BEFORE THE HON'BLE CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

PETITION NO.....

IN THE MATTER OF : Petition Under Section 62 and 79 (1) (a) of the Electricity Act, 2003 read with Chapter-III of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 2023 and Regulation-9 read with Chapter-9 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 for approval of **input price of coal supplied from Talaipalli mine for the period from 01.04.2024 to 31.03.2029.**

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Summary of Issues: Talaipalli Coal Mining Project (TLCMP)

(In compliance with CERC notice dated 07.06.2024)

The major highlights of the TLCMP Tariff petition for 2024-29 are as follows: -

The present petition is being filed under Section 62 and 79 (1) (a) of the Electricity Act, 2003 read with Chapter-III of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 2023 and Chapter-9, of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 for approval of input price of TLCMP for the period from 01.04.2024 to 31.03.2029.

TLCMP is located at District Raigarh, in the state of Chhattisgarh (CG). TLCMP started commercial operation (COD) on 01.10.2023. The coal supplied from TLCMP is being used by its end use generating plant i.e. Lara Super Thermal Power Project (2X800 MW under commercial operation, 2x800 MW under execution, 1x800 MW proposed). Power from Lara is being supplied to various discoms (as per MoP allocation and respective PPAs) including Madhya Pradesh Power Management Company Limited (MPPMCL), Gujarat Urja Vikas Nigam Limited (GUVNL), Maharashtra State Electricity Distribution Company Limited (MSEDCL), Chhattisgarh State Power Distribution Company Limited (CSPDCL), Electricity Department of Goa (EDG), Dadra and Nagar Haveli and Daman and Diu Power Distribution Corporation Limited (DNHDDPDCL).

The input price of TLCMP for the period from 01.10.2023 (COD) to 31.03.2024 is yet to be determined by the Hon'ble Commission in Petition No. 386/MP/2023 (The petition is under consideration by the Hon'ble Commission). The capital cost claimed for determination of input price in petition no 386/MP/2023 included the projected additional capital expenditure upto 31.03.2024.

Subsequently, the trued up capital cost from COD i.e. 01.10.23 to 31.03.24 was filed vide affidavit dated 23.11.2024 has been filed for revision of input price of TLCMP for the tariff period 2019-24 (i.e. COD 01.10.2023 to 31.03.2024) after the truing up exercise based on actual expenditures as on 31.03.2024 as per provisions of Regulation 13 of CERC Tariff Regulations 2019 and subsequent second amendment 2021.

The closing capital cost as on 31.03.2024 as per true up petition has been taken as opening capital cost as on 01.04.2024 as per provisions of Tariff Regulation 2024. The capital cost as on 31.03.2029 includes projected additional capital expenditure for FY 2024-25, 2025-26, 2026-27, 2027-28 & 2028-29 the same has been depicted in Form 9 of the Appendix-I along with applicable regulations and justification for the claims. It is humbly requested to approve the projected Additional Capital expenditure claimed during the period of 2024-29.

It is humbly submitted that Revised Cost Estimate (RCE-1) for TLCMP is under approval of NTPC board. RCE-1 has become necessary because NTPC is going to execute CHP at TLCMP as per the approved mine plan. Earlier CHP was envisaged to be executed by MDO but now NTPC shall execute the same. As of now, CHP package is under tendering stage. Since initial investment approval didn't factor in the cost of CHP and therefore, RCE-1 has become necessary. NTPC craves liberty from the Hon'ble Commission to incorporate RCE-1 by amending the tariff forms or through additional submission at a later stage once RCE-1 gets NTPC board approval.

In the light of above submission and as per the Petition being filed by the Petitioner for determination of input price of Talaipalli Coal Mine project, the Hon'ble Commission may please approve the input price of coal for the period 2024-29 as per provision of Tariff Regulations 2024.

BEFORE THE HON'BLE CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

PETITION NO.....

IN THE MATTER OF : Petition Under Section 62 and 79 (1) (a) of the Electricity Act, 2003 read with Chapter-III of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 2023 and Regulation-9 read with Chapter-9 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 for approval of **input price of coal supplied from Talaipalli mine for the period from 01.04.2024 to 31.03.2029.**

AND
IN THE MATTER OF

Petitioner : NTPC Ltd.
NTPC Bhawan
Core-7, Scope Complex
7, Institutional Area, Lodhi Road
New Delhi-110 003.

Respondents

1. Madhya Pradesh Power Management Company Ltd.,
Shakti Bhawan, Rampur,
Jabalpur-482008

2. Maharashtra State Electricity Distribution Corporation Ltd.,
Prakashgad, Bandra (East),
Mumbai-400051

3. Gujarat Urja Vikas Nigam Ltd.,
Vidyut Bhawan, Racecourse,
Vadodara-390007

4. Chhattisgarh State Power Distribution Company Ltd.,
P.O. Sundar Nagar,
Dangania, Raipur-492013

5. Electricity Department of Goa,
Vidyut Bhawan, Panaji, Goa-403001

6. DNHDDPDCL
1st and 2nd Floor, Vidyut Bhavan,
Silvassa-396230, DNH, India

The Petitioner humbly states that:

1) The Petitioner herein NTPC Ltd. (hereinafter referred to as '**Petitioner**' or '**NTPC**'), is a company incorporated under provisions of the Company Act, 1956 and a Government Company as defined under Section 2(45) of the Companies Act, 2013. Further, NTPC is a 'Generating Company' as defined under Section 2(28) of the Electricity Act, 2003.

2) In terms of Section 79(1)(a) of Electricity Act, 2003, the Hon'ble Commission has been vested with the functions to regulate the tariff of NTPC, being a Generating Company owned and controlled by the Central Government. The regulation of the tariff of NTPC is as provided under Section 79(1)(a) read with Section 61, 62 and 64 of the Electricity Act, 2003 and the Regulations notified by the Hon'ble Commission in exercise of powers under Section 178 read with Section 61 of the Electricity Act, 2003.

3) It is submitted that integrated coal mines (both captive mines and basket mines) have been allocated to NTPC for specified end use generating stations, whose tariff is determined by the Commission under Section 62 of the Act. Talaipalli coal mine (hereinafter referred to as '**Talaipalli**') is one such coal mine (captive type) which has been allocated to NTPC Ltd as a linked mine for Lara STPS, 4000 MW (2X800 MW under commercial operation, 2X800 MW under execution, 1X800 MW envisaged). Talaipalli coal mine is located in Raigarh district of Chhattisgarh State. The power generated from the end use station generating station i.e. Lara STPS is being supplied to the respondents herein above.

4) It is submitted that the revised mining plan (1st Revision) for Talaipalli Coal mine was approved by Ministry of Coal (MoC), GoI in September 2023. Copy of the mining plan dated 26.09.2023 is attached as **Annexure- C.**

5) The Hon'ble Commission has notified the Central Electricity Regulatory Commission (Terms & Conditions of Tariff) Regulations, 2024 (hereinafter 'Tariff Regulations 2024') which came into force from 01.04.2024, specifying the terms & conditions and methodology of tariff determination for the period 01.04.2024 to 31.03.2029.

6) Clause (2) of Regulation 2 of Tariff Regulations 2024, as amended, provides as under:

"(2) These regulations shall also apply in all cases where a generating company has the arrangement for the supply of coal or lignite from the integrated mine(s) allocated to it, for one or more of its specified end use generating stations, whose tariff is required to be determined by the Commission under section 62 of the Act read with section 79 thereof."

7) Regulation 9(4) of Tariff Regulations 2024 provides as follows:

"(4) Where the generating company has the arrangement for the supply of coal or lignite from an integrated mine(s) to one or more of its generating stations, the generating company shall file a petition for determination of the input price of coal or lignite for determining the energy charge along with the tariff petitions for one or more generating stations in accordance with the provision of Chapter 9 of these regulations:

Provided that a generating company with integrated mine(s) shall file a petition for determination of the input price of coal or lignite from the integrated mine(s) not later than 90 days from the date of actual commercial operation of the integrated mine(s) in accordance with these regulations."

In terms of above, the Petitioner is filing the present petition for determination input price of coal supplied from Talaipalli mine for the period from 01.04.2024 to 31.03.2029 as per the Tariff Regulations, 2024.

8) It is submitted that Petition No. 386/MP/2023 was filed by the Petitioner before the Hon'ble Commission for determination and approval of input price of coal supplied from Talaipalli coal mine based on the actual capital cost as on COD of Talaipalli (i.e. 01.10.2023) and projected additional capital expenditure for the period from 01.10.2023 to 31.03.2024.

9) The said petition is under active consideration of the Hon'ble Commission and the order for approval of input price of coal for Talaipalli for the period from 01.10.2023 to 31.03.2024 is yet to be issued by the CERC in Petition No. 386/MP/2023.

10) The petition for determination of the input price of the Talaipalli mine for the tariff period 01.10.2023 (COD) to 31.03.2024 was filed by the Petitioner before the Hon'ble Commission in accordance with the CERC (Terms & Conditions of Tariff) Regulations 2019. Same is under active consideration of the Hon'ble Commission. The petitioner vide affidavit dated 23.11.2024 had filed a true up of capital cost from COD to 31.03.2024 in petition no 386/MP/2023 i.e. for the period from 01.10.2023 to 31.03.2024 for revision of input price in line with the applicable provisions of Tariff Regulations 2019.

11) It is submitted that the actual closing capital cost as on 31.03.2024 has been worked out in the aforesaid true-up petition as Rs. 2147.87 Cr based on the actual expenditure after truing up exercise for the period 2019-24. Accordingly, the opening capital cost as on 01.04.2024 has been considered as Rs 2147.87 Cr. in the instant petition. The Hon'ble Commission may be pleased to accordingly adopt this capital cost as on 31.03.2024 and determine the input price in the present petition for the period 2024-29.

12) It is further submitted that Revised Cost Estimate (RCE-1) is under approval of NTPC board, and it shall be duly incorporated in the tariff forms once it is approved. RCE-1 has become necessary on account of expenditure regarding coal handling plant (CHP) envisaged for Talaipalli as per approved mine plan. Two streams of conveyor belt from west and east pit up to coal loading point (i.e. Coal Silo) is proposed to be constructed as per approved mine plan. Right now, CHP is under advance stage of tendering and contract shall be awarded in due course of time. The CHP is proposed to be completed in 2024-29 period. Since CHP execution process is underway, the petitioner is incurring loading and transportation cost. Once CHP is commissioned, it will result in saving of surface transportation and loading cost thereby resulting in reduction of input price. It is submitted that CHP cost was not factored into initial investment approval and hence revised cost estimate has become necessary. The petitioner craves liberty from the

Hon'ble Commission to allow for modification of forms for including revised cost estimate once it is approved by the NTPC Board.

13) It is further submitted that separate contract for surface transportation of coal from mine pit to loading point has been placed for evacuation of coal. The petitioner has to incur this cost for continuous evacuation till CHP gets installed and commissioned as brought out above in the para 12. The additional charges/Surface Estimate of transportation cost has been shown in Form-1. The Hon'ble Commission is requested to allow the same.

14) The capital cost claimed in the instant petition is based on the opening capital cost as on 01.04.2024 considered as above and projected estimated capital expenditures claimed for the period 2024-29 under Regulation 41 and Regulation 42 of the Tariff Regulations, 2024. The input price has been calculated based on parameters provided in Tariff Regulations, 2024, as amended as depicted below:

A. **Debt: Equity ratio**: 70:30.
B. **Base rate of return on equity**: This has been considered as 14%.
C. **Rate of interest on loan**: It has been considered based on actual weighted average rate of interest of the project.
D. **Depreciation:** Straight line depreciation has been calculated as per life of assets mentioned in **Appendix III** to CERC Tariff Regulations, 2024.
E. **O&M expenses**: O&M expenses have been claimed based on actual O&M expenses for the year 2023-24 and the same has been escalated @ 5.25% per year for subsequent years. It is further submitted that the O&M expenses are subject to truing up in terms of Tariff Regulations, 2024, as amended.
F. **Statutory expenses:** These expenses have been indicated as applicable as on date. Any increase or decrease in statutory expenses shall be submitted at the time of truing up. Further, GST @ 5% will be applicable along with GST Cess @ Rs. 400/- per Ton, if the coal is supplied to a station having different GST number.

G. **Fixed Reserve Price:** Fixed reserve price claimed for the period from FY 2024-25 to 2028-29 is based on the actual fixed reserve price paid for the financial year 2024-25 as per office order of Nominated Authority, Ministry of Coal, GoI. Copy of the office order dated 18.09.2023 of Nominated Authority, MoC stating the fixed reserve price applicable for FY 2023-24 is attached hereto and marked as **Annexure- B.**

H. **Additional Capitalization:** The year-wise projected additional capital expenditure has been claimed under the Form-9 of the tariff forms and enclosed as part of Appendix-I herewith.

I. **Mining Charge:**

i. Tariff Regulations, 2024, provides that MDO mining charge shall be allowed as part of input price of coal.

ii. MDO mining charge has been claimed as per the Letter of Award issued to MDO and the agreement signed with the MDO.

iii. In terms of the agreement signed with MDO, mining fee is subject to escalation based on pre-defined formula.

iv. The mining charges for the tariff period from 01.04.2024 to 31.03.2029 has been claimed based on the mining charge claimed for FY 2023-24 after taking into consideration the escalation paid to MDO in terms of the MDO Agreement during FY 2023-24 and schedule of production and stripping ratio.

v. It is submitted that for future period, the Hon'ble Commission may be pleased to allow to bill the input price of coal based on quarterly escalated price of MDO to avoid accumulation of arrears. Detailed calculation in regard to escalation of MDO price shall be submitted before the Hon'ble Commission at the time of truing up.

vi. It is also submitted that the contract with MDO also contains the provisions for adjustment of mining fee based on actual stripping ratio. However, the clause (4) of Regulation 51 of Tariff Regulations, 2024, provides for adjustment of input price of coal in case shortfall of overburden removal during any year is not made good by the generating company by adjusting

such shortfall against excess of overburden removal, if any, during the subsequent three years. Therefore, adjustment of input price of coal due to shortfall in overburden removal shall be submitted before the Hon'ble Commission at the time of truing up. Hon'ble Commission may be pleased to allow the same.

- **Mine Closure Expenses:** It is submitted that the mine closure expenses claimed for the tariff period from 01.04.2024 to 31.03.2029 are as per the provisions of the Regulations 48 of Tariff Regulations, 2024 and are based on the amounts to be deposited in the Escrow Account for respective years as per the Mining Plan.

15) It is submitted that sub-clause (5) of Regulation 3 of CERC Tariff Regulations, 2024 defines that the ATQ in respect of an integrated mine(s) means the quantity of coal or lignite to be extracted during a year from such integrated mine(s) corresponding to 85% of the quantity specified in the Mining Plan. Further, the sub-clause (2) of Regulation 39 of CERC Tariff Regulations, 2024 provides that the Run of Mine Cost of coal in case of integrated mine allocated through allotment route under Coal Mines (Special Provisions) Act, 2015 shall be worked out as under.

ROM Cost = [(Annual Extraction Cost / (ATQ or Actual production whichever is higher) + Mining Charge] + (Fixed Reserve Price).

As mentioned above, the ROM Cost is also dependent on the actual production of coal during a year. However, the details of actual production for the tariff period 2024-29 shall be available in due course of time. In view of the same, the quantity specified in the Mining Plan has been considered as ATQ for calculation of the ROM Cost in the instant Petition. However, same shall be replaced with the ATQ or Actual production quantity in terms of the Regulation 39 (2) of CERC Tariff Regulations, 2024 during truing up.

16) The Petitioner further respectfully submits that the wage/ salary revision of the employees of the Petitioner will be due with effect from 01.01.2027. As per Regulation 36(1)(8) of the Tariff Regulations 2024, the impact on account of implementation of wage/ pay revision shall be allowed at the time of truing up of tariff. The Petitioner therefore craves liberty to approach the Hon'ble Commission for allowing the impact on account of implementation of wage/ pay revision of the employees of the Petitioner with effect from 01.01.2027, based on the actual payments whenever paid by it.

RE: FILING FEE

17) It is submitted that Regulation 94 (1) of Tariff Regulations, 2024 provides that the application fee and publication expenses may be allowed to be recovered directly from the beneficiaries at the discretion of the Hon'ble Commission. Accordingly, it is prayed that Hon'ble Commission may be pleased to allow recovery of filing fee directly from the beneficiaries.

18) It is submitted that the Petitioner has already paid the requisite filing fee as per the provisions of the CERC (Payment of Fees) Regulations, 2012 as amended.

19) It is submitted that the Petitioner has uploaded the copy of the Petition at CERC site (Saudamini), the access of which is available to all the Respondents mentioned herein above and therefore the petition stands served to all the respondents. Further, the petitioner has also posted the Petition on the company website i.e. www.nhpc.co.in.

20) In accordance with the 'Conduct of Business Regulations 2023' of the Hon'ble Commission, the Petitioner shall, within 7 days after filing the tariff petition, publish a notice about such filing in at least two daily leading digital newspapers one in English language and another in any of the Indian languages, having wide circulation in each of the States and Union Territories where the beneficiaries are situated, as per Form 14 appended to these regulations. Subsequently, the Petitioner shall submit the proof of publications as soft copies of the publications under an affidavit through the e-filing portal of the Hon'ble Commission within one week from the date of publication. Further, the

Petitioner shall also submit the detail of expenses incurred for publication of the notice along with the prayer for recovery of Publication Expenses as per Regulation-94 of CERC Tariff Regulations 2024.

21) It is submitted that the petitioner is filing this input price determination petition subject to the outcome of its various appeals/ petitions pending before different courts. Besides, the petition filed by NTPC for determination of capital base as on 31.03.2024 through true-up exercise is pending before the Hon'ble Commission and would take some time. The Petitioner, therefore, reserves its right to amend the tariff petition as per the outcome in such appeals/ petitions, if required.

22) Apart from the above-mentioned submissions, NTPC wishes to inform this Hon'ble Commission that the instant mine/assets are in the process of being transferred by NTPC to a fully owned subsidiary by the name of 'NTPC Mining Limited (NML)' in terms of a Business Transfer Agreement (BTA) signed on 17.08.2023. It is stated that the modalities of transfer are still under way and NTPC undertakes to inform as well as substitute in its place its subsidiary as the Petitioner in the instant petition once the transfer is complete in all respects.

23) The Petitioner undertakes to submit any further information or clarification which may be required by this Hon'ble Commission for adjudication of the present petition.

Prayers

In the light of the above submissions, the Petitioner, therefore, prays that the Hon'ble Commission may be pleased to:

i) Approve input price of coal of Talaipalli Coal Mine for the tariff period 2024-29 as per provision of Regulation 9 (4) read with Chapter 9 of Tariff Regulations, 2024.

ii) Allow the recovery of filing fees as & when paid to the Hon'ble Commission and publication expenses from the beneficiaries.

iii) Allow the recovery of pay/wage revison under O&M expenses as and when applicable;

iv) Condone any error/omission in the petition and to grant an opportunity to the Petitioner to rectify the same;

v) Permit the Petitioner to make such further submission(s), addition(s) and alteration(s) to this Petition as may be necessary from time to time;

vi) Pass any other order as it may deem fit in the circumstances mentioned above.

(Petitioner)

Noida

Date: .....

BEFORE THE CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

PETITION NO.....

IN THE MATTER OF : Petition Under Section 62 and 79 (1) (a) of the Electricity Act, 2003 read with Chapter-III of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 2023 and Chapter-3, Regulation-9 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 for approval of input price of Talaipalli Coal Mine for the period from 01.04.2024 to 31.03.2029.

Petitioner : NTPC Ltd.
NTPC Bhawan
Core-7, Scope Complex
7, Institutional Area, Lodhi Road
New Delhi-110 003

Respondents:

1.Madhya Pradesh Power Management
Company Limited,
Shakti Bhawan, Vidyut Nagar,
Jabalpur 482 008

and others

AFFIDAVIT

I, Sameer Kumar Aggarwal, Son of Late Shri B K Aggarwal, aged about 51 years, working as Additional General Manager (Commercial) in the office of NTPC Limited, having its registered office at NTPC Bhawan, Scope Complex, Core-7, Lodhi Road, New Delhi-110003 do hereby solemnly affirm, and state as follows:

1. That the deponent is the Additional General Manager (Commercial) of the Petitioner NTPC Ltd. and is well conversant with the facts and the circumstances of the case and therefore competent to swear this affidavit.

2. That the accompanying Petition under Section 62 and 79 (1) (a) of the Electricity Act, 2003, has been filed by my authorized representative under my instruction and the contents of the same are true and correct to the best of my knowledge and belief.

3. That the contents of Para No 1 to 23 as mentioned in the Petition are true and correct based on my personal knowledge, belief and records maintained in the office.

4. That the annexures annexed to the Petition are correct and true copies of the respective originals.

5. That the Deponent has not filed any other Petition or Appeal before any other forum or court of law with respect to the subject matter of the dispute.

(Deponent)
समीर अग्रवाल/SAMEER AGGARWAL
अपर महाप्रबंधक (वाणिज्यिक)
Addl. General Manager (Commercial)
एन टी पी सी लिमिटेड/NTPC LIMITED
EOC, A-8A, Sector-24, Noida-201 301 (U.P.)

Verification:

Verified at Noida on this 27th day of November 2024, that the contents of my above noted affidavit are true and correct to my knowledge and no part of it is false and nothing material has been concealed therefrom.

(Deponent)
समीर अग्रवाल/SAMEER AGGARWAL
अपर महाप्रबंधक (वाणिज्यिक)
Addl. General Manager (Commercial)
एन टी पी सी लिमिटेड/NTPC LIMITED
EOC, A-8A, Sector-24, Noida-201 301 (U.P.)

NOTARY GOVT. OF INDIA

ATTESTED
YOGENDRA SINGH
NOTARY NOIDA
G.B. NAGAR (U.P.) INDIA
27 NOV 2024

Petition No : .....

TARIFF FILING FORMS (INTEGRATED MINE)

FOR DETERMINATION OF INPUT PRICE

FOR

TALAIPALLI COAL MINE

PETITION FOR DETERMINATION OF INPUT PRICE FOR THE PERIOD 01.04.2024 TO 31.03.2029

PART-IV

ANNEXURE-I

PART-IV

Checklist of Main Tariff Forms and other information for tariff filing for Integrated Mine

Form No.	Title of Tariff Filing Forms (Integrated Mine)	Tick
FORM- 1	Summary of Input Price	✓
FORM -1A	Summary of ROM Cost	✓
FORM -1B	Summary of Additional Charges	N/A
FORM-2	Statement showing claimed Capital Cost	✓
FORM-2A	Statement showing claimed Return on Equity	✓
FORM-2B	Statement showing claimed O&M cost	✓
FORM- 3	Mine Characteristics Important Details as per Mine Plan	✓
FORM- 3A	Normative Parameters considered for Input Price computation	✓
FORM- 4	Details of Foreign loans	✓
FORM- 4A	Details of Foreign Equity	N/A
FORM-5	Abstract of Admitted Capital Cost for the existing Integrated Mine	N/A
FORM- 6	Financial Package up to date of commercial operation & up to Peak rated capacity	✓
FORM- 7	Details of Integrated Mine Specific Loans	N/A
FORM- 8	Details of Allocation of corporate loans to Integrated Mine	✓
FORM-9	Year wise Statement of Additional Capitalization after date of commercial operation up to beyond achieving Peak rated Capacity	✓
FORM- 10	Financing of Additional Capitalization	**
FORM- 11	Calculation of Depreciation	✓
FORM- 12	Statement of Depreciation	✓
FORM- 13	Calculation of Weighted Average Rate of Interest on Actual Loans	✓
FORM- 14	Draw Down Schedule for Calculation of IDC & Financing Charges	✓
FORM- 15	Non-Tariff Income	**
FORM- 16	Details of Applicable Statutory Charges	✓
FORM-17	Details of Mine Closure expenses	✓
FORM- 18	Details for GCV Adjustment	**

** Shall be submitted at the time of truing up

PART-IV List of Supporting Forms / documents for tariff filing for Integrated Mine		
Form No.	**Title of Tariff Filing Forms (Integrated Mine)**	**Tick**
FORM-A	Abstract of Capital Cost Estimates and cost on date of commercial operation of the Integrated Mine	✓
FORM-B	Break-up of Capital Cost for New Integrated Mine	✓
FORM-C	Break-up of Construction/Supply/Service Packages	N/A
FORM –D	Details of Assets De-capitalized during the period	**
FORM –E	Reconciliation of Capitalization claimed vis-à-vis books of accounts	✓
FORM –F	Statement showing details of items/assets/works claimed under Exclusions	**
FORM-G	Statement of Capital cost	✓
FORM-H	Statement of Capital Works in Progress	✓
FORM-I	Calculation of Interest on Normative Loan	✓
FORM-J	Calculation of Interest on Working Capital	✓
FORM-K	Incidental Expenditure up to date of commencement of Production and up to Actual/anticipated date of commercial operation	N/A
FORM-L	Expenditure under different packages up to date of commencement of Production and up to Actual/anticipated date of commercial operation	N/A
FORM-M	Actual cash expenditure	✓
FORM-N	Statement of Liability flow	✓

** Shall be submitted at the time of truing up

List of supporting documents for tariff filing for Integrated Mine		
S. No.	**Information / Document**	**Tick**
1	Certificate of incorporation, Certificate for Commencement of Business, Memorandum of Association, & Articles of Association (For New Integrated Mine setup by a company making application for the first time to CERC)	N/A
2	A. Mine wise and Corporate audited Balance Sheet and Profit & Loss Accounts with all the Schedules & annexures on date of commercial operation of the Mine for the new mine & for the relevant years. B. Mine wise and Corporate audited Balance Sheet and Profit & Loss Accounts with all the Schedules & annexures for the existing mine for relevant years.	**
3	Copies of relevant loan Agreements	N/A
4	Copies of the approval of Competent Authority for the Capital Cost and Financial package	N/A
5	Copies of the Equity participation agreements and necessary approval for the foreign equity	N/A
6	List of End use generating plant to whom supplies made/to be made and quantity supplied / to be supplied	**
7	Integrated Mine shall submit copy of Cost Audit Report along with cost accounting records, cost details, statements, schedules etc. for the Integrated Mine and subsequently consolidated at Company level as submitted to the Govt. of India from the date of commencement of production in case of a new mine or first two years i.e. 2019-20 and 2020-21 at the time of mid-term true-up in 2021-22 and for balance period of tariff period 2019-24 at the time of final true-up in 2024-25. In case of initial tariff filing the latest available Cost Audit Report should be furnished.	**
8	Any other relevant information, (Please specify)	
9	Reconciliation with Balance sheet of any actual capitalization or additional capitalization year on year basis duly audited	**

Summary of Input Price

PART-IV
FORM- 1

Name of the Petitioner: **NTPC Ltd**

Name of the Integrated Mine: **Talaipalli**

Place (Region District State): **WR/ Raigarh/ Chhattisgarh**

S. No.	Particulars	Unit	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8	9
1.1	ROM Cost as per Form 1 A	Rs/Tonne	2531.78	1694.51	1605.97	1647.08	1552.00	1521.47
1.2	Additional Charges/Surface Transportation Charges#	Rs/Tonne	-	82.71	113.17	171.38	220.64	-
	Input Price	Rs/Tonne	2531.78	1777.22	1719.15	1818.47	1772.64	1521.470927
1.3	Statutory Charges	Rs/Tonne	532.13	395.85	403.67	411.74	421.84	429.13
1.4	Total input price		3063.91	2173.07	2122.82	2230.21	2194.48	1950.60
1.5	GST @ 5%							
	Total input price	**Rs/Tonne**	**3063.91**	**2173.07**	**2122.82**	**2230.21**	**2194.48**	**1950.60**

(Petitioner)

Note: GST @5% and GST Compensation cess @Rs 400 per Ton shall be applicable in case coal is transferred to station having different GSTN.

* Additional Transportation Charges/ Surface Transportation cost is required for transportation cost from mine pit to loading point till CHP is commissioned

Summary of ROM Cost

PART-IV
FORM- 1A

Name of the Petitioner: NTPC Ltd
Name of the Integrated Mine: Talaipalli
Place (Region District/State): WR, Raigarh/ Chhattisgarh

Amount in Rs Lakhs

S. No.	Particulars	Unit	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8	9
1.1	Depreciation	Rs Lakh	9,123.68	9,421.38	9,849.92	12,000.98	14,525.49	15,094.93
1.2	Interest on Loan	Rs Lakh	10,052.72	9,828.17	9,376.01	11,156.85	12,952.17	12,694.54
1.3	Return on Equity	Rs Lakh	10,753.52	11,036.52	11,304.25	14,018.54	17,015.65	17,682.70
1.4	Interest on Working Capital	Rs Lakh	1,066.41	584.19	667.35	775.94	1,051.66	1,131.19
1.5	O&M Expenses excluding mining charge	Rs Lakh	29,298.07	10,268.97	10,808.10	11,375.52	11,972.74	12,601.30
1.6	Mine closure expense*	Rs Lakh	1,040.84	497.34	530.47	585.06	651.16	659.42
1.0	Total Annual Extraction Cost (Sum of above 1.1 to 1.6)	Rs Lakh	**61,295.25**	**41,636.57**	**42,336.05**	**49,930.69**	**58,118.84**	**59,864.08**
2.0	Annual Target Quantity (ATQ)	Tonne	35,00,000	60,30,000	75,80,000	90,00,000	1,44,00,000	1,80,00,000
3.0	Annual Extraction cost per tonne (1.0 in Rs/2.0)	Rs/Tonne	1,751.29	690.49	558.52	554.79	403.60	332.58
4.0	Mining charge#	Rs/Tonne	780.55	868.00	911.45	956.28	1,012.38	1,032.87
5.0	Fixed Reserve Price	Rs/Tonne		136.02	136.02	136.02	136.02	136.02
6.0	ROM cost (3.0+4.0)	Rs/Tonne	2,531.78	1,694.51	1,605.97	1,647.08	1,551.00	1,501.47

 # Mining Charges claimed are based on Mining Charges as per provided data on projection basis considering mine stripping ratio as 4.33

*** Mine closure expenses taken as per mining plan chapter 5 (progressive and final mine closure plan) for each year**

Statement showing claimed capital cost

PART-IV
FORM-2

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

Amount in Rs Lakhs

S. No.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7
1	Opening Capital Cost	2,14,787.71	2,18,935.35	2,25,308.39	3,27,169.00	3,41,526.57
2	Add: Addition during the year period	4,147.64	6,373.04	1,01,860.61	14,357.58	11,857.58
3	Less: De-capitalization during the year period*	-	-	-	-	-
4	Add: Discharges of Liability during the year period	-	-	-	-	-
5	**Closing Capital Cost (1+2-3+4)**	2,18,935.35	2,25,308.39	3,27,169.00	3,41,526.57	3,53,384.15
6	**Average Capital Cost**	2,16,861.53	2,22,121.87	2,76,238.69	3,34,347.79	3,47,455.36

(Petitioner)

* Shall be provided at the time of true up

Statement showing claimed Return on Equity

PART- IV
FORM-2A

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

Amount in Rs Lakhs

Sr	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7
A)	**Return on Equity**					
1	Opening Equity	64,436.31	65,680.60	67,592.52	98,150.70	1,02,457.97
2	Add: Increase in equity due to addition during the year / period	1,244.29	1,911.91	30,558.18	4,307.27	3,557.27
3	Less: Decrease due to De-capitalization during the year / period	-	-	-	-	-
4	Add: Increase due to discharges during the year / period	-	-	-	-	-
5	Closing Equity (1+2-3+4)	65,680.60	67,592.52	98,150.70	1,02,457.97	1,06,015.24
6	Average Equity	65,058.46	66,636.56	82,871.61	1,00,304.34	1,04,236.61
7	Rate of ROE (Pre Tax)	16.964	16.964	16.964	16.964	16.964
8	**Total ROE**	**11,036.52**	**11,304.23**	**14,058.34**	**17,015.63**	**17,682.70**

(Petitioner)

Statement showing claimed O&M cost

PART-IV
FORM-2B

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

Amount in Rs Lakhs

S. No.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5		7
1	Opening Capital Cost					
2	Add: Addition during the year/period					
3	Less: De-capitalization during the year/period					
4	Add: Discharges of Liability during the year/ period					
5	Closing Capital Cost (1+2-3+4)					
6	Average Capital Cost					
7	Projected O&M Expenses in terms of Regulation 46*	8,965.22	9,435.89	9,931.27	10,452.67	11,001.43
8	Projected Annual Charge of Agency(ies) Other Than MDO**					
	Loading & Covering Cost	1,122.60	1,181.54	1,243.57	1,308.86	1,377.57
	Sampling cost	181.16	190.67	200.68	211.21	222.30
9	**Total Claimed O&M Expenses**	**10,268.97**	**10,808.10**	**11,375.52**	**11,972.74**	**12,601.30**

* Projections given as per 23-24 actual expenses and escalated @ 5.25% each year

Petitioner

Mine Characteristics/Important Details as per Approved Mine Plan dated (26/09/2023)		PART- IV FORM-3
Name of the Petitioner: NTPC Ltd Name of the Integrated Mine: Talaipalli		
Sr No	Parameters	Values
1	Mining plan/Mine closure plan Revision number and date of revision, if any	1st Modification(26.09.2023
2	Peak rated Capacity	25 MTPA
3	Year in which proposed to be achieved	2037-38
4	Mineable reserves	631.56 MMT
5	Mining area land - Acquired/ Leased	2119.4 Ha
6	If Leased - Period and terms of lease	Till Mine life
7	Mining Block Area	2119.4 Ha
8	Type of Mining	Opencast
9	Method of Mining	Drilling & Blasting, Shovel - Dumper for Overburden and Surface Miner for Coal
10	Mine life in Years	31
11	Scheduled date of commercial operation as per investment approval	Not mentioned
12	Distance of Loading Point from mine end	Loading through Silo into Dedicated MGR system within mine
13	Gross Calorific value (GCV in Kcal/Kg) of coal as per Geological Report Range: Mean	Range : 2834 to 7198 Kcal/Kg (UG to G1) Average : 4548 Kcal/Kg (G10)
14	Specific gravity of coal (Avg)	1.62
15	Main Equipments	Overburden : a) Hyd Backhoe or Shovel - 28 cum b) Hyd Backhoe or Shovel - 10 cum c) Rear Dumper - 290 T d) Rear Dumper - 100 T Coal : a) Surface Miner - 35M b) FE Loader - 6 cum c) Coalbody Dumper - 60 T
16	Other Important Parameters as deemed necessary	NA

CALENDER PRODUCTION PROGRAMME DURING THIS TARIFF PERIOD			
Production Year	Coal Production (Mt)	OB Removal (Mm^3)	Stripping Ratio (m^3/t)
2024-25	6.03	29.77	4.94
2025-26	7.58	27.91	3.68
2026-27	9.00	35.60	3.89
2027-28	14.40	55.97	3.88
2028-29	18.00	100.00	5.56

ACTUAL PRODUCTION ACHIEVED DURING THIS TARIFF PERIOD			
Production Year	Coal Production (Mt)	OB Removal (Mm^3)	Stripping Ratio (m^3/t)
2024-25	Shall be provided at the time of true up		
2025-26			
2026-27			
2027-28			
2028-29			

(Petitioner)

Normative parameters considered for Input Price computations

PART- IV
FORM-3A

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

Particulars	Unit	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8
Base Rate of Return on Equity	%	14	14	14	14	14	14
Effective Tax Rate	%	17.472	17.472	17.472	17.472	17.472	17.472
Input Cost of Coal for WC	in days	7	7	7	7	7	7
Consumption of stores and spares % of O&M	%	15	15	15	15	15	15
One Month O&M Expenses	Rs lakh	2441.34	855.75	900.67	947.96	997.73	1050.11
Rate of Interest on Working Capital	%	12.00	11.90	11.90	11.90	11.90	11.90

(Petitioner)

PART-IV
FORM-II

Statement Giving Details of Project Financed through a Combination of loan

Form II

	TRANCHE NO	
RP NO 5400000762	T00001	D00001
Unsecured Loan From AXIS BANK II		
Source of Loan	AXIS BANK II	
Currency	INR	
Amount of Loan	24,00,00,00,000	
Total Drawn amount	9,00,00,00,000	
Date of Draw	11.01.2019	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate / Floating Interest	[8.00%, 8.25%	
Margin, if Floating Interest		
Up Front and Exit Fees	NIL	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Grace Days		
Moratorium Period	3 Years	
Moratorium effective from	11.01.2019	
Repayment Period (in Moratorium)	12 Years	
Repayment Frequency	9 Yearly Yearly Instalment	
Repayment Type	AVG	
1st Repayment Date	11.01.2019	
Base Currency Rate	SUPER	
Date of Spot Exchange Rate	N.A.	
Project Code	Project Name	Amount
	BARSH	90,00,00,000
	CHADRWARA	2,85,00,00,000
	NOPL-63D	24,00,00,000
	BILHAUR SOLAR 140MW	30,00,00,000
	TALAIPALI	1,05,00,00,000
Total Allocated Amount		5,34,00,00,000

Statement Giving Details of Project Financed through a Commercial Loan

PART-V
FORM-II

Form II

TRANCHE NO

BP NO 3400004762	TRSEC	000007
Unsecured Loan From AXIS BANK-II		
Source of Loan :	AXIS BANK-II	
Currency :	INR	
Amount of Loan :	25,00,00,00,000	
Total Drawn amount :	4,00,00,00,000	
Date of Draw :	19.04.2021	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest :	7.40%	
Margin, If Floating Interest :		
Any Other and Total Cost :	NIL	
Frequency of Int. Payment :	MONTHLY	
If Above is any specify Case Type :		
Moratorium Period :	3 Years	
Moratorium effective from :	19.04.2021	
Repayment Period (in Months) :	12 Years	
Repayment Frequency :	9 Yearly Years Installment	
Repayment Type :	AVG	
First Repayment Date :	31.03.2029	
Base Exchange Rate :	INR/EE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BILHAUR SOLAR 140MW	50,00,00,000
	TALAIPALI COAL MINE	10,00,00,000
	HARSHDARI COAL MINE	3,40,00,00,000
Total Allocated Amount		4,00,00,00,000
Loan Allocated to LARA w.e.f. 01.04.2021		
TRANSFERRED TO LARA / DN 1/7/2021		

Statement Giving Details of Project Financed through a Combination of loan

PART-IV
FORM-5

Form 5

TRANCHE NO.

