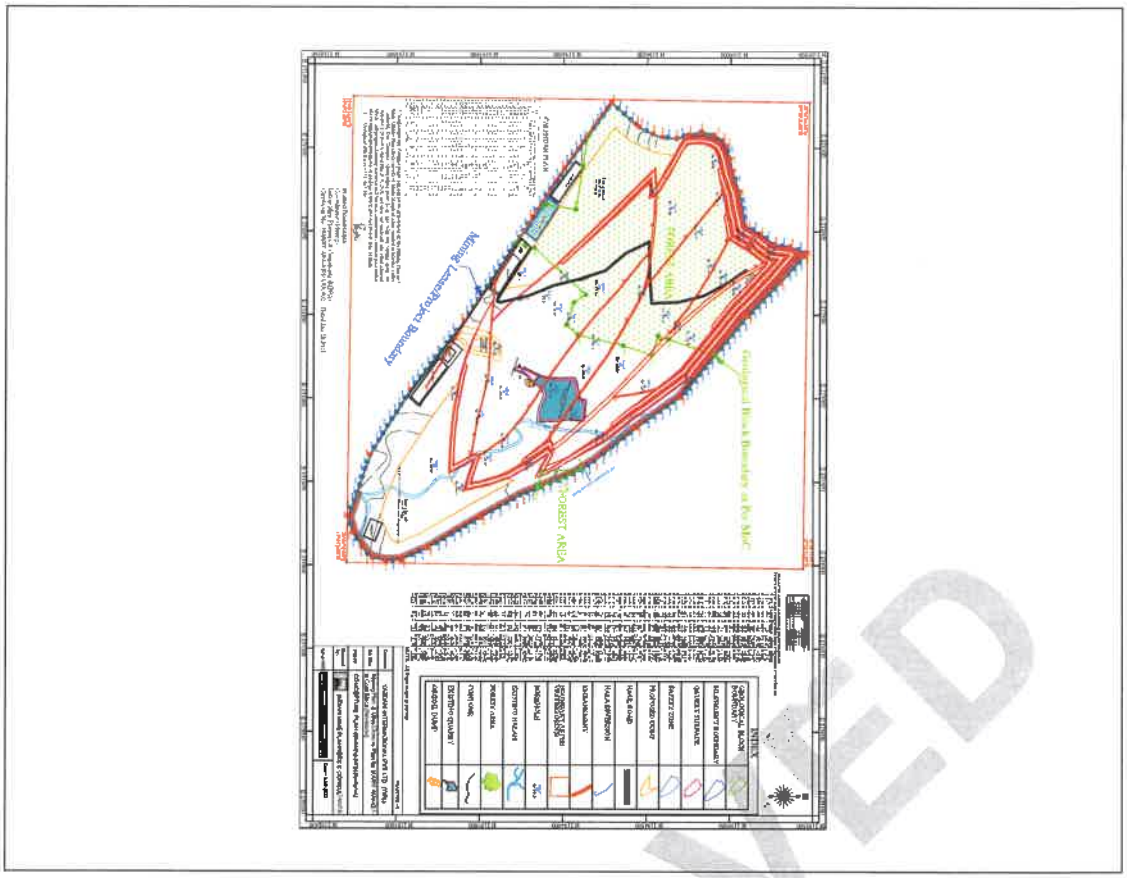
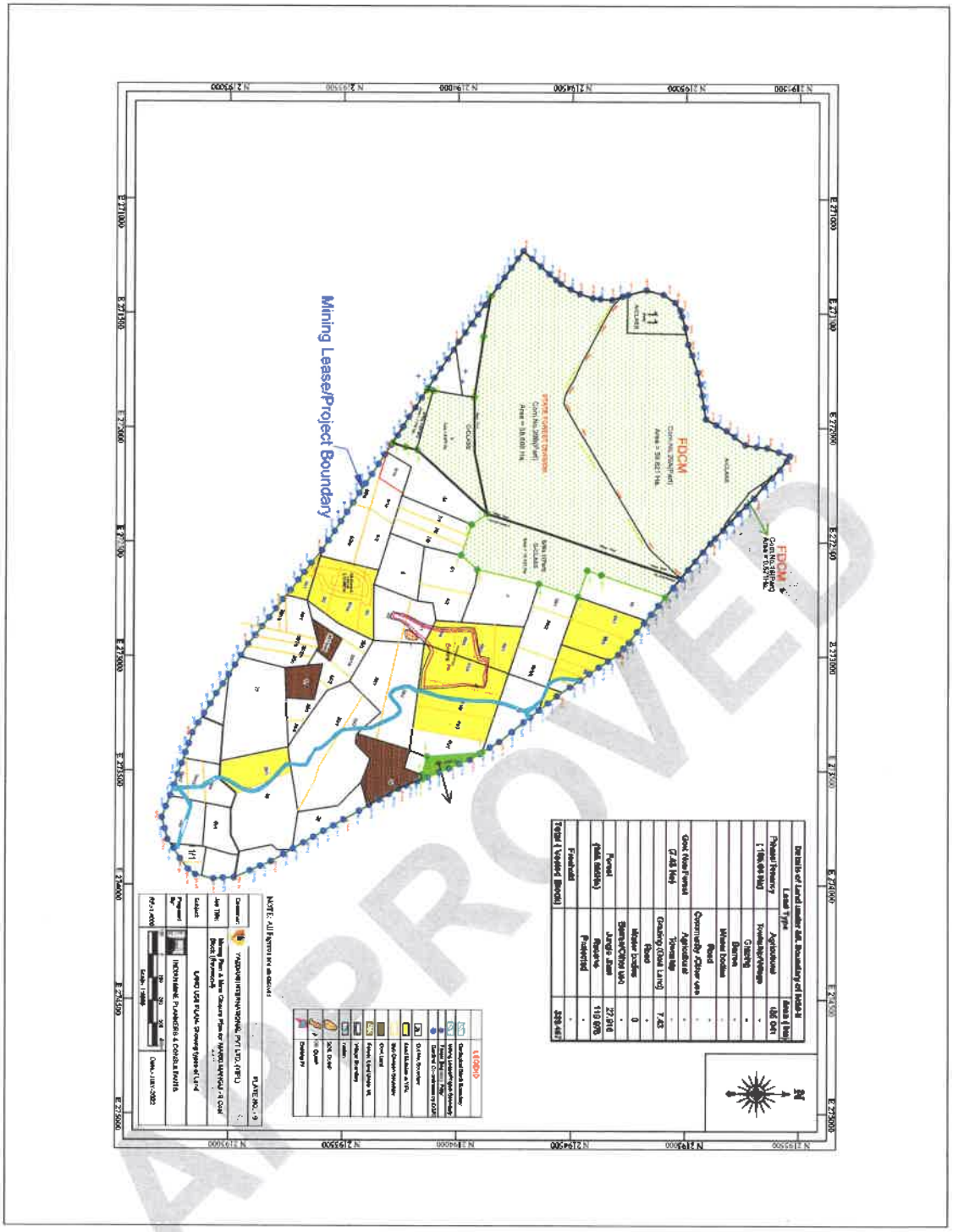