DP NO:0650001801	700001	000001
Unsecured Loan From AIIB BANK @		
Source of Loan	AIIB BANK @	
Currency	INR	
Amount of Loan	4,00,00,00,000	
Total Drawn Amount	3,42,00,00,000	
Date of Draw	24.09.2020	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	5.30%	
Margin, if Floating Interest		
Are there any Capital Gain	YES	
If Answer is yes, specify Capital Gain		
Repayment Period	12 Years	
Moratorium effective from	24.09.2020	
Repayment Period (incl Moratorium)	18 Years	
Repayment Frequency	12 Years (Yearly Instalment)	
Repayment Type	ANNUITY	
First Repayment Date	24.09.2024	
Base Exchange Rate	EUROS	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	DARLIPALLI	98,00,50,000.00
	DASARWARA	1,68,00,00,500.00
	TALAPALI COAL MINE	13,50,00,000.00
	TARE MAN VISHNUGARH	31,49,50,500.00
	TELANGANA	1,30,99,99,000.00
Total Allocated Amount		3,42,00,00,000

Statement Giving Details of Project Financed through a Combination of loan

PART-IV
FORM-E

Form E

BP NO.5000001001	TRANCHE NO 700001	000002
Unsecured Loan From AXIS BANK IB		
Source of Loan	AXIS BANK IB	
Currency	INR	
Amount of Loan	4,00,00,00,000	
Total Drawn amount	40,00,00,000	
Date of Drawl	29.08.2020	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	8.20%	
Margin, if Floating Interest		
Any Base rate Cap/ Floor	no	
Frequency of Int. Payment	MONTHLY	
If Annual or oth. specify Cal/d Days		
Moratorium Period	3 Years	
Moratorium effective from	24.08.2020	
Repayment Period (incl Moratorium)	12 Years	
Repayment Frequency	12 Years Yearly Instalment	
Repayment Type	Bullet	
First Repayment Date	24.08.2024	
Base Exchange Rate	INR/SE	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	TALABIRA I COAL MINE	40,00,00,000.00
Total Allocated Amount		40,00,00,000

Statement Giving Details of Project Financed through a Combination of loan		PART IV FORM 6
Form 6		
TRANCHE 3D BP NO 505006371 T00001		D00003
UNSECURED Loan From AXIS BANK IV		
Source of Loan	AXIS BANK IV	
Currency	INR	
Amount of Loan	1400,00,00,000	
Total Drawn amount	1000,00,00,000	
Date of Draw	07-Jun-23	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, If Floating Interest	9.00%	
Margin, If Floating Interest		
Any Base and Other Floor	0.00	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Other Floor		
Moratorium Period	30 Years	
Moratorium effective from	NIL	
Repayment Period incl Moratorium	15 Years	
Repayment Frequency	15 Yearly Instalment	
Repayment Type	EMI	
First Repayment Date	05.03.2024	
Base Exchange Rate	RUPEE	
Date of Base Exchange Rate	N.A.	
Project Cost	Project Name	Amount
	TANDALJ	16,00,00,000.00
	NDPS-E3D	34,00,00,000.00
	TATPGRSMJ	8,00,00,000.00
	BARHJ	2,20,01,00,000.00
	NORTH KARANPURA	86,00,00,000.00
	LARAJ	2,57,50,00,000.00
	SADARWARA	4,84,00,00,000.00
	SOAPLPAZJ	1,34,02,00,000.00
	KHARSOAN	1,15,01,00,000.00
	TELAIYAIVA	1,50,00,00,000.00
	VERENGAR	2,40,00,00,000.00
	CHATTISGARATU	8,00,00,000.00
	TAPOVAN VISHNUGAD	12,50,00,000.00
	TALAIPALI	83,50,00,000.00
Total Allocated Amount		19,00,00,00,000

Statement Giving Details of Project Financed through a Combination of loan			PART-IV FORM-5
Form 5			
BP NO 9000001341	TRANCHE NO 100001	000001	
Unallocated Loan From Bank of Baroda II			
Source of Loan	Bank of Baroda II		
Currency	INR		
Amount of Loan	33,00,00,00,000		
Total Drawn amount	2,00,00,00,000		
Date of Drawal	06.01.1900		
Interest Type	Floating		
Fixed Interest Rate			
Base Rate, if Floating Interest	7.10%		
Margin, if Floating Interest	NIL		
Are there any Caps/ Floor	n/a		
Frequency of Int. Payment	Monthly		
If Above is yes, specify Caps/ Floor			
Moratorium Period	3 Years		
Moratorium effective from	30-Jan-08		
Repayment Period (Incl Moratorium)	15 Years		
Repayment Frequency	12 Years		
Repayment Type	Annl		
First Repayment Date	13.11.2020		
Base Exchange Rate	INR/DC		
Date of Base Exchange Rate			
Project Code	Project Name	Amount	
	TOPCORE WORKSHOP	3,00,00,000.00	
	SHOP(PNU)	20,00,00,000.00	
	HADAGALI-I	38,00,00,000.00	
	TRIVIPELLY CORE MINE	8,00,00,000.00	
	HARTI KARANPURA 30MW	30,00,00,000.00	
	RAMAGUNDAM FLOATING SOLAR	3,00,00,000.00	
	HAVERICHAMTS (12 MW)	8,00,00,000.00	
	ALIGANJ A SOLAR PS 30MW	9,00,00,000.00	
	JETSAR SOLAR 100MW	39,00,00,000.00	
	NEYVOLI SOLAR (10 MW)	10,00,00,000.00	
	DEVKOT SOLAR (50 MW)	15,00,00,000.00	
	TTAYAPURAM SOLAR (20MW)	12,00,00,000.00	
Total Allocated Amount		2,00,00,00,000.00	

Statement Giving Details of Project Financed through a Combination of loan

PART-IV
FORM-II

Form II

BP no 555/0021121

TRANCHE NO
TR0001

000002

Unsecured Loan From Bank Of India V.A

Source of Loan	Bank Of India V.A	
Currency	INR	
Amount of Loan	11,66,11,00,000	
Total Drawn amount	1,44,00,000	
Date of Drawn	30.06.2021	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	5.65%	
Margin, if Floating Interest	NIL	
Are there any Caste/ Pipe	YES	
Frequency of Int. Payment	Monthly	
If Above is yes, specify Caste/Pipe		
Moratorium Period	0 Years	
Moratorium effective from	30.06.2021	
Repayment Period (Incl Moratorium)	10 Years	
Repayment Frequency	Yearly	
Repayment Type	NOS	
First Repayment Date	30.06.2026	
Base Exchange Rate	Rs/FCE	
Date of Base Exchange Rate		
Project Code	Project Name	Amount
	TALLAPALLI	1,44,00,000.00
Total Allocated Amount		1,44,00,000

Statement Giving Details of Project Financed through a Commission of Loan

PART-IV
FORM-II

Form II

TRANCHE NO

RP NO 5400000581	T00001	00000
Unsecured Loan From HDFC Bank Ltd. V		
Source of Loan	HDFC Bank Ltd. V	
Currency	INR	
Amount of Loan	24,00,00,00,000	
Total Drawn amount	2,30,00,00,000	
Date of Draw	02.01.2018	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate / Floating Interest	8.10%	
Margin, if Floating Interest	NIL	
Any Penal and Grace Period	YES	
Frequency (if Int. Payable)	MONTHLY	
If Above is yes, specify Grace Period		
Moratorium Period	6 Years	
Moratorium effective from	12.07.2018	
Repayment Period (in Months/years)	18 Years	
Repayment Frequency	8 Years Installment	
Repayment Type	ADS	
End Repayment Date	14.04.2038	
Base Exchange Rate	EURO	
Date of Bank Exchange Rate	N.A.	
Project Code	Project Name	Amount
	LAFAA	20,00,00,000
	DULANGA COAL MINE	10,00,00,000
	TALAIPALI COAL MINE	10,00,00,000
	NORTH KARANPURA	70,00,00,000
	KHARSIDIH	70,00,00,000
Total Allocated Amount		2,30,00,00,000

Statement Giving Details of Project Financed through a Combination of loan		PART-IV FORM-II
Part-II		
BP NO 6000000791	TRANCHE NO 000001	000001
Unsecured Loan From HDFC Bank Ltd. -VII		
Source of Loan	HDFC Bank Ltd.-VII	
Currency	INR	
Amount of Loan	395,00,00,00,000	
Total Drawn amount	3,95,00,00,000	
Date of draw	11.06.2018	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	8.40%	
Margin, if Floating Interest	NIL	
Are there any Caps/ Floor	Y/N	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor		
Moratorium Period	6 Year(s)	
Moratorium effective from	11.06.2018	
Repayment Period (ex Moratorium)	15 Years	
Repayment Frequency	4 Yearly Instalment	
Repayment Type	NYG	
First Repayment Date	11.06.2024	
Base Exchange Rate	RUPEE	
Rate of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	BONGAIGAON	1,21,00,00,000
	LAPA	28,00,00,000
	TAPOVAN VISHNUGAD	15,00,00,000
	BARSHI	45,00,00,000
	SADARWARA	20,00,00,000
	CHATTI BARIATU GMB	15,00,00,000
	DARLIPALLI	20,00,00,000
	DULANGA GMB	35,00,00,000
	TALAPALI GMB	40,00,00,000
Total Allocated Amount		3,95,00,00,000

Statement Giving Details of Project Financed through Commercial Bank

PART-IV
FORM-5

Form 8

		TRANCHE NO	
BF NO 5050000791		000001	D00001
Unsecured Loan From HDFC Bank Ltd. VII			
Source of Loan		HDFC Bank Ltd. VII	
Currency		INR	
Amount of Loan		75,00,00,00,000	
Total Drawn amount		3,00,00,00,000	
Date of detail		11.02.2020	
Interest Type		Floating	
Fixed Interest Rate			
Base Rate, if Floating Interest		7.90%	
Margin, if Floating Interest		1.65	
Are there any Caps/ Floor		YES	
Frequency of Int. Payment		Monthly	
If Above is yes, specify Caps/ Floor			
Moratorium Period		6 Years	
Moratorium effective from		11.02.2020	
Repayment Period (my Moratorium		15 Years	
Repayment Frequency		Yearly Installment	
Repayment Type		AUS	
First Repayment Date		11.02.2026	
Base Exchange Rate		SUNTE	
Date of Base Exchange Rate		N.A.	
Project Code	Project Name		Amount
	BARH I		30,00,00,000
	TAPOVAN VISHNUGAD		35,00,00,000
	MUNIRKA KARAMPURA		35,00,00,000
	DADLPWLU		58,00,00,000
	RAMPUR		20,00,00,000
	RATTANA II		1,20,00,00,000
	DULHASTI CWR		15,00,00,000
	TALAIPALLI CWR		20,00,00,000
Total Allocated Amount			3,00,00,00,000

Statement Giving Details of Project Financed through a Combination of loan			PART-IV FORM-E
	FINANCING NO		
BP NO 9850000561	700001	000001	
Unsecured Loan From HDFC Bank Ltd. -IX			
Source of Loan	HDFC Bank Ltd.-IX		
Currency	INR		
Amount of Loan	50,00,00,00,000		
Total Drawn amount	3,00,00,00,000		
Date of draw	30-09-2020		
Interest Type	Floating		
Fixed Interest Rate			
Base Rate, if Floating Interest	8.35%		
Margin, if Floating Interest	NIL		
Are there any Caps/ Floor	NO		
Frequency of Int. Payment	MONTHLY		
If Above is yes, specify Caps/ Floor			
Moratorium Period	3 Years		
Moratorium effective from	30.09.2020		
Repayment Period (incl Moratorium)	15 Years		
Repayment Frequency	12 Yearly Instalments		
Repayment Type	Annuity		
First Repayment Date	30.09.2024		
Base Exchange Rate	RUPEE		
Date of Base Exchange Rate	N.A.		
Project Code	Project Name	Amount	
	BARKA	87,00,00,000	
	TAPOVAN VISHNUGAD	35,00,00,000	
	PAKRI BARWADIH CME	41,00,00,000	
	LAPAS	28,00,00,000	
	SHDARIWARA	22,00,00,000	
	DARLIPALLI	25,00,00,000	
	TALABELI COAL MINE	15,00,00,000	
	BARJUNA II	30,00,00,000	
	BILHAUR SOLAR 140MW	30,00,00,000	
	JETSAR SOLAR	4,00,00,000	
	KIRENDARI	15,00,00,000	
	CHATTI BARIATU CMB	15,00,00,000	
Total Allocated Amount		3,00,00,00,000	

Attachment Giving Details of Project Financed through a Combination of Hub

PART-V
FORM-5

Form 5

RP NO 2400000981

TRANCHE NO
T00001 D00002

Structured Loan From HDFC Bank Ltd. /R

Source of Loan	HDFC Bank Ltd. /R	
Currency	INR	
Amount of Loan	50,00,00,00,000	
Total Drawn amount	2,50,00,00,000	
Date of Draw	13.03.2024	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate / Floating Interest	8.30%	
Margin / Floating Interest	NIL	
Any Rate and Cost Floor	YES	
Frequency of RR Payment	MONTHLY	
If Above is yes, specify Date Floor		
Moratorium Period	3 Years	
Moratorium effective from	13.04.2027	
Repayment Period (in Moratorium)	15 Years	
Repayment Frequency	12 Yearly Instalment	
Repayment Type	ADB	
First Repayment Date	30.04.2030	
Rate Configure Refix	YEARLY	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	BABHU	70,00,00,000
	DADARWAPA	55,00,00,000
	NORTH KARAMPURA	45,00,00,000
	TEJASSANA	35,00,00,000
	TALAIPALI	55,00,00,000
Total Allocated Amount		2,50,00,00,000

Statement Giving Details of Project Financed through a Combination of Hire

PART-V
FORM-5

Form 5

TRANCHE NO

RF NO 2400000981	T00001	000000
Structured Loan From HDFC Bank Ltd. /R		
Source of Loan	HDFC Bank Ltd. /R	
Currency	INR	
Amount of Loan	50,00,00,00,000	
Total Drawn amount	1,90,00,00,000	
Date of Draw	29.09.2020	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate / Floating Interest	8.30%	
Margin, if Floating Interest	NIL	
Any Floor and Cap/ Floor	YES	
Frequency (if Int. Payable)	MONTHLY	
If Above is yes, specify Caps/ Floor		
Moratorium Period	3 Years	
Moratorium effective from	29.09.2020	
Repayment Period (in Months/yrs)	15 Years	
Repayment Frequency	12 Yearly Instalment	
Repayment Type	ADB	
1st Repayment Date	30.09.2023	
Base Exchange Rate	INR/FX	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	BABELI	20,00,00,000
	HARNA REM	30,00,00,000
	RAMAGUNDAM 3 & 11 REM	85,00,00,000
	TALAIPALI COAL MINE	30,00,00,000
	KIRENDARI	15,00,00,000
Total Allocated Amount		1,90,00,00,000

Statement Giving Details of Project Financed through Corporation of loan	PART-IV FORM-5

Form 5

TRANCHE NO

BP NO 5930006881 709061 000568

Unsecured Loan From HDFC Bank Ltd. IX		
Source of Loan	HDFC Bank Ltd. IX	
Currency	INR	
Amount of Loan	10,00,00,00,000	
Total Project amount	1,00,00,00,000	
Date of Avail	18.11.2020	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, If Floating Interest	6.95%	
Margin, If Floating Interest	NIL	
Are there any Caps/ Floor	Y/N	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor		
Moratorium Period	2 Years	
Moratorium effective from	18.11.2020	
Repayment Period (Incl Moratorium)	15 Years	
Repayment Frequency	12 Yearly Instalment	
Repayment Type	ADB	
First Repayment Date	30.09.2024	
Base Exchange Rate	Rs/INR	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
	[redacted]	[redacted]
Total Allocated Amount		9,99,99,99,999

Statement Giving Details of Project Financed through a Continuation of loan			PART-IV FORM-5
Form 5			
	TRANCHE NO		
IEP NO: 5500071151	[5500]	[5500]	
Unsecured Loan From HDFC Bank Ltd. 5			
Source of Loan :	HDFC Bank Ltd. 5		
Currency :	INR		
Amount of Loan :	50,00,00,00,000		
Total Drawn amount :	4,90,20,07,208		
Date of draw :	24.11.2021		
Interest Type :	Floating		
Fixed Interest Rate :			
Base Rate, if Floating interest :	5.70%		
Margin, if Floating Interest :	NIL		
Are there any Caps/ Floor :	YES		
Frequency of Int. Payment :	MONTHLY		
If there is yes, specify Caps/ Floor :			
Moratorium Period :	3 Years		
Moratorium effective from :	24.11.2021		
Repayment Period (incl. Moratorium) :	15 Years		
Repayment Frequency :	12 Yearly Instalment		
Repayment Type :	BULLET		
First Repayment Date :	24.11.2025		
Base Exchange Rate :	INVOKE		
Date of Base Exchange Rate :	N.A.		
Project Code :	Project Name	Amount	
	NORTH KARANPURA	24,00,00,000.00	
	RAMGARH	3,00,00,000.00	
	TELAIYAIYA	23,00,00,000.00	
	LAPA	50,00,00,000.00	
	GADRWARA	90,00,00,000.00	
	CHIRIMIRI	77,00,00,000.00	
	TANDA-II	89,20,00,000.00	
	BARJORA-II	20,00,00,000.00	
	SINGRAULI R&M	15,00,00,000.00	
	HARDUA R&M	25,00,00,000.00	
	RAMAGUNDAM I & II R&M	40,00,00,000.00	
	VINDHYACHAL R&M	7,00,00,000.00	
	FARAKKA R&M	10,00,00,000.00	
	KAHALGAON R&M	4,00,00,000.00	
	RIHAND R&M	15,00,00,000.00	
	KAHALGAON R&M	7,00,00,000.00	
	CHATTI BARIATU OMS	590,00,000.00	
	DULANGA COAL MINE	38,00,00,000.00	
	TALAIPALI COAL MINE	25,00,00,000.00	
	HYDENDARI	2,00,00,000.00	
	BARHI FGD	2,00,00,000.00	
	MOUDA-II FGD	6,00,00,000.00	
Total Allocated Amount		500,00,00,000	

Form-8

RP NO 5250001151	TRANCHE NO T00001	D00003
Unsecured Loan From HDFC Bank Ltd. X		
Source of Loan	HDFC Bank Ltd. X	
Currency	INR	
Amount of Loan	10,00,00,00,000	
Total Drawn amount	9,30,00,00,000	
Date of Draw	29-Jun-22	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	6.90%	
Margin, if Floating Interest	NIL	
Any Bank any Open Plan	YES	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Open Plan		
Moratorium Period	3 Years	
Moratorium effective from	24.11.2022	
Repayment Period (ex Moratorium)	15 Years	
Repayment Frequency	12 Yearly Instalments	
Repayment Type	EQUAL	
First Repayment Date	24.11.2025	
Base Exchange Rate	EURTEC	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	KHAPRGHE	80,30,00,000.00
	LARA	40,00,00,000.00
	DADARWARA	15,00,00,000.00
	DARLIPALLI	1,50,00,00,000.00
	TANDA-II	40,00,00,000.00
	BARADEH-II	15,00,00,000.00
	TALAIPALLI COAL MINE	15,00,00,000.00
	KURENGARI	15,00,00,000.00
	TELANGANA	38,00,00,000.00
	NORTH KARANPURA	1,92,00,00,000.00
Total Allocated Amount		9,30,00,00,000

PART-V
FORM-5

Statement Giving Details of Project Financed through a Combination of loan

Form II

BP NO 58000135E	TRANCHE NO T00001	D00002
Unsecured Loan From HDFC Bank Ltd. III		
Source of Loan :	HDFC Bank Ltd. III	
Currency :	INR	
Amount of Loan :	80,00,00,00,000	
Total Drawn amount :	10,00,00,00,000	
Date of draw :	01-Jan-05	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, if Floating Interest :	7.75%	
Margin, if Floating Interest :	NIL	
Any from date Copy/ Date :	FIX	
Frequency of Int. Payment :	MONTHLY	
If Above is Yes, specify Days/ Year :		
Moratorium Period :	0 Years	
Moratorium effective from :	14.07.2005	
Repayment Period (no Moratorium) :	15 Years	
Repayment Frequency :	12 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	14.07.2005	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH-I	8,82,14,40,000.00
	PAKRI BARWADIH CMB	1,70,00,00,000.00
	NPGC SOLAR PLOT-III (245M	19,20,00,000.00
	SINGRAULI-I & II FGD	26,73,00,000.00
	KERANDARI	25,00,00,000.00
	NPGC SOLAR PLOT-II (241MW	22,95,60,000.00
	RAMAGUNDAM-I & II FGD	20,04,00,000.00
	TALAIPALI COAL MINE	20,00,00,000.00
	TSTPS STAGE-II & I FGD	17,83,00,000.00
	FARAKKA-I & II FGD	16,76,50,000.00
	VINDHYACHAL-I &II FGD	15,72,00,000.00
	TTPS II 2X660MW	0,00,00,000.00
	DULANGA COAL MINE	10,00,00,000.00
	KAHALGAON-I & II FGD	8,88,60,000.00
	NPGC SOLAR PLOT-I (245MW)	8,90,00,000.00
	UNCHAHAR-I, II & III-FGD	8,58,20,000.00
	VINDHYACHAL-III &IV FGD	8,55,00,000.00
	SIMHADRI-I & II FGD	7,48,20,000.00
	RIHAND-I & II FGD	5,58,60,000.00
	KHARGONE FGD	5,38,00,000.00
	KORBA-I & III FGD	5,14,20,000.00
	SIPAT-I FGD	5,07,80,000.00
	KUDGI FGD	4,74,00,000.00
	DARLIPALLI FGD	4,50,00,000.00
	LARA FGD	3,92,00,000.00
	MOUDA-II FGD	3,14,20,000.00
	SADARWARA FGD	3,06,60,000.00
	NORTH KARANPURA FGD	2,40,00,000.00

PART-V
FORM-5

Statement Giving Details of Project Proposed Through a Constituency of Hon

MOUDA-I FSD	[illegible]
BARHI FSD	2,16,00,900.00
SOLAPUR FSD	[illegible]
TANDA II FSD	[illegible]
RAMPURHAT-III FSD	[illegible]
Total Allocated Amount	[illegible]

Statement Giving Details of Project Financed through a Combination of loan			PART-IV FORM-E
Form E			
IBP NO.5000000451	TRANCHE NO T00001		
Unsecured Loan From IOCHV			
Source of Loan	IOCHV		
Currency	INR		
Amount of Loan	70,07,00,00,000		
Total Drawn amount	9,00,00,00,000		
Date of Drawal			
Interest Type	Floating		
Fixed Interest Rate			
Base Rate, if Floating Interest	[illegible]7.90%		
Margin, if Floating Interest	NIL		
Any Base and Caps Rate	[illegible]		
Frequency of Int. Payment	MONTHLY		
If Above is yes, specify Caps/Floor			
Moratorium Period	8 Years		
Moratorium effective from	31.03.2027		
Repayment Period (incl Moratorium)	15 Years		
Repayment Frequency	8 Yearly Instalment		
Repayment Type	NONE		
First Repayment Date	16.09.2023		
Base Exchange Rate	INRCE		
Date of Base Exchange Rate	N.A.		
Project Code	Project Name	Amount	
	TALAIPALLI COAL MINE	9,00,00,00,000.00	
Total Allocated Amount		9,00,00,00,000.00	

Statement Giving Details of Project Financed through a Combination of Loan

PART-IV
FORM-9

Form 9

TRANCHE NO.

SP-NC 50000000041	T00001	D00002
Unwarmed Loan From IDFC-VI		
Source of Loan	IDFC-VI	
Currency	INR	
Amount of Loan	15-09-00-00-000	
Total Drawn amount	3,00,00,00,000	
Date of Drawal	28.08.2019	
Drawal Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	7.90%	
Margin, if Floating Interest	NIL	
Are there any Caps/ Floor	YES	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor		
Moratorium Period	6 Years	
Moratorium effective from	28.08.2019	
Repayment Period (incl. Moratorium)	15 years	
Repayment Frequency	9 Yearly Instalment	
Repayment Type	ADB	
First Repayment Date	11.08.2024	
Base Exchange Rate	Rupee	
Date of Base Exchange Rate	N.A	

Project Code	Project Name	Amount
	MOUDA-I	7,15,20,000.00
	JHARKHAND(WON CMS	83,71,80,000.00
	TALAIPALI COAL MINE	24,89,20,000.00
	KORBA-III	20,38,20,000.00
	NCTPP-II	16,01,80,000.00
	RIHAND-III	42,70,80,000.00
	SINGRAULI-III	48,54,80,000.00
	VSTPP-V	48,04,80,000.00
Total Allocated Amount		3,00,00,00,000.00

Statement Giving Details of Project Financed through a Combination of Loan

PART-IV
FORM-5

Form-5

TRANCHE NO

GP NO 9999999541 | 100001 | 000000

Unsecured Loan From ICICI-III

Source of Loan	ICICI-III	
Currency	INR	
Amount of Loan	50,00,00,00,000	
Total Drawn amount	1,00,00,00,000	
Date of Drawal	21.12.2017	
Interest Type	Floating	
Basic Interest Rate		
Base Rate/ If Floating Interest	7.95%	
Margin, If Floating Interest	NIL	
Are there any Grace Peiod	YES	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Grace Peiod		
Moratorium Period	2 Years	
Moratorium effective from	21.12.2017	
Repayment Period (in Months)	15 years	
Repayment Frequency	3 Years Instalment	
Repayment Type	EQS	
First Repayment Date	21.09.2020	
Base Exchange Rate	RUPEE	
Type of Base Exchange Rate	N.A.	

Project Code	Project Name	Amount
	DKULOAM	5,00,00,000.00
	PAKRI BARWADIH CMP	80,00,00,000.00
	TALAIPALI COAL MINE	15,00,00,000.00
Total Allocated Amount		1,00,00,00,000.00

Statement Giving Details of Project Financed through a Combination of loan		PART-V FORM-9
Form 9		
	TRANCHE NO	
IEP NO 3000000342	190051	000052
Unallocated Loan From IOCL-VB		
Source of Loan	IOCL-VB	
Currency	INR	
Amount of Loan	[illegible]	
Total Drawn amount	9,77,21,00,000	
Date of Drawal	01.03.2025	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	8.00%	
Margin, if Floating Interest	NIL	
Are there any Capital Flows	YES	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Capital Flows		
Moratorium Period	3 Years	
Moratorium effective from	01.03.2025	
Repayment Period (for Moratorium)	15 years	
Repayment Frequency	12 Yearly Installment	
Repayment Type	Annuity	
First Repayment Date	01.12.2028	
Base Exchange Rate	INR/SGD	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	PHDC	5,08,91,29,000.00
	NRTPDC	4,68,49,50,000.00
	BILHAUR SOLAR 140MW	26,00,37,000.00
	BILHAUR SOLAR 85MW	8,03,50,000.00
	KURNIYA SOLAR 30MW	18,00,00,000.00
	JETSAR SOLAR	6,00,00,000.00
	[illegible]OT SOLAR	23,00,00,000.00
	SAMBHALKHERI	47,00,00,000.00
	KORBA 45MW	5,99,10,000.00
	SHAHGANJ[illegible]AM 75MW	47,00,00,000.00
	[illegible]PSH 75MW	32,00,00,000.00
	SHAKTI BARIATU	20,00,00,000.00
	Shivalkar 10MW	9,50,00,000.00
	[illegible]PALI	30,00,00,000.00
Total Allocated Amount		9,77,21,00,000.00
Loan Allocated to LARA w.e.f. 01.04.2021		

Statement Giving Details of Project Financed through Commercial Bank	PART-IV FORM-5

Form 5

TRANCHE NO

Sr. NO 5050001262	TRANCHE NO 1(last)	Dated
Unsecured Loan From Industrial Bank		
Source of Loan	Industrial Bank	
Currency	INR	
Amount of Loan	15,00,00,00,000	
Total Drawn amount	2,16,42,00,000	
Date of Drawal	19.07.2022	
Interest Type	FLOATING	
Rate of Interest	8.30%	
Margin, If Floating Interest	0.95%	
Any Reset and Other Fees	NIL	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Other Fees		
Moratorium Period	0 Years	
Moratorium effective from	19.07.22	
Repayment Period incl Moratorium	13 Years	
Repayment Frequency	13 Equal annual instalments	
Repayment Type	NVS	
First Repayment Date	19.JUL.35	
Base Exchange Rate	INR/EC	
Date of Base Exchange Rate	N.A.	

Project Code	Project Name	Amount
	ETTAYAPURAM SOLAR(230MW)	14,42,80,000.00
	NORTH KARAIPURA	87,00,00,000.00
	DEVKOT SOLAR 40MW	12,00,00,000.00
	SAMBHU KI BHURJ SOLAR 30	9,00,00,000.00
	FATEHGARH (180MW)	10,00,00,000.00
	JAISAR SOLAR 66MW	5,00,00,000.00
	BARAUNI-II (250MW)	6,00,00,000.00
	SINGRAULI RSM	20,00,00,000.00
	KORBA RSM	20,00,00,000.00
	RAMAGUNDAM STPRSM	20,00,00,000.00
	VINDHYACHALRSM	11,00,00,000.00
	FARAKKA RSM	7,00,00,000.00
	CHATTI SARJATU CMS	10,00,00,000.00
	TALAIPALI COAL MINE	13,00,00,000.00
	KRENDARI	4,00,00,000.00
Total Allocated Amount		2,16,42,00,000.00

Form 5

TRANCHE NO

BP NO 3000000871 T00001 000003

Unsecured Loan From Punjab National Bank-III	
Name of Loan	Punjab National Bank-III
Currency	INR
Amount of Loan	20,00,00,00,000
Total Drawn amount	5,00,00,00,000
Date of Draw	13.08.2018
Interest Type	Floating
Fixed Interest Rate	
Base Rate (if Floating Interest)	8.25%
Margin (if Floating Interest)	0.00%
Any Base rate Cons/ Rate	YN
Frequency (if Int. Payment)	MONTHLY
If Above is yes, specify Cap/ Floor	
Moratorium Period	2 Years
Moratorium effective from	13.08.2018
Repayment Period (ex. Moratorium)	12 Years
Repayment Frequency	6 Years Onwards
Repayment Type	AVG
First Repayment Date	31.08.2020
Base Exchange Rate	70.4512
Date of Base Exchange Rate	N.A.

Project Costs	Project Name	Amount
	BARHI	30,00,00,000.00
	SOLAPUR	20,00,00,000.00
	TANDALI	25,00,00,000.00
	TALAIPALLI	50,00,00,000.00
	SANGRAULI R&M	30,00,00,000.00
	FARIDKA R&M	25,00,00,000.00
	RIHAND R&M	50,00,00,000.00
	DADRI GAS R&M	45,00,00,000.00
	KORBA R&M	40,00,00,000.00
	RAMAGUNDAM R&M	40,00,00,000.00
	VINDHYACHAL R&M	30,00,00,000.00
	UNCHAHAR R&M	20,00,00,000.00
Total Allocated Amount		5,00,00,00,000.00

Statement Giving Details of Project Financed through a Combination of loan

PART IV
FORM-II

Form II

TRANCHE NO

BP NO 3000000711	120001	000001
Unsecured Loan From Punjab National Bank-IV		
Name of Loan	Punjab National Bank-IV	
Currency	INR	
Amount of Loan	20,00,00,00,000	
Total Drawl Amount	20,00,00,00,000	
Date of Drawl	31.01.2018	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate (If Floating Interest)	1.00%	
Margin (If Floating Interest)	11.00%	
Net Rate w.e.f Date	12%	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor		
Moratorium Period	0 Years	
Moratorium Effective from	31.01.2018	
Repayment Period (in Months)	12 Years	
Instalment Frequency	4 Yearly Instalment	
Repayment Type	XYZ	
First Repayment Date	14.09.2025	
Base Exchange Rate	RUPEE	
Rate of Base Exchange Rate	N.A.	
Project Details	Project Name	Project Amount
	UNCHAHAR STPP IV	49,00,00,000.00
	TANDA-II	83,00,00,000.00
	NCTPP-II	35,43,00,000.00
	DADRI GAS REM	46,00,00,000.00
	KORBA-III	15,00,00,000.00
	SIPAT-II	17,14,00,000.00
	PARAGOA-III	8,57,00,000.00
	KAHALGAON-II	17,14,00,000.00
	BARH-I	1,08,57,00,000.00
	BARSHI	8,00,00,000.00
	NORTH KARANPURA	1,00,00,00,000.00
	KOLDAM	8,43,00,000.00
	TAPOVAN VISHNUGAD	28,57,00,000.00
	PAKRI BARWADIH	1,42,01,00,000.00
	CHATTI BARIATU	10,00,00,000.00
	SONNAGADH	36,43,00,000.00
	KUDGI	60,00,00,000.00
	LARA	1,28,00,00,000.00
	GAEARWARA	2,27,72,00,000.00
	DARLIPALLI	2,13,00,00,000.00
	KHARSIAS	50,00,00,000.00
	ANANTPUR SOLAR	17,00,00,000.00
	TALAIPALI COAL MINE	3,00,00,00,000.00
Total Allocated amount		20,00,00,00,000.00
Loan Allocated to LARA w.e.f. 31.04.2021		

PART-V
FORM-II

Statement Giving Details of Project Financed through a Combination of loan

Form II

TRANCHE NO

SR NO 5555555531	100001	000004
Unsecured Loan From Punjab National Bank-V		
Source of Loan	Punjab National Bank-V	
Currency	INR	
Amount of Loan	28,00,00,00,000	
Total Drawn amount	4,90,00,00,000	
Date of Drawl	14.07.2025	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	7.75%	
Margin, if Floating Interest	[1.50]%	
Are there any Caps/ Floor	N	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor		
Moratorium Period	3 Years	
Moratorium effective from	14.07.2025	
Repayment Period (incl. Moratorium)	15 Years	
Repayment Frequency	12, Yearly instalment	
Repayment Type	Any	
Final Repayment Date	27.03.2034	
Base Exchange Rate	INR	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	SARNI	65,00,00,000.00
	TARIYANI VISHNUGARH	15,00,00,000.00
	NORTH KARANPURA	1,00,00,00,000.00
	DARLIPALLI	75,00,00,000.00
	PASHAM	10,00,00,000.00
	TELANGANA	35,00,00,000.00
	BARAUNI-II	40,00,00,000.00
	TALAIPALI COAL MINE	60,00,00,000.00
Total Allocated Amount		4,90,00,00,000.00

PART-V
FORM-9

Statement Giving Details of Project Financed through a Commission of loan
Form 9

TRANCHE NO

SP NO 5000000551	1999/1	00000
	Unsecured Loan From SBI-IE	
Source of Loan	SBI-IE	
Currency	INR	
Amount of Loan	50,00,00,00,000	
Total Drawn amount	5,00,00,00,000	
Date of Drawal	20.06.2018	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	7.90%	
Margin, if Floating Interest	2.00%	
Are there any Caps/ Floor	Y/N	
If Yes/enter no of Yrs/ Months	Month(s)	
If Above is yes, specify Caps/ Floor		
Moratorium Period	3 Years	
Moratorium effective from	20.06.2018	
Repayment Period (incl Moratorium)	13 Years	
Repayment Frequency	9 Yearly Installments	
Repayment Type	Annuity	
First Repayment Date	31.03.2021	
Base Exchange Rate	TC/FCC	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	BADVI	70,00,00,000
	TAPOVAN VISHNUGARH	20,00,00,000
	BONGAIGAON	4,00,00,000
	PANDA II	12,00,00,000
	RAMGARH	20,00,00,000
	TELANGANA	44,00,00,000
	NAUDA II	1,20,00,00,000
	BHADLA SOLAR PV	24,00,00,000
	PUGAAL WIND	9,00,00,000
	KALPI BARWAGH CHP	1,21,00,00,000
	DIHATTI BARIAT CHP	8,00,00,000
	PURANGA COAL MINE	10,00,00,000
	TALAIPALI COAL MINE	13,00,00,000
Total Allocated Amount		3,60,00,00,000.00

PART-IV
FORM-5

Statement Giving Details of Project Financed through a Combination of loan

Form II

TRANCHE NO

SP NO 5000000031		08508
Innovative Loan From IBRD		
Source of Loan	IBRD	
Currency	INR	
Amount of Loan	50,00,00,00,000	
Total Drawn amount	40,77,62,854	
Date of Drawal	26.06.2018	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	8.00%	
Margin, if Floating Interest	0.80%	
Are there any Caps/ Floor	Y/N	
Frequency of Int. Payment	Monthly	
If Above is Yes, specify Caps/ Floor		
Moratorium Period	3 Years	
Moratorium effective from	26.06.2018	
Repayment Period (incl Moratorium)	12 Years	
Repayment Frequency	6 Yearly Installments	
Repayment Type	NONE	
First Repayment Date	31.03.2021	
Base Exchange Rate	Rs/USD	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	TALAIPALI COAL MINE	40,77,62,854.00
Total Allocated Amount		40,77,62,854.00

PART-V
FORM-5

Statement Giving Details of Project Financed through a Combination of sign

Form 5

	TRANCHE NO.	
SR NO 9999999997	789001	999999
	Unpaid Loan from SBI-X	
Source of Loan	SBI-X	
Currency	INR	
Amount of Loan	40,00,00,97,000	
Total Drawn amount	3,00,99,60,569	
Date of Drawal	01.06.2018	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	7.95%	
Margin, if Floating Interest	0.00%	
Are there any Caps/ Floor	(Y/N)	
If Moratorium (in no. of months)	Months	
If Above is yes, specify Caps/Floor		
Moratorium Period	6 Years	
Moratorium effective from	07.06.2018	
Repayment Period (incl. Moratorium)	12 Years	
Repayment Periodicity	6 Years Installments	
Repayment Type	50/50	
First Repayment Date	01.12.2024	
Base Exchange Rate	SOURCE	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	[illegible] BARKHEDH CMD	70,00,00,000
	[illegible] BANSATU CMD	15,00,00,000
	DULANGA COAL MINE	25,00,00,000
	[illegible] NAHALI COAL MINE	140,00,00,000
Total Allocated Amount		3,00,99,60,569.30
Loan Allocated to LA&A w.e.f. 01.04.2021		

PART-IV
FORM-5

Statement Giving Details of Project Financed through a Combination of Loan

Form 5

	TRANCHE NO.	
SR NO 9999999991	199991	999992
	Unclassified Loan From SBI-XI	
Source of Loan	SBI-XI	
Currency	INR	
Amount of Loan	10,00,00,00,000	
Total Drawn amount	5,00,00,00,000	
Date Of Drawal	16.12.2015	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, If Floating Interest	9.30%	
Margin, if Floating Interest	0.00%	
Are there any Callet Clips	NIL	
If Moratorium in Int. Payment	Months	
If Above is yes, specify Date/Peiod		
Moratorium Period	3 Years	
Moratorium effective from	16.12.2015	
Repayment Period (on Moratorium)	12 Years	
Repayment Frequency	6 Years Installments	
Repayment Type	Other	
First Repayment Date	01.12.2022	
Base Exchange Rate	SOURCE	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	SINGARENI	50,00,00,000
	SINGARENI	1,00,00,00,000
	KOTHAGUDEM	1,20,00,00,000
	TELANGANA	50,00,00,000
	GOLKONDA COAL MINE	20,00,00,000
	TALARI-I COAL MINE	10,00,00,000
Total Allocated Amount		3,50,00,00,000.00

PART-IV
FORM-II

Statement Giving Details of Project Financed through a Combination of loan

Form II

TRANCHE-NO

SP NO 5000000061	190061	080004
Unsecured Loan From SBI-XI		
Source of Loan	SBI-XI	
Currency	INR	
Amount of Loan	50,00,00,00,000	
Total Drawn amount	8,80,00,00,500	
Date of Drawal	22.11.2018	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	8.30%	
Margin, if Floating Interest	0.00%	
Are there any Caps/ Floor	Y/N	
If Yes(Interest Paid/Payable)	Monthly	
If Above is yes, specify Caps/ Floor		
Moratorium Period	0 Years	
Moratorium effective from	22.11.2018	
Repayment Period (incl Moratorium)	12 Years	
Repayment Frequency	8 Yearly Installments	
Repayment Type	Annual	
First Repayment Date	31.10.2019	
Base Exchange Rate	TC/FOE	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	BAREILLY	40,00,00,000
	TAPDIARA VSK RAIGARH	11,00,00,000
	BOMDARA DR	11,00,00,000
	SOLAPUR	20,00,00,000
	UJJAIN	50,00,00,000
	SAGAREKA	55,00,00,000
	NORTH KARANPURA	36,00,00,000
	DARLIPALI	80,00,00,000
	TANDA II	10,00,00,000
	BHARSAR	70,00,00,000
	TELINGANA	25,00,00,000
	TAL NPALI COAL MINE	1,00,00,000
	NAMAGUNDAM I & II P&M	30,00,00,000
	ANDERYA DIV. P&M	14,00,00,000
	TAPAKKA P&M	10,00,00,000
	NEYVELI BADN P&M	11,00,00,000
	KHARGONE	3,80,00,00,000
	TELANGANA	1,00,00,00,000
Total Allocated Amount		8,80,00,00,000.50

PART IV
FORM 8

Statement Giving Details of Project Financed through a Combination of loan

Form 8

TRANCHE NO

BP NO 5050000141	T00001	D00001
Unsecured Loan From SBI XII		
Source of Loan	SBI XII	
Currency	INR	
Amount of Loan	750,00,00,000	
Total Drawn amount	7,50,00,00,000	
Date of Drawal	11.08.2016	
Interest Type	Floating	
Fixed interest Rate		
Base Rate, if Floating Interest	8.50%	
Margin, if Floating Interest	NIL	
Are there any Caps/ Floor	P/N	
Frequency of Int. Payment	Monthly	
If Above is yes, specify Caps/ Floor		
Moratorium Period	8 Years	
Moratorium effective from	11.07.2016	
Repayment Period (incl Moratorium)	16 Years	
Repayment Frequency	8 Yearly Installments	
Repayment Type	EMI	
First Repayment Date	31.05.2024	
Base Exchange Rate	RUPEE	
Date of Base Exchange Rate	N.A.	

Project Code	Project Name	Amount
	BATHI	1,30,00,00,000.00
	KADUVAYA USD 80 CrAPH	10,00,00,000.00
	MANDAKON	85,00,00,000.00
	SOLAPUR	40,00,00,000.00
	SIDDARWARA	90,00,00,000.00
	DUDUPALLI	60,00,00,000.00
	TANDA II	85,00,00,000.00
	ANANSONE	90,00,00,000.00
	TELANGANA	75,00,00,000.00
	SOUTH KARATA	15,00,00,000.00
	DUNNAR	35,00,00,000.00
	TALINFALI	85,00,00,000.00
	NTPS PSD	00,00,00,000.00
Total Allocated Amount		7,50,00,00,000.00

PART-IV
FORM-9

Statement Giving Details of Project Financed through a Combination of Loan

Form 9

TRANCHE NO

BP NO 5000038741	T00001	C00002
	Unsecured Loan From SBI #3	
Source of Loan	SBI-XII	
Category	NS	
Amount of Loan	50,00,00,00,000	
Total Drawn amount	5,00,00,00,000	
Date of Drawal	26.03.2019	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	8.05%	
Margin, if Floating Interest	NIL	
Are there any Caps/ Floor	YES	
Frequency of Int. Payment	Monthly	
If Yes/No, is it with any Caps/ Floor		
Moratorium Period	8 Years	
Moratorium effective from	06.03.2019	
Repayment Period (incl. Moratorium)	15 Years	
Repayment Frequency	8 Yearly Installments	
Repayment Type	AVG	
1st Repayment Date	31.03.2026	
Base Exchange Rate	EURFF	
Date of Base Exchange Rate	N.A.	

Project Code	Project Name	Amount
	BARH I	40,00,00,000.00
	UNCHAHAR STPP III	1,20,00,00,000.00
	LARA	80,00,00,000.00
	MOUDA SUPERCRITICAL	50,00,00,000.00
	SASARAM(RB)	40,00,00,000.00
	DADRI(PH-II)	40,00,00,000.00
	TANDA II	30,00,00,000.00
	BHABHAUR	80,00,00,000.00
	TELANGANA	80,00,00,000.00
	DARLIPALI II	5,00,00,000.00
	GULBARGA	10,00,00,000.00
	TALAIPALI	10,00,00,000.00
	NORTH KARANPURA	5,00,00,000.00
Total Allocated Amount		5,00,00,00,000.00

PART-IV
FORM-E

Statement Giving Details of Project Financed through a Combination of loan
Form-II

TRANCHE NO

SIP NO 5000000881	100001	000001
UNSECURED LOAN From SBI-XIII		
Source of Loan	SBI-XIII	
Category	NR	
Amount of Loan	50,00,00,00,000	
Total Drawn amount	2,00,00,00,000	
Date of Drawal	24.03.2026	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	7.45%	
Margin, if Floating Interest	NIL	
Are there any Other Fees	YES	
Frequency of Int. Payment	Monthly	
If Above is Yes, specify Other Fees		
Moratorium Period	6 Years	
Moratorium effective from	24.03.2026	
Repayment Period (incl. Moratorium)	16 Years	
Repayment Frequency	12 Yearly Installments	
Repayment Type	ANY	
1st Repayment Date	24.03.2026	
Base Exchange Rate	INR/FE	
Date of Base Exchange Rate	N.A.	

Project Code	Project Name	Amount
	BELHAUR SOLAR 1500M	20,00,00,000.00
	BELHAUR SOLAR 65MW	4,00,00,000.00
	AURAIYA SOLAR 25MW	25,00,00,000.00
	JETSAR SOLAR	5,00,00,000.00
	DEVHAT SOLAR	20,00,00,000.00
	SAMBHU KI BHURJ SOLAR	47,00,00,000.00
	KORBA P&M	4,00,00,000.00
	RAMAGUNDAM P&M	10,00,00,000.00
	VINDHYACHAL P&M	25,00,00,000.00
	CHATTI BARIATU CMB	20,00,00,000.00
	DULANGA COAL MINE	5,00,00,000.00
	TALAIPALI COAL MINE	25,00,00,000.00
Total Allocated Amount		2,00,00,00,000.00

PART-IV
FORM-II

Statement Giving Details of Project Financed through a Combination of loan

Form II

TRANCHE NO

SR NO 5000001942 | 100001 | 000002

Unsecured Loan From UCO BANK IV

Source of Loan	UCO BANK IV	
Currency	INR	
Amount of Loan	10,00,00,00,000	
Total Drawn amount	2,60,00,00,000	
Date of Drawal	08.07.1997	
Interest Type	Floating	
Cash Interest Rate		
Base Rate, if Floating Interest	7.45%	
Margin, if Floating Interest	0%	
Are there any Caps/ Floor	N	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor		
Moratorium Period	3 Years	
Moratorium effective from	08-Jun-00	
Repayment Period (Incl. Moratorium)	12 Years	
Repayment Frequency	12 Years	
Repayment Type	NOS	
Final Repayment Date	11.11.2006	
Base Exchange Rate	INDEX	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	BARIA	1,20,00,00,000.00
	NORTH KARANPURA	92,30,00,000.00
	RAMGARH WORKSHOP	37,50,00,000.00
	SIMDEGA	2,87,00,000.00
	TELANGANA	25,00,00,000.00
	TALAIPALI COAL MINE	6,90,00,000.00
	CHATTI BARIATU	4,11,00,000.00
	BARIA	87,00,000.00
Total Allocated Amount		2,60,00,00,000.00

PART-V
FORM-5

Statement Giving Details of Project Financed through a Combination of loan

Form 6

	TRANCHE NO	
SP NO SB50001348	190001	020003
	Unsecured Loan From UCO BANK IV	
Source of Loan	UCO BANK IV	
Currency	INR	
Amount of Loan	10 Cr (@ 10 cr)	
Total Drawn amount	2,20,00,00,000	
Date of Drawal	01-01-1900	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	7.70%	
Margin, if Floating interest	NIL	
Are there any Caps/ Floor	YES	
Frequency of Int. Payment	MONTHLY	
If Apex is use, specify Caps/ Floor		
Moratorium Period	3 Years	
Moratorium effective from	02-Jan-96	
Repayment Period (Incl Moratorium)	12 Years	
Repayment Frequency	12 Year's	
Repayment Type	ANG	
First Repayment Date	11.11.2008	
Base Exchange Rate	RUPEE	
Date of Base Exchange Rate	N.A.	
Project Code	Project Name	Amount
	BARHI (3X 660MW)	200000000
	TAPOVAN VISHNUGARH	120000000
	NORTH KARANPURA	200000000
	RAMNAM	20000000
	TELANGANA	350000000
	NOKH SOLAR PLOT-I	200000000
	NOKH SOLAR PLOT-III	130000000
	DARLIPALLI	420000000
	RAGHUNATH	80000000
	CHATTI BARIATU OMS	10000000
	TALAIPALI COAL MINE	70000000
	KURENJARI	80000000
	RIHAND-I FSD	70000000
	RIHAND- II & III FSD	10000000
	JNCHAHAR-I, II & III-FSD	80000000
	VINDHYACHAL-I &II FSD	70000000
	VINDHYACHAL-III &IV FSD	30000000
	SIPAT-I FSD	20000000
	RAMAGUNDAM-III	30000000
	KORBA-I, II & III (3X200	120000000
	RAMAGUNDAM-I & II FSD	40000000
	SIMHADRI-II & I (2X500 MW	10000000
	MOUDA-I FSD	10000000
	MOUDA-II FSD	20000000
	SOLAPUR FSD	50000000
	MUNDRA FSD	20000000
	SINGRAULI-I & II FSD	130000000

PART-IV
FORM-5

Statement showing Details of Project Proposals through a Commission of sum

PARLI(A) - II & III EXT	10000000
KAHALGAON-II & III PID	50000000
TSTPS STAGE-II & I PID	100000000
Total Allocated amount	2,50,00,00,000.00

PART-V
FORM-9

Statement Giving Details of Project Financed through a Combination of loan

Form 9

TRANCHE NO

SR NO 5000001942	100001	D00004
Unsecured Loan From UCO BANK IV		
Source of Loan	UCO BANK IV	
Currency	INR	
Amount of Loan	10,00,00,00,000	
Total Drawn amount	2,50,00,00,000	
Date of Drawal	08-07-1901	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	7.75%	
Margin, if Floating Interest	NIL	
Are there any Caps/ Floor	Y/N	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor		
Moratorium Period	3 Years	
Moratorium effective from	05-Jun-08	
Repayment Period (incl. Moratorium)	12 Years	
Repayment Frequency	12 Years	
Repayment Type	NOS	
Final Repayment Date	31.11.2020	
Base Exchange Rate	INR/EE	
Date of Base Exchange Rate	N.A	
Project Code	Project Name	Amount
	TELANGANA (2X800MW)	120000000
	ANTA SOLAR (90MW)	80000000
	NOKH SOLAR PLOT-I (245MW)	500000000
	NOKH SOLAR PLOT-II (245MW	450000000
	NOKH SOLAR PLOT-III (245M	230000000
	TALAIPALI COAL MINE	400000000
	BARH-I	950000000
	TIFCV(MV) VISHNUGARH	200000000
Total Allocated Amount		2,50,00,00,000.00

PART-IV
FORM-5

Statement Giving Details of Project Financed through a Consortium of Bank

Form 5

TRANCHE NO.

BP NO 5050000391	100001	D00004
Sanctioned Loan From Vijaya Bank		
Source of Loan	Vijaya Bank Ltd	
Currency	INR	
Amount of Loan	2,50,00,00,000	
Total Drawn amount	89,00,00,000	
Rate of Order	0	
Interest Type	Floating	
Basic Interest Rate	7.40%	
Base Rate, if Floating Interest	Declare 7.0%	
Margin, if Floating Interest	NIL	
Are there any Grace Peiod	YES	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Grace Peiod		
Moratorium Period	5 Years	
Moratorium effective from	13.11.2017	
Repayment Period (ex Moratorium)	15 Years	
Repayment Frequency	12 Months	
Repayment Type	Average	
First Repayment Date	14.03.2020	
Base Exchange Rate	INDIAN	
Date of Base Exchange Rate	NA	
Project Code	Project Name	Amount
	GADARWARA	20,00,00,000
	UNCHAHAR STPP III	20,00,00,000
	SANTHALI I	20,00,00,000
	UNCHAHAR-IV	10,00,00,000
	TALAIPALLI COAL MINE	19,00,00,000.00
Total Allocated Amount		89,00,00,000.00

PART-V
FORM-6

Statement Giving Details of Project Financed through a Combination of loan

Form 8

BP NO 9000001441 | TRANCHE NO 700001 | 000001

Unsecured Loan From HDFC Bank Ltd. 38

Source of Loan :	HDFC Bank Ltd. 38
Currency :	INR
Amount of Loan :	50,00,00,00,000
Total Drawn amount :	5,00,00,00,000
Date of draw :	12-Oct-23
Interest Type :	Floating
Fixed Interest Rate :	
Base Rate, if Floating Interest :	7.40%
Margin, if Floating Interest :	NIL
Any Other any Charge / Fee :	NIL
Frequency of Int. Payment :	MONTHLY
If Above is yes, specify Other Fees :	
Moratorium Period :	3 Years
Moratorium effective from :	12.10.2023
Repayment Period (by Moratorium) :	15 Years
Instalment Frequency :	12 Years Instalment
Disbursement Type :	Actual
First Repayment Date :	15.10.2027
Base Exchange Rate :	INR
Date of Base Exchange Rate :	N/A

Project Code	Project Name	Amount	
	[redacted]	37,00,00,000.00	13-10-2023
	[redacted]	1,00,00,000.00	13-10-2023
	[redacted]	20,00,00,000.00	13-10-2023
	[redacted]	8,00,00,000.00	13-10-2023
	[redacted]	1,00,00,000.00	13-10-2023
	[redacted]	3,00,00,000.00	13-10-2023
	[redacted]	7,00,00,000.00	13-10-2023
	[redacted]	1,00,00,000.00	13-10-2023
	[redacted]	25,00,00,000.00	13-10-2023
	[redacted]	84,00,00,000.00	13-10-2023
	[redacted]	1,00,00,000.00	13-10-2023
	[redacted]	60,00,00,000.00	13-10-2023
	[redacted]	3,00,00,000.00	13-10-2023
	[redacted]	1,00,00,000.00	13-10-2023
	[redacted]	2,00,00,000.00	13-10-2023
	[redacted]	3,00,00,000.00	13-10-2023
	[redacted]	1,00,00,000.00	13-10-2023
	[redacted]	1,00,00,000.00	13-10-2023
	[redacted]	10,00,00,000.00	13-10-2023
	[redacted]	60,00,00,000.00	13-10-2023
	[redacted]	12,00,00,000.00	13-10-2023
	[redacted]	13,00,00,000.00	13-10-2023
	[redacted]	20,00,00,000.00	13-10-2023
	[redacted]	32,00,00,000.00	13-10-2023
	[redacted]	16,00,00,000.00	13-10-2023
	[redacted]	10,00,00,000.00	13-10-2023
	[redacted]	8,00,00,000.00	13-10-2023
	[redacted]	50,00,00,000.00	13-10-2023
Total disbursed Amount		5,00,00,00,000.00	

PART-V
FORM-6

Statement Giving Details of Project Financed through a Combination of loan

Form 6

TRANCHE NO

IBP NO SE0020144.1 | T00001 | Date002

Unsecured Loan From HDFC Bank Ltd. 33

Source of Loan	HDFC Bank Ltd. 33
Currency	INR
Amount of Loan	50,00,00,00,000
Total Drawn amount	5,00,00,01,804
Date of draw	01-Nov-23
Interest Type	Floating
Fixed Interest Rate	
Base Rate, if Floating Interest	7.95%
Margin, if Floating Interest	0%
Are there any Caps/ Floor	YES
Frequency of Int. Payment	MONTHLY
If Yearly, is any specific Date/ Floor	
Moratorium Period	3 Years
Moratorium effective from	13.10.2023
Repayment Period (incl. Moratorium)	15 Years
Repayment Frequency	12 Year(s) Instalment
Repayment Type	EQI
First Repayment Date	13.10.2027
Base Exchange Rate	INR/INR
Date of Base Exchange Rate	N.A.

Project Code	Project Name	Amount	
	DARLIPALI (2X 660MW)	50,00,00,000.00	01-11-2023
	CHHABRA Unit #6(500MW)	10,00,00,000.00	01-11-2023
	KURJI KHARGPUR 3&4	66,00,00,000.00	01-11-2023
	KHARGAR(1&2)(1320MW)	7,00,00,000.00	01-11-2023
	TELANGANA (2X800MW)	35,00,00,000.00	01-11-2023
	TSPS II (2X660MW)	30,00,00,000.00	01-11-2023
	UMPL STAGE II 2X660 MW	4,00,00,000.00	01-11-2023
	NOKHRA SOLAR PLOT I (240MW)	30,00,00,000.00	01-11-2023
	NOKHRA SOLAR PLOT II (300MW)	40,00,00,000.00	01-11-2023
	NOKHRA SOLAR PLOT III (150MW)	20,00,00,000.00	01-11-2023
	NABHA PGS	10,00,00,000.00	01-11-2023
	TSL UPALI COAL MINE	50,00,00,000.00	01-11-2023
	NAVINDATA	43,00,00,000.00	01-11-2023
	RAYAGADA I PGS	4,00,00,000.00	01-11-2023
	RAMAGUNDAM III & IV PGS	8,00,00,000.00	01-11-2023
	UNCHAHAR I, II & III PGS	4,00,00,000.00	01-11-2023
	VINDHYACHAL I,II,III PGS	7,00,00,000.00	01-11-2023
	VINDHYACHAL IV & V PGS	6,00,00,000.00	01-11-2023
	SIPAT I (1980 MW) PGS	1,00,00,000.00	01-11-2023
	SIPAT II PGS	11,00,00,000.00	01-11-2023
	KORBA I, II & III PGS	13,00,00,000.00	01-11-2023
	SIPAT II PGS	2,00,00,000.00	01-11-2023
	RAMAGUNDAM I & II PGS	6,00,00,000.00	01-11-2023
	RAMAGUNDAM III (1X660 MW)	4,00,00,000.00	01-11-2023
	TALCHER II & I PGS	4,00,00,000.00	01-11-2023

PART-V
FORM-8

Attachment Giving Details of Project Financed through a Combination of loan

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Total Allocated Amount		

PART-IV
FORM-6

Statement Giving Details of Project Financed through a Commitment of Rupee Loan

Form 8

FINANCIER NO

SP-ID: 50000001441	100001	000005
Unsecured Loan From HDFC Bank Ltd. All		
Source of Loan	HDFC Bank Ltd. All	
Currency	INR	
Amount of Loan	80,00,00,00,000	
Total Drawn amount	10,00,00,00,000	
Date of Loan	27-Dec-23	
Interest Type	Floating	
Fixed Interest Rate		
Base Rate, if Floating Interest	7.90%	
Margin, if Floating Interest	NIL	
Are Term are Open Floor	ON	
Frequency of Int. Payment	MONTHLY	
If Above is yes, specify Open Floor		
Moratorium Period	1 Years	
Moratorium effective from	13.11.2023	
Repayment Period (on Moratorium)	15 Years	
Repayment Frequency	12 Years Installment	
Prepayment Type	Any	
First Repayment Date	13.10.2027	
Base Exchange Rate	SUPEC	
Date of Base Exchange Rate	N.A.	

Project Code	Project Name	Amount	
	BATHI (DK BIDAR)	2,13,00,00,000.00	01-12-2023
	TADOVA (DB-BELGAUM) (DK LD)	88,00,00,000.00	01-12-2023
	BAPTA KANAKPURA (DKBID)	47,00,00,000.00	01-12-2023
	SAJEBAN (DKGUM)	13,00,00,000.00	01-12-2023
	LARA STAGE II (DKBID-WS)	76,00,00,000.00	01-12-2023
	SANDHYA (DKBI)	1,00,00,000.00	01-12-2023
	SOLAPUR SOLAR (DKBID)	3,00,00,000.00	01-12-2023
	TUHAND SOLAR (DGWA)	2,00,00,000.00	01-12-2023
	BETA SOLAR (DKBID)	6,40,00,000.00	01-12-2023

PART-IV
FORM-3

Statement Giving Details of Project Financed through a Combination of loan

	NOKH SOLAR PLOT I [illegible]	[illegible]	01-12-2023
	NOKH SOLAR PLOT II [illegible]	[illegible]	01-12-2023
	NOKH SOLAR PLOT III [illegible]	[illegible]	01-12-2023
	[illegible]	[illegible]	01-12-2023
	[illegible]	[illegible]	01-12-2023
	[illegible]	[illegible]	01-12-2023
	DARLIPALI I	[illegible]	01-12-2023
	TANDA II	[illegible]	01-12-2023
	BARAUNI II (2X250MW)	[illegible]	01-12-2023
	NABINAGAR	[illegible]	01-12-2023
	CHATTI BARIATU CMB	[illegible]	01-12-2023
	TALAIPALLI COAL MINE	[illegible]	01-12-2023
	KERANDARI	[illegible]	01-12-2023
	PAKRI BARWADIH CMB	[illegible]	01-12-2023
	RIHAND I FGD	[illegible]	01-12-2023
	RIHAND II & III FGD	[illegible]	01-12-2023
	UNCHAHAR I, II & III FGD	[illegible]	01-12-2023
	VINDHYACHAL I & II FGD	[illegible]	01-12-2023
	VINDHYACHAL III & IV FGD	[illegible]	01-12-2023
	SIPAT II FGD	[illegible]	01-12-2023
	KORBA I, II & III FGD	[illegible]	01-12-2023
	BARH II FGD	[illegible]	01-12-2023
	RAMAGUNDAM I & II FGD	[illegible]	01-12-2023
	RAMAGUNDAM III FGD	[illegible]	01-12-2023
	MOUDA I FGD	[illegible]	01-12-2023
	[illegible] FGD	[illegible]	01-12-2023
	SOLAPUR FGD	[illegible]	01-12-2023
	KUDGI FGD	[illegible]	01-12-2023
	SINGRAULI I & II FGD	[illegible]	01-12-2023
	FARAKKA I, II & III FGD	[illegible]	01-12-2023
	KAHALGAON I & II FGD	[illegible]	01-12-2023
	[illegible] STAGE II & I FGD	[illegible]	01-12-2023
Total Allocated Amount		[illegible]	

PART-IV
FORM-II

Statement Giving Details of Project Financed through a Combination of loan

Form II

TRANCHE NO

RP NO 5000001A#1	T00001	D00004
Unsecured Loan From HDFC Bank Ltd. -II		
Source of Loan :	HDFC Bank Ltd. -II	
Currency :	INR	
Amount of Loan :	10,00,00,00,000	
Total Drawn amount :	9,75,00,00,000	
Date of Issue :	31-Jan-24	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, if Floating Interest :	7.85%	
Margin, if Floating Interest :	NIL	
Any Moratorium Date/ Days :	0 M	
Frequency of Int. Payment :	MONTHLY	
If Above is yes, specify Days/ Year :		
Moratorium Period :	2 Years	
Moratorium effective from :	15-12-2026	
Repayment Period (no. Moratorium) :	15 Years	
Repayment Progress :	12 Years instalment	
Repayment Type :	EQI	
First Repayment Date :	15-12-2027	
Base Exchange Rate :	INDEX	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	[BA201] (1x 660MW)	3,40,00,00,000.00
	[PARDWA] (2X135+1X270)	33,00,00,000.00
	[KURTI KARANPURA (3X660)]	1,47,00,00,000.00
	[UMSRM (3X250)]	3,00,00,000.00
	[TH_AMRAPALI (3X500MW)]	40,00,00,000.00
	[SASOI(2X660MW]	1,00,00,000.00
	[RIHAND-III(2X500MW)]	1,00,00,000.00
	[VNTA (NTPC)(2X660)]	2,00,00,000.00
	[NSHM(SOLAR PLOT A)(66MW]	30,00,00,000.00
	[NSHM(SOLAR PLOT B)(34MW	30,00,00,000.00
	[APA	30,00,00,000.00
	[SHOBHASAN]	8,00,00,000.00
	[2X800 (DB)-II]	35,00,00,000.00
	[TANDA-II	25,00,00,000.00
	[MOUDA II (2X660MW)]	100,00,000.00

Statement giving details of Project Proposed through a Commission of Inquiry

PART-IV
FORM-II

[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	05-02-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	30-01-2024
[illegible]	[illegible]	05-02-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	05-02-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	05-02-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	05-02-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	05-02-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	05-02-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	05-02-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	31-01-2024
[illegible]	[illegible]	05-02-2024
[illegible]	[illegible]	31-01-2024
Total Allocated Amount :	[illegible]	

PART-V
FORM-6

Statement Giving Details of Project Financed through a Combination of loan

Form 6

BP NO 9000001441 | TRANCHE NO 700001 | 000004

Unsecured Loan From HDFC Bank Ltd. 38

Source of Loan	HDFC Bank Ltd. 38
Currency	INR
Amount of Loan	50,00,00,00,000
Total Drawn amount	7,00,00,00,000
Date of draw	13 Mar 24
Interest Type	Floating
Fixed Interest Rate	
Base Rate, if Floating Interest	7.90%
Margin, if Floating Interest	NIL
Are there any Call/ Put	YOU
Frequency of Int. Payment	MONTHLY
If there is any moratorium	
Moratorium Period	3 Years
Moratorium effective from	13-10-2027
Repayment Period (incl Moratorium)	15 Years
Repayment Frequency	12 Years Instalment
Repayment Type	YOU
First Repayment Date	13-10-2027
Base Exchange Rate	BUYER
Date of Base Exchange Rate	N.A.