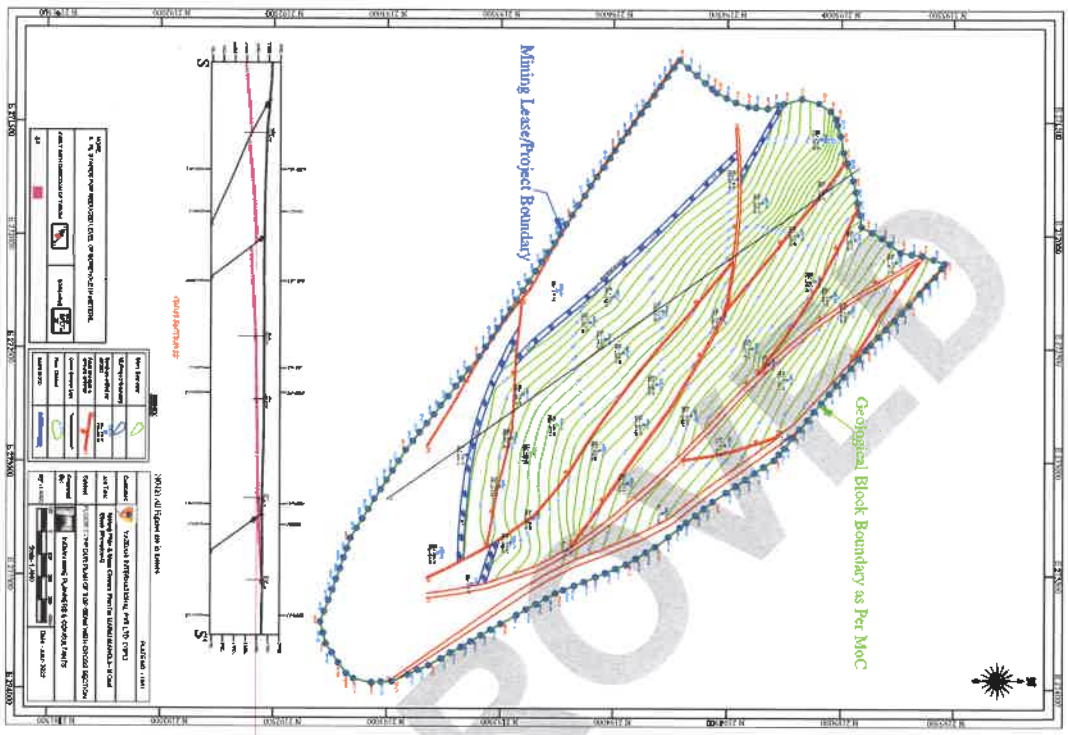
# Plan / Plate 8