Project Code	Project Name	Amount	
	[illegible]	50,00,00,000.00	01.03.2024
	TAPOVAN VIDYUTPRI	50,00,00,000.00	01-03-2024
	NEERTH KARANPURA (Debenture)	1,50,00,00,000.00	01-03-2024
	[illegible]	15,00,00,000.00	01.03.2024
	TELANGANA (DEBENTURE)	50,00,00,000.00	01-03-2024
	PTC[illegible]	7,50,00,000.00	01-03-2024
	[illegible]	5,00,00,000.00	01-03-2024
	SOLARUS SOLAR (DEBENTURE)	7,00,00,000.00	01-03-2024
	[illegible]	50,00,00,000.00	01-03-2024
	NOIDA SOLAR PLOT I (DEBENTURE)	25,00,00,000.00	01.03.2024
	NEEMRANA SOLAR PLOT II (DEBENTURE)	1,25,00,00,000.00	01.03.2024
	NEEMRANA SOLAR PLOT III (DEBENTURE)	50,00,00,000.00	01-03-2024
	[illegible]	20,00,00,000.00	01-03-2024
	[illegible]	10,00,00,000.00	01-03-2024
	[illegible]	5,00,00,000.00	01-03-2024
	[illegible]	5,00,00,000.00	01-03-2024
	[illegible]	1,00,00,000.00	01-03-2024
	[illegible]	3,00,00,000.00	01-03-2024
	TAJGRAT COAL MINE	5,00,00,000.00	01-03-2024
	KERANGARI	30,00,00,000.00	01-03-2024
	[illegible]	20,00,00,000.00	01-03-2024
	[illegible]	1,00,00,000.00	01-03-2024
	[illegible]	1,00,00,000.00	01-03-2024
	[illegible]	5,00,00,000.00	01-03-2024
	[illegible]	2,00,00,000.00	01-03-2024
Total Allocated Amount		7,00,00,00,000.00	

FORM-8

Name of the Company	**NTPC Limited**
Name of the Power Station	**Talaipalli Coal Mine**
Commercial Operation Date (COD)	**01.10.2023**

(Amount in Rs. Lakh)

Particulars							
Source of Loan - Bond's Series	**67**	**69**	**73**	**74**	**75**	**76**	**78**
Currency	INR	INR	INR	INR	INR	INR	INR
Amount of Loan sanctioned (In Lakh)	4,00,000	4,30,000	2,50,000	3,99,600	3,00,000	1,17,500	2,00,000
Amount of Gross Loan drawn upto COD (In Lakh)	4,00,000	4,30,000	2,50,000	3,99,600	3,00,000	1,17,500	2,00,000
Interest Type	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Fixed Interest Rate, if applicable	8.30%	7.32%	6.43%	6.87%	6.69%	6.74%	7.44%
Base Rate, if Floating Interest	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Margin, if Floating Interest	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Are there any Caps/Floor	No	No	No	No	No	No	No
If above is yes,specify caps/floor	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moratorium Period (In Years)	10	10	10	15 yrs 1 day	10	10 yrs 3 months 25 days	10
Moratorium effective from*	15-01-2019	17-07-2019	27-01-2021	20-04-2021	13-09-2021	20-12-2021	25-08-2022
Repayment Period	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment
Repayment effective from	15-01-2029	17-07-2029	27-01-2031	21-04-2036	13-09-2031	14-04-2032	25-08-2032
Repayment Frequency	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment
Repayment Instalment (In Lakh)	4,00,000	4,30,000	2,50,000	3,99,600	3,00,000	1,17,500	2,00,000
Base Exchange Rate	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Door to Door Maturity (In Years)	10	10	10	15 yrs 1 day	10	10 yrs 3 months 25 days	10
Name of the Projects	**67**	**69**	**73**	**74**	**75**	**76**	**78**
Anta Solar 90MW					650.00	200.00	900.00

FORM-8							
Name of the Company	**NTPC Limited**						
Name of the Power Station	**Talaipalli Coal Mine**						
Commercial Operation Date (COD)	**01.10.2023**						**(Amount in Rs. Lakh)**
Auraiya R&M			200.00				
Auraiya Solar 20MW			400.00			425.00	
Auraiya Solar FS 20MW				150.00		2,000.00	586.00
Barauni-II				1,500.00	8,400.00		500.00
BARH I	65,957.14	84,200.00	51,100.00	32,900.00	42,600.00	11,650.00	4,511.00
BARH II	1,000.00	1,400.00					
BONGAIGAON	38,819.64	17,100.00					
CC - Jhabua Power							50,000.00
CC - NEEPCO		1,391.30	18,243.00	56,696.00	48,250.00	24,017.00	10,922.00
CC - THDC		2,608.70	34,207.00	1,06,304.00	90,470.00	45,033.00	20,478.00
CHATTI BARIATU CMB		3,000.00	825.00	200.00	1,350.00	600.00	211.00
DADRI GAS R&M				100.00	200.00		
DARLIPALLI		40,000.00	28,300.00	11,500.00	1,000.00		500.00
Dulanga Coal Mine		5,000.00	2,700.00	3,400.00	4,100.00		
FARAKKA R&M		1,000.00	1,700.00	1,600.00	1,550.00		
Farakka-I II & III FGD				1,500.00	550.00		
Faridabad R&M			100.00		700.00		
GADARWARA	25,900.00	47,600.00	19,000.00	7,500.00			
Gandhar 20MW				3,750.00	90.00	1,395.00	
KAHALGAON R&M			600.00	1,200.00	2,620.00		
Kahalgaon-I & II FGD				300.00			
Kawas Solar				2,900.00	5,250.00	4,050.00	800.05
Kayamkulam FS (22 MW)			170.00	2,000.00	2,195.00		100.00
Kayamkulam FS (70 MW)			1,630.00	2,850.00	1,925.00	4,830.00	
KHARGONE	36,500.00	13,500.00	3,000.00	2,000.00			500.00
Kirenderi Coal Mine			7,350.00		165.00	1,400.00	1,900.00
KOLDAM	8,598.21						
KORBA III	2,135.00						
KORBA R&M			2,300.00	1,350.00	4,050.00		2,200.00
Korba-I, II & III FGD				100.00			
KUDGI	10,000.00	21,500.00					
KUDGI-FGD		2,500.00		2,950.00	1,000.00		

FORM-8							
Name of the Company	**NTPC Limited**						
Name of the Power Station	**Talaipalli Coal Mine**						
Commercial Operation Date (COD)	**01.10.2023**						**(Amount in Rs. Lakh)**
LARA	47,812.50	10,600.00	1,700.00	14,000.00			
MAUDA I	715.00	6,000.00		500.00			
MAUDA II		29,000.00		100.00	2,200.00		
Nabinagar							5,664.00
NCPS-FGD		6,500.00			5,600.00		
NCTPP II	1,601.00						
NCTPP R&M				200.00			
Nokh Solar Plot-I(245 MW)							7,500.00
Nokh Solar Plot-II(245 MW)							7,500.00
Nokh Solar Plot-III(245 MW)							7,500.00
NORTH KARANPURA	55,900.00	15,000.00	9,500.00	11,700.00	11,900.00	6,100.00	3,917.00
PAKRI BARWADIH CMS	21,521.00			20,000.00			41,800.00
RAMAGUNDAM R&M				3,300.00			
Ramagundam Floating Solar-100 MW			3,375.00	3,800.00	8,640.00	3,800.00	1,400.00
Ramagundam I & II R&M			4,200.00		8,985.00		1,800.00
RAMAGUNDAM SOLAR		1,000.00					
Ramagundam-I & II FGD					100.00		
Ramagundam-III (1x500 MW)				400.00			
RAMMAM	2,500.00	2,500.00	3,300.00	1,100.00	800.00	1,050.00	311.00
Rihand- I FGD					20.00		
Rihand- II & III FGD					130.00		
RIHAND III	4,270.00						
RIHAND R&M			1,200.00	2,000.00	6,275.00		2,400.00
Rihand Solar (20MW)				300.00	510.00		400.00
Simhadri Floating			1,875.00	3,050.00	525.00	1,350.00	
SIMHADRI II	4,804.00						
SIMHADRI R&M					200.00		
Simhadri-II & I (2x500 MW) & (2x500 MW) FGD				7,600.00	1,150.00		
Singrauli R&M		1,000.00	4,200.00	1,700.00	2,725.00		1,300.00
Singrauli-I & II FGD				8,700.00	150.00		
Sipat-I (3x660 MW) FGD				5,600.00	1,100.00		500.00
SOLAPUR	25,200.00	21,500.00					

FORM-8							
Name of the Company	**NTPC Limited**						
Name of the Power Station	**Talaipalli Coal Mine**						
Commercial Operation Date (COD)	**01.10.2023**					**(Amount in Rs. Lakh)**	
Solapur Solar					2,575.00	800.00	200.00
Solapur-FGD				2,700.00	3,450.00		
Talaipali Coal Mine	**4,900.00**	**11,500.00**	**19,400.00**	**4,800.00**	**2,160.00**	**2,600.00**	**856.00**
TALCHER R&M			500.00				
TANDA II	12,500.00	17,000.00	9,500.00	16,700.00	1,000.00		
Tapovan Vishnugarh	15,062.50	16,600.00	6,200.00	8,000.00	1,500.00		155.00
TELANGANA		37,000.00	9,725.00	20,300.00	9,200.00	6,800.00	8,678.00
TSTPP R&M					640.00		700.00
TSTPS Stage-II & I FGD				9,700.00			
TTPS III	1,000.00						
Unchahar R&M			500.00	900.00	1,050.00		1,500.00
Unchahar-I, II & III-FGD				5,400.00	5,100.00		
UNCHAHAR IV	2,500.00	14,000.00					
Unchahar-IV-FGD				2,750.00	1,200.00		
VINDHYACHAL HYDRO	500.00						
VINDHYACHAL IV	4,804.00						
VINDHYACHAL R&M			2,800.00	1,450.00	2,900.00		1,800.00
VINDHYACHAL V	5,500.00						
Vindhyachal-I &II FGD				200.00	900.00		
Total	**4,00,000.00**	**4,30,000.00**	**2,50,000.00**	**3,99,600.00**	**3,00,000.00**	**1,17,500.00**	**2,00,000.00**

Name of the Company: NTPC Ltd.
Name of the Power Station: Talcher STPS

Particulars:											
	G	H	I	J	K	L	M	N	O	P	Q
Name of Loan	Euro Loan I	Euro Loan II	Euro Loan III	USD 750 Million Drawl I	USD 750 Million Drawl II	USD 750 Million Drawl III	USD 750 Million Drawl IV	USD 750 Million Drawl V	USD 750 Million Drawl VI	JBIC Eqv. $400 Million Drawl I	JBIC Eqv. $400 Million Drawl II
Source of Loan											
Currency	EURO	EURO	EURO	USD	USD	USD	USD	USD	USD	JPY	JPY
Amount of Loan sanctioned	€ 60.75 mn	€ 42.50 mn	€ 42.50 mn	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Amount of Gross Loan drawn upto 31.03.2013	€ 60.75 mn	€ 42.50 mn	€ 42.50 mn	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Interest Type	Floating	Floating	Floating	Floating	Floating	Floating	Floating	Floating	Floating	Floating	Floating
Fixed Interest Rate, if applicable	-	-	-	-	-	-	-	-	-	-	-
Base Rate, if Floating Interest*	6 Month EURIBOR*	6 Month EURIBOR*	6 Month EURIBOR*	6 Month Libor 30/60*	6 Month Libor 30/60*	6 Month Libor 30/60*	6 Month Libor 30/60*	6 Month Libor 30/60*	6 Month Libor 30/60*	6 Month Compounded 180/365*	6 Month Compounded 180/365*
Margin, if Floating interest rate	0.50%	0.50%	0.60%	0.0050%	0.0050%	0.0050%	0.0050%	0.0050%	0.0050%	0.0040%	0.0040%
Any Caps/Floor/Collar	No	No	No	No	No	No	No	No	No	No	No
Number of Tranches, if any	-	-	-	-	-	-	-	-	-	-	-
Moratorium Period	7	7	7	4	4	4	4	4	4	4	4
Moratorium effective from	31-Dec-2009	31-Dec-2009	31-Dec-2009	30-Jun-2010	30-Jun-2010	30-Jun-2010	30-Jun-2010	30-Jun-2010	30-Jun-2010	30-Jun-2010	30-Jun-2010
Repayment period	Bullet payment	Bullet payment	Bullet payment	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly
Repayment effective from	14-Jun-2016	14-Jun-2016	14-Jun-2016	07-Oct-2016	07-Oct-2016	07-Oct-2016	07-Oct-2016	07-Oct-2016	07-Oct-2016	15-May-27	15-May-27
Repayment frequency	One Time	One Time	One Time	Semi-annu.	Semi-annu.	Semi-annu.	Semi-annu.	Semi-annu.	Semi-annu.	Semi-annu.	Semi-annu.
Repayment amount/term	€ 60.75 mn	€ 42.50 mn	€ 42.50 mn	€ 42.85 mn	€ 42.85 mn	$ 53.56 mn	€ 42.85 mn	€ 42.85 mn	€ 42.85 mn	¥ 9,600 mn	¥ 9,600 mn
Base exchange Rate - 31.03.2013	80.2700	80.2700	80.2700	55.7600	55.7600	55.7600	55.7600	55.7600	55.7600	0.5626	0.5626
Any foreign currency loan hedged	No	No	No	No	No	No	No	No	No	No	No
If answer is Yes, specify details	-	-	-	-	-	-	-	-	-	-	-

Name of the Projects	%	%	%	%	%	%	%	%	%	%	%
Vindhyachal IV						3.67%					
Rihand I						10.83%					
Rihand II						2.69%					
Korba						8.42%					
Vindhyachal III							14.13%	8.04%	7.28%	3.11%	3.11%
Talcher III						13.33%				3.69%	3.67%
Kawas I,II,III	Kawas I,II&III	3.9600FV%	2.97123%	0.41699%	1.50181%	0.40964%	0.29%		0.32%	1.09%	1.34%	1.34%
Kawas III,IV	Kawas III&IV					0.62798%			0.34%	0.34%	0.85%	1.71%
Jhanjgeer												
Tapovan Vishnugad	Tapovan Vishnugad	3.9600%	0.01101%	17.00000%	14.83072%	6.71167%	11.39%	3.73%	2.14%		3.09%	3.45%
Rihand-III	Rihand-III				0.00199%	0.11999%	0.18%	0.97%	0.18%	0.34%	1.40%	0.41%
Vindhyachal I & II			0.01101%				0.84%	1.46%	2.39%	6.75%	2.85%	2.45%
Vindhyachal III & IV							0.84%	0.85%	1.58%	2.91%	1.70%	4.02%
Dadri-II	Dadri-II&III	4.4400%	3.33487%	0.41129%		1.48892%	0.42%	2.88%	0.34%		0.84%	1.27%
Unchahar I&II							4.08%					
Dadri-I	Dadri-I				1.02442%	0.14100%	11.88%	10.33%	6.37%	2.55%	5.81%	11.05%
Dadri-II	Dadri-II GAD					2.80704%	0.37%	0.47%			0.13%	0.82%
Unchahar III												
Farakka	Farakka			12.50000%	11.11111%		0.28%	0.54%	0.68%	2.45%	4.18%	7.84%
Farakka III			0.01101%									
Simhadri	Simhadri	0.04741%	0.00825%									
Kahalgaon-I	Kahalgaon PSDF			0.75000%	0.55249%	0.12000%	0.29%		0.08%	0.19%	1.94%	0.72%
Unchahar-IV												
Gadarwara	Gadarwara	0.39600%	0.33041%	2.48000%	2.12084%	0.71116%	0.35%	1.82%			2.63%	1.13%
Korba-III	Korba-III(PSDF)	0.39600%	0.33041%			0.11249%	0.38%	0.42%	0.09%	0.42%	0.68%	0.08%
Singrauli	Singrauli-III&IV	0.07920%	0.06608%		0.31299%	0.44291%	1.08%	0.28%	2.51%	7.18%	2.00%	1.08%
Korba-I,II	Korba-I,II&III				0.34199%	0.08268%	2.28%	0.59%	0.98%	0.23%	0.68%	1.08%
Kahalgaon	Kahalgaon	0.39600%	0.33041%	0.08148%	0.55249%	0.12000%	4.41%	11.39%	15.11%	10.19%	0.72%	1.45%
Dadri II												
Ramagundam	Ramagundam I,II,III		0.07391%	0.08148%		0.44410%	2.27%	2.24%	1.27%	2.88%	0.97%	1.95%

	Name of the Company: NTPC Ltd											
	Name of the Power Station: Talcher Old											
Pandiabil	Pandiabil (JAM)											
Nalco(gen	Nalco(gen) (JV)											
NTPC Sta	Talcher STPS-I(JV)											
Machakun	Machakund (JV)											
Dagachi	Dagachi											
Tamil II	Tamil II											
	Dadhikal (P)											
Kharagpur	Kharagpur											
Bandhaur	Bandhaur											
Telangana	Telangana											
Banaskan	Banaskan-II											
	Amarpur Solar											
	Madhavi Solar											
	Bhilwara Solar											
	Rewari Wind											
Dulanga	Dulanga Old Mine											
	Talaipalli Coal Mine											
Chanti Ba	Chanti Baram (JV)											
Khandadi	Khandadi											
	Pakri Barwadih (JV)											
Ramagun	Ramagundam STPS											
Gadarwa	Gadarwa (JV)											
Nimuch-II	Nimuch-II (JV)											
Nimuch-III	Nimuch-III (JV)											
Khandi-II	Khandi-II (JV)											
	Dadhikal (PSU)											
	Unallocated											
	Total											

Notes:

Name of the Company	[illegible]
Name of the [illegible]	[illegible]
Particulars	
[illegible]	**[illegible]**
[illegible]	
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
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[illegible]	[illegible]
[illegible]	-
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[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	-
[illegible]	
Name of the Projects	**%**
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
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[illegible]	[illegible]
[illegible]	[illegible]

Year wise Statement of Additional Capitalisation after date of Commercial operation up to Revised achieving Peak rated Capacity

Part-V
Form-8

Name of the Petitioner: NTPC Ltd
Name of the Integrated Mine: Talaipalli
Date of Commercial Operation: 01.10.2023

Financial Year 2024-25

Amount in Rs Lakhs

S. No.	Head of Work / Equipment	ACE Claimed (Projected)				Regulation under which claimed	Justification	Admitted Cost by the Commission, if any
		Accrual basis	Un-discharged Liability included in column 2	Cash basis	IDC included in col. 3			
1	2	3	4	(5 = 6 + 8)	6	7	8	9
1	Land	1,527.38	-	1,527.38	-	42(1)(a)	Chapter VI of the Mine Plan stipulates the land requirement (Annexure VII). It is submitted that land for mining is acquired as and when mining progresses. The actual expenditure is required towards land and asset compensation and related R&R activities as per mine plan and before peak rated capacity and the same is also envisaged in Investment Approval.	
2	Construction of Buildings & Structures	214.24	-	214.24		43(3)(c)	Chapter V of the Mine Plan stipulates the development of coal mining operations including approach mines, coal handling and dispatch operations (Annexure VI). The Expenditure pertains to construction of buildings such as administrative building, security barrack, control room, magazine building and other associated works as per Mine Plan, Investment Approval and Revised Cost Estimate (RCE) which is under approval before peak rated capacity.	
3	Township	722.34	-	722.34	-	43(3)(c)	Chapter V of the Mine Plan stipulates for Residential complex (Annexure VII). This expenditure is required for construction of Township buildings such as residential quarters, water treatment plant, township boundary, barrels, security structures etc. as envisaged in Investment Approval and Revised Cost Estimate (RCE) which is under approval before peak rated capacity of the mine.	
4	Air quality monitoring system (AQMS)	180.00	-	180.00	-	42(1)(c)	This expenditure pertains to statutory environment related procurement of AQMS for round the clock monitoring of ambient air quality around the mine and adjacent area as per the guidelines issued under consent to operate (CTO) dated 20.09.2023 at para B issued by Chhattisgarh Environment Conservation Board (CECB). CTO letter is attached as **Annexure-A**	

Year wise Statement of Additional Capitalisation after date of Commercial operation up to Revised achieving Peak rated Capacity

Part-V
Form-8

Name of the Petitioner: NTPC Ltd
Name of the Integrated Sihar: Talaipalli
Date of Commercial Operation: 01.10.2023

Financial Year 2024-25

Amount in Rs. Lakhs

S. No.	Head of Work / Equipment	ACE Claimed (Projected)				Regulation under which claimed	Justification	Admitted Cost by the Commission, if any
		Accrual basis	Un-discharged Liability included in column 2	Cash basis	IDC included in col. 3			
1	2	3	4	(5 = 3 - 4)	6	7	8	9
3	Electrical installations and lighting	174.00	-	174.00	-	42(1)(b)	This pertains to expenditure related to electrical installations and lighting works in mine area as per mine plan under chapter 5.4 and 5.5. These works include procurement of high mast lights, street lighting, procurement of 33 KV/ 11KV transformers etc. along coal evacuation roads and related items.	
8	Weigh bridge for east pit	84.30	-	84.30	-	42(1)(b)	It is hereby intimated that CHP is envisaged in Talaipalli mine as per approved mine plan. CHP package is under execution and shall be operationalised in 2024-25. As of now, coal is transported through dumpers from pit to stockyard and railway siding and then it is carried through MGR. Weighbridge is required for measurement of coal loaded trucks/dumpers for upward movement towards railway siding. The power expense is towards installation of 100T weigh bridge for east pit. The Hon'ble Commission may please allow the same.	
9	MS Pipes, Fasteners & Fittings	800.00	-	800.00	-	42(1)(d)	Chapter V of the Mine Plan stipulates for development of coal mining operations comprising opencast mines, coal handling and dispatch operations (Annexure VIII). Pipelines, IT equipments and electrical equipments and other related items are procured as per requirement so that mining operations are carried out smoothly and the manpower deployed at site is enabled to function properly and efficiently.	

Year wise Statement of Additional Capitalisation after date of Commercial operation up to Second sucheeing Peak rated Capacity

Part-V
Form-8

Name of the Petitioner: NTPC Ltd
Name of the Integrated Sihar: Talaipalli
Date of Commercial Operation: 01.10.2023

Financial Year 2024-25

Amount in Rs Lakhs

S. No.	Head of Work / Equipment	ACE Claimed (Projected)				Regulation under which claimed	Justification	Admitted Cost by the Commission, if any
		Accrual basis	Un-discharged Liability included in column 2	Cash basis	IDC included in col. 3			
1	2	3	4	(5 = 3 - 4)	6	7	8	9
8	Railway siding & related works	888.50	-	888.50	-	42(3)(a)	This pertains to expenditure related to construction and development of railway siding as per mine plan, chapter 7, (a) no. 1 (4) before the peak rated capacity. The current expense covers development of wind barrier and balance work of railway siding as envisaged under the mine plan.	
9	Roads, bridges & Culverts	145.00	-	145.00		42(3)(b)	The expenditure pertains to construction of civil works like roads, bridges & culverts as per approved mine plan under chapter 7, (a) no. 7.1 (4) under mine infrastructure before peak rated capacity. The works include road construction and development of various sections of the mine namely road for secure Silo C, coal evacuation road for one pit coal stacker and road from weigh bridge to weighbridge, magazine building, paved roads, administrative building road etc. The hon'ble commission may please allow the same.	
	Total	4,147.84	-	4,147.84	-			
10	Liability Discharge							
	Grand Total	4,147.84	-	4,147.84	-			

(Petitioner)

Year wise Statement of Additional Capitalisation after date of Commercial operation up to beyond achieving Peak rated Capacity

Part-IV
Form-9

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

Date of Commercial Operation: 01.10.2023

Financial Year 2025-26

Amount in Rs Lakhs

S. No.	Head of Work / Equipment	ACE Claimed (Projected)				Regulations under which claimed	Justification	Admitted Cost by the Commission, if any
		Accrual basis	Un-discharged Liability included in column 3	Cash basis	IDC included in col. 3			
1	2	3	4	(5 = 3 - 4)	6	7	8	9
1	Land	827.04	-	827.04	-	42(3)(a)	As per form 9_24-25	
2	Construction of Buildings & Structures	140.00	-	140.00	-	42(3)(a)	As per form 9_24-25	
3	Township	1,120.00	-	1,120.00	-	42(3)(a)	As per form 9_24-25	
4	Air quality monitoring system (AQMS)	60.00	-	60.00	-	42(3)(c)	As per form 9_24-25	
5	Electrical installations and lighting	465.00	-	465.00	-	42(3)(a)	As per form 9_24-25	
6	Mbooks, Furniture & Fittings	1,362.00	-	1,362.00	-	42(3)(a)	As per form 9_24-25	
7	Railway siding & related works	38.00	-	38.00	-	42(3)(a)	As per form 9_24-25	
8	Roads, bridges & Culverts	2,361.00	-	2,361.00	-	42(3)(a)	As per form 9_24-25	
	Total	**6,373.04**	**-**	**6,373.04**	**-**			
9	Liability Discharge							
Grand Total		**6,373.04**	**-**	**6,373.04**	**-**			

(Petitioner)

Year wise Statement of Additional Capitalization after date of Commercial operation up to the end of the year wise Peak rated Capacity

Part-IV
Form-8

Name of the Petitioner: NTPC Ltd
Name of the Generating Station: Lakhisarai
Date of Commercial Operation: 01/10/2024

Financial Year 2026-27

Amount in Rs. Lakhs

S. No.	Head of Work / Equipment	ACE Claimed (Projected)				Regulation under which claimed	Justification	Admitted Cost by the Commission, if any
		Accrual basis	To be discharged Liability included in column 3	Cash basis	IDC included in col. 3			
1	2	3	4	[5=(3 - 4)]	6	7	8	9
1	Construction of buildings & structures	1,000.00	-	1,000.00	-	9(3)(iv)	As per Form-9, 24.23	
2	Township	1,000.00	-	1,000.00	-	9(3)(iv)	As per Form-9, 24.23	
4	CHP	99,860.01	-	99,860.01	-	9(3)(iv)	It is submitted that as per approved mine plan Chapter-5, Sl no. 5.4, Lakhisarai coal mines is to be operated through UHP for coal transportation from mine to surface. Any amount of conveyor in coal side of mine i.e. work and cost for item planned conveying and transfer system shall be under coal production supply and transportation of coal from coal pit to coal yard. It is further submitted that revised cost estimate reflecting the cost estimate for CHP is under approval in NTPC Board and the same shall be submitted with true-up for the Commission in due course of time. CHP package wise detailing provide as above.	
6	NRM (Ash Handling & Fittings)	900.00	-	900.00	-	9(3)(iv)	As per Form-9, 24.23	
7	Roads, Bridges & Culverts	1,000.00	-	1,000.00	-	9(3)(iv)	As per Form-9, 24.23	
Total		103,860.01	-	103,860.01	-			
8	Liability Discharge							
	Grand Total	103,860.01	-	103,860.01	-			

(Petitioner)

Year wise Statement of Additional Capitalisation after date of Commercial operation up to Beyond achieving Peak rated Capacity

Part-IV
Form-9

Name of the Petitioner: NTPC Ltd

Name of the Integrated Unit: Telangana

Date of Commercial Operation: 01.10.2023

Financial Year 2027-28

Amount in Rs Lakh

S. No.	Head of Work / Equipment	ACE Claimed (Projected)				Regulations under which claimed	Justification	Admitted Cost by the Commission, if any
		Accrual basis	Un-discharged Liability included in column 3	Cash basis	IDC included in col. 3			
1	2	3	4	5 = 3 - 4	6	7	8	9
1	Township	2,500.00	-	2,500.00	-	42(3)(a)	As per form 9_24-25	
2	CHP	11,457.53	-	11,457.53	-	42(3)(a)	As per form 9_26-27	
3	MB/OAs/ Furniture & Fittings	400.00	-	400.00	-	42(3)(a)	As per form 9_24-25	
	Total	14,357.53	-	14,357.53	-			
2	Liability Discharge							
	Grand Total	14,357.53	-	14,357.53	-			

(Petitioner)

Year wise Statement of Additional Capitalisation after date of Commercial operation up to beyond achieving Peak rated Capacity

Part-IV
Form-9

Name of the Petitioner: NTPC Ltd
Name of the Integrated Mine: Talaipalli
Date of Commercial Operation: 01.10.2021

Financial Year 2028-29

Amount in Rs Lakhs

S. No.	Head of Work / Equipment	ACE Claimed (Projected)				Regulations under which claimed	Justification	Admitted Cost by the Commission, if any
		Accrual basis	Un-discharged Liability included in column 3	Cash basis	IDC included in col. 3			
1		3	4	(5 = 3 - 4)	6	7	8	9
1	CHP	11,457.58	-	11,457.58	-	42(3)(a)	As per form 9_24-25	
2	Furniture and fittings	400.00	-	400.00		42(3)(a)	As per form 9_24-25	
Total		11,857.58	-	11,857.58	-			
3	Liability Discharge							
Grand Total		11,857.58	-	11,857.58				

(Petitioner)

PART- IV
FORM- 11

Calculation of Depreciation

Name of the Petitioner : NTPC

Name of the Integrated Mine : Talaipalli

(Amount in Rs Lakh)

S. No.	Name of the Assets	Useful Life (Years)	Salvage Value (%)	Gross Block as on 01.04.2024	Depreciation Amount for 2024-29
1	2	3	4		
1	Free hold Land	999		1,649.84	-
2	Leasehold Land	30	0.00	436.34	14.54
3	Coal Bearing Land	31	0.00	1,03,038.10	3,323.81
4	Other Buildings	15	5.00	15,978.09	885.28
5	Temporary erection	1	0.00	37.12	37.12
6	Railway siding	15	5.00	3,909.34	247.59
7	Plant and machinery	15	5.00	627.52	39.73
8	Furniture and fixtures	15	5.00	638.90	40.46
9	Other Office Equipments	15	5.00	390.73	24.75
10	EDP, WP machines & SATCOM equipment	15	0.00	222.37	14.82
11	Vehicles including speedboats	10	5.00	-	-
12	Electrical installations	15	5.00	5,475.07	346.75
13	Communication equipment	15	5.00	427.99	27.11
14	Hospital equipment	15	5.00	90.15	5.71
15	Laboratory and workshop equipment	15	5.00	53.23	3.37
16	Roads, bridges, culverts, helipads	25	5.00	3,809.56	144.76
17	Computer and Software	3	0.00	168.14	56.05
18	Mine development expenses	20	0.00	99,307.82	4,965.39
	TOTAL			**2,34,260.11**	**10,177.25**
	Weighted Average Rate of Depreciation %				**4.34%**

(Petitioner)

Statement of Depreciation

PART- IV
FORM- 12

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

Amount in Rs Lakhs

S. No.	Particulars	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8
1	Opening Capital Cost	2,07,106.60	2,14,787.71	2,18,935.35	2,25,308.39	3,27,169.00	3,41,526.57
2	Closing Capital Cost	2,14,787.71	2,18,935.35	2,25,308.39	3,27,169.00	3,41,526.57	3,53,384.13
3	**Average Capital Cost**	2,10,947.16	2,16,861.53	2,22,121.87	2,76,238.69	3,34,347.79	3,47,455.36
4	Freehold land	1,649.84	1,649.84	1,649.84	1,649.84	1,649.84	1,649.84
4A	Assets having zero salvage value	2,03,209.90	2,03,209.90	2,03,209.90	2,03,209.90	2,03,209.90	2,03,209.90
5	Rate of depreciation	4.33%	4.34%	4.34%	4.34%	4.34%	4.34%
6	Depreciable value	2,08,992.94	2,14,611.60	2,19,608.92	2,71,019.91	3,26,223.54	3,38,675.74
7	Balance useful life at the beginning of the period	31.00	30.00	29.00	28.00	27.00	26.00
8	Remaining depreciable value	2,08,992.94	2,10,049.76	2,05,625.70	2,47,388.77	2,90,589.42	2,88,518.14
9	**Depreciation (for the period)**	4,561.84	9,421.38	9,649.92	12,000.98	14,525.49	15,094.93
10	**Depreciation (annualized)**	9,123.68	9,421.38	9,649.92	12,000.98	14,525.49	15,094.93
11	Cumulative depreciation at the end of the period	4,561.84	13,983.22	23,633.14	35,634.12	50,159.60	65,254.54
12	Less: Cumulative depreciation adjustment on account of de-capitalization	-	-	-	-	-	-
13	Net Cumulative depreciation at the end of the period	4,561.84	13,983.22	23,633.14	35,634.12	50,159.60	65,254.54

(Petitioner)

Form-13

Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
Axis Bank-IV					
Gross Drawl opening	8,360.00	8,360.00	8,360.00	8,360.00	8,360.00
Cummulative repayment of drawl till prev yr	535	1070	1605	2140	2675
Net Loan opening	4,818.00	4,290.00	3,748.00	3,210.00	2,675.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	4,818.00	4,290.00	3,748.00	3,210.00	2,675.00
Repayment of loan during the year	535	535	535	535	535
Net loan closing	4,290.00	3,748.00	3,210.00	2,675.00	2,140.00
Average net loan	4,548	4,019	3,479	2,942	2,408
Rate of Interest on loan	8.0000%	8.0000%	8.0000%	8.0000%	8.0000%
Interest on loan	364	321	278	235	193
Bank of Baroda-II					
Gross Drawl opening	900.00	900.00	900.00	900.00	900.00
Cummulative repayment of drawl till prev yr	0	0	0	50	100
Net Loan opening	900.00	900.00	900.00	850.00	800.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	900.00	900.00	900.00	850.00	800.00
Repayment of loan during the year	0	0	50	50	50
Net loan closing	900.00	900.00	850.00	800.00	750.00
Average net loan	900	900	875	825	775
Rate of Interest on loan	5.0500%	5.0500%	5.0500%	5.0500%	5.0500%
Interest on loan	46	46	45	42	39
Bank of India V-A					
Gross Drawl opening	144.00	144.00	144.00	144.00	144.00
Cummulative repayment of drawl till prev yr	0	12	24	36	48
Net Loan opening	144.00	132.00	120.00	108.00	96.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	144.00	132.00	120.00	108.00	96.00
Repayment of loan during the year	12	12	12	12	12
Net loan closing	132.00	120.00	108.00	96.00	84.00
Average net loan	138	126	114	102	90
Rate of Interest on loan	8.0000%	8.0000%	8.0000%	8.0000%	8.0000%
Interest on loan	11	10	9	8	7
HDFC Bank Limited-VII					
Gross Drawl opening	8,000.00	8,000.00	8,000.00	8,000.00	8,000.00
Cummulative repayment of drawl till prev yr	0	0	0	667	1333
Net Loan opening	8,000.00	8,000.00	8,000.00	8,333.33	4,666.67
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	8,000.00	8,000.00	8,000.00	8,333.33	4,666.67
Repayment of loan during the year	0	0	667	667	667
Net loan closing	8,000.00	8,000.00	8,333.33	4,666.67	4,000.00
Average net loan	8,000	8,000	8,667	6,000	4,333
Rate of Interest on loan	7.9500%	7.9500%	7.9500%	7.9500%	7.9500%
Interest on loan	477	477	481	328	245
HDFC-X					
Gross Drawl opening	4,100.00	4,100.00	4,100.00	4,100.00	4,100.00
Cummulative repayment of drawl till prev yr	0	0	342	683	1024
Net Loan opening	4,100.00	4,100.00	3,758.33	3,416.67	3,076.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	4,100.00	4,100.00	3,758.33	3,416.67	3,076.00
Repayment of loan during the year	0	342	342	342	342
Net loan closing	4,100.00	3,758.33	3,416.67	3,074.00	2,733.33
Average net loan	4,100	3,929	3,588	3,246	2,904
Rate of Interest on loan	7.9500%	7.9500%	7.9500%	7.9500%	7.9500%
Interest on loan	326	312	285	258	231

HDFC Bank Limited-XI					
Gross Drawl opening	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00
Cummulative repayment of drawl till prev yr	0	0	0	0	167
Net Loan opening	2,000.00	2,000.00	2,000.00	2,000.00	1,833.33
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	2,000.00	2,000.00	2,000.00	2,000.00	1,833.33
Repayment of loan during the year	0	0	0	167	167
Net loan closing	2,000.00	2,000.00	2,000.00	1,833.33	1,666.67
Average net loan	2,000	2,000	2,000	1,917	1,750
Rate of interest on loan	7.8400%	7.8400%	7.8400%	7.8400%	7.8400%
Interest on loan	157	157	157	150	137
HDFC Bank Limited-XII D-1					
Gross Drawl opening	1,800.00	1,800.00	1,800.00	1,800.00	1,800.00
Cummulative repayment of drawl till prev yr	0	0	0	0	133
Net Loan opening	1,800.00	1,800.00	1,800.00	1,800.00	1,466.67
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	1,800.00	1,800.00	1,800.00	1,800.00	1,466.67
Repayment of loan during the year	0	0	0	133	133
Net loan closing	1,800.00	1,800.00	1,800.00	1,466.67	1,333.33
Average net loan	1,800	1,800	1,800	1,633	1,400
Rate of interest on loan	7.6000%	7.6000%	7.6000%	7.6000%	7.6000%
Interest on loan	122	122	122	117	106
HDFC Bank Limited-XII D-2					
Gross Drawl opening	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00
Cummulative repayment of drawl till prev yr	0	0	0	0	167
Net Loan opening	2,000.00	2,000.00	2,000.00	2,000.00	1,833.33
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	2,000.00	2,000.00	2,000.00	2,000.00	1,833.33
Repayment of loan during the year	0	0	0	167	167
Net loan closing	2,000.00	2,000.00	2,000.00	1,833.33	1,666.67
Average net loan	2,000	2,000	2,000	1,917	1,750
Rate of interest on loan	7.8000%	7.8000%	7.8000%	7.8000%	7.8000%
Interest on loan	162	162	162	148	133
HDFC Bank Limited-XII D-3					
Gross Drawl opening	2,200.00	2,200.00	2,200.00	2,200.00	2,200.00
Cummulative repayment of drawl till prev yr	0	0	0	0	183
Net Loan opening	2,200.00	2,200.00	2,200.00	2,200.00	2,016.67
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	2,200.00	2,200.00	2,200.00	2,200.00	2,016.67
Repayment of loan during the year	0	0	0	183	183
Net loan closing	2,200.00	2,200.00	2,200.00	2,016.67	1,833.33
Average net loan	2,200	2,200	2,200	2,108	1,925
Rate of interest on loan	7.8000%	7.8000%	7.8000%	7.8000%	7.8000%
Interest on loan	167	167	167	160	146
HDFC Bank Limited-XII D-4					
Gross Drawl opening	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00
Cummulative repayment of drawl till prev yr	0	0	0	0	167
Net Loan opening	2,000.00	2,000.00	2,000.00	2,000.00	1,833.33
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	2,000.00	2,000.00	2,000.00	2,000.00	1,833.33
Repayment of loan during the year	0	0	0	167	167
Net loan closing	2,000.00	2,000.00	2,000.00	1,833.33	1,666.67
Average net loan	2,000	2,000	2,000	1,917	1,750
Rate of interest on loan	7.8000%	7.8000%	7.8000%	7.8000%	7.8000%
Interest on loan	162	162	162	148	133
HDFC Bank Limited-XII -E					
Gross Drawl opening	800.00	800.00	800.00	800.00	800.00
Cummulative repayment of drawl till prev yr	0	0	0	0	67
Net Loan opening	800.00	800.00	800.00	800.00	733.33
Increase decrease due to FERV					
Increase decrease due to ACE					