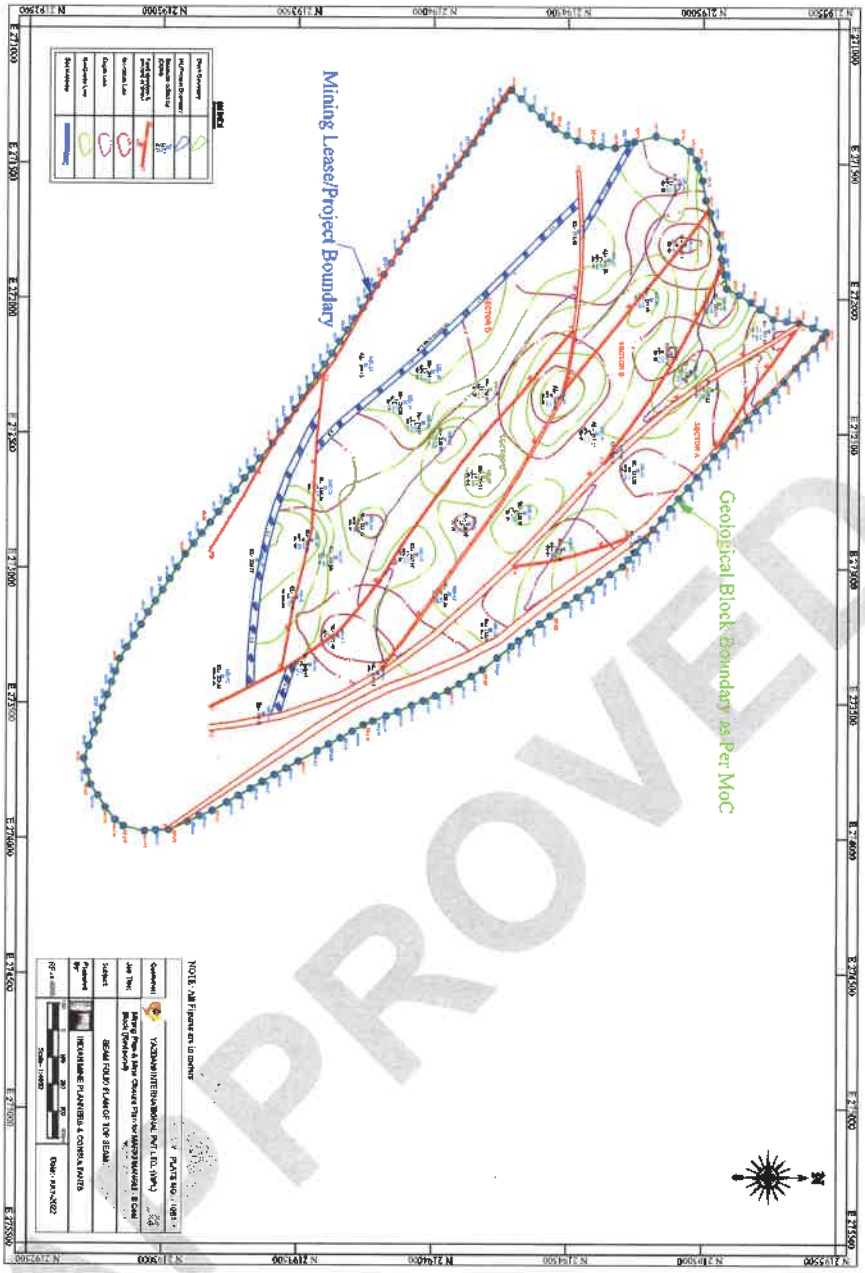
# Plan / Plate 9



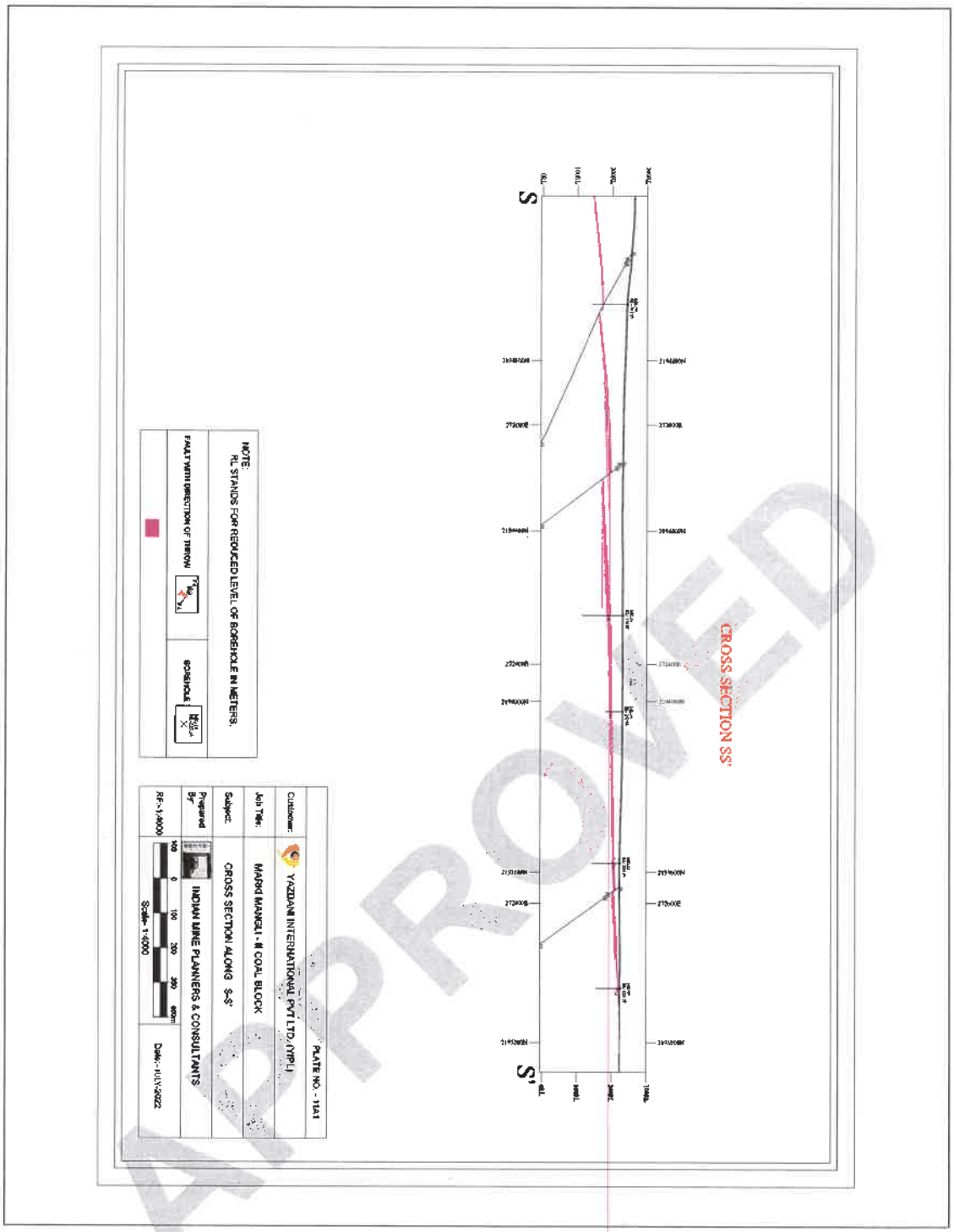
# Plan / Plate 10A1



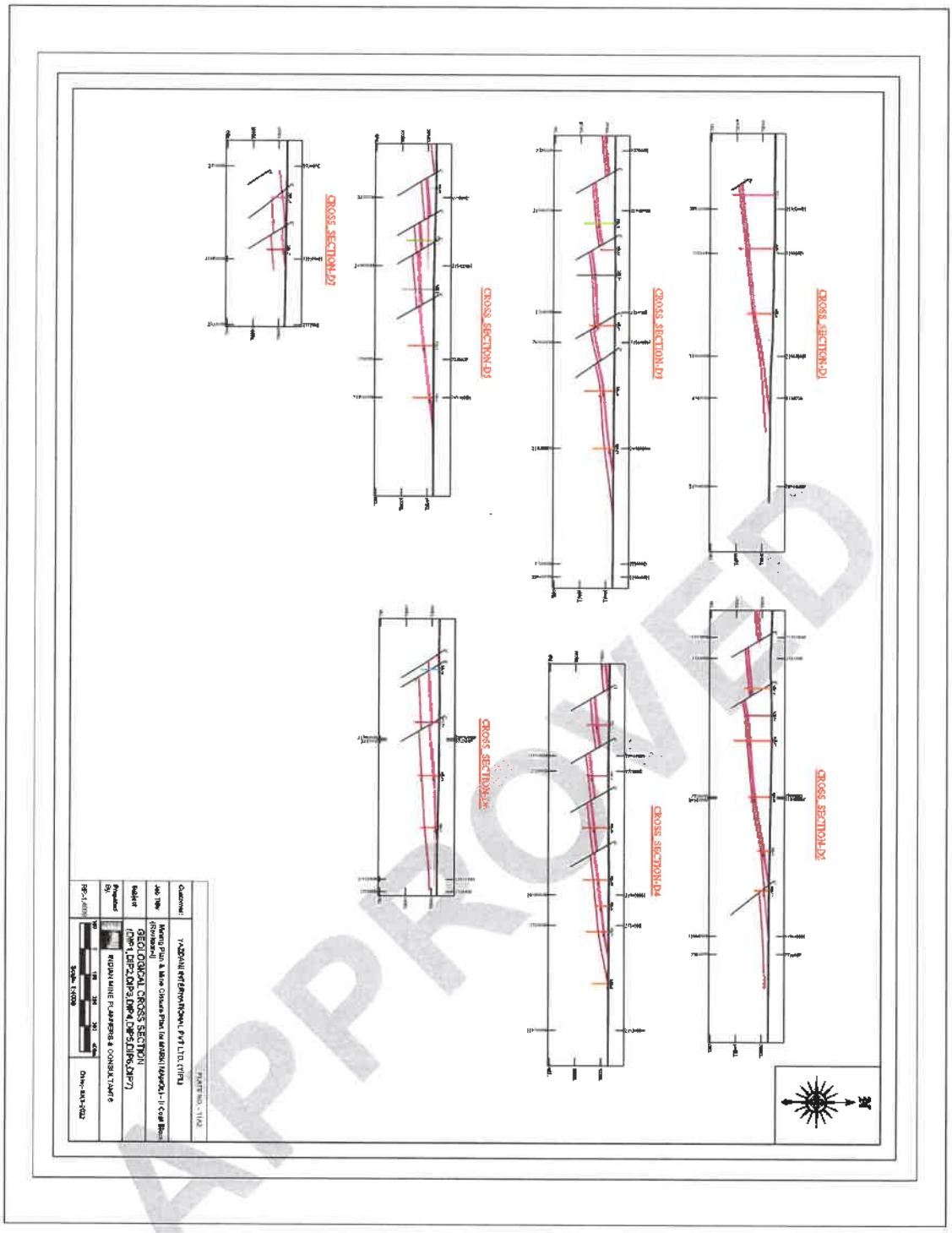