Total	800.00	800.00	800.00	800.00	733.33
Repayment of loan during the year	0	0	0	67	67
Net loan closing	800.00	800.00	800.00	733.33	666.67
Average net loan	800	800	800	767	700
Rate of interest on loan	7.9000%	7.9000%	7.9000%	7.9000%	7.9000%
Interest on loan	61	61	61	58	53
Indusind Bank					
Gross Drawl opening	1,300.00	1,300.00	1,300.00	1,300.00	1,300.00
Cummulative repayment of drawl till prev yr	0	0	0	108	217
Net Loan opening	1,300.00	1,300.00	1,300.00	1,191.67	1,083.33
Increase decrease due to PERV					
Increase decrease due to ACE					
Total	1,300.00	1,300.00	1,300.00	1,191.67	1,083.33
Repayment of loan during the year	0	0	108	108	108
Net loan closing	1,300.00	1,300.00	1,191.67	1,083.33	975.00
Average net loan	1,300	1,300	1,246	1,138	1,029
Rate of interest on loan	8.0800%	8.0800%	8.0800%	8.0800%	8.0800%
Interest on loan	105	105	100	92	83
Punjab National Bank III					
Gross Drawl opening	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00
Cummulative repayment of drawl till prev yr	1667	3333	2778	3333	3889
Net Loan opening	3,333.33	2,777.78	2,222.22	1,666.67	1,111.11
Increase decrease due to PERV					
Increase decrease due to ACE					
Total	3,333.33	2,777.78	2,222.22	1,666.67	1,111.11
Repayment of loan during the year	556	556	556	556	556
Net loan closing	2,777.78	2,222.22	1,666.67	1,111.11	555.56
Average net loan	3,056	2,500	1,944	1,389	833
Rate of interest on loan	7.9000%	7.9000%	7.9000%	7.9000%	7.9000%
Interest on loan	241	197	154	110	66
PNB V					
Gross Drawl opening	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
Cummulative repayment of drawl till prev yr	500	1000	1500	2000	2500
Net Loan opening	5,500.00	5,000.00	4,500.00	4,000.00	3,500.00
Increase decrease due to PERV					
Increase decrease due to ACE					
Total	5,500.00	5,000.00	4,500.00	4,000.00	3,500.00
Repayment of loan during the year	500	500	500	500	500
Net loan closing	5,000.00	4,500.00	4,000.00	3,500.00	3,000.00
Average net loan	5,250	4,750	4,250	3,750	3,250
Rate of interest on loan	7.9000%	7.9000%	7.9000%	7.9000%	7.9000%
Interest on loan	415	375	336	296	257
State Bank of India - IX					
Gross Drawl opening	5,377.83	5,377.83	5,377.83	5,377.83	5,377.83
Cummulative repayment of drawl till prev yr	433	1828	2294	2633	3421
Net Loan opening	4,944.80	3,748.43	3,151.89	2,594.35	1,956.83
Increase decrease due to PERV					
Increase decrease due to ACE					
Total	4,944.80	3,748.43	3,151.89	2,594.35	1,956.83
Repayment of loan during the year	1196	596	558	637	760
Net loan closing	3,748.43	3,151.89	2,594.35	1,956.83	1,196.76
Average net loan	4,347	3,451	2,873	2,276	1,577
Rate of interest on loan	8.2000%	8.2000%	8.2000%	8.2000%	8.2000%
Interest on loan	356	283	234	186	130
State Bank of India - XI					
Gross Drawl opening	7,700.00	7,700.00	7,700.00	7,700.00	7,700.00
Cummulative repayment of drawl till prev yr	1711	2567	3423	4279	5135
Net Loan opening	5,988.91	5,133.36	4,277.79	3,422.24	2,566.68
Increase decrease due to PERV					
Increase decrease due to ACE					
Total	5,988.91	5,133.36	4,277.79	3,422.24	2,566.68
Repayment of loan during the year	856	856	856	856	856
Net loan closing	5,133.36	4,277.79	3,422.24	2,566.68	1,711.13
Average net loan	5,561	4,706	3,850	2,994	2,139

Rate of interest on loan	8.2000%	8.2500%	8.3000%	8.2000%	8.3500%
Interest on loan	468	396	318	246	175
State Bank of India - XII					
Gross Drawl opening	9,000.00	9,000.00	8,000.00	8,000.00	8,000.00
Cummulative repayment of drawl till prev yr	0	0	1000	2000	3000
Net Loan opening	9,000.00	9,000.00	8,000.00	7,000.00	6,000.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	9,000.00	9,000.00	8,000.00	7,000.00	6,000.00
Repayment of loan during the year	0	1000	1000	1000	1000
Net loan closing	9,000.00	8,000.00	7,000.00	6,000.00	5,000.00
Average net loan	9,000	8,500	7,500	6,500	5,500
Rate of interest on loan	8.2000%	8.2500%	8.3000%	8.3500%	8.3500%
Interest on loan	738	697	618	533	451
UCO Bank-IV					
Gross Drawl opening	5,394.00	5,394.00	5,394.00	5,394.00	5,394.00
Cummulative repayment of drawl till prev yr	0	0	0	450	899
Net Loan opening	5,394.00	5,394.00	5,394.00	4,944.50	4,495.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	5,394.00	5,394.00	5,394.00	4,944.50	4,495.00
Repayment of loan during the year	0	0	450	450	450
Net loan closing	5,394.00	5,394.00	4,944.50	4,495.00	4,045.50
Average net loan	5,394	5,394	5,169	4,720	4,271
Rate of interest on loan	7.7000%	7.7000%	7.7000%	7.7000%	7.7000%
Interest on loan	415	415	398	363	329
Bonds Series - 67					
Gross Drawl opening	4,900.00	4,900.00	4,900.00	4,900.00	4,900.00
Cummulative repayment of drawl till prev yr	0	0	0	0	0
Net Loan opening	4,900.00	4,900.00	4,900.00	4,900.00	4,900.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	4,900.00	4,900.00	4,900.00	4,900.00	4,900.00
Repayment of loan during the year	0	0	0	0	4900
Net loan closing	4,900.00	4,900.00	4,900.00	4,900.00	-
Average net loan	4,900	4,900	4,900	4,900	2,450
Rate of interest on loan	8.3300%	8.3300%	8.3300%	8.3300%	8.3300%
Interest on loan	408	408	408	408	204
Bonds Series - 69					
Gross Drawl opening	11,500.00	11,500.00	11,500.00	11,500.00	11,500.00
Cummulative repayment of drawl till prev yr	0	0	0	0	0
Net Loan opening	11,500.00	11,500.00	11,500.00	11,500.00	11,500.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	11,500.00	11,500.00	11,500.00	11,500.00	11,500.00
Repayment of loan during the year	0	0	0	0	0
Net loan closing	11,500.00	11,500.00	11,500.00	11,500.00	11,500.00
Average net loan	11,500	11,500	11,500	11,500	11,500
Rate of interest on loan	7.3500%	7.3500%	7.3500%	7.3500%	7.3500%
Interest on loan	846	846	846	846	846
Bonds Series - 73					
Gross Drawl opening	19,400.00	19,400.00	19,400.00	19,400.00	19,400.00
Cummulative repayment of drawl till prev yr	0	0	0	0	0
Net Loan opening	19,400.00	19,400.00	19,400.00	19,400.00	19,400.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	19,400.00	19,400.00	19,400.00	19,400.00	19,400.00
Repayment of loan during the year	0	0	0	0	0
Net loan closing	19,400.00	19,400.00	19,400.00	19,400.00	19,400.00
Average net loan	19,400	19,400	19,400	19,400	19,400
Rate of interest on loan	6.4600%	6.4600%	6.4600%	6.4600%	6.4600%
Interest on loan	1,253	1,253	1,253	1,253	1,253
Bonds Series - 74					

Gross Drawl opening	4,800.00	4,800.00	4,800.00	4,800.00	4,800.00
Cummulative repayment of drawl till prev yr	0	0	0	0	0
Net Loan opening	4,800.00	4,800.00	4,800.00	4,800.00	4,800.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	4,800.00	4,800.00	4,800.00	4,800.00	4,800.00
Repayment of loan during the year	0	0	0	0	0
Net loan closing	4,800.00	4,800.00	4,800.00	4,800.00	4,800.00
Average net loan	4,800	4,800	4,800	4,800	4,800
Rate of interest on loan	6.9000%	6.9000%	6.9000%	6.9000%	6.9000%
Interest on loan	331	331	331	331	331
Bonds Series - 75					
Gross Drawl opening	2,160.00	2,160.00	2,160.00	2,160.00	2,160.00
Cummulative repayment of drawl till prev yr	0	0	0	0	0
Net Loan opening	2,160.00	2,160.00	2,160.00	2,160.00	2,160.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	2,160.00	2,160.00	2,160.00	2,160.00	2,160.00
Repayment of loan during the year	0	0	0	0	0
Net loan closing	2,160.00	2,160.00	2,160.00	2,160.00	2,160.00
Average net loan	2,160	2,160	2,160	2,160	2,160
Rate of interest on loan	6.7200%	6.7200%	6.7200%	6.7200%	6.7200%
Interest on loan	145	145	145	145	145
Bonds Series - 76					
Gross Drawl opening	2,600.00	2,600.00	2,600.00	2,600.00	2,600.00
Cummulative repayment of drawl till prev yr	0	0	0	0	0
Net Loan opening	2,600.00	2,600.00	2,600.00	2,600.00	2,600.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	2,600.00	2,600.00	2,600.00	2,600.00	2,600.00
Repayment of loan during the year	0	0	0	0	0
Net loan closing	2,600.00	2,600.00	2,600.00	2,600.00	2,600.00
Average net loan	2,600	2,600	2,600	2,600	2,600
Rate of interest on loan	6.7100%	6.7100%	6.7100%	6.7100%	6.7100%
Interest on loan	178	178	178	178	178
Bonds Series - 78					
Gross Drawl opening	856.00	856.00	856.00	856.00	856.00
Cummulative repayment of drawl till prev yr	0	0	0	0	0
Net Loan opening	856.00	856.00	856.00	856.00	856.00
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	856.00	856.00	856.00	856.00	856.00
Repayment of loan during the year	0	0	0	0	0
Net loan closing	856.00	856.00	856.00	856.00	856.00
Average net loan	856	856	856	856	856
Rate of interest on loan	7.4700%	7.4700%	7.4700%	7.4700%	7.4700%
Interest on loan	64	64	64	64	64
Euro Loan I					
Gross Drawl opening	2,377.96	2,377.96	2,377.96	2,377.96	2,377.96
Cummulative repayment of drawl till prev yr	0	0	0	0	0
Net Loan opening	2,377.96	2,377.96	2,377.96	2,377.96	2,377.96
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	2,377.96	2,377.96	2,377.96	2,377.96	2,377.96
Repayment of loan during the year	0	0	0	0	2,378
Net loan closing	2,377.96	2,377.96	2,377.96	2,377.96	-
Average net loan	2,378	2,378	2,378	2,378	1,189
Rate of interest on loan	4.9840%	4.9840%	4.9840%	4.9840%	4.9840%
Interest on loan	119	119	119	119	59
Euro Loan II					
Gross Drawl opening	7,639.83	7,639.83	7,639.83	7,639.83	7,639.83
Cummulative repayment of drawl till prev yr	0	0	0	0	0
Net Loan opening	7,639.83	7,639.83	7,639.83	7,639.83	7,639.83
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	7,639.83	7,639.83	7,639.83	7,639.83	7,639.83

Repayment of loan during the year	0	0	0	0	7540
Net loan closing	7,539.93	7,539.93	7,539.93	7,539.93	-
Average net loan	7,540	7,540	7,540	7,540	3,770
Rate of interest on loan	4.9824%	4.9824%	4.9824%	4.9824%	4.9824%
Interest on loan	391	391	391	391	190
Euro Loan III					
Gross Drawl opening	4,953.65	4,953.65	4,953.65	4,953.65	4,953.65
Cummulative repayment of drawl till prev yr	0	0	0	0	0
Net Loan opening	4,953.65	4,953.65	4,953.65	4,953.65	4,953.65
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	4,953.65	4,953.65	4,953.65	4,953.65	4,953.65
Repayment of loan during the year	0	0	0	0	4954
Net loan closing	4,953.65	4,953.65	4,953.65	4,953.65	-
Average net loan	4,954	4,954	4,954	4,954	2,477
Rate of interest on loan	4.9824%	4.9824%	4.9824%	4.9824%	4.9824%
Interest on loan	242	242	242	242	121
USD 750 Million Drawl I					
Gross Drawl opening	2,359.35	2,359.35	2,359.35	2,359.35	2,359.35
Cummulative repayment of drawl till prev yr	0	0	0	409	817
Net Loan opening	2,359.35	2,359.35	2,359.35	2,450.87	2,042.39
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	2,359.35	2,359.35	2,359.35	2,450.87	2,042.39
Repayment of loan during the year	0	0	409	409	409
Net loan closing	2,359.35	2,359.35	2,450.87	2,042.39	1,633.91
Average net loan	2,359	2,359	2,555	2,247	1,838
Rate of interest on loan	8.7241%	8.7241%	8.7241%	8.7241%	8.7241%
Interest on loan	192	192	179	161	124
USD 750 Million Drawl II					
Gross Drawl opening	2,726.46	2,726.46	2,726.46	2,726.46	2,726.46
Cummulative repayment of drawl till prev yr	0	0	0	389	778
Net Loan opening	2,726.46	2,726.46	2,726.46	2,336.95	1,947.49
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	2,726.46	2,726.46	2,726.46	2,336.95	1,947.49
Repayment of loan during the year	0	0	389	389	389
Net loan closing	2,726.46	2,726.46	2,336.95	1,947.49	1,557.99
Average net loan	2,726	2,726	2,532	2,142	1,753
Rate of interest on loan	8.7241%	8.7241%	8.7241%	8.7241%	8.7241%
Interest on loan	193	193	170	144	118
USD 750 Million Drawl III					
Gross Drawl opening	308.03	308.03	308.03	308.03	308.03
Cummulative repayment of drawl till prev yr	0	0	0	44	88
Net Loan opening	308.03	308.03	308.03	264.03	220.03
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	308.03	308.03	308.03	264.03	220.03
Repayment of loan during the year	0	0	44	44	44
Net loan closing	308.03	308.03	264.03	220.03	176.02
Average net loan	308	308	286	242	198
Rate of interest on loan	8.7241%	8.7241%	8.7241%	8.7241%	8.7241%
Interest on loan	21	21	18	18	13
USD 750 Million Drawl IV					
Gross Drawl opening	1,626.19	1,626.19	1,626.19	1,626.19	1,626.19
Cummulative repayment of drawl till prev yr	0	0	0	232	464
Net Loan opening	1,626.19	1,626.19	1,626.19	1,393.67	1,160.95
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	1,626.19	1,626.19	1,626.19	1,393.67	1,160.95
Repayment of loan during the year	0	0	232	232	232
Net loan closing	1,626.19	1,626.19	1,393.67	1,160.95	928.80
Average net loan	1,626	1,626	1,509	1,277	1,045
Rate of interest on loan	8.7241%	8.7241%	8.7241%	8.7241%	8.7241%
Interest on loan	109	109	101	86	70
USD 700 Million Drawl V					

Gross Drawl opening	708.66	708.66	708.66	708.66	708.66
Cummulative repayment of drawl till prev yr	0	0	0	101	202
Net Loan opening	708.66	708.66	708.66	607.42	506.19
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	708.66	708.66	708.66	607.42	506.19
Repayment of loan during the year	0	0	101	101	101
Net loan closing	708.66	708.66	607.42	506.19	404.95
Average net loan	709	709	658	557	456
Rate of interest on loan	6.7241%	6.7241%	6.7241%	6.7241%	6.7241%
Interest on loan	48	48	44	37	31
USD 750 Million Drawl VI					
Gross Drawl opening	3,047.99	3,047.99	3,047.99	3,047.99	3,047.99
Cummulative repayment of drawl till prev yr	0	0	0	435	871
Net Loan opening	3,047.99	3,047.99	3,047.99	2,612.57	2,177.14
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	3,047.99	3,047.99	3,047.99	2,612.57	2,177.14
Repayment of loan during the year	0	0	435	435	435
Net loan closing	3,047.99	3,047.99	2,612.57	2,177.14	1,741.71
Average net loan	3,048	3,048	2,830	2,395	1,959
Rate of interest on loan	6.7241%	6.7241%	6.7241%	6.7241%	6.7241%
Interest on loan	205	205	190	161	132
JPY Eqv. $400 Million Drawl I					
Gross Drawl opening	1,245.37	1,245.37	1,245.37	1,245.37	1,245.37
Cummulative repayment of drawl till prev yr	0	0	0	0	178
Net Loan opening	1,245.37	1,245.37	1,245.37	1,245.37	1,067.46
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	1,245.37	1,245.37	1,245.37	1,245.37	1,067.46
Repayment of loan during the year	0	0	0	178	178
Net loan closing	1,245.37	1,245.37	1,245.37	1,067.46	889.65
Average net loan	1,245	1,245	1,245	1,156	978
Rate of interest on loan	1.2125%	1.2125%	1.2125%	1.2125%	1.2125%
Interest on loan	15	15	15	14	12
JPY Eqv. $400 Million Drawl II					
Gross Drawl opening	4,798.62	4,798.62	4,798.62	4,798.62	4,798.62
Cummulative repayment of drawl till prev yr	0	0	0	0	684
Net Loan opening	4,798.62	4,798.62	4,798.62	4,798.62	4,102.91
Increase decrease due to FERV					
Increase Decrease due to ACE					
Total	4,798.62	4,798.62	4,798.62	4,798.62	4,102.91
Repayment of loan during the year	0	0	0	684	684
Net loan closing	4,798.62	4,798.62	4,798.62	4,102.91	3,418.01
Average net loan	4,797	4,797	4,797	4,445	3,761
Rate of interest on loan	1.2125%	1.2125%	1.2125%	1.2125%	1.2125%
Interest on loan	58	58	58	54	46
JPY Eqv. $400 Million Drawl IV					
Gross Drawl opening	400.00	400.00	400.00	400.00	400.00
Cummulative repayment of drawl till prev yr	0	0	0	0	57
Net Loan opening	400.00	400.00	400.00	400.00	342.98
Increase decrease due to FERV					
Increase decrease due to ACE					
Total	400.00	400.00	400.00	400.00	342.98
Repayment of loan during the year	0	0	0	57	57
Net loan closing	400.00	400.00	400.00	342.98	285.71
Average net loan	400	400	400	371	314
Rate of interest on loan	1.2125%	1.2125%	1.2125%	1.2125%	1.2125%
Interest on loan	5	5	5	5	4

Gross Drawl opening	145360.949	145360.949	145360.949	145360.949	145360.949
Cummulative repayment of drawl till prev yr	4648.08960	9496.27389	12398.5092	20178.2182	26054.0029
Net Loan opening	140514.859	135881.675	132464.38	125181.732	118596.918
Increase decrease due to FERV	0	0	0	0	0
Increase decrease due to ACE	0	0	0	0	0
Total	140514.859	135881.675	132464.38	125181.732	118596.918
Repayment of loan during the year	3452.1942	4597.31433	7282.72197	6084.31869	20658.5437
Net loan closing	135881.675	132464.38	125181.732	118596.918	97240.8621
Average net loan	138198.267	134565.313	128823.246	122038.824	107918.739
Rate of interest on loan	6.6850%	6.6850%	6.3140%	6.7780%	8.6400%
Interest on loan	9583.23801	8997.84032	8778.04209	8174.57013	6957.17940

Name of the Loan	From	To	Floating Rate of interest	Withholding Tax (WHT)	Applicability of Withholding Tax	Interest Basis	Interest rate (incl WHT)	Loan Proportion
Euro Loan I Drawl I*	06-12-2023	31-03-2024	4.89500%	1.77703%		Act/360	4.981985%	100%
Euro Loan I Drawl II*	06-12-2023	31-03-2024	4.89500%	1.743516%		Act/360	4.980343%	100%
Euro Loan I Drawl III*	06-12-2023	31-03-2024	4.89500%	1.743516%		Act/360	4.980343%	100%
USD 750 Million Drawl I	25-10-2023	31-03-2024	6.61909%	0		Act/360	6.619090%	87%
USD 750 Million Drawl I	25-10-2023	31-03-2024	6.53909%	5.46000%	100.00000%	Act/360	6.916744%	13%
USD 750 Million Drawl II	25-10-2023	31-03-2024	6.61909%	0		Act/360	6.619090%	87%
USD 750 Million Drawl II	25-10-2023	31-03-2024	6.53909%	5.46000%	100.00000%	Act/360	6.916744%	13%
USD 750 Million Drawl III	25-10-2023	31-03-2024	6.61909%	0		Act/360	6.619090%	87%
USD 750 Million Drawl III	25-10-2023	31-03-2024	6.53909%	5.46000%	100.00000%	Act/360	6.916744%	13%
USD 750 Million Drawl IV	25-10-2023	31-03-2024	6.61909%	0		Act/360	6.619090%	87%
USD 750 Million Drawl IV	25-10-2023	31-03-2024	6.53909%	5.46000%	100.00000%	Act/360	6.916744%	13%
USD 750 Million Drawl V	25-10-2023	31-03-2024	6.61909%	0		Act/360	6.619090%	87%
USD 750 Million Drawl V	25-10-2023	31-03-2024	6.53909%	5.46000%	100.00000%	Act/360	6.916744%	13%
USD 750 Million Drawl VI	25-10-2023	31-03-2024	6.61909%	0		Act/360	6.619090%	87%
USD 750 Million Drawl VI	25-10-2023	31-03-2024	6.53909%	5.46000%	100.00000%	Act/360	6.916744%	13%
JPY Eqv. $400 Million Drawl I	15-11-2023	31-03-2024	1.21218%	6		Act/365	1.212180%	100%
JPY Eqv. $400 Million Drawl II	15-11-2023	31-03-2024	1.21218%	0		Act/365	1.212180%	100%
JPY Eqv. $400 Million Drawl IV	22-12-2023	31-03-2024	1.21886%	0		Act/365	1.218860%	100%

* without grossing up of Withholding tax

Name of the Company: NTPC LTD

Name of the Integrated Mine: TALAIPALLI COAL MINE

Name of the Bank	Drawl Amount	Drawl Date	Interest Details				
			w.e.f	ROI			
Axis Bank-I	1,00,00,00,000.00	11-07-2019	11-Jul-19	8.30%			
Axis Bank-II	10,00,55,000.00	15-04-2020	11-Aug-19	8.25%			
			11-Sep-19	8.25%			
			11-Oct-19	8.10%			
			11-Nov-19	8.00%			
			11-Dec-19	7.90%			
			11-Jan-20	7.90%			
			31-Jan-20	7.65%			
			29-Feb-20	7.45%			
			25-Apr-20	6.70%			
			28-May-20	6.30%			
Axis Bank-III	10,50,00,000.00	24-09-2020	24-Aug-22	6.30%			
Axis Bank-III	40,00,00,000.00	28-09-2020	24-Sep-22	6.70%			
			24-Jun-22	7.20%			
			24-Aug-22	7.70%			
			24-Oct-22	8.20%			
			01-Nov-22	7.70%			
			01-Jan-23	8.05%			
			01-Mar-23	8.30%			
Axis Bank-IV	63,50,00,000.00	29-03-2023	29-Mar-23	8.05%			
Bank of Baroda-II	5,00,00,000.00	11-11-2022	11-Nov-22	7.10%			
			11-Dec-22	7.25%			
			11-Jan-23	7.50%			
			11-Feb-23	7.55%			
			11-Mar-23	7.90%			
			11-May-23	7.95%			
			11-Sep-23	8.00%			
			01-Oct-23	8.05%	133.00	10.64	
			11-Feb-24	8.05%	50.00	4.026	8.0137%
			31-Mar-24	8.05%			
Bank of India-V-A	1,44,00,000.00	30-03-2023	30-Mar-23	8.15%			
			01-Apr-23	8.00%			
HDFC Bank Limited-V	10,00,00,000.00	02-07-2019	02-Jul-19	8.10%			
			25-Sep-19	8.30%			
			25-Dec-19	8.45%			

			25-Jun-19	8.40%
			29-Jul-19	8.30%
			29-Aug-19	8.20%
			26-Sep-19	8.10%
			28-Oct-19	8.00%
			01-Dec-19	7.85%
			01-Mar-20	7.45%
			01-Jun-20	6.30%
			24-Dec-20	5.95%
HDFC Bank Limited-VII	30,00,00,000.00	11-06-2019	11-Jun-19	8.40%
HDFC Bank Limited-VII	30,00,00,000.00	11-02-2020	29-Jul-19	8.30%
			29-Aug-19	8.20%
			26-Sep-19	8.10%
			28-Oct-19	8.00%
			01-Dec-19	7.85%
			11-Feb-20	7.60%
			01-Mar-20	7.45%
			01-Jun-20	6.30%
			24-Dec-20	5.95%
			24-May-22	8.35%
			24-Jun-22	8.55%
			24-Aug-22	7.25%
			24-Oct-22	7.95%
			24-Dec-22	8.20%
			01-Jan-23	7.95%
			01-Mar-23	8.01%
			01-Jun-23	7.95%
HDFC-IX	15,00,00,000.00	30-06-2020	31-Jun-22	8.30%
HDFC-IX	80,00,00,000.00	15-09-2020	24-Dec-20	5.95%
HDFC-IX	20,00,00,000.00	28-09-2020		
HDFC-IX	75,00,00,000.00	18-11-2020		
HDFC-X	25,00,00,000.00	21-09-2022	23-Mar-22	5.83%
HDFC-X	15,00,00,000.00	02-05-2022	24-May-22	6.22%
			24-Aug-22	7.23%
			24-Nov-22	7.73%
			24-Feb-23	8.20%
			01-Mar-23	8.01%
			01-Jun-23	7.95%
HDFC Bank Limited-XI	25,00,00,000.00	01-09-2023	01-Sep-23	7.74%
			11-Sep-23	7.90%
			01-Oct-23	7.90%
			11-Oct-23	7.77%
			11-Nov-23	7.92%
			11-Dec-23	7.97%
			11-Jan-24	7.98%

10.00	0.79
31.00	2.4567
30.00	2.376
31.00	2.4707
31.00	2.4469

			11-Feb-24	7.67%	29.00	2.2243	
			11-Mar-24	7.84%	21.00	1.6464	7.9429%
			31-Mar-24	7.84%			
ICICI IV	5,00,00,00,000.00	01-04-2017	01-Apr-17	7.90%			
ICICI-IV			02-Dec-17	7.65%			
ICICI IV			02-Mar-18	8.00%			
ICICI-IV			02-Jun-18	8.10%			
			02-Sep-18	8.35%			
			02-Dec-18	8.60%			
ICICI-VI	34,00,00,000.00	26-09-2017	02-Dec-17	7.90%			
ICICI-VI	16,00,00,000.00	31-12-2017	11-Dec-17	7.95%			
			11-Mar-18	8.00%			
			11-Jun-18	8.10%			
			11-Sep-18	8.35%			
			11-Dec-18	8.60%			
IDC Bank-VI	20,00,00,000.00	08-09-2021	06-Mar-21	8.00%			
			30-Mar-21	8.24%			
Indusind Bank	10,00,00,000.00	15-07-2022	15-Jul-22	8.82%			
			15-Oct-22	7.67%			
			15-Jan-23	8.00%			
			15-Apr-23	8.10%			
			15-Jul-23	8.15%			
			20-Sep-23	8.00%			
			01-Oct-23	8.00%	60.00	5.4	
			26-Dec-23	8.05%	153.00	8.2915	8.0981%
			31-Mar-24				
Punjab National Bank II	50,00,00,000.00	13-09-2018	13-Aug-18	8.05%			
			01-Nov-18	8.20%			
			04-May-19	8.20%			
			04-Aug-19	8.05%			
			04-Nov-19	7.95%			
			04-Feb-20	7.85%			
			04-May-20	7.25%			
			04-Jun-20	7.05%			
			04-Aug-20	6.95%			
			04-Nov-20	6.70%			
			21-Dec-20	6.50%			
			01-Apr-21	6.20%			
			21-Sep-21	5.60%			
			21-Jun-22	6.70%			
			01-Sep-22	7.20%			
			01-Dec-22	7.70%			

			01-Jan-23	8.05%
			01-Mar-23	8.30%
			01-Apr-23	7.95%
PNB-IV	5,00,00,00,000.00	01-01-2019	01-Jan-19	8.65%
			04-Feb-19	8.30%
			04-May-19	8.20%
			04-Aug-19	8.05%
			01-Oct-19	8.05%
			04-Nov-19	7.90%
			04-Feb-20	7.85%
			04-May-20	7.20%
			04-Jun-20	7.05%
			04-Aug-20	6.80%
			04-Nov-20	6.70%
			21-Dec-20	6.50%
PNB-V	60,55,00,000.00	14-07-2021	14-Jul-21	5.70%
			21-Sep-21	5.80%
			21-Jun-22	6.70%
			01-Sep-22	7.20%
			01-Oct-22	7.70%
			01-Jan-23	8.05%
			01-Mar-23	8.30%
			01-Apr-23	7.90%
State Bank of India - IX	13,00,00,000.00	30-09-2016	28-Jun-16	7.85%
State Bank of India - IX	40,77,82,884.00	31-03-2023	14-Aug-16	7.95%
			14-Nov-16	8.00%
			14-Feb-18	8.25%
			14-May-18	8.15%
			14-Aug-18	7.95%
			01-Oct-18	7.95%
			14-Nov-19	7.70%
			14-Feb-20	7.65%
			14-May-20	7.00%
			14-Aug-20	6.65%
			14-May-22	6.75%
			14-Aug-22	7.15%
			14-Nov-22	7.60%
			14-Feb-23	8.00%
			14-May-23	8.15%
			14-Aug-23	8.15%
			01-Oct-23	8.15%
			14-Feb-24	8.20%
			31-Mar-24	
State Bank of India - X	1,90,00,00,000.00	31-05-2019	31-May-19	7.95%

138.00	11.094	
47.00	3.854	8.182344%

			25-Jun-18	7.95%			
			25-Sep-18	8.15%			
			25-Dec-18	8.25%			
			25-Jun-19	8.15%			
			25-Sep-19	7.65%			
			25-Dec-19	7.75%			
			25-Mar-20	7.60%			
			25-Jun-20	6.75%			
			25-Sep-20	6.65%			
State Bank of India - XI	70,00,00,000.00	16-10-2018	16-Oct-19	8.90%			
State Bank of India - XI	7,00,00,000.00	22-11-2018	11-Jan-19	8.35%			
			15-Apr-19	8.95%			
			11-Jul-19	8.20%			
			11-Oct-19	7.85%			
			11-Jan-20	7.75%			
			01-Feb-20	7.75%			
			11-Apr-20	7.15%			
			11-Jul-20	6.85%			
			11-Jul-22	7.05%			
			11-Oct-22	7.25%			
			11-Jan-23	8.00%			
			11-Apr-23	8.10%			
			01-Oct-23	8.10%	10.00	8.81	
			11-Oct-23	8.13%	92.00	7.499	
			11-Jan-24	8.20%	91.00	8.642	8.1604%
			31-Mar-24				
State Bank of India - XII	60,00,00,000.00	11-02-2019	18-Feb-19	8.35%			
State Bank of India - XII	10,00,00,000.00	28-03-2019	11-May-19	8.05%			
			11-Aug-19	8.05%			
			11-Nov-19	7.90%			
			11-Jan-20	7.75%			
			01-Feb-20	7.70%			
			11-Apr-20	7.15%			
			11-Jul-20	6.85%			
			11-Jul-22	7.05%			
			11-Oct-22	7.25%			
			11-Jan-23	8.00%			
			11-Apr-23	8.10%			
			01-Oct-23	8.10%	10.00	8.81	
			11-Oct-23	8.13%	92.00	7.499	
			11-Jan-24	8.20%	91.00	8.642	8.1604%
			31-Mar-24				
SBI-XIII	20,00,00,000.00	24-03-2020	24-Mar-20	7.45%			
			24-Apr-20	7.10%			
			24-May-20	6.96%			
			24-Jun-20	6.70%			

			24-Jul-20	6.65%
Vijaya Bank-VI	15,00,00,000.00	13-11-2017	13-Nov-17	7.90%
			15-Aug-18	8.10%
			13-Sep-18	8.15%
			15-Oct-18	8.20%
			13-Nov-18	8.25%
			13-Jan-19	8.35%
			15-Feb-19	8.40%
			13-Apr-19	8.35%
			13-May-19	8.30%
			13-Jul-19	8.30%
			13-Aug-19	8.19%
			13-Sep-19	8.10%
			15-Oct-19	8.05%
			13-Nov-19	7.95%
			13-Dec-19	7.65%
			13-Jan-20	7.90%
			13-Feb-20	7.65%
			13-Apr-20	7.40%
			13-May-20	7.35%
			15-Jun-20	7.25%
			13-Jul-20	7.15%
UCO Bank-V	5,84,00,000.00	02-02-2023	02-Feb-23	7.45%
	7,00,00,000.00	09-05-2023	11-Feb-23	7.70%
	40,00,00,000.00	22-09-2023		

Bank Loan	Interest Rate	Applicable from	Applicable upto	Number of Days	Product	Weighted Average Rate of Interest	Remarks
HDFC Bank Limited-XII D-1	7.47%	18-Oct-23	12-Nov-23	31.00	2.32		
	7.71%	13-Nov-23	13-Dec-23	30.00	2.31		
	7.78%	13-Dec-23	12-Jan-24	31.00	2.41		
	7.79%	13-Jan-24	12-Feb-24	31.00	2.39		
	7.81%	13-Feb-24	12-Mar-24	29.00	2.23		
	7.80%	13-Mar-24	31-Mar-24	19.00	1.44		
				171.00	13.12	7.67%	

Bank Loan	Interest Rate	Applicable from	Applicable upto	Number of Days	Product	Weighted Average Rate of Interest	Remarks

HDFC Bank Limited-XII D-2	7.21%	01-Nov-23	12-Nov-23	12.00	0.91		
	7.71%	13-Nov-23	12-Dec-23	30.00	2.31		
	7.75%	13-Dec-23	12-Jan-24	31.00	2.41		
	7.70%	13-Jan-24	12-Feb-24	31.00	2.39		
	7.65%	13-Feb-24	12-Mar-24	29.00	2.22		
	7.60%	13-Mar-24	31-Mar-24	19.00	1.44		
				152.00	11.68	7.69%	