# Plan / Plate 10B1



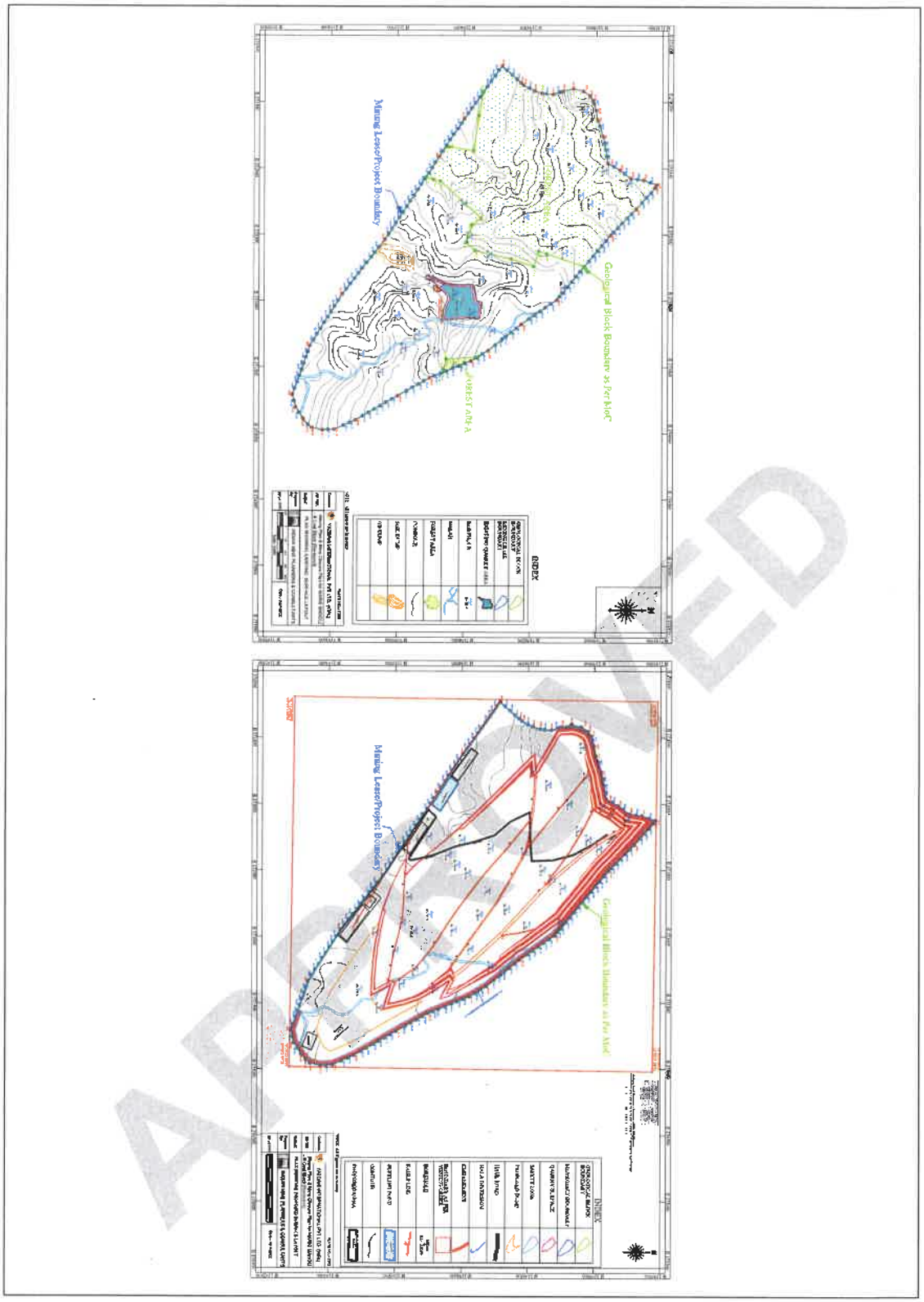
# Plan / Plate 11A1



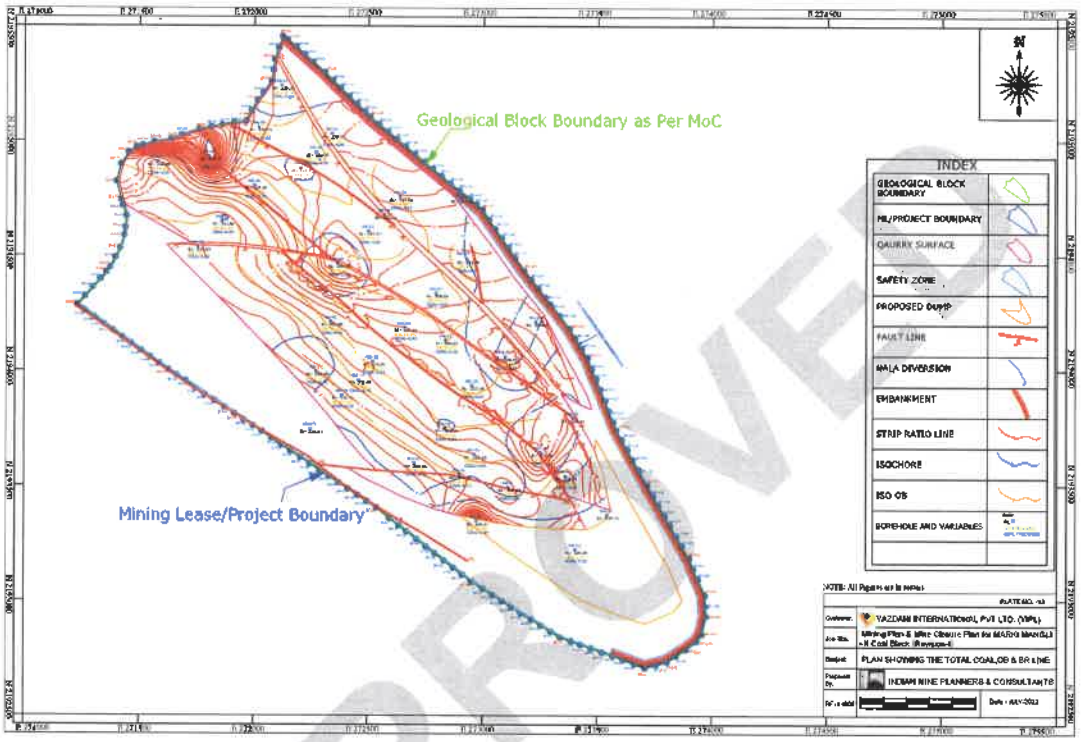