Bank Loan	Interest Rate	Applicable from	Applicable upto	Number of Days	Product	Weighted Average Rate of Interest	Remarks
HDFC Bank Limited-XII D-3	7.71%	01-Dec-23	12-Dec-23	12.00	0.93		
	7.75%	13-Dec-23	12-Jan-24	31.00	2.41		
	7.70%	13-Jan-24	12-Feb-24	31.00	2.39		
	7.65%	13-Feb-24	12-Mar-24	29.00	2.22		
	7.60%	13-Mar-24	31-Mar-24	19.00	1.44		
				122.00	9.39	7.69%	

Bank Loan	Interest Rate	Applicable from	Applicable upto	Number of Days	Product	Weighted Average Rate of Interest	Remarks
HDFC Bank Limited-XII D-4	7.75%	01-Jan-24	12-Jan-24	12.00	0.93		
	7.70%	13-Jan-24	12-Feb-24	31.00	2.39		
	7.65%	13-Feb-24	12-Mar-24	29.00	2.22		
	7.60%	13-Mar-24	31-Mar-24	19.00	1.44		
				91.00	6.98	7.67%	

Bank Loan	Interest Rate	Applicable from	Applicable upto	Number of Days	Product	Weighted Average Rate of Interest	Remarks
HDFC Bank Limited-XII D-5	7.65%	01-Mar-24	12-Mar-24	12.00	0.92		
	7.60%	13-Mar-24	31-Mar-24	19.00	1.44		
				31.00	2.36	7.62%	

Non-Tariff Income

PART- IV
FORM- 15

Name of the Petitioner: NTPC Ltd
Name of the Integrated Mine: Talaipalli

S. No.	Parameters	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	Income from sale of washery rejects, if and as	Shall be submitted at the time of truing up					
2	Profit from supply of coal to CIL or merchant						
3	Income from rent of land or buildings						
4	Income from sale of scrap						
5	Income from advertisements						
6	Others *						

(Petitioner)

Details of Applicable Statutory Charges

PART- IV
FORM- 16

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

Particulars	Applicable Rate	Quantity	Existing (2023-24) (01.10.2023-31.03.2024)	2024-25	2025-26	2026-27	2027-28	2028-29
Grade			G13	G12	G12	G12	G12	G12
Royalty	% of Input Price (CIL Basic Rate)	14%	115.78	125.44	125.44	125.44	125.44	125.44
GST under Reverse Charge Mechanism	% of Royalty	18%	20.84	22.58	22.58	22.58	22.58	22.58
District Mineral Foundation (DMF)	% of Royalty	10%	11.58	12.54	12.54	12.54	12.54	12.54
GST under Reverse Charge Mechanism	% of DMF	18%	2.08	2.26	2.26	2.26	2.26	2.26
National Mineral Exploration Trust (NMET)	% of Royalty	2%	2.32	2.51	2.51	2.51	2.51	2.51
GST under Reverse Charge Mechanism	% of NMET	18%	0.42	0.45	0.45	0.45	0.45	0.45
Mineral Transit Cess (Forest Cess)	Rs per tonne	10.32	19.32	19.32	19.32	19.32	19.32	19.32
GST under Reverse Charge Mechanism	% of Forest Cess	18%	3.48	3.48	3.48	3.48	3.48	3.48
CG Vikas Upkar	Rs per tonne	11.25	11.25	11.25	11.25	11.25	11.25	11.25
GST under Reverse Charge Mechanism	% of CG Vikas Upkar	18%	2.03	2.03	2.03	2.03	2.03	2.03
CG Paryavaran Upkar	Rs per tonne	11.25	11.25	11.25	11.25	11.25	11.25	11.25
GST under Reverse Charge Mechanism	% of Paryavaran Upkar	18%	2.03	2.03	2.03	2.03	2.03	2.03
Reserve Price (with escalation)*	Rs per tonne	135.00	135.14					
GST under Reverse Charge Mechanism	% Reserve Price	18%	23.97	24.48	24.48	24.48	24.48	24.48
GST on MMO price	% of Mining Charges	18%	172.66	136.24	164.06	172.13	182.23	189.52
Total			532.33	390.85	409.67	411.74	421.84	429.15

Note: Royalty is to be paid at CIL price of equivalent grade

*Reserve price (With escalation) taken in form 1A

(Petitioner)

Details of Mine Closure Expenses

PART- IV
FORM- 17

Name of the Petitioner : NTPC

Name of the Integrated Mine : Talaipalli

Amount in Rs Lakhs

1. Amount Deposited in Escrow Account prior to date of Commercial Operation (Rs)	PV	2,190.86
2. Life of Mine over which amount is to be recovered (Yrs)	n	31
3. Borrowing Rate per year (%)	r	6.90%
4. Amount recoverable per Year (Rs)	P = PV x r [1-(1+r)-n]	71.46

5. Deposit after the date of Commercial operation - when mine closure is in scope of Generating Company itself

Production Year No. (1)	Amount of Deposit in Escrow account (2)	Date of Deposit in Escrow account (3)	Interest Earned/Accrued in Escrow account (4)	Amount received from Escrow account towards Mine closure (5)	Admissible Mine closure expense (6)	
4	413.90	31-03-2023			413.90	
5	434.60	31-03-2026			434.60	
6	456.35	31-03-2027			456.35	
7	479.15	31-03-2028			479.15	
8	503.10	31-03-2029			503.10	

6. Deposit after the date of Commercial operation - when mine closure is in scope of Mine Developer & Operator (MDO)

Production Year No. (1)	Amount of Deposit in Escrow account (2)	Date of Deposit in Escrow account (3)	Borrowing cost at weighted average rate of interest of actual loan (4)	Interest Earned/Accrued in Escrow account (5)	Amount received from Escrow account towards Mine closure (6)	Adjustment to be made in Input price as a part of Mine closure expense (7)
4	413.90	31-03-2025	28.54	16.56	0	11.98
5	434.60	31-03-2026	58.35	33.94		24.41
6	456.35	31-03-2027	89.45	52.19		37.26
7	479.15	31-03-2028	121.92	71.36		50.56
8	503.10	31-03-2029	156.34	91.48		64.86

Note: Rate of interest in escrow account has been provisionally taken as 4% and the actual interest shall be submitted at the time of truing up

Petitioner

Details for GCV Adjustment					PART- IV FORM- 15
Name of the Petitioner: NTPC Ltd					
Name of the Integrated Mine: Talaipalli					
	2024-25	2025-26	2026-27	2027-28	2028-29
1. Declared GCV of Coal (Kcal/Kg)	Shall be submitted at the time of truing up.				
2. Weighted Average GCV of Coal extracted in the year as reported to CCO (Kcal/Kg)					

(Petitioner)

Reconciliation of capitalization claimed vis-à-vis books of accounts

PART- IV
FORM- E

Name of the Petitioner: NTPC Ltd
Name of the Integrated Mine: Talaipalli

(Amount in Rs. Lakh)

S.No.	Particulars	As on 01.04.2024	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8
1	Closing Gross Block as per IND AS		Shall be provided at the time of true up				
2	Less: Ind AS Adjustments						
3	Closing Gross Block as per I GAAP						
4	Opening Gross Block as per IND AS	2,40,749.67					
5	Add/ Less: Adjustments	-6,489.55					
6	Opening Gross Block as per I GAAP	2,34,260.11					
7	**Total Additions as per books (G = 3 - 6)**						
8	Less: Additions pertaining to other Mines (give Mine wise breakup)						
9	**Net Additions pertaining to instant Mine**						
10	Less: Exclusions (items not allowable / not claimed)						
11	**Net Additional Capital Expenditure Claimed (on accrual basis) (I GAAP)**						
12	**Less: Un-discharged Liabilities**						
13	**Add: Discharges of un-discharged liabilities**						
14	**Net Additional Capital Expenditure Claimed (on cash basis)**						

(Petitioner)

Statement of Capital cost

(To be given for relevant dates and year wise)

PART- IV
FORM- G

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

(Amount in Rs. Lakh)

S. No.	Particulars	As on 01.04.2024		
		Accrual Basis	Un-discharged Liabilities	Cash Basis
A	a) Opening Gross Block Amount as per books (Indian GAAP)	2,34,260.11	25,815.82	2,10,444.30
	b) Amount of IDC in A(a) above	30,204.12	-	30,204.12
	c) Amount of FC in A(a) above	179.73	-	179.73
	d) Amount of FERV in A(a) above	-	-	-
	e) Amount of Hedging Cost in A(a) above	-		-
	f) Amount of IEDC in A(a) above	-		-
B	a) Addition in Gross Block Amount during the period (Direct purchases) (Indian GAAP)	Shall be submitted at the time of truing up.		
	b) Amount of IDC in B(a) above			
	c) Amount of FC in B(a) above			
	d) Amount of FERV in B(a) above			
	e) Amount of Hedging Cost in B(a) above			
	f) Amount of IEDC in B(a) above			
C	a) Addition in Gross Block Amount during the period (Transferred from CWIP) (Indian GAAP)			
	b) Amount of IDC in C(a) above			
	c) Amount of FC in C(a) above			
	d) Amount of FERV in C(a) above			
	e) Amount of Hedging Cost in C(a) above			
	f) Amount of IEDC in C(a) above			
D	a) Deletion in Gross Block Amount during the period (Indian GAAP)			
	b) Amount of IDC in D(a) above			
	c) Amount of FC in D(a) above			
	d) Amount of FERV in D(a) above			
	e) Amount of Hedging Cost in D(a) above			
	f) Amount of IEDC in D(a) above			
E	a) Closing Gross Block Amount as per books (Indian GAAP)			
	b) Amount of IDC in E(a) above			
	c) Amount of FC in E(a) above			
	d) Amount of FERV in E(a) above			
	e) Amount of Hedging Cost in E(a) above			
	f) Amount of IEDC in E(a) above			

(Petitioner)

Statement of Capital Works in Progress (To be given for relevant dates and year wise)				PART- IV FORM- H
Name of the Petitioner: NTPC Ltd				
Name of the Integrated Mine: Talaipalli				
				(Amount in Rs. Lakh)
S. No.	Particulars	As on 01.04.2024		
		Accrual Basis	Un-discharged Liabilities	Cash Basis
A	a) Opening CWIP as per books (Indian GAAP)	214.86	206.98	7.90
	b) Amount of IDC in A(a) above	2.48		2.48
	c) Amount of FC in A(a) above	-	-	-
	d) Amount of FERV in A(a) above	-	-	-
	e) Amount of Hedging Cost in A(a) above	-	-	-
	f) Amount of IEDC in A(a) above	-	-	-
B	a) Addition in CWIP during the period(Indian GAAP)	Shall be submitted at the time of truing up.		
	b) Amount of IDC in B(a) above			
	c) Amount of FC in B(a) above			
	d) Amount of FERV in B(a) above			
	e) Amount of Hedging Cost in B(a) above			
	f) Amount of IEDC in B(a) above			
C	a) Transferred to Gross Block Amount during the period (Indian GAAP)			
	b) Amount of IDC in C(a) above			
	c) Amount of FC in C(a) above			
	d) Amount of FERV in C(a) above			
	e) Amount of Hedging Cost in C(a) above			
	f) Amount of IEDC in C(a) above			
D	a) Closing CWIP as per books (Indian GAAP)			
	b) Amount of IDC in E(a) above			
	c) Amount of FC in E(a) above			
	d) Amount of FERV in E(a) above			
	e) Amount of Hedging Cost in E(a) above			
	f) Amount of IEDC in E(a) above			
				(Petitioner)

Calculation of Interest on Normative Loan

PART- IV
FORM- I

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

(Amount in Rs Lakh)

S. No.	Particulars	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8
1	Gross Normative loan – Opening	1,44,974.62	1,50,351.40	1,53,254.74	1,57,715.87	2,29,018.30	2,39,068.60
2	Cumulative repayment of Normative loan up to previous year	-	4,561.84	13,983.22	23,633.14	35,634.12	50,159.60
3	**Net Normative loan – Opening**	1,44,974.62	1,45,789.56	1,39,271.52	1,34,082.73	1,93,384.18	1,88,909.00
4	Add: Increase due to addition during the year	1,063.46	2,903.35	4,461.13	71,302.43	10,050.30	8,300.30
5	Less: Decrease due to de-capitalisation during the year	-	-	-	-	-	-
6	Add: Increase due to discharges during the year / period	4,313.32	-	-	-	-	-
6A	Less: repayment during the period	4,561.84	9,421.38	9,649.92	12,000.98	14,525.49	15,094.93
7	**Net Normative loan - Closing**	1,45,789.56	1,39,271.52	1,34,082.73	1,93,384.18	1,88,909.00	1,82,114.37
8	**Average Normative loan**	1,45,382.09	1,42,530.54	1,36,677.13	1,63,733.46	1,91,146.59	1,85,511.68
9	Weighted average rate of interest	6.9008%	6.8955%	6.8600%	6.8140%	6.7760%	6.8430%
10	Interest on Loan	10,032.75	9,828.17	9,376.01	11,156.85	12,952.17	12,694.34

(Petitioner)

Calculation of Interest on Working Capital

PART- IV
FORM- J

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

(Amount in Rs Lakh)

S. No.	Particulars	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8
1	Input Cost of Coal Stock for 7 days of Production corresponding to ATQ for the relevant year	2050.98	2513.03	3085.93	3849.40	6043.82	6733.58
2	Consumption of stores and spare including explosives, lubricants and fuels (@ 15%) of O&M expenses excluding mining charge of MDO or annual charge of any agency other than MDO	4394.41	1540.35	1621.21	1706.33	1795.91	1890.20
3	One Month O&M Expenses excluding mining charge of MDO or annual charge of any agency other than MDO	2441.34	855.75	900.67	947.96	997.73	1050.11
4	Total Working Capital	8886.73	4909.12	5607.82	6503.69	8837.46	9673.88
5	Rate of Interest	12.00	11.90	11.90	11.90	11.90	11.90
6	Interest on Working Capital	**1066.41**	**584.19**	**667.33**	**773.94**	**1051.66**	**1151.19**

(Petitioner)

Annexure-A

CHHATTISGARH ENVIRONMENT CONSERVATION BOARD
Parvavas Bhawan, North Block, Sector - 19, Nava Raipur Atal Nagar,
District - Raipur (C.G.)e-mail - hoecb@gmail.com

No. 5312/TS/CECB/2023 Nava Raipur Atal Nagar, Raipur, Dated 29/09/2023

To,

General Manager,
M/s N.T.P.C. Limited,
Talaipalli Coal Mining Project,
Lailunga Road, Gharghoda,
District - Raigarh (C.G) 496111

Sub: - Renewal of the consent of the Board under section 25 of the Water (Prevention and Control of Pollution) Act, 1974 and under section 21 of the Air (Prevention and Control of Pollution) Act, 1981.

Ref: -

1. Consent of the Board issued under section 25/26 of the Water (Prevention and Control of Pollution) Act, 1974 vide letter no. 6237/TS/CECB/2016 Raipur, dated: 17/03/2016 and under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 videletter no. 6239/TS/CECB/2016 Raipur, dated: 17/03/2016 for Open Cast Coal Mine - 18.0 MTPA and Underground Coal Mine - 0.72 MTPA.
2. Consent of the Board issued under section 25/26 of the Water (Prevention and Control of Pollution) Act, 1974 and under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 vide letter no. 6825/TS/CECB/2020 Nava Raipur Atal Nagar, Raipur, dated: 03/11/2020 for Open Cast Coal Mine - 18.0 MTPA and Underground Coal Mine - 0.72 MTPA.
3. Extension of the validity of Consent of the Board issued under section 25/26 of the Water (Prevention and Control of Pollution) Act, 1974 and under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 vide letter no. 9138/TS/CECB/2021 Nava Raipur Atal Nagar, Raipur, dated: 20/01/2021 for Open Cast Coal Mine - 18.0 MTPA and Underground Coal Mine - 0.72 MTPA.
4. Last renewal of the consent issued under section 25 of the Water (Prevention and Control of Pollution) Act, 1974 and under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 vide letter no. 4246/TS/CECB/2023 Nava Raipur Atal Nagar Raipur, dated: 19/09/2022.
5. Your online application no. 12922309, dated 17/03/2023.

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With reference to your above application, consents under section 25 of the Water (Prevention and Control of Pollution) Act, 1974 and under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 are hereby renewed for a period of **one year from 01/11/2023 to 31/10/2024**, subject to the fulfillment of the terms and conditions incorporated in the water and air consent letter no. **6825/TS/CECB/2020 Nava Raipur Atal Nagar, Raipur, dated: 03/11/2020** and subsequent renewal(s)/amendment(s) issued by the Board and additional conditions mentionedbelow.

This renewal of consent is valid for production capacity of: -

S.No.	Product	Production Capacity
1.	Open Cast Coal Mine	18.0 Million Tonnes per Annum (Eighteen point Zero Million Tonnes per Annum)
2.	Underground Coal Mine	0.72 Million Tonnes per Annum (Zero point Seven Two Million Tonnes per Annum)

Additional Conditions

A. Water (Prevention and Control of Pollution) Act, 1974

1. Mine management shall operate and maintain effluent treatment system regularly to meet prescribed standards all the time. No effluent shall be discharged outside of the mine premises in any circumstances; hence zero discharge condition outside of the mine premises shall be maintained all the time.
2. Mine management shall install separate digital water meter for measurement of ground & surface water used.
3. Mine management shall ensure maximum reuse of non-potable water.
4. Mine management shall submit appraisal report for usage of water from competent authority
5. Mine water after proper treatment shall be used for drinking and agriculture purposes. Mine management shall also ensure availability of drinking water in nearby villages.
6. Mine management complete the following works:- (1) Installation of 01 number of CAAQMS before 30/09/2023 and remaining 02 number of CAAQMS before 31/05/2024 (2) Construction of 3-stage settling pond before 31/05/2024 (3) Mea-Waki Plantation before 31/12/2024 (4) Deployment of fog cannon before 01/10/2023 (5) Water sprinkling along haul road through fixed sprinklers before 31/03/2024 (6) Safety zone fencing along with plantation in balance 17 km patch before 31/12/2024. (7) Installation of coal handling plant (CHP) by December, 2025. In case the mine management fails to implement above works in the stipulated time period, the bank guarantee vide letter dated 19/12/2020 and 06/08/2022 may be forfeited.
7. Mine management shall comply the provisions of notification dated 31/12/2021 (as amended upto date) issued by MoEF&CC regarding utilization of fly ash in mixing with over burden back filling of mine.
8. Mine management shall transport the coal in properly covered vehicles to avoid dust emission during transportation. Mine management shall provide Tarpaulin cover over MGR rakes for coal transportation.
9. Mine management shall comply with the provision of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, (as amended up to date)
10. All the solid waste industrial and domestic shall be disposed off in environment friendly manner as per rule.
11. Internal roads shall made pucca. Roads shall be cleaned regularly. Dust, muck and sludge shall be disposed of properly.
12. Mine management shall enhance the rain water harvesting system capacity to recharge the ground water.

13. Extensive in tree plantation shall be carried out in the open areas available within and around the plant premises in during monsoon season. Fruit bearing species like mango, tamarind, guava etc. shall be given preference in this regard.

14. Mine management shall submit Environment Statement to this Board as per provision of Environment (Protection) Amendment Rule, 1993 for the previous year ending 31st March on or before 30th September every year.

15. This renewal of consent is being issued under the "Scheme of Auto-Renewal of Consent" of the Board issued vide office order no. 5937 dated 29/01/2018 as per self certificate submitted by authorized signatory Mr. Somes Bandyopadhyay, Chief General Manager of M/s N.T.P.C. Limited, Talaipalli Coal Mining Project, Raikera, Gharghoda, District - Raigarh (C.G.).

16. Chhattisgarh Environment Conservation Board reserves the rights to revoke the consent / renewal of consent at any time for any violation/non- compliance.

17. In case, if the capital investment is increased by such amount that the total investment exceeds the range for which renewal fees has been paid, the Mine management shall have to pay the difference amount of renewal fees for the corresponding block years.

18. In case, the prescribed fee payable is amended in future, the Mine management shall be liable to pay the difference amount for corresponding block years.

B. Air (Prevention and Control of Pollution) Act, 1981

1. Mine management shall operate and maintain the air pollution control equipments properly. Mine management shall ensure the emission quality meets the standards prescribed by the Board.

2. Ambient air quality within mine area shall be kept within latest prescribed standards.

3. Mine management complete the following works:- (1) Installation of 01 number of CAAQMS before 30/09/2023 and remaining 02 number of CAAQMS before 31/05/2024 (2) Construction of 3-stage settling pond before 31/05/2024 (3) Mea-Waki Plantation before 31/12/2024 (4) Deployment of fog cannon before 01/10/2023 (5) Water sprinkling along haul road through fixed sprinklers before 31/03/2024 (6) Safety zone fencing along with plantation in balance 17 km patch before 31/12/2024. (7) Installation of coal handling plant (CHP) by December, 2025. In case the mine management fails to implement above works in the stipulated time period, the bank guarantee vide letter dated 19/12/2020 and 06/08/2022 may be forfeited.

4. Calibration and data validation shall be carried out of all CAAQMS and availability of real time data should be ensured in CECB/CPCB server.

5. All the solid waste industrial and domestic shall be disposed off in environment friendly manner.

6. Internal roads shall made pucca. Roads shall be cleaned regularly. Dust, muck and sludge shall be disposed of properly.

7. Mine management shall comply the provisions of notification dated 31/12/2021 (as amended upto date) issued by MoEF&CC regarding utilization of fly ash in mixing with over burden back filling of mine.

8. Mine management shall comply with the provision of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. (as amended up to date)

9. Mine management shall transport the coal in properly covered vehicles to avoid dust emission during transportation. Mine management shall provide Tarpaulin cover over MGR rakes for coal transportation.

10. Extensive in tree plantation shall be carried out in the open areas available within and around the plant premises in during monsoon season. Fruit bearing species like mango, tamarind, guava etc. shall be given preference in this regard.

11. Mine management shall submit Environment Statement to this Board as per provision of Environment (Protection) Amendment Rule, 1993 for the previous year ending 31st March on or before 30th September every year.

12. This renewal of consent is being issued under the "Scheme of Auto-Renewal of Consent" of the Board issued vide office order no. 5937 dated 29/01/2018 as per self certificate submitted by authorized signatory Mr. Somes Bandyopadhyay, Chief General Manager of M/s N.T.P.C. Limited, Talaipalli Coal Mining Project, Raikera, Gharghoda, District - Raigarh (C.G.).

13. Chhattisgarh Environment Conservation Board reserves the rights to revoke the consent / renewal of consent at any time for any violation/non- compliance.

14. In case, if the capital investment is increased by such amount that the total investment exceeds the range for which renewal fees has been paid, the Mine management shall have to pay the difference amount of renewal fees for the corresponding block years.

15. In case, the prescribed fee payable is amended in future, the Mine management shall be liable to pay the difference amount for corresponding block years.

Member Secretary
Chhattisgarh Environment Conservation Board
Nava Raipur Atal Nagar, Raipur (C.G.)

Endt. No. 5313/TS/CECB/2023 Nava Raipur Atal Nagar, Raipur, Dated 29/09/2023

Copy to: - Regional Officer, Regional Office, Chhattisgarh Environment Conservation Board, Raigarh (C.G.). Please ensure compliance and report, if any condition/conditions are violated by the Mine Management.

Sd/-
Member Secretary
Chhattisgarh Environment Conservation Board
Nava Raipur Atal Nagar, Raipur (C.G.)

File No NA-103/31/2015-NA
Government of India/भारत सरकार
Ministry of Coal/कोयला मंत्रालय
Office of Nominated Authority / नामनिर्दिष्ट प्राधिकारी का कार्यालय
****

R.No. 120, F-Wing, Shastri Bhawan,
New Delhi, Date : 04.10.2023

To,

The Chairman cum Managing Director,
NTPC Limited, NTPC Bhawan,
Scope Complex, 7, Institutional Area,
Lodhi Road, New Delhi-110003.

Subject : Escalation of Reserve Price for Talaipalli coal mine allocated to M/s NTPC under the Coal Mines (Special Provisions) Act, 2015.

****

Sir,

The undersigned is directed to inform that as per clause 9.2 of Coal Block Development and Production Agreement (CBDPA), reserve price will be subjected to annual escalation based on a pre-specified formula stipulated in the relevant Standard Bidding Document for Design, Build, Finance, Own, and Operate (DBFOO). The provisions for escalating the reserve price for mines allocated to the Power sector under the CM (SP) Act 2015 are as under:-

(a) The Reserve Price for mines allotted to the Power sector is fixed at Rs. 100 per tonne of coal.
(b) The pricing for auctioned mines comprises a Fixed Rate of Rs. 100 per tonne of coal, alongside the Bid Price, which represents the final price offered by the Bidder in reverse bidding.
(c) As specified in Clause 9.2.1 of the CMDPA, the Reserve Price will be increase annually corresponding to the percentage rise in the Reference Index, as per the pre-specified formula. This escalation is applicable after the issuance of the Allotment Order/Vesting Order.
(d) Clause 22.2.3b of the DBFOO document further clarifies that the cost of Fuel procured from Coal Mine/Blocks will increase annually at a compounded growth rate of 2%. This increase is based on a formula that factors in fluctuations in the Wholesale Price Index (WPI) between specific dates.

2. Adhering to the instructions stipulated in Clause 9.2.1 of the CMDPA and Clause 22.2.3b of the DBFOO document, the escalation of the Reserve Price has been carried out with consideration to the following factors:-

- The Wholesale Price Index (WPI) of all commodities is adopted for coal mines allocated to the Power sector under the CM(SP) Act, 2015.
- For the first year of production, the Reserve Price is escalated to reflect a 60% increase in the Wholesale Price Index (WPI) [Reference Index].
- For subsequent financial years, an annual compounded rate of 2% is applied, in addition to the escalation needed to reflect the 60% WPI change.

- For calculating the escalation in the following financial year, the escalated price from the immediately preceding year is taken into account.
- The Reserve Price/FPO (Fixed Price Offer) shall increase on a year-on-year basis according to the percentage change in the Reference Index. It is important to clarify that, for the purpose of escalation in subsequent financial years, the escalated Reserve Price/FPO of the immediately preceding year is considered. The formulas for the escalation of Reserve Price for mines allocated to the Power sector under the CM(SP) Act, 2015, are as follows:

(a) Formula for the first year of production:
Escalated Price for the 1st year = Reserve price/FPO * (1 + ((Percentage change in WPI / 100) * 0.6))
(b) Formula for subsequent years:
Escalated Price from the 2nd year onwards = Escalated Reserve Price/FPO of the Previous year * (1 + 0.02) * (1 + ((Percentage change in WPI / 100) * 0.6))

3. Considering the above and in accordance with Clause 9.2.1 of the CMDPA, the Monthly Payment for coal extracted from the mines will be subject to an annual escalation, based on the Wholesale Price Index (WPI) (the "Reference Index"). The Monthly Payment will increase by the percentage growth in the WPI on a year-on-year basis. Accordingly, the escalated Reserve Price applicable for FY 2019-20, 2020-21, 2021-22, 2022-23 & 2023 for the coal mine, is tabulated as below:-

Name of Mine	Talaipalli	**Allottee**	Vesting order date: 08-09-2015	**PRC 18 MT/Annum**
SL No	**Escalated Reserve Price Applicable for FY**	**Applicable WPI (Base Year 2011-12) for the month of march of Previous FY**	**Calculation of reserve price**	
			WPI (Change in % WPI from preceding year)	Escalated Reserve price (Reserve price of preceding year)
A	B	C	F= (Change in WPI from preceding year year/ WPI of previous year *100)	G=(Escalated Reserve Price/FPO of Previous year *(1+0.02) *(1+ ((Percentage change in WPI /100)*0.6))
Vesting Year	2016-17	107.70		100.00
0	2017-18	113.20		**Not in Production**
0	2018-19	116.30		**Not in Production**
1	2019-20	119.90	11.33	**106.80**
2	2020-21	120.40	0.42	**109.21**
3	2021-22	129.90	7.89	**116.66**
4	2022-23	148.90	14.63	**129.44**
5	2023-24	151.00	1.41	**133.14**

5. M/s NTPC is requested to make monthly payments including arrears of previous years to State Govt. accordingly. However, M/s NTPC may be allowed to make the payments of arrears through four equal installments over a course of year.

Yours faithfully,

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

Copy to: -

1. Shri Amitabh Jain, Chief Secretary, Government of Chhattisgarh, Mahanadi Bhawan, Mantralaya, Naya Raipur-49200
2. Shri Anurag Diwan, Joint Director, Mineral Resource Department, Government of Chhattisgarh, Indravati Bhavan, Block-4, Second Floor, Naya Raipur-49200

Mine Plan and Mine Closure Plan

(First Modification/Revision)

For

Talaipalli

MAND-RAIGARH Coal Field
(Under Rule 22E of MCR 1960)
Raigarh
Chhattisgarh

Project area 2119.40 ha

Rated Capacity 25 MTPA
Peak Capacity -37.5000MTPA

Prepared By
Central Mine Planning and Design Institute

Contact No. - 8987788956
Email ID - rc.dutta@coalindia.in

APPLICANT
NTPC LIMITED
NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi-110003

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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 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 (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/allotted 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. 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. 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	Talaipalli
1.1.2	Name of the Coalfield/ Lignite Field	MAND-RAIGARH Coal Field
1.1.3	Base date of Mining Plan/ Mine Closure Plan	01/04/2023
1.1.4	Linked End Use Plant	LARA STPP
1.1.5	Distance of End Use Plant from the pit head of the project in äkmå	70
1.1.6	Mode of Coal Transport	BY RAIL

1.2 Location, Topography & Communication:

S.No	Parameters	Details
1.2.1	Location of coal deposit	District - Raigarh, State - Chattisgarh
	State	Chhattisgarh
	District	Raigarh
1.2.2	Communication	Road from Raigarh town via Gharghora to Ambikapur (SH) at 25 Km. Raigarh Rail station on Howrah Bombay main railway line is 55 Km from the block. Nearest Airport is Jharsuguda at a distance of 100 Km
1.2.3	Availability of power supply & water etc.	Water from Kelo River, and Permanent Power is available from 132 KV / 33 KV NTPC Substation at Raikera village within block
1.2.4	Prominent physiographic features, drainage pattern, natural water courses, rainfall data, highest flood level.	Kelo River is flowing through the south-eastern part of the present area, constitute the main drainage system. The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area. This subsidiary stream channel is fed by number of small tributaries rising from hills both from north and south. HFL for the Kelo river is 279 m.The monsoon period extends from mid-June to September with an average annual mean rainfall of 1620 mm
1.2.5	Important surface features within the project area and major diversion or shifting involved	No such important surface features with in the project There is no involvement of major diversion or shifting

1.3 Details of the Allotment Agreement:

S.No	Parameters	Details
1.3.1	Name of the Allottee	NTPC LIMITED
1.3.2	Details of allotment/vesting Order	103/31/2015/NA
1.3.2(B)	Allocation/Vesting Order Date	2015-09-08
1.3.3	Name and address of the Applicant	NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi-110003
1.3.4	Name of the previous Allottee of the Block	NTPC LIMITED
1.3.5	Starting date of the Mine as per CMDPA/CBDPA	01/05/2019
1.3.6	Rated capacity as per CMDPA/CBDPA	18.00
1.3.7	Production Schedule as per opening permission (meeting provisions of CMDPA if any)	AS PER CMDPA
1.3.8	End Use of Coal/ Lignite as per allotment order if any	LARA STPP
1.3.9	Cardinal points coordinates of the Block Boundary	Cardinal Points files data shown below

Cardinal Points co-ordinates of the Block boundary :

ANNEXURE-VIIIC		
CARDINAL POINTS OF TALAIPALLI COAL BLOCK		
POINT NO	LONGITUDE (WGS84)	LATTITUDE (WGS84)
P-0	83° 29' 42.381" E	22° 14' 43.085" N
P-1	83° 29' 45.262" E	22° 14' 41.094" N
P-2	83° 29' 48.143" E	22° 14' 39.103" N
P-3	83° 29' 51.024" E	22° 14' 37.111" N
P-4	83° 29' 53.905" E	22° 14' 35.120" N
P-5	83° 29' 56.786" E	22° 14' 33.129" N
P-6	83° 29' 59.667" E	22° 14' 31.137" N
P-7	83° 30' 2.548" E	22° 14' 29.146" N
P-8	83° 30' 5.429" E	22° 14' 27.154" N
P-9	83° 30' 8.309" E	22° 14' 25.163" N
P-10	83° 30' 11.190" E	22° 14' 23.172" N
P-11	83° 30' 14.071" E	22° 14' 21.180" N
P-12	83° 30' 11.954" E	22° 14' 18.738" N
P-13	83° 30' 9.814" E	22° 14' 16.780" N
P-14	83° 30' 6.528" E	22° 14' 14.811" N
P-15	83° 30' 6.228" E	22° 14' 14.703" N
P-16	83° 30' 5.569" E	22° 14' 14.744" N
P-17	83° 30' 4.840" E	22° 14' 14.978" N
P-18	83° 30' 3.891" E	22° 14' 15.481" N
P-19	83° 30' 2.441" E	22° 14' 16.259" N
P-20	83° 30' 0.927" E	22° 14' 16.848" N
P-21	83° 29' 59.067" E	22° 14' 17.346" N
P-22	83° 29' 58.194" E	22° 14' 17.369" N
P-23	83° 29' 57.459" E	22° 14' 17.199" N
P-24	83° 29' 56.726" E	22° 14' 16.809" N
P-25	83° 29' 56.201" E	22° 14' 16.252" N
P-26	83° 29' 55.552" E	22° 14' 15.385" N
P-27	83° 29' 54.946" E	22° 14' 14.299" N
P-28	83° 29' 54.351" E	22° 14' 12.722" N
P-29	83° 29' 54.054" E	22° 14' 11.569" N
P-30	83° 29' 53.562" E	22° 14' 9.562" N
P-31	83° 29' 53.278" E	22° 14' 8.813" N
P-32	83° 29' 52.773" E	22° 14' 7.856" N
P-33	83° 29' 52.009" E	22° 14' 6.932" N
P-34	83° 29' 51.411" E	22° 14' 6.388" N
P-35	83° 29' 50.868" E	22° 14' 6.180" N
P-36	83° 29' 50.524" E	22° 14' 6.145" N
P-37	83° 29' 49.951" E	22° 14' 6.203" N
P-38	83° 29' 49.303" E	22° 14' 6.382" N
P-39	83° 29' 48.581" E	22° 14' 6.646" N
P-40	83° 29' 47.775" E	22° 14' 7.039" N
P-41	83° 29' 47.015" E	22° 14' 7.674" N
P-42	83° 29' 46.074" E	22° 14' 8.476" N
P-43	83° 29' 43.827" E	22° 14' 10.084" N
P-44	83° 29' 42.565" E	22° 14' 10.543" N
P-45	83° 29' 41.374" E	22° 14' 10.840" N
P-46	83° 29' 39.109" E	22° 14' 10.994" N
P-47	83° 29' 37.410" E	22° 14' 11.000" N
P-48	83° 29' 36.301" E	22° 14' 10.770" N
P-49	83° 29' 34.771" E	22° 14' 10.324" N
P-50	83° 29' 33.857" E	22° 14' 9.973" N
P-51	83° 29' 32.985" E	22° 14' 9.570" N
P-52	83° 29' 32.155" E	22° 14' 9.012" N
P-53	83° 29' 31.146" E	22° 14' 8.053" N
P-54	83° 29' 30.001" E	22° 14' 6.617" N
P-55	83° 29' 28.913" E	22° 14' 4.444" N
P-56	83° 29' 27.772" E	22° 14' 1.936" N
P-57	83° 29' 27.416" E	22° 14' 0.799" N
P-58	83° 29' 27.356" E	22° 14' 0.074" N
P-59	83° 29' 27.604" E	22° 13' 59.031" N
P-60	83° 29' 27.883" E	22° 13' 58.346" N
P-61	83° 29' 28.539" E	22° 13' 57.253" N
P-62	83° 29' 28.929" E	22° 13' 56.763" N
P-63	83° 29' 29.000" E	22° 13' 56.531" N
P-64	83° 29' 28.918" E	22° 13' 56.092" N
	83° 29' 28.725" E	22° 13' 55.652" N