# Plan / Plate 11A2



# Plan / Plate 12



# OC Plate-13



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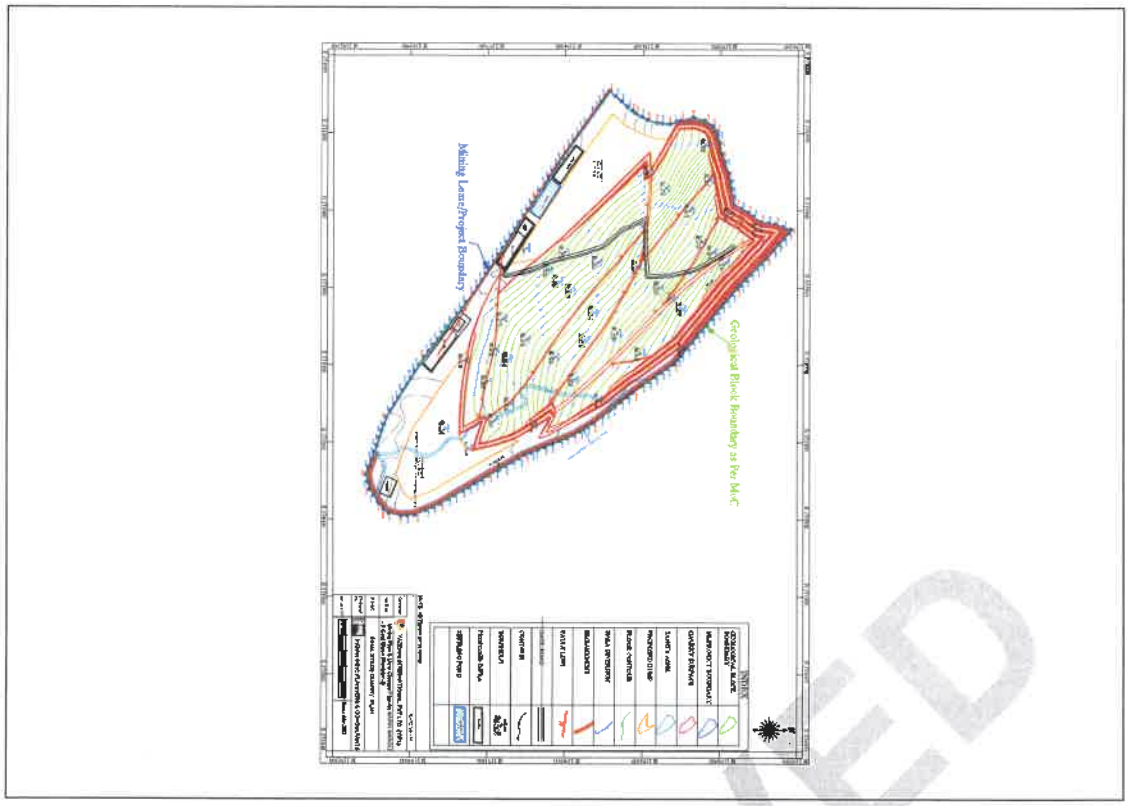
# OC Plate-14



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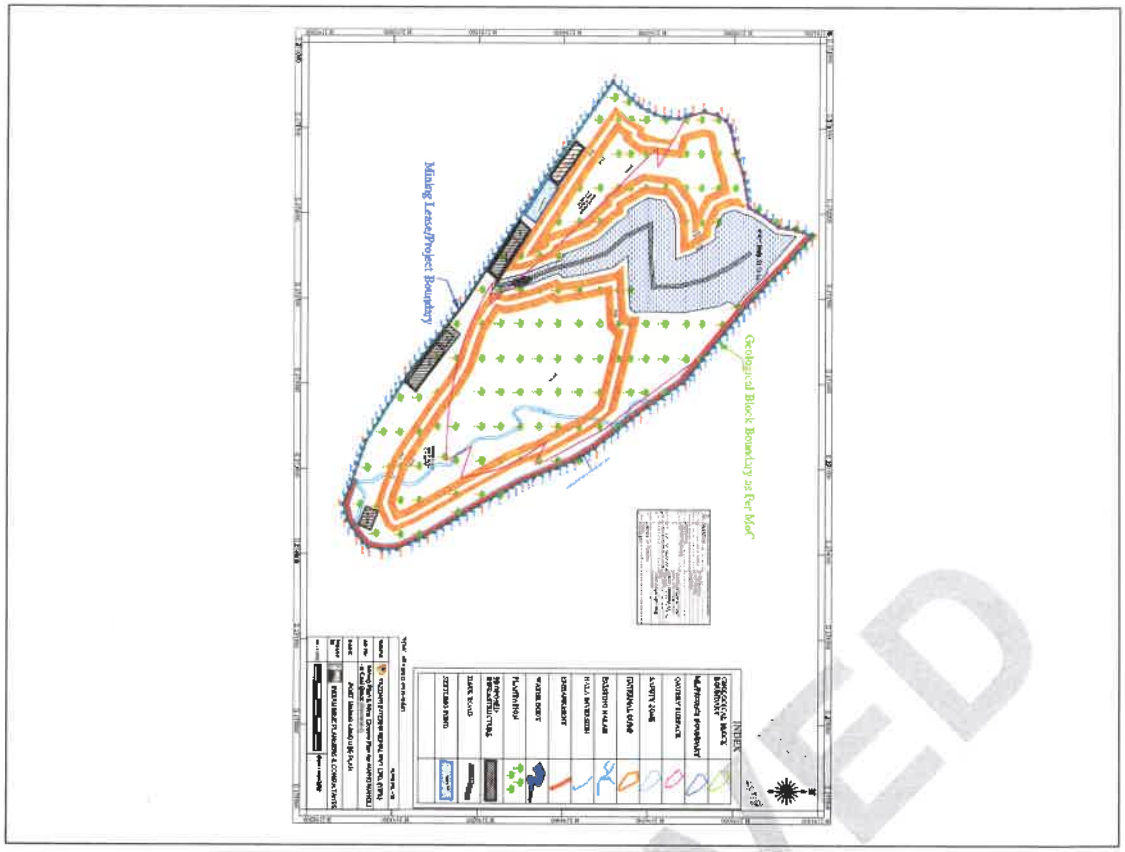
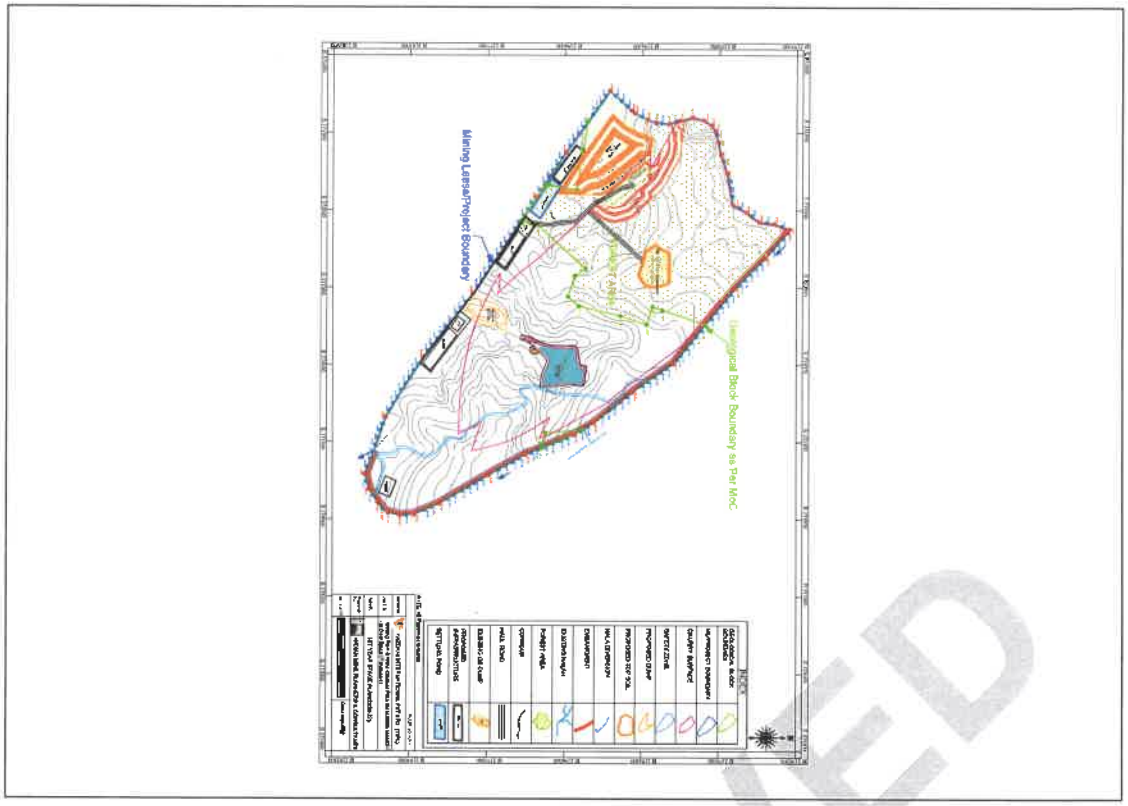
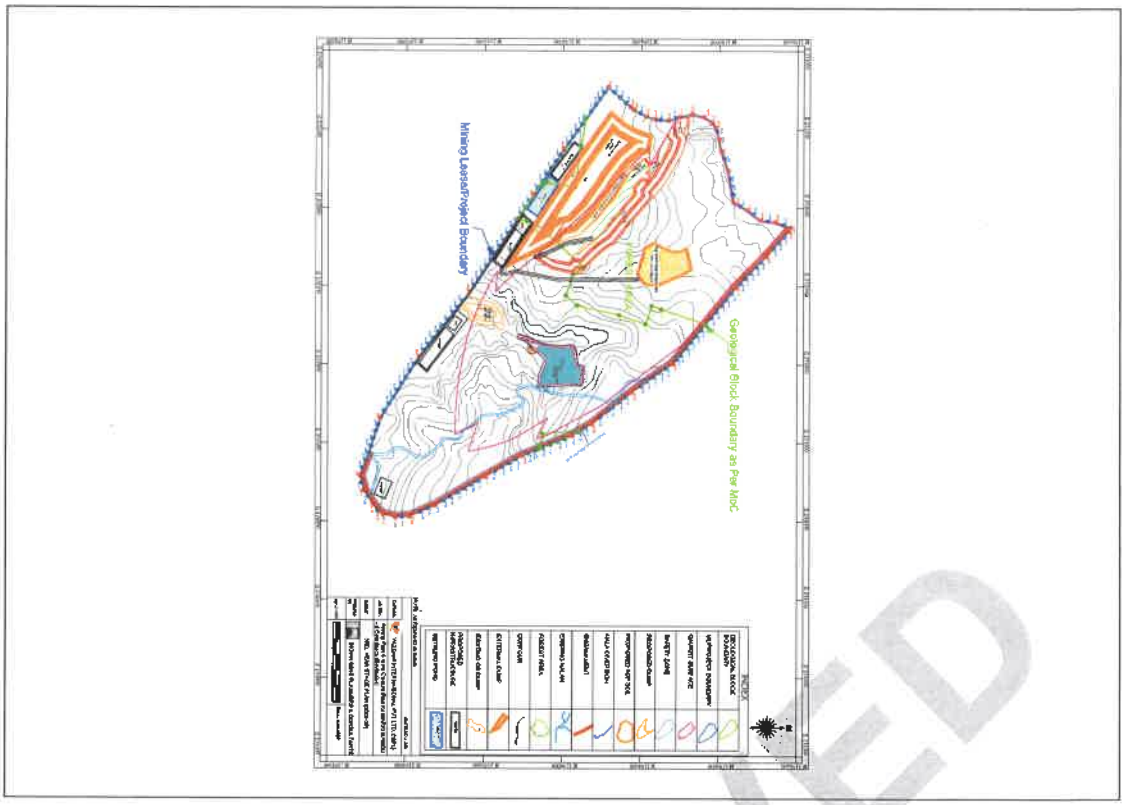
# Plan / Plate 20