ANNEXURE-VIIIC		
P-66	83° 29' 28.409" E	22° 13' 55.083" N
P-67	83° 29' 27.843" E	22° 13' 54.266" N
P-68	83° 29' 27.315" E	22° 13' 53.427" N
P-69	83° 29' 26.957" E	22° 13' 52.652" N
P-70	83° 29' 26.574" E	22° 13' 51.321" N
P-71	83° 29' 26.390" E	22° 13' 50.368" N
P-72	83° 29' 26.594" E	22° 13' 49.643" N
P-73	83° 29' 27.249" E	22° 13' 48.896" N
P-74	83° 29' 28.209" E	22° 13' 48.008" N
P-75	83° 29' 25.416" E	22° 13' 45.934" N
P-76	83° 29' 22.623" E	22° 13' 43.860" N
P-77	83° 29' 19.830" E	22° 13' 41.786" N
P-78	83° 29' 17.038" E	22° 13' 39.712" N
P-79	83° 29' 14.245" E	22° 13' 37.638" N
P-80	83° 29' 11.453" E	22° 13' 35.564" N
P-81	83° 29' 8.660" E	22° 13' 33.490" N
P-82	83° 29' 5.867" E	22° 13' 31.416" N
P-83	83° 29' 3.075" E	22° 13' 29.342" N
P-84	83° 29' 0.282" E	22° 13' 27.267" N
P-85	83° 28' 57.490" E	22° 13' 25.193" N
P-86	83° 28' 54.698" E	22° 13' 23.119" N
P-87	83° 28' 51.905" E	22° 13' 21.045" N
P-88	83° 28' 48.443" E	22° 13' 21.936" N
P-89	83° 28' 44.980" E	22° 13' 22.827" N
P-90	83° 28' 41.518" E	22° 13' 23.718" N
P-91	83° 28' 38.056" E	22° 13' 24.609" N
P-92	83° 28' 34.593" E	22° 13' 25.499" N
P-93	83° 28' 31.131" E	22° 13' 26.390" N
P-94	83° 28' 27.668" E	22° 13' 27.281" N
P-95	83° 28' 24.206" E	22° 13' 28.172" N
P-96	83° 28' 20.744" E	22° 13' 29.063" N
P-97	83° 28' 17.281" E	22° 13' 29.953" N
P-98	83° 28' 13.819" E	22° 13' 30.844" N
P-99	83° 28' 10.356" E	22° 13' 31.735" N
P-100	83° 28' 6.894" E	22° 13' 32.625" N
P-101	83° 28' 3.431" E	22° 13' 33.516" N
P-102	83° 27' 59.969" E	22° 13' 34.407" N
P-103	83° 27' 56.506" E	22° 13' 35.297" N
P-104	83° 27' 53.044" E	22° 13' 36.188" N
P-105	83° 27' 49.581" E	22° 13' 37.079" N
P-106	83° 27' 46.119" E	22° 13' 37.969" N
P-107	83° 27' 42.656" E	22° 13' 38.860" N
P-108	83° 27' 39.193" E	22° 13' 39.750" N
P-109	83° 27' 35.623" E	22° 13' 39.719" N
P-110	83° 27' 32.052" E	22° 13' 39.688" N
P-111	83° 27' 28.482" E	22° 13' 39.656" N
P-112	83° 27' 24.911" E	22° 13' 39.625" N
P-113	83° 27' 21.341" E	22° 13' 39.594" N
P-114	83° 27' 17.771" E	22° 13' 39.562" N
P-115	83° 27' 14.200" E	22° 13' 39.531" N
P-116	83° 27' 10.630" E	22° 13' 39.499" N
P-117	83° 27' 7.059" E	22° 13' 39.468" N
P-118	83° 27' 3.489" E	22° 13' 39.436" N
P-119	83° 26' 59.918" E	22° 13' 39.405" N
P-120	83° 26' 56.348" E	22° 13' 39.373" N
P-121	83° 26' 52.777" E	22° 13' 39.342" N
P-122	83° 26' 49.207" E	22° 13' 39.310" N
P-123	83° 26' 45.636" E	22° 13' 39.279" N
P-124	83° 26' 42.066" E	22° 13' 39.247" N
P-125	83° 26' 38.495" E	22° 13' 39.215" N
P-126	83° 26' 34.925" E	22° 13' 39.184" N
P-127	83° 26' 31.354" E	22° 13' 39.152" N
P-128	83° 26' 27.784" E	22° 13' 39.120" N
P-129	83° 26' 24.213" E	22° 13' 39.089" N
P-130	83° 26' 20.643" E	22° 13' 39.057" N
P-131	83° 26' 17.072" E	22° 13' 39.025" N
P-132	83° 26' 13.502" E	22° 13' 38.993" N
	83° 26' 9.931" E	22° 13' 38.962" N

ANNEXURE-VIIIC		
P-134	83° 26' 6.361" E	22° 13' 38.930" N
P-135	83° 26' 2.790" E	22° 13' 38.896" N
P-136	83° 25' 59.220" E	22° 13' 38.866" N
P-137	83° 25' 55.649" E	22° 13' 38.834" N
P-138	83° 25' 52.079" E	22° 13' 38.802" N
P-139	83° 25' 48.509" E	22° 13' 38.770" N
P-140	83° 25' 44.938" E	22° 13' 38.738" N
P-141	83° 25' 41.368" E	22° 13' 38.706" N
P-142	83° 25' 41.345" E	22° 13' 42.254" N
P-143	83° 25' 41.323" E	22° 13' 45.801" N
P-144	83° 25' 41.301" E	22° 13' 49.348" N
P-145	83° 25' 41.278" E	22° 13' 52.896" N
P-146	83° 25' 41.256" E	22° 13' 56.443" N
P-147	83° 25' 41.234" E	22° 13' 59.991" N
P-148	83° 25' 41.211" E	22° 14' 3.538" N
P-149	83° 25' 41.189" E	22° 14' 7.085" N
P-150	83° 25' 41.167" E	22° 14' 10.633" N
P-151	83° 25' 44.729" E	22° 14' 10.676" N
P-152	83° 25' 48.292" E	22° 14' 10.720" N
P-153	83° 25' 51.854" E	22° 14' 10.764" N
P-154	83° 25' 55.416" E	22° 14' 10.808" N
P-155	83° 25' 58.979" E	22° 14' 10.852" N
P-156	83° 26' 2.541" E	22° 14' 10.895" N
P-157	83° 26' 6.104" E	22° 14' 10.939" N
P-158	83° 26' 9.666" E	22° 14' 10.983" N
P-159	83° 26' 13.228" E	22° 14' 11.026" N
P-160	83° 26' 16.791" E	22° 14' 11.070" N
P-161	83° 26' 20.353" E	22° 14' 11.114" N
P-162	83° 26' 20.331" E	22° 14' 14.419" N
P-163	83° 26' 20.310" E	22° 14' 17.724" N
P-164	83° 26' 20.288" E	22° 14' 21.029" N
P-165	83° 26' 20.266" E	22° 14' 24.335" N
P-166	83° 26' 20.244" E	22° 14' 27.640" N
P-167	83° 26' 20.222" E	22° 14' 30.945" N
P-168	83° 26' 20.201" E	22° 14' 34.251" N
P-169	83° 26' 20.179" E	22° 14' 37.556" N
P-170	83° 26' 20.157" E	22° 14' 40.861" N
P-171	83° 26' 20.135" E	22° 14' 44.167" N
P-172	83° 26' 20.113" E	22° 14' 47.472" N
P-173	83° 26' 20.092" E	22° 14' 50.777" N
P-174	83° 26' 20.070" E	22° 14' 54.082" N
P-175	83° 26' 20.048" E	22° 14' 57.388" N
P-176	83° 26' 20.026" E	22° 15' 0.693" N
P-177	83° 26' 20.004" E	22° 15' 3.998" N
P-178	83° 26' 19.983" E	22° 15' 7.304" N
P-179	83° 26' 19.961" E	22° 15' 10.609" N
P-180	83° 26' 19.939" E	22° 15' 13.914" N
P-181	83° 26' 19.917" E	22° 15' 17.220" N
P-182	83° 26' 19.895" E	22° 15' 20.525" N
P-183	83° 26' 19.874" E	22° 15' 23.830" N
P-184	83° 26' 19.852" E	22° 15' 27.135" N
P-185	83° 26' 19.830" E	22° 15' 30.441" N
P-186	83° 26' 19.808" E	22° 15' 33.746" N
P-187	83° 26' 19.786" E	22° 15' 37.051" N
P-188	83° 26' 19.765" E	22° 15' 40.357" N
P-189	83° 26' 19.743" E	22° 15' 43.662" N
P-190	83° 26' 19.721" E	22° 15' 46.967" N
P-191	83° 26' 19.699" E	22° 15' 50.273" N
P-192	83° 26' 19.677" E	22° 15' 53.578" N
P-193	83° 26' 22.402" E	22° 15' 56.082" N
P-194	83° 26' 25.126" E	22° 15' 58.585" N
P-195	83° 26' 27.850" E	22° 16' 1.089" N
P-196	83° 26' 30.575" E	22° 16' 3.593" N
P-197	83° 26' 33.299" E	22° 16' 6.096" N
P-198	83° 26' 36.023" E	22° 16' 8.600" N
P-199	83° 26' 38.748" E	22° 16' 11.103" N
P-200	83° 26' 42.004" E	22° 16' 9.691" N
	83° 26' 45.261" E	22° 16' 8.278" N

ANNEXURE-VIIIC		
P-202	83° 26' 48.517" E	22° 16' 6.865" N
P-203	83° 26' 51.774" E	22° 16' 5.453" N
P-204	83° 26' 55.030" E	22° 16' 4.040" N
P-205	83° 26' 58.287" E	22° 16' 2.627" N
P-206	83° 27' 1.543" E	22° 16' 1.214" N
P-207	83° 27' 4.800" E	22° 15' 59.802" N
P-208	83° 27' 8.056" E	22° 15' 58.389" N
P-209	83° 27' 8.064" E	22° 15' 54.395" N
P-210	83° 27' 8.072" E	22° 15' 50.402" N
P-211	83° 27' 8.080" E	22° 15' 46.408" N
P-212	83° 27' 8.088" E	22° 15' 42.416" N
P-213	83° 27' 11.411" E	22° 15' 41.273" N
P-214	83° 27' 14.734" E	22° 15' 40.130" N
P-215	83° 27' 18.058" E	22° 15' 38.988" N
P-216	83° 27' 21.381" E	22° 15' 37.845" N
P-217	83° 27' 24.704" E	22° 15' 36.702" N
P-218	83° 27' 28.027" E	22° 15' 35.560" N
P-219	83° 27' 31.351" E	22° 15' 34.417" N
P-220	83° 27' 34.674" E	22° 15' 33.274" N
P-221	83° 27' 37.997" E	22° 15' 32.132" N
P-222	83° 27' 41.320" E	22° 15' 30.989" N
P-223	83° 27' 44.643" E	22° 15' 29.846" N
P-224	83° 27' 47.966" E	22° 15' 28.703" N
P-225	83° 27' 51.289" E	22° 15' 27.561" N
P-226	83° 27' 54.613" E	22° 15' 26.418" N
P-227	83° 27' 57.936" E	22° 15' 25.275" N
P-228	83° 28' 1.259" E	22° 15' 24.132" N
P-229	83° 28' 4.582" E	22° 15' 22.989" N
P-230	83° 28' 7.905" E	22° 15' 21.846" N
P-231	83° 28' 11.228" E	22° 15' 20.703" N
P-232	83° 28' 14.551" E	22° 15' 19.560" N
P-233	83° 28' 17.874" E	22° 15' 18.417" N
P-234	83° 28' 21.197" E	22° 15' 17.274" N
P-235	83° 28' 24.520" E	22° 15' 16.131" N
P-236	83° 28' 27.843" E	22° 15' 14.988" N
P-237	83° 28' 31.166" E	22° 15' 13.845" N
P-238	83° 28' 34.488" E	22° 15' 12.702" N
P-239	83° 28' 37.811" E	22° 15' 11.559" N
P-240	83° 28' 41.134" E	22° 15' 10.416" N
P-241	83° 28' 40.226" E	22° 15' 6.067" N
P-242	83° 28' 39.318" E	22° 15' 1.718" N
P-243	83° 28' 43.082" E	22° 15' 2.752" N
P-244	83° 28' 46.845" E	22° 15' 3.787" N
P-245	83° 28' 50.609" E	22° 15' 4.821" N
P-246	83° 28' 54.373" E	22° 15' 5.855" N
P-247	83° 28' 57.890" E	22° 15' 6.894" N
P-248	83° 29' 1.408" E	22° 15' 7.932" N
P-249	83° 29' 4.926" E	22° 15' 8.971" N
P-250	83° 29' 7.807" E	22° 15' 6.980" N
P-251	83° 29' 10.688" E	22° 15' 4.989" N
P-252	83° 29' 13.570" E	22° 15' 2.998" N
P-253	83° 29' 16.451" E	22° 15' 1.006" N
P-254	83° 29' 19.332" E	22° 14' 59.015" N
P-255	83° 29' 22.213" E	22° 14' 57.024" N
P-256	83° 29' 25.095" E	22° 14' 55.033" N
P-257	83° 29' 27.976" E	22° 14' 53.042" N
P-258	83° 29' 30.857" E	22° 14' 51.050" N
P-259	83° 29' 33.738" E	22° 14' 49.059" N
P-260	83° 29' 36.619" E	22° 14' 47.068" N
P-261	83° 29' 39.500" E	22° 14' 45.077" N
P-262	83° 29' 42.381" E	22° 14' 43.085" N
NOTE: Boundary points are software generated from georeferenced block boundary of Talaipalli coal block		

1.4 Details of the Previous Approval of Mining Plan

S.No	Parameters	Details
1.4.1	Date of approval	31/03/2010
	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	The mining company shall take all necessary precaution regarding safety of mine workings, persons, deployed therein	COMPLIED
2	Mining lease to be acquired shall not encroach into any other coal block	COMPLIED
3	The approval of the mining plan is without prejudice to the requirement of approvals	COMPLIED

1.4.3	Scheduled year of start of production	2012-13
1.4.4	Proposed year of achieving the targeted production	2016
1.4.5	Date of actual commencement of mining operations, if operations already started	15/10/2019
1.4.6	Likely date of mining operations, if operations not yet started & reasons for non-commencement of operations	Operational

1.4.7 Planned production and actual levels achieved in last 3 years (Coal in Mte, OB in MM3, SR in MM3/te)

Year	Planned				Actual			
	Coal "Mte"		OB MM3	SR M3	Coal "Mte"		OB MM3	SR M3
	UG	OC			UG	OC		
2019-20		1.500	7.650	5.100	0.000	0.190	2.070	10.890
2020-21	0.000	4.000	19.040	4.760	0.000	0.810	3.710	4.580
2021-22	0.000	8.000	34.000	4.250	0.000	0.410	2.450	5.980
2022-23	0.000	13.000	55.250	4.250	0.000	2.000	12.210	6.110

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	ENVIRONMENTAL CLEARANCE	ATTACHED AS ANNNEXURE VIIIA	COMPLIED
2	FOREST CLEARANCE	ATTACHED AS ANNEXURE VIIIB	COMPLIED
3	CONSENT TO OPERATE	ATTACHED AS ANNEXURE VIIIH	COMPLIED
4	ENVIRONMENTAL CLEARANCE	ATTACHED AS ANNNEXURE VIIIA	COMPLIED
5	FOREST CLEARANCE	ATTACHED AS ANNEXURE VIIIB	COMPLIED
6	CONSENT TO OPERATE	ATTACHED AS ANNEXURE VIIIH	COMPLIED

1.4.9	Reasons for difference between the planned and actual production levels	MDO contract ran into legal dispute and subsequently contract was terminated on 4th July 2019. However, mining operation was started on a small patch in Oct 2019 contractually in the area beyond the disputed MDO contract by appointing an agency

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	2113	2119.4000
1.5.2	Geological Block Area Projectised HA	2113	2119.40
1.5.3	Lease area HA	2113	2119.4000
1.5.4	Project area HA	2113	2119.4000
1.5.5	Life of the Project Yrs	54	31
1.5.6	Minimum and Maximum Depth of working	70-404	30 -340
1.5.7	Geological Block Area yet to be projectised "Ha"	0.00	0.00
1.5.8	Production Target MTP	18	25.0000
1.5.9	Seams Available As per GR	XLA, XLB, XTOP, XBOT, IXL2, IX L1, IX, VIII, VII, VITOP, VIMID, VIBOT,VTOP,VMID,VBOT,IVTOP,IVMID,IVL,IVBOT, III L, III, II L3, II L2, II L1, II, II L, I	X-LA,X-LB,X-TOP,X-BOT,IX-L2,IX-L1,IX,VIII,VII,VI-TOP,VI-MID,VI-BOT,V-TOP,V-MID,V-BOT,IV-TOP,IV-MID,IV-L,IV-BOT,III L,III,II L3,II L2,II L1,II,II L,I

1.5.10	Seams not considered for Mining with Reasons					

S No	Seams	Reason
1	III L	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine Seam I is not workable
2	III	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine Seam I is not workable
3	II L3	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine Seam I is not workable
4	II L2	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine Seam I is not workable
5	II L1	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine Seam I is not workable

S No	Seams	Reason

			6	II	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine Seam I is not workable
			7	II L	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine Seam I is not workable
			8	I	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine Seam I is not workable
1.5.11	Gross Geological Reserve Mte	1400.57	1407.94		
1.5.12	Net Geological Reserve Mte	1260.52	1267.1450		
1.5.13	Blocked Reserve Mte	396.25	408.7378		
1.5.14	Minable Reserve Mte	905.65	664.7999		
1.5.15	Extractable Reserve Mte	861.25	631.5597		
1.5.16	% of Extraction/ recovery	68.32%	49.8410%		
1.5.17	Reserve Depleted (till the base date) Reserves Mte	3.41	3.4100		
1.5.18	Balance Extractable Reserve Mte	857.84	628.1600		
1.5.19	Average Grade	F	4214.0000		
1.5.20	OB in MM3	3777.07	2714.1300		
1.5.21	SR M3/te	4.48	4.3208		
1.5.22	Mining Technology	OC Shovel Dumper and Surface Miner UG Continuous Miner and Shuttle Car	OC Shovel Dumper and Surface Miner UG to be planned later		
1.5.23	Coal Beneficiation envisaged				
1.5.24	Handling of Rejects	NOT APPLICABLE	NOT APPLICABLE		
1.5.25	Land use pattern " Ha"				
1	Excavation Area	2079.56	1639.8500		
2	Top Soil Dump		0.0000		
3	External Dump		0.0000		
4	Safety Zone	33.44	29.1000		
5	Other Use		19.7300		
6	Infrastructure area		189.6000		
7	Green Belt		17.1600		
8	Undisturbed Area		23.9000		
	Total	2113.0000	2119.4000		

1.5.26	Reasons for revision	M/s TEMPL was appointed as MDO on 26.08.2020 by NTPC for development and operation of Talaipalli Coal Block. Post award of the contract, a dispute developed between M/s TEMPL and NTPC wherein TEMPL claimed that as per their calculations 404.5 MT of coal cant be extracted at a stripping ratio of 4.30 cum/tonne as specified in the approved Mining Plan. In view of M/s TEMPL, the stripping ratio should be around 4.92 to 5.25 Cum/t. Along with this, the issue of accommodation of excess OB in the designated dump area including temporary external dump and unfeasibility of 100 backfilling by re-handling of temporary external dump as per approved mining plan was raised by M/s TEMPL. Subsequently, M/s TEMPL chose to rescind the contract 04.05.21 and filed a Commercial Civil Suit before Honble Delhi High Court. Subsequent to few hearings and submissions made by both the Parties, NTPC and TEMPL jointly approached CMPDIL for technical solution. CMPDIL suggested for modification of Mining plan is necessary for start of mining operations. Meanwhile, NTPC terminated the contract on 08.03.22 For floating of fresh NIT, as per CMDPILs suggestion, modification of Mining plan is necessary.

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	Unexplored
		East	Pelma
		South	Unexplored and Dipside of Barod-Bijari Block
		West	Chimtapani Extension Block and Dipside of Barod-Bijari Block
2.1.2	Location of the Block	Talaipalli Coal Block is located in the eastern part of Mand-Raigarh coalfield. District Raigarh, State ChattisgarhLatitude 220 13 20 N to 220 16 12 NLongitude 830 25 40 E to 830 30 16 ETalaipalli block is covered by Survey of India top sheet No. 64N/7 N/8 (RF 150000)	
	State	Chhattisgarh	
	District	Raigarh	
2.1.3	Area of the Block "Ha"	2119.40	
2.1.4	Area of the geological block projectized in "Ha" (Area of the geological block considered for liquidation of coal reserve)	2119.40	
2.1.5	Balance area yet to be projectized "Ha"	0	
2.1.6	Likely Reserve in the area yet to be projectized "Mte"	193.61	
2.1.7	Cardinal Point Co-ordinates of the non-coal/lignite bearing area/existing mining lease outside the allotted Geological Coal/Lignite block	The Geological Block area and the Project area are same Project area doesnt contain any area outside the block boundary	
	(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	The Geological Block area, lease area and the Project area are same i.e. 2119.40 Ha. Project area doesnt contain any area outside the block boundary
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. The proposed project area is confined within the allotted block boundary	
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	NA	
2.1.12(1)	Year of Starting	2019	
2.1.12(2)	Type of the Project	OPERATING	

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

Document not found

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)	

Mand-Raigarh Coalfield lies in the drainage basin of Mahanadi. It represents a part of the south-eastern periphery of a vast cauldron of sedimentary terrain, known as Son-Mahanadi Gondwana Master Basin. Mand-Raigarh Coalfield along with Ib-Himgir coalfield towards south-east and Korba-Hasdo towards west and north-west constitute the large NW-SE trending asymmetrical synformal master basin.

The extensive occurrences of Barakar and Supra-Barakar rocks amidst isolated Talchir outcrops spanned between latitudes N21° 45' to 22° 42' and longitudes E83° 01' to 8 30 44', constitutes Mand-Raigarh Coalfield. It is situated between Ib-River Coalfield in the southeast and Korba Coalfield in the northwest with more or less similar stratigraphic and tectonic setting. The coal measures in the Mand-Raigarh basin are exposed in three well defined patches due to erosion of the overlying Kamthi rocks along the drainage of the prominent rivers.

The Mand-Raigarh Coalfield is an asymmetrical basin with an approximately NW-SE axis. It is a part of Ib-Mand-Korba master basin lying within the Mahanadi graben. It displays a typical half-graben configuration, with the southern boundary marked by a major NW-SE zone of faulting coinciding with the trend of the Mahanadi graben and the northern boundary not faulted over the major part. The beds dip at low angle 5° – 7° towards south-west. In the southern limb, the strike is approximately NW-SE with minor variations and the beds dip towards north-east.

The General Stratigraphic sequence is furnished below:

Age	Formation	Thickness (m)	Lithology
1	2	3	4
Recent to subrecent			Aluvial soil pebbly to bouldary bed with silty clay band, laterite etc.
Cretaceous to Eocene	Deccan Traps		Basalt flows & dolerite dykes
Lower to Middle Triassic	Kamthi	2851	Poorly sorted, frequently ferruginous, coarse to very coarse grained, locally graded to pebbly, mega cross bedded sandstone containing, brownish grey to buff coloured clay clasts. A fossiliferous red claystone to siltstone bed occurs at the base.
Upper Permian to Lower Permian	Raniganj	180	Mostly fine to medium grained, grayish white, micaceous sandstone and siltstone with claystone, shale, minor coarse grained sandstone and two coal seams of inferior grade.
	Barren Measure	300	Dominantly grey claystone/grey shale with siltstone and iron stone bands, interbanded sequence of fine to medium grained sandstone and shale.
	Barakar	425 - 800	Medium to coarse and very coarse grained even gritty, sandstone at the lower part followed upward by fine to medium grained assemblage with grey claystone/shale which become predominant towards the upper part, number of coal seams and carbonaceous shale.
	Karharbari(?)	23	Mottled at places carbonaceous sandstone, frequently associated with pebbles of quartzite, granite etc. of various shapes and sizes
Upper Carboni-ferous to lowermost Permian	Talchir	150+	Very fine to fine grained sandstone with siltstone and shale, occasionally greenish in nature, at places with matrix based variegated polymictic conglomerate.

2.2.2	Local geology, Structure, Stratigraphic sequence, Characteristics of the litho-logical units (coal seams /partings/overburden)

Talaipalli Block is located in the eastern part of Mand-Raigarh Coalfield. Major part of Talaipalli block is covered by the rocks of Barakar formations. Barren measure occurs in the southern part of the block. However a small patch of Barren Measure is also noticed in the north western part of the block.

The geological succession is given below:

Formation	Thickness (m)	Lithology
Recent	0.50 – 18.00	Soil, alluvium
Barren Measures	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakars	30.00 – 596.00	Fine, medium and coarse grained felspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir	1.00 – 54.30	Khakee,greenish shales & sandstone,occassional pebbly
Basement		Metamorphics

The general strike of the bed is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from 4 to 8 towards South-west.
The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data with throw varying from 0-150m. Out of 12, three faults namely fault F1-F1, F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. Barren Measure Formation is preserved in a limited area in the north-western part of the block. Remaining area is structurally free except two relatively minor faults.

The sequence of Coal seams is given below:

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.2	1.06			0.50-0.90
	Parting			5.41	11.9	6.0-9.5
2	X LB	0.3	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.4	1.6			1.00-1.15
	Parting			0.7	3	1.0-2.0
4	X Bot	1.5	8.1			3.5-6.0
	Parting			2.3	20.15	3.5-16.5
5	IX L2	1.2	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.65	11.87	6.0-8.0
7	IX	0.96	6.96			3.5-6.0
	Parting			6.3	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.1	3.9			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0
12	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.8	23.45	14.0-21.0
13	V Top	0.5	3.09			0.50-1.50
	Parting			9.09	18.94	11.5-16.5
14	V Mid	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bot	0.3	5.4			0.50-2.0
	Parting			15.16	14	17.0-23.0
	IV Top	0.54	5.78			2.5-5.0

	Parting			5.3	20.13	8.0-10.0
17	IV Mid	0.99	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.7	4.55	0.50-2.0
19	IV Bot	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.1	3.25			0.50-1.5
	Parting			24.57	44.55	33.0-39.0
21	III	0.66	5.97			2.0-5.5
	Parting			31.1	55.99	33.0-51.0
22	II L3	0.5	3.09			<0.90
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			<0.90
	Parting			5	60.39	35
24	II L1	0.05	1.54			<0.90
	Parting			1.27	20.59	3.0-14.0
25	II	0.13	5.92			1.5-2.5
	Parting			0.37	3.89	0.50-2.0
26	II L	0.05	2.45			<0.90
	Parting			Around 35.0 m		
27	I	0.22	0.55		-	27

2.2.3	Geological Block Area "Ha"	2119.40
2.2.4	Status of Exploration of the block	
Detail exploration in the block was carried out since 2006-09. A total of 117 number of boreholes were drilled by GSI & MECL which were considered for preparation of the Geological Report. Total meterage considered for preparation of Geological Report is 46289.30 m.		
2.2.5	Area covered by "detailed" exploration within the block (sq. km)	21.194
2.2.6	Whether entire area has been covered by a detailed exploration	Yes The entire proposed lease area has been explored
2.2.7	No. of boreholes drilled within the block	117
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	5.52
2.2.11	No of Seams available as per GR (Geological Report)	X-LA,X-LB,X-TOP,X-BOT,IX-L2,IX-L1,IX,VIII,VII,VI-TOP,VI-MID,VI-BOT,V-TOP,V-MID,V-BOT,IV-TOP,IV-MID,IV-L,IV-BOT,III L,III,II L3,II L2,II L1,II,II L
2.2.12	Seams not considered for Mining with Reasons	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining. Further below seams cannot be mined by OC method due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine Seam I is not workable
2.2.13	Dip of the Seam	The general strike is NW-SE with south-westerly dip of 4-8 deg

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	
X-LA	0.20-1.06	21.40-165.78	3.537			3.4333		3.4333		0.1037	0.0052		0.0985					0.00	0.10		0.1	
Parting	5.41-11.90							0.0000										0.00	0.00			
X-LB	0.30-1.28	14.52-177.58	4.8500	0.0837	0.0839	4.4053		4.5729		0.2771	0.0139		0.2632					0.00	0.26		0.26	
Parting	3.37-14.89							0.0000										0.00	0.00			

X-TOP	0.40-1.60	10.97-187.19	14.1260	1.6241	0.7455	4.7536		7.1232		7.0028	0.3501		6.6527			0.0599		0.00	6.59		6.59	
Parting	0.70-3.00							0.0000										0.00	0.00			
X-BOT	1.60-8.10	12.28-192.93	80.4080	6.9134	10.0448	5.8303		24.7885		55.6205	2.7810		52.8394			0.6842		0.00	52.16		52.16	
Parting	2.30-20.15							0.0000										0.00	0.00			
IX-L2	1.20-2.55	10.78-225.31	28.9590	3.3499	3.7316	2.2589		9.3404		19.6185	0.9809		18.6376			0.2614		0.00	18.38		18.38	
Parting	13.59-21.54							0.0000										0.00	0.00			
IX-L1	0.36-1.85	10.78-225.31	29.2930	4.4773	3.4069	1.6731		9.5573		19.7357	0.9868		18.7489			0.2535		0.00	18.50		18.5	
Parting	5.65-11.87							0.0000										0.00	0.00			
IX	0.96-6.96	11.87-238.02	1023310	14.4822	10.2044	5.4623		30.1489		72.1821	3.6091		68.5730			1.0043		0.00	67.57		67.57	
Parting	6.30-16.15							0.0000										0.00	0.00			
VIII	2.06-6.64	7.95-256.47	128.2510	20.0172	12.4646	9.1594		41.6412		86.6098	4.3305		82.2793			1.1467		0.00	81.13		81.13	
Parting	17.68-42.01							0.0000										0.00	0.00			
VII	0.10-3.90	58.20-270.08	15.8490	5.0414	5.1484	2.1133		12.3031		3.5459	0.1773		3.3686					0.00	3.37		3.37	
Parting	1.08-17.44							0.0000										0.00	0.00			
VI-TOP	0.37-3.42	12.08-312.32	34.2940	5.7560	4.3446	4.6167		14.7173		19.5767	0.9788		18.5978					0.00	18.60		18.6	
Parting	0.58-3.25							0.0000										0.00	0.00			
VI-MID	3.09-10.01	9.96-321.49	180.9160	33.8405	15.2906	15.5950		64.7261		116.1899	5.8095		110.3804					0.00	110.38		110.38	
Parting	0.85-5.98							0.0000										0.00	0.00			
VI-BOT	0.48-1.75	12.43-328.50	10.9360	1.3703	0.1460	5.0924		6.6087		4.3273	0.2164		4.1109					0.00	4.11		4.11	
Parting	2.80-23.45							0.0000										0.00	0.00			
V-TOP	0.50-3.09	12.44-347.15	17.0110	4.4889	2.4842	2.6138		9.5869		7.4241	0.3712		7.0529					0.00	7.05		7.05	
Parting	9.09-18.94							0.0000										0.00	0.00			
V-MID	0.15-3.73	15.57-360.80	36.1570	9.3193	2.6841	5.5884		17.5918		18.5651	0.9283		17.6369					0.00	17.64		17.64	
Parting	4.55-15.95							0.0000										0.00	0.00			

V-BOT	0.30-5.40	22.96-377.90	42.2010	8.9308	2.7183	6.6342		18.2833		23.9177	1.1959		22.7218					0.00	22.72		22.72	
Parting	15.16-30.14							0.0000										0.00	0.00			
IV-TOP	0.54-5.78	10.87-405.19	93.8220	25.1159	2.2913	10.5820		37.9892		55.8328	2.7916		53.0411					0.00	53.04		53.04	
Parting	5.30-20.13							0.0000										0.00	0.00			
IV-MID	0.99-7.24	19.55-425.07	145.4770	35.7954	12.6738	10.6022		59.0714		86.4055	4.3203		82.0852					0.00	82.09		82.09	
Parting	0.75-6.95							0.0000										0.00	0.00			
IV-L	0.23-4.99	23.28-400.11	31.1310	5.5926	0.4445	5.2905		11.3276		19.8034	0.9902		18.8132					0.00	18.81		18.81	
Parting	0.70-4.55							0.0000										0.00	0.00			
IV-BOT	0.55-5.67	28.39-402.70	73.9880	17.6626	4.3560	3.9081		25.9267		48.0613	2.4013		45.6583					0.00	45.66		45.66	
Parting	8.05-21.54							0.0000										0.00	0.00			
III L	0.10-3.25	42.78-421.12	33.043					0.0000										0.00	0.00			in this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for open cast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhausbon of OC mine Seam I is not workable

Parting	24.57-44.55							0.0000										0.00	0.00			
III	0.66-5.97	80.11-46690	80.045					0.0000										0.00	0.00			In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for open cast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine Seam I is not workable
Parting	31.10-55.99							0.0000										0.00	0.00			

II L3	0.50-3.09	115 68-520 84	17.9 58					0.00 00										0.00	0.00			In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for open cast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
Parting	13.39-40.90							0.00 00										0.00	0.00			

II L2	0.07-2.68	12988-54950	8.414					0.0000										0.00	0.00			In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for open cast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
Parting	5.00-60.39							0.0000										0.00	0.00			

II L1	0.05-154	18502-57505	6.9730					0.0000										0.00	0.00			In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for open cast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
Parting	1.27-20.59							0.0000										0.00	0.00			

II	0.13-5.92	19341-59116	42.7810					0.0000										0.00	0.00			In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for open cast mining due to lack of dumping space. Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
Parting	0.37-3.89							0.0000										0.00	0.00			

III L	0.05-245	24150-59244	4:3930					0.0000										0.00	0.00			In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for open cast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
Parting	350							0.0000										0.00	0.00			

I	0.22-0.55	32635-48172	0.00					0.0000										0.00	0.00			In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for open cast mining due to lack of dumping space Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
Total			12671450	2058815	932635	1096128		4087378		6647999	332383		6315597			34100			6281497		6281497	

S.No	Parameters	Details
2.2.15	Methodology of reserves estimation (also mention if any software package has been used)	

Basic assumptions and considerations for reserve estimations are listed below. Minex Package has been utilized for resource estimation

i. The isochores, isograde and the floor contours, Iso-OB, Iso depth lines have been generated by Minex Software.

ii. The open cast reserves have been estimated on the basis of I-100 thickness for the seams from seam XLA to IV Bottom, where all the carbonaceous bands and obvious bands individually or collectively upto 1m. thickness have been included in the seam & >1m bands have been excluded.

iii. The reserves have been estimated on I-30 thickness for the seams from III L to II L as underground reserve.

iv) Reserves are not estimated for BCS, & IP seam thicknesses.

v) The opencast reserves are estimated for 1 m and above seam thickness & at 1 m thickness interval. For underground reserves estimation minimum workable thickness has been considered as 0.50m, 0.90, 1.2, 1.50 m thickness and onward at 0.50 m thickness interval. The highly disturbed zone between fault F8, F9, F4, F7 and F5 area, the reserve have been estimated in indicated category for all the seams.

vi) Iso-overburden & Iso-quarry lines are generated through model upto the floor of seam-IV Bottom. The Iso-overburden lines are compared with combined coal thickness to generated C. OB lines, sub sector wise.

vii) A 60 m barrier zone is left for Kelo River and its tributary as nala.

viii) All volumes of coal are estimated by Minex Software Model and reserves are estimated as :
Gross Reserves = Area X Thickness X Sp. Gravity of Coal

ix) A 10% deduction has been made from the gross proved reserves to arrive at the net-in-situ proved reserves available in the block for open cast potential and underground area where as 100% gross reserves are considered for Indicated category.