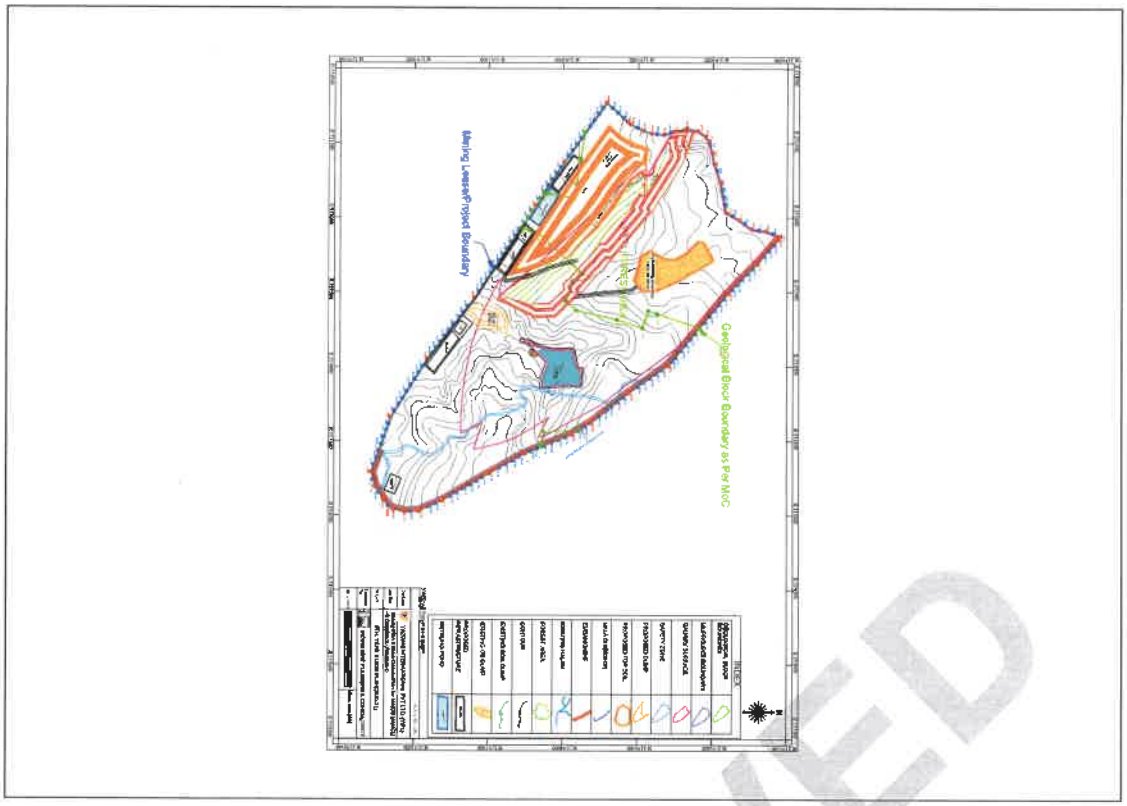
# Plan / Plate 21A



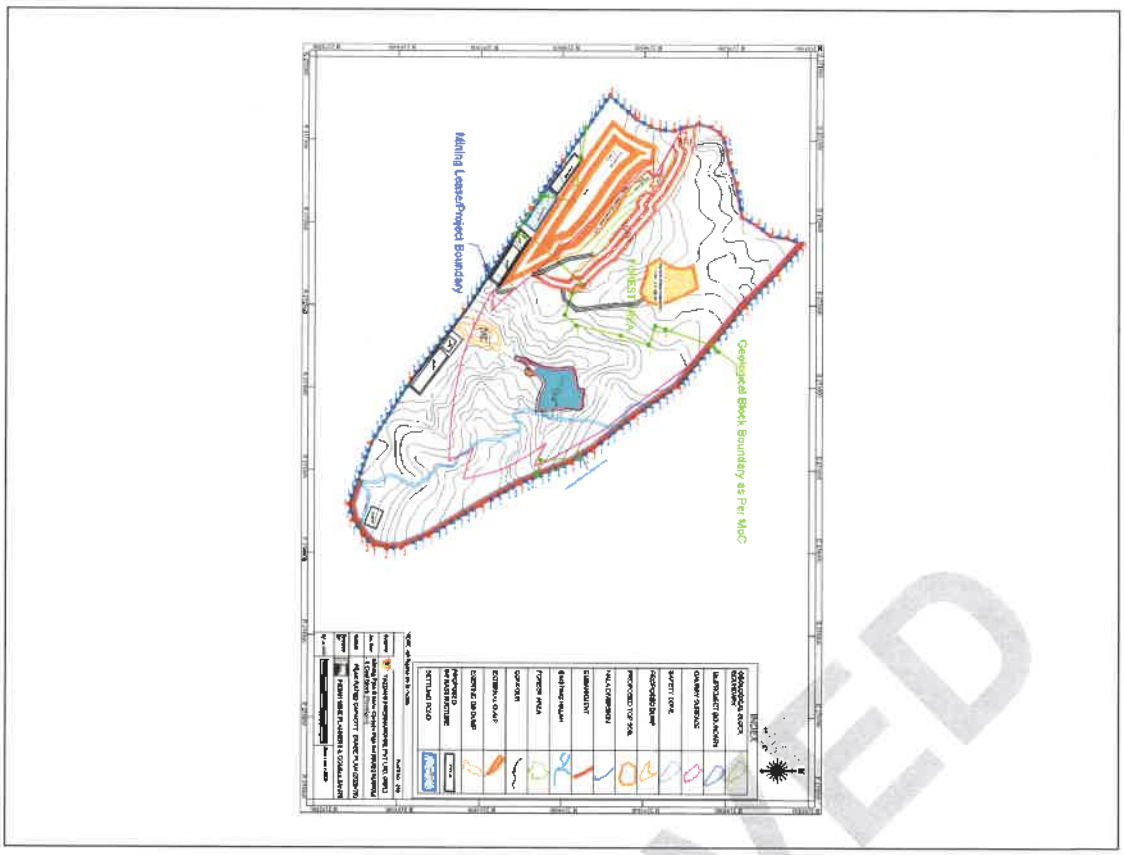
# Plan / Plate 21B



# Plan / Plate 21C



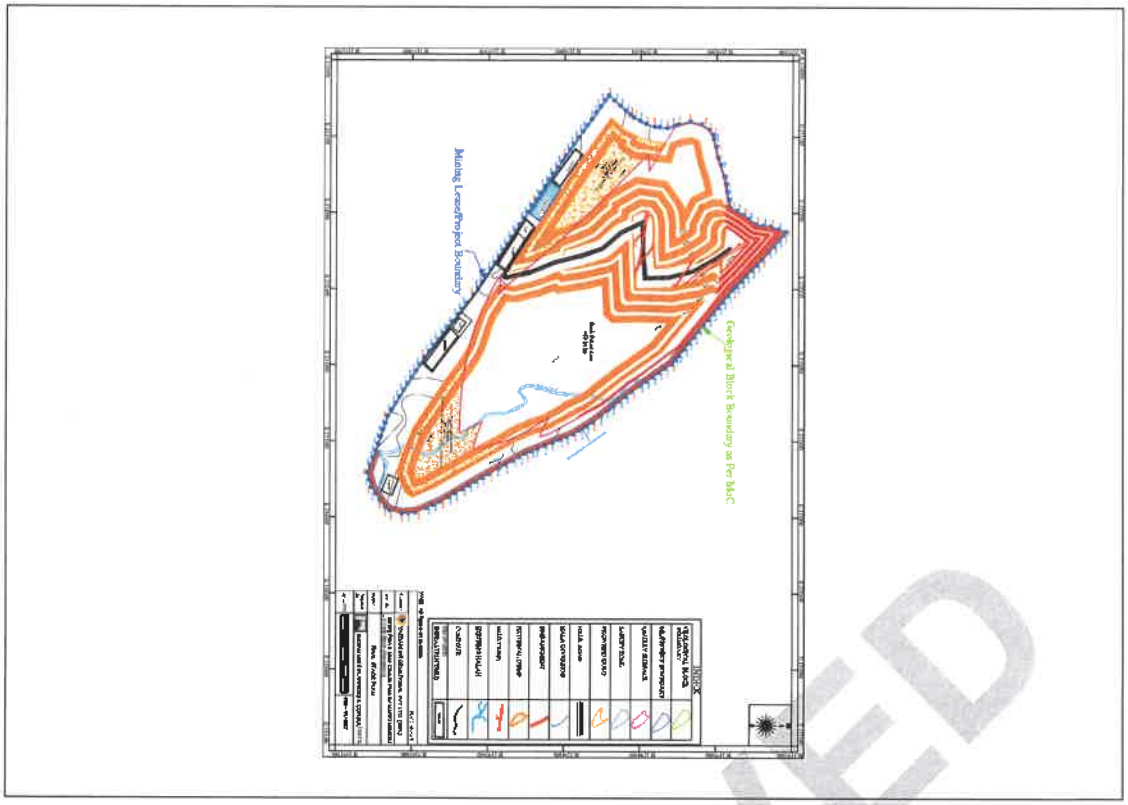
# Plan / Plate 21D






Prepared By INDIAN MINE PLANNERS AND CONSULTANTS On 05/07/2022

# Plan / Plate 21E



# Plan / Plate 22

# Additonal Plan / Plates-23