2.2.16	Average GCV "KCal/kg"	
4214 Kcal/kg		
2.2.17	Gross Geological Reserve of the block "Mte"	1407.94
2.2.18	Net Geological Reserve of the block "Mte"	1267.1450
2.2.19	Minable Reserve of the block "Mte"	664.7999
2.2.20	Blocked Reserve "Mte"	408.7378
2.2.21	Corresponding extractable reserve of the block "Mte"	631.5597
2.2.22	Percentage of Extraction	49.841
2.2.23	Reserve already depleted (Base date of Mining Plan)	3.41
2.2.24	Balance Reserve (as on Base Date))	628.1497

Chapter-3: Mining

3.1 Mining Method

S.No	Parameters	Details
3.1.1	Existing method of mining if the mine is under operation	OPENCAST MINING
3.1.2	Proposed method of mining with justification on suitability of method of mining	

PROPOSED METHOD OF MINING

Considering the geo-mining characteristics of the block, dumping space constraints and for **conservation of resource**, it is proposed to extract the coal reserves upto Seam IV BOT using open cast mining Method because of following reasons –

i. Occurrence of multiple seam with a significant number having low thickness between 0.5m-1.5m. Also, some seams are thick and are above 5m in thickness. Coal loss in such seam conditions can be minimized by opencast mining method.

ii. The existence of very low cover for entry to bottom-most seam considered (Seam-IV BOT) in the eastern part of the block makes opencast mining an obvious choice.

The deposit has therefore been proposed for mining by opencast method up to the Seam IV BOT Floor due to constraint of space for dumping. Seam below IV BOT shall be considered for UG mining after exhaustion of OC mine.

CHOICE OF TECHNOLOGY

The operational factors include

- Multi-Seam operation involving 19 seams horizons.
- Effective seam thickness varying from 1.00 to 9.00 m with majority of seams having less effective thickness varying from 1.00 to 2.50m.
- Mild seam gradient.
- OB with varying parting thickness

Based on the above factors surface miner has been considered for extraction of coal as surface miner eliminates blasting in coal.

As removal of overburden with varying parting thickness requires flexible operation, shovel-dumper combination with conventional system of mining i.e. inclined slicing has been considered for removal of overburden.

For a rated capacity of 25.0 Mty, it is proposed to deploy 10-12 cum Hydraulic Shovel/backhoe and 20-22 Cum Hydraulic shovel/backhoe with 100T and 200T Rear Dumper respectively for OB. For Coal, Surface Miner with Front End Loader and 60T Dumper shall be deployed

PIT FORMULAION STRATEGY:

The mine boundary for the pit has been delineated taking into consideration block boundary, surface features, strip ratio and **external dump space required for continuity of mining**. Considering the above, the pit is formulated with maximum possible external OB dump on the dip side within the block to be re-handled later and internal dumping in the decoaled area. **Pit optimization has been done considering constraint on space availability for dumping of waste.**

The pit boundary has been fixed leaving safety barrier, conveyor corridor along the eastern, southern and western boundary. Also, the infrastructural facilities (MGR, Silos, workshop etc) is proposed to be located in the south-west corner of the block.

The proposed Pit has been formulated considering Seam IV as base seam. . Seam IV has been taken as the base seam for the pit since going upto Seam III which is only 4-4.5m thick and is 50-60m below seam IV increases the OB handling to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~277 Mt of Coal. So, Opencast mining for the Talaipalli coal block has been proposed upto Seam IV as suggested above to maximize the recovery of coal.

Considering the above quarry surface within the block has been delineated as follow:

North	East	South	West
50m from Block boundary, foothill of the Tolge Hill in NW and leaving area for UG infrastructure in north near BH MNRT-92	60m from edge of Kelo river and 50m from Block boundary	50m from block boundary	50m from Block boundary and leaving area for infrastructure in south-west

RATED CAPACITY:

Revised Mining Plan for Talaipalli Coal Block has been prepared for a rated/peak capacity of 25.0 Mty of Coal from Opencast mine.This output is considered based on thickness of multiple coal seams (19 No of Coal Horizons for OCP) and strike length of ~5 Km)

BASIC PROJECT AND MINE PARAMETERS:

The basic project parameters is given below

Sl. No.	Parameters	Unit	Value
1	Maximum depth	m	340
2	Usual strike length: along the Mine Floor along the Mine Surface	 m m	 4800 5300
4	Usual dip rise length: on the Mine Floor on the Mine Surface	 m m	 2500 3200
6	Area: On the Mine Floor On the Mine	 ha ha	 1301.10 1839.85

	Surface		

SEQUENCE OF MINING:

The block has NW-SE strike of around 5 km. Opencast mining for the Talaipalli coal block has been proposed upto Seam IV as suggested above to maximize the recovery of coal and effective dump management. It has been proposed to mine maximum area in the block with due consideration to space required within the block for external dumping and infrastructures.

To ensure availability of adequate quantity of coal and early reaching of target capacity, a two-entry scenario has been envisaged. one on the north eastern side and the other on the north-western side. Seam IV will be accessed from both the side which will form the base of the quarry. Then working front of both the quarry will advance towards south and towards each other eventually merging into a single quarry with full strike length after about 9-10 years.

In the initial years, simultaneous working of mechanized opencast mine and the projected belowground mine may pose operational problems due to massive production from the opencast unit. As such, it is considered prudent to start underground mine work after exhaustion of opencast workings.

OB will be transported through flank roads to Internal OB dumps and temporary external OB dumps in dip side. Coal is proposed to be transported through ramps and flank roads. Coal from both pit in initial years and also after merger of the pit will be transported to mobile coal handling arrangement at the surface in both eastern and western side and thereafter to Coal dispatch center by surface conveyors.

The mining operation in the block is continuing in the southern part of the block since October 2019 through outsourcing means upto seam VIII. This south pit is projected to extract 2.81 Mt of coal by the end of FY 2022-23. This pit will extend for another 3 years after FY 2022-23. The projected coal production and OB removal from this south pit and its extension is given below:

		Existing South Pit and its extension	
Year	Calendar Year	Coal (Mte)	OB (Mcum)
Upto Base Yr FY 2022-23	Upto Base Yr FY 2022-23	2.81	16.01
1	2023-24	1.50	11.10
2	2024-25	2.03	11.77
3	2025-26	1.58	5.91
Total		**7.92**	**44.80**

Moreover, the work for mining operation through outsourcing means in the north-western side has already been awarded for 5 years upto Seam VIII. The pit will be opened in the north west side as per the proposed mine entry and the mine will produce about 14.69 Mt of coal with 46.63 Mcum of OB removal in the 5 years out of which 0.60 Mt of coal is projected to be extracted in 2022-23. The OB will be dumped south of the proposed western pit near the pit and will have to be re-handled to proposed temporary external dump in the southern part of the block after 5 years.

The proposed coal production and OB removal from the eastern and western pit for first 5 years of operation is given below:

Year	Calendar Year	West Pit		East Pit		Total Coal (Mt)	Total OB (Mcum)
		Coal (Mt)	OB (Mcum)	Coal (Mt)	OB (Mcum)		
Upto Base Yr FY 2022-23		0.60	4.43			0.60	4.43
1	2023-24	1.02	6.29	0.98	3.71	2.00	10.00
2	2024-25	2.03	8.50	1.97	9.50	4.00	18.00
3	2025-26	4.01	10.94	1.99	11.06	6.00	22.00
4	2026-27	4.00	11.02	5.00	23.98	9.00	35.00
5	2027-28	3.03	5.44	11.37	50.13	14.40	55.57
Total		**14.69**	**46.63**	**21.31**	**98.37**	**36.00**	**145.00**

The average lead for OB dumping works out to be around 3.5-4 km. However, in initial 10 years, the lead for external dumps would be around 5-6 Km and lead for internal dumps will be around 3.5-4 km.

The average lead for coal would be around 3.5-4 km. However in initial years, the lead would be around 2.5-3 km.

The lead estimation is tentative and may be estimated each year in the yearly operation plan.

MINING SYSTEM PARAMETERS :

Elements of mining system have been determined in accordance with the parameters of excavation, transport equipment and parameters of drilling and blasting. However, the space constraint for dumping the OB has been the most important factor taken into consideration for designing the mining system, since the mining system plays an important role for determining the void created for internal dump.

Top OB and thick partings:

Bench height : 10-15 m with 20cum electric-hydraulic shovel/backhoe
Bench width : Working-40-45m, Non-working- 25m
Bench slope : 70 deg

Parting between seams:

Bench height : as per inter-burden thickness with 10-12 cum electric-hydraulic shovel/ backhoe
Bench width : Working- 40-45m, Non-working- 25m
Bench slope : 70 deg

Coal:

Bench height : Seam height with Surface Miner
Bench width : 40-45m
Bench slope : 70 deg

Dump:
Bench height : 30m
Bench width : 30m
Bench slope : 37 deg

WASTE DISPOSAL STRATEGY :

It is envisaged that initially for 3 years, all the OB generated will be dumped externally from both the eastern and western pit. This temporary external dump is proposed to be located in the southern side of the block. Once sufficient void is created after 3 years of operation, internal dumping will start in eastern pit while in the Western pit, internal dumping can be started only from 8th year of operation once the base seam is reached.

The external dumping will continue till 13th year and thereafter from 14th year, this external dump (the OB part) will have to be re-handled back into the quarry void for smooth mine advancement. However, re-handling of 3.73 Mcum/year of Top Soil for spreading over internal dump will start from 10th year only.

Out of the total OB of 2734.58 Mcum, it is estimated that 533.53 Mcum (~19.5%) will be required to be temporarily dumped externally. This 533.53 Mcum will be re-handled back into the quarry after sufficient space is available for accommodation of waste from 14th year and will be re-handled upto 25th year. The lead for re-handling would be around 3.5 km. The Strip ratio for the project including re-handling will be 5.17 cum/t.

The height of the temporary external dump is proposed to be around 120m above ground level upto an RL of +420m and final height of the internal dump is proposed to be 120m above ground level upto an RL of +420m. This will ensure optimization of the life of the mine to extract maximum mineable coal. Slope stability study will be imperative to determine final dump height and final dump slope as per regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020. Slope stability analysis for proposed dumps in the mining plan has been carried out and the factor of safety for dump height upto 120m from OGL was modelled using the cross sections and the material properties collected from the field. The analysis indicates a factor of safety in the range of 1.25-1.50 for various cases.

Overall slope of dump works out to be 23- 24.

The waste disposal schedule is given below

Year	Temporary External Dump (Mcum)		Internal Dump (Mcum)		Embankment	Total OB (Mcum)		Rehandling to Internal Dump (Mcum)	
	Progressive	Cumulative	Progressive	Cumulative		Progressive	Cumulative	Progressive	Cumulative
Upto Base Yr FY 2022-23	20.44	20.44				20.44	20.44		
1	20.88	41.32	0.00	0.00	0.22	21.10	41.55		
2	29.77	71.10	0.00	0.00		29.77	71.32		
3	27.91	99.01	0.00	0.00		27.91	99.23		
4	22.23	121.24	12.77	12.77		35.00	134.23		
5	25.77	147.01	29.80	42.57		55.57	189.80		
6	58.80	205.81	41.20	83.77		100.00	289.80		
7	63.58	269.38	46.92	130.69		110.50	400.30		
8	63.58	332.96	46.92	177.62		110.50	510.80		
9	63.58	396.54	46.92	224.54		110.50	621.30		
10	63.58	460.12	46.92	271.46		110.50	731.80	3.73	3.73
11	24.49	484.61	86.01	357.47		110.50	842.30	3.73	7.47
12	24.46	509.07	77.54	435.01		102.00	944.30	3.73	11.20
13	24.46	533.53	77.54	512.55		102.00	1046.30	3.73	14.93
14			102.00	614.55		102.00	1148.30	16.43	31.36
15			102.00	716.55		102.00	1250.30	37.18	68.54
16			102.00	818.55		102.00	1352.30	42.10	110.64
17			102.00	920.55		102.00	1454.30	47.02	157.65
18			102.00	1022.55		102.00	1556.30	47.02	204.67
19			102.00	1124.55		102.00	1658.30	47.02	251.68
20			102.00	1226.55		102.00	1760.30	47.02	298.70
21			100.00	1326.55		100.00	1860.30	47.02	345.72
22			100.00	1426.55		100.00	1960.30	47.02	392.73
23			100.00	1526.55		100.00	2060.30	47.02	439.75
24			100.00	1626.55		100.00	2160.30	47.02	486.76
25			100.00	1726.55		100.00	2260.30	46.77	533.53
26			100.00	1826.55		100.00	2360.30		
27			100.00	1926.55		100.00	2460.30		
28			100.00	2026.55		100.00	2560.30		
29			100.00	2126.55		100.00	2660.30		
30			50.00	2176.55		50.00	2710.30		
			24.28	2200.83		24.28	2734.58		

Total	533.53		2200.83		0.22	2734.58		533.53	

3.1.3	Coal production capacity proposed MTPA	25.0000
3.1.4	Justification for optimization Coal production capacity	
Considering the geo-mining condition, cumulative thickness of coal seams (~40m) and strike length of 5 Km, the production capacity of 25 Mty is justified.		
3.1.5	Calendar year from which the production will start	2023-24
3.1.6	Year of Achieving rated production	2037-38

3.1.7 Tentative Coal production Plan MT

Year		Coal Production Schedule			OB MM3	SR
Year of Operation	Calendar Year	UG	OC	Total		
1	2023-24	0.00	3.50	3.5000	21.10	6.0286
2	2024-25	0.00	6.03	6.0300	29.77	4.9370
3	2025-26	0.00	7.58	7.5800	27.91	3.6821
4	2026-27	0.00	9.00	9.0000	35.00	3.8889
5	2027-28	0.00	14.40	14.4000	55.57	3.8590
6	2028-29	0.00	18.00	18.0000	100.00	5.5556
7	2029-30	0.00	22.00	22.0000	110.50	5.0227
8	2030-31	0.00	22.00	22.0000	110.50	5.0227
9	2031-32	0.00	22.00	22.0000	110.50	5.0227
10	2032-33	0.00	22.00	22.0000	110.50	5.0227
11	2033-34	0.00	22.00	22.0000	110.50	5.0227
12	2034-35	0.00	22.00	22.0000	102.00	4.6364
13	2035-36	0.00	22.00	22.0000	102.00	4.6364
14	2036-37	0.00	22.00	22.0000	102.00	4.6364
15	2037-38	0.00	25.00	25.0000	102.00	4.0800
16	2038-39	0.00	25.00	25.0000	102.00	4.0800
17	2039-40	0.00	25.00	25.0000	102.00	4.0800
18	2040-41	0.00	25.00	25.0000	102.00	4.0800
19	2041-42	0.00	25.00	25.0000	102.00	4.0800
20	2042-43	0.00	25.00	25.0000	102.00	4.0800
21	2043-44	0.00	25.00	25.0000	100.00	4.0000
22	2044-45	0.00	25.00	25.0000	100.00	4.0000
23	2045-46	0.00	25.00	25.0000	100.00	4.0000
24	2046-47	0.00	25.00	25.0000	100.00	4.0000
25	2047-48	0.00	25.00	25.0000	100.00	4.0000
26	2048-49	0.00	25.00	25.0000	100.00	4.0000
27	2049-50	0.00	25.00	25.0000	100.00	4.0000
28	2050-51	0.00	25.00	25.0000	100.00	4.0000
29	2051-52	0.00	25.00	25.0000	100.00	4.0000
30	2052-53	0.00	12.00	12.0000	50.00	4.1667
31	2053-54	0.00	6.6397	6.6397	24.28	3.6568
Note: Calendar Plan/Production Plan for the entire life of the mine.						

3.1.8	Rated Capacity Mtpa	By OC : 25.00 By UG : 0.00 Overall : 25.0000
3.1.9	Life of the mine: Years	By OC : 31 By UG : 0 Overall : 31
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	As the block area is surrounded by coal bearing blocks on all sides, there is no availability of any land for external dumping outside the block area. Hence the proposed external OB dump is planned on the dip side within the block on coal bearing area.However, the external dump is temporary and will be re-handled back to in-pit dump from 14th year and coal will be extracted.

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	The proposed external OB dump is temporary and will be re-handled back and coal will be extracted. Infrastructure is planned on the south-west corner of the block and coal below the infrastructure will be mined out by UG method after exhaustion of OC mine.
3.1.12	Results of any investigation carried out for scientific mining, conservation of minerals and protection of environment, future proposals	The Hydrgeological study report is and Slope stability report is enclosed as Annexure-VIIID and Annexure-VIIIG respectively.
3.1.13	Type of Equipment/ HEMM proposed	

S.No.	Type of Equipment	Capacity	Unit	Population
1	Hyd Backhoe or Shovel	20	Cubic Meter	15
2	Hyd Backhoe or Shovel	10	Cubic Meter	15
3	Surface Miner	3	SM	9
4	FE Loader	6	Cubic Meter	14
5	Rear Dumper	200	ton	144
6	Rear Dumper	100	ton	177
7	Rear Dumper Coal Body	60	ton	60
8	Drill	250	mm	23
9	Dozer with Ripper	850	Horsepower (HP)	4
10	Crawler Dozer	410	Horsepower (HP)	28
11	Wheel Dozer	450	Horsepower (HP)	10
12	Diesel hydraulic backhoe	2	Cubic Meter	4
13	Water Sprinkler	70	KL	10
14	Mobile Dust supression cannon	10	no	10
15	Motor Grader	280	Horsepower (HP)	8
16	Fire Tender	2	no	2
17	Vibratory Compactor	25	ton	4
18	Diesel Bowser	9	KL	4
19	Crane	10	ton	4
20	Crane	25	ton	4
21	Crane	50	ton	1
22	Tyre Handler	4	no	4
23	Fork Lift	4	no	4
24	Maintenance Van	2	no	2
25	Farm Tractor	4	no	4
26	Tipping Truck	25	ton	4

3.1.14	Upload Require Document	OC NA UG NA

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.	

Areas of concern	Remedial measures
Safety Management Plan	For complying with **Reg. 104** of CMR 2017, exercise shall be done to identify, assess and record the hazards of health and safety of the persons employed in the mine after consulting the Safety Committee and Internal Safety Organisation (ISO). Based on the above, Safety Management Plan (SMP) shall be formulated for overall management for developing and implementing the safety policy of the company. SMP shall contain, *inter alia*, plan to implement the policy, principal hazard management, standard operating procedure (SOP), monitor, evaluate and review the plan.
Failure of OB/Coal Benches	Bench height of maximum 15.00 meters matching with the maximum reach of the digging and loading equipment has been proposed. This reduces chances of accidents due to fall of loose materials. In coal surface miner will be used for extraction. This a safe operational environment avoiding blasting with very safe and stable benches. All DGMS guidelines and regulations shall be strictly adhered to.
Failure of Dump slopes	The internal and external Dumps have been benched at 30 meters height. Overall slope has been proposed to 23-24degrees leaving 30 meters wide berm between two successive benches. This will reduce the chances of OB dump slope failure and subsequent damages. The dumps once sterile should be stabilized by bio reclamation. The overall dump height shall be +120 m from the original ground level. A slope stability study as per DGMS guidelines has already been carried out and attached as Annexure. All DGMS guidelines and regulations shall be strictly adhered to.
Flooding of the mine	The pumping capacity has been proposed based on single day maximum rainfall data of past ten years and the mine water discharge. For surface inundation an embankment of around 2.5 km length and 7.0 meters height has been proposed all along the Kelo River and garland drains along the quarry surface boundary. All required precaution against inundation would be taken care of and Standing order for withdrawal of persons in case of apprehended danger shall be framed and implemented.
Blasting in OB benches	Blasting shall be carried out under the direct supervision of statutory personnel and as per the permissions and regulations of DGMS.
Fire in coal benches/stockyard	Spontaneous heating of coal will be controlled by continuous and regular movement of coal benches. In case any bench is idle it should be properly dressed and properly cleaned from coal dust and fines at the time of stoppage.
Accidents due to lack of proper space of movement in Mine.	Workers around shovel, dozer, dumper, drill and cranes must be warned to keep out of blind area so that operator may be able to see them clearly. Audio visual alarms are used for pre warning of persons around this machine. To overcome shortage of space if any, strict discipline will have to be inculcated among workmen and supervisors. At any given point of time, multiple benches will be worked together which will distribute the major producing HEMM at safer distances.
Disaster Management	The Mine will prepare a DMP(Disaster Management Plan) as per guideline. This plan is to be vetted by DGMS. This is to be prepared and submitted for approval by DGMS just after opening the Mine. It is to be stated that in case of any disaster DGMS is the first organization which is to be first informed. The emergency plan for Disaster management is executed under the guidance of best grade of the industry and the senior officers of the regulator, the Directorate General of Mines Safety, GOI

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	Attached as Annexure-III

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 rowspan="6">5.1</td><td rowspan="6">Mine infrastructure required</td><td>S.No</td><td>Infrastructure to be reatin to be public use</td><td>Infrastructure to be dismantle/reclaimed</td></tr>
<tr><td>1</td><td>Substation required for public use</td><td>Coal Handling Plant</td></tr>
<tr><td>2</td><td>Overhead Electrical Transmission Lines</td><td>All buildings and their sewer system, other than those required for public use</td></tr>
<tr><td>3</td><td>Water tanks and water pipelines</td><td>All structural sheds including workshop, store</td></tr>
<tr><td>4</td><td>Roads constructed to serve the mine facilities</td><td>All surface haul roads and other roads except the roads to be used for society</td></tr>
<tr><td>5</td><td>Any buildings required for public use</td><td>All power lines, telephone lines, poles, cables and conductors, including Sub-Station transformers, etc. not required for public use</td></tr>
<tr><td>5.2</td><td colspan="4">Power supply & illumination</td></tr>
<tr><td colspan="5">Talaipalli coal block, having substantial coal reserve, is located in Raigarh district, Chhattisgarh. This block has been allotted to NTPC for necessary development and mining operations consisting of coal mining operation covering opencast mines, coal handling and dispatch arrangement as per requirement. Coal mining operation will require deployment of a number of large coal mining equipment and other auxiliary installations like dewatering pumps, coal handling plant, workshop, residential complex etc.
It is estimated that total power demand for Talaipalli OCP, for a planned production capacity of 25 MTY mining, will be around 28MVA. Considering the load of HEMM, CHP, Pumping, and other common loads envisaged for the project, two nos. of 2X16 MVA 33/6.6kV substation has been envisaged for fulfilling the power requirement of the project.
To cater this load, it is envisaged to draw four nos of 33kV feeder from existing 132/33kV NTPC substation at Raikera Village within the block.
It is envisaged that each proposed 33/6.6 kV substation to be installed for mining operation will have provision for 2 nos. incoming 33 kV feeders and required nos. of outgoing 6.6 kV feeders as per requirement.
The transformers for the substation have been selected considering maximum demand of the project at overall power factor of 0.98, and 100 % stand-by transformation capacity. The transformers of the substation shall be provided with NGR to limit the neutral current as required by statutory provisions. 33 kV VCBs shall be used for primary control of the 33/6.6 kV transformers and incoming 33 kV feeders. Necessary CTs and PTs shall also be provided. Outdoor type 6.6 kV VCBs will be used for secondary control of transformers, control of 6.6 kV outgoing feeders, bus-coupler and capacitor bank control. Necessary protections against over current, short circuit and earth fault for all incoming and outgoing circuit breakers and transformers has also been envisaged. To maintain power factor at 0.98, capacitor bank of suitable capacity with automatic power factor correction relay shall be provided. Necessary provision of automatic fire protection of transformers along with portable fire extinguishers has been envisaged for fire protection in the substations. Provision of fire hydrant system for firefighting of outdoor yard. These substations shall be installed near the quarry at suitable location for supply of power to different equipment of the project.
Illumination of the mine (external illumination) shall be done with LED luminaries, fixed on pole, fixed towers and mobile towers. Indoor illumination also will be done with LED fixtures.</td></tr>
<tr><td>5.3</td><td colspan="4">Drainage & Pumping : Assessment of Volume of Water for Pumping, Pumping Capacity and Pump Selection</td></tr>
</table>

The sources of water accumulation inside the quarry area are from following sources

- Rain water falling directly within the excavated area
- Inflow of rain water from back filled area
- Inflow of rain water from area beyond excavation
- Seepage of water from Strata/ Ground water

- The pumping system has been designed to dewater the in-flow of water due to precipitation falling within the active pit limit during the monsoon season to enable the mining activity to continue round the year.

- The planning of de-watering of the mine has been done in such a way that as far as possible the working faces and haul roads remain dry. The layout of the quarry provides suitable gradient along the quarry floors and the benches to facilitate self-drainage of water to the lowest level of the quarry.
- The rain water intake to the opencast mine is non-uniform during the year. The maximum rain water intake will be during the period of about four months i.e., June to September in a year. During dry season, say October to May, seepage from strata is expected to be moderate and the same can be dealt by running a few number of pumps provided for monsoon pumping. During this period repair and overhauling of the pumps will be done by rotation.
- Pumping capacity has been designed so that the volume of water accumulated in the mine on the day of maximum rainfall can be pumped out within 5 days with 20 hours of working. The assessment has been made for maximum daily precipitation (rainfall) from collected from nearby area which comes to 160 mm and life of the mines of 31 years.

Pumping capacity and pump selection:

Volume of rain water entering to the mine and accumulating in the quarry (make of water) has been assessed on the basis of the following formula:

$Q = [\{(A1-A3) \times h \times n1\} + (A2 \times h \times n2) + (A3 \times h \times n3)]$ m3/ day

Where, A1 = Mined out area in m2
A2 = Area beyond excavation in m2
A3 = Internal Dump area in m2
h = Maximum precipitation/ rainfall in a day in m

The run off co-efficient (n) has been considered as below:

For mined out area (n1) 0.60
For area beyond excavation (n2) 0.10
For internal dumped area (n3) 0.10

Considering 10% seepage from strata the total water accumulation will be:

Q1 = 1.1 Q.

- Total make of water comes out to be **4,82,967 cum**. (Final Year)

Above volume of water will be dewatered in 5 days at the rate of 20 hours pumping per day.
Pumping capacity per hour thus worked out **4830 Cum/hr**

Pump selection:

	Items	
		QTY.
1	Main Pump , 810 m3/hr (225 lps), 100 m head, 400 kW	2 Nos. (1 working + 1 standby)
2	Main Pump , 810 m3/hr (225 lps), 250m head, 800 kW	5 Nos. (4 working + 1 standby)
3	Main Pump , 810 m3/hr (225 lps), 350m head, 1200 kW	2 Nos. (2 working)
4	Pump , 137 m3/hr (38 lps), 60 m head, 37 kW	06 Nos
5	Face Pump, 54 m3/hr (15 lps), 60m head, 22.5 kW	10 Nos
4	Electrical Slurry pump, 101 m3/hr (28 lps), 28m head, 37 kW	08 Nos.
	Diesel Pumps, 288 m3/hr (80 lps), 170m head	03 Nos.
	Pipe fittings, bends, armoured suction, delivery hoses etc.	LS

5.4	Coal Handling Arrangement: Brief detail of the CHP/ Mode of Dispatch, Coal quality and Coal staking and handling arrangement	CHP/Mode of DespatchA full-fledged coal handling plant of 25.0 Mtpa capacity at surface for Taraipalli OCP has been proposed for handling of entire coal.As per requirement suggested by NTPC, 2 streams of conveyor in each side of mine has been provided considering 1 stream as standbyIt has been planned to produce coal by blast free technique i.e. through surface miners of (-) 100 mm size. As such further crushing of coal has not been envisaged.For designing CHP, 330 working days in a year and three shifts in a day having 6 effective hours in each shift, suitable nominal system capacity has been envisaged considering other parameters for entire coal handling plant. However, wagon loading will be round the clock.Possibility of in-pit crushing conveying system was also explored, but due to space constraint for internal and external dumping and other mining parameters, in-pit crushing conveying system were not found feasible.Suitable receiving arrangement through Reclaim feeder/ Chain feeder/Truck receiving station has been proposed for receiving of coal in the mine pit. It may be finalised at later stage according to mine condition and space availability in the mine quarry. These receiving arrangement for coal have been proposed inside the mine quarry to minimize the truck/dumper movements. The receiving pit/ station may be shifted as per the mine advancement and requirement during mine operation. Two streams of identical conveyors of suitable capacity and required belt width has been envisaged for collecting coal from truck receiving hopper for onward conveying. Coal from bunker has been proposed to feed 2 nos. of suitable capacity silo with RLS System.Storage arrangementOne number of over ground RCC Bunkers, is proposed for storing coal through tripper conveyor of required belt width. Handling arrangementCoal from bunker will be reclaimed through suitable capacity plough feeders and fed to proposed silo through two nos. of belt conveyors.The coal will be loaded in to railway wagons through Rapid load out system having pre-weigh hopper envisaged with loading Silo.The loading conveyors will discharge coal into proposed 2 nos. of Silos with RLS system.There is provision of feeding coal from reclaim conveyor to either Silo 1 or Silo 2.Silo will be located on rail lines. The tentative location of the silo has been provided by NTPC in proposed railway siding for loading of coal into railway wagons. Each silo shall facility of wagon loading with the help of 2 nos. RLS with pre-weigh hoppers. However, only one set of RLS with Pre-Weigh hopper of each silo will be operational at a time. Facility of OHE system below the silo is also been considered to facilitate loading the coal through electric loco.The CHP has been provided with all the necessary facilities like Firefighting system, Dust suppression system, communication systems, belt weighers, magnetic separators, sampling systems, safety switches, necessary control system etc.The proposed Silos locations has been provided by NTPC, on the railway siding under-construction by NTPC. Necessary sound and dust proof arrangement for conveyors passing through administration building shall be envisaged.
5.5	Coal washing and the proposed handling/ disposal of rejects	Not Envisaged

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	
Total Land Requirement- 2119.40 Ha. Source of data is Cadastral Plan		

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

S.No	Land Type	Exsiting/pre-Mining Use	Area
1	Forest Land	Jungle Jhari	360.81
2	Private Land	Agriculture	1197.94
3	Private Land	Water Bodies	2.95
4	Government Land	Township	43.12
5	Government Land	Grazing	59.66
6	Government Land	Barren	47.13
7	Government Land	Water Bodies	21.96
8	Government Land	Road & others	36.33
9	Forest Land	Protected	349.29

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	1839.85								
Backfilled Area		1579.90		1277.02	302.88				1579.9000
Excavated Void		259.95			259.95				259.9500
Without Plantation									
Top Soil Dump									
External Dump									
Safety Zone	29.10	29.10		29.10					29.1000
Haul Road between quarries									
Road diversion									
Diversion Or Below River Or Nala Or Canal									
Settling Pond									
Road And Infrastructure Area	189.60	189.60		169.60		20.00			189.6000
Rationalization Area									
Garland Drains	19.73	19.73		19.73					19.7300
Embankment									
Green Belt	17.16	17.16		17.16					17.1600
Water Reservoir Near Pit									
UG Entry									

Undisturbed OR Mining Right For UG	23.96	23.96						23.96	23.9600
Resettlement									
Pit Head Power Plant									
Water Harvesting									

S.No	Parameters	Details
6.1.3	Surface features over the block area	Forest cover is found in the south eastern part of the block. Small land patches having forest cover are available in central part of the block. Remaining part of the area is mostly cultivated land. Cultivation and collection of forest products are the main occupation of the people of the area The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area.
6.1.4	No. of villages/Houses to be shifted	8 Villages
6.1.5	Population to be affected by the project	2187 PAFs
6.1.6	Proposed Rehabilitation programme	As per approved RR Policy of Govt. of Chhattisgarh and NTPC

6.2 DETAILS OF LEASE

S.No	Parameters	Details
6.2.1	Status of Lease	
Not Applicable for the land acquired under Coal Bearing Areas (Acquisition & Development) Act, 1957 Letter from Ministry of Coal to Govt. of Chattisgarh is attached as Annexure- VIIIE		
6.2.2	Existing Lease Area "Ha"	2119.40
6.2.3	Period for which Mining Lease has been granted/is to be renewed/ is to be applied for	Life of the Mine (31 years)
6.2.4	Date of expiry of earlier Mining Lease, if any	Not Applicable
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)	2119.40
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	NA
	Purpose for which it is required, e.g. roads/ OB dumps/ service buildings/ colony/ safety zone/ others (specify)	NA
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)	NA

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	Attached as Annexure-III

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	2023	53.86	49.00	109.48	53.8600				
Y-1	2023-24	93.65	224.93	255.59	574.1700				
Y-3	2025-26	223.19	339.88	255.59	818.6600			17.16	17.1600
Y-5	2027-28	356.51	441.74	255.59	1053.8400			17.16	17.1600
Y-10	2032-33	838.21	622.47	255.59	1716.2700	115.00		17.16	132.1600
Y-15	2037-38	1104.13	582.81	255.59	1942.5300	267.00		17.16	284.1600
Y-20	2042-43	1442.36	320.60	255.59	2018.7500	553.00		17.16	570.1600
Y-25	2047-48	1722.68		255.59	1978.2700	779.00		17.16	796.1600
Y-30	2052-53	1839.85		255.59	2095.4400	1044.00		17.16	1061.1600
Y-31	2053-54	1839.85		255.59	2095.4400	1100.00		17.16	1117.1600
Post Closure									
Y-34	2056-57	1839.85		255.59	2095.44	1579.90		515.54	2095.44

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	2023								
Y-1	2023-24							23.96	23.9600
Y-3	2025-26							23.96	23.9600
Y-5	2027-28							23.96	23.9600
Y-10	2032-33		59.00			59.0000		23.96	82.9600
Y-15	2037-38		220.00			220.0000		23.96	243.9600
Y-20	2042-43		505.00			505.0000		23.96	528.9600
Y-25	2047-48		727.00			727.0000		23.96	750.9600
Y-30	2052-53		940.00			940.0000		23.96	963.9600
Y-31	2053-54		985.00			985.0000		23.96	1008.9600
Post Closure									
Y-34	2056-57		1512.61	562.83	20.00	2095.44		23.96	2119.40

S.No	Parameters	Details

8.2	Post Closure Water Quality management (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.	The proposed mining area is not dissecting any natural water stream. The storm water and ground water intersected during mining operations will be the source of water accumulation within the mining pit. Accumulated mine pit water during the active mining period will be pumped while post mining operation, there will be accumulated water in the left out voids. An area of about 562.83 ha of land will be converted to waterbody at the end of mine life. This area cannot be backfilled, however will technically reclaimed by converting into water body.In post closure phase, Routine Environmental Monitoring (REM) of the water accumulated shall be fortnightly sampled and analyzed to monitor development of acidity or toxicity in the water at least for 3 years. As post mine period, most of the broken areas will be backfilled and left out water bodies will be much less, development of toxic water is not anticipated. The pH of the accumulated water is thus expected to be within a narrow range near the neutral value.The accumulated water will be utilized for the local community for agriculture and other uses. Regular monitoring of the water quality will be carried out as per the CPCB norms. Once the mine is closed, outside water shall be prevented to enter into the mined out pit which in turn will reduce the TDS and other solvents.The pit water will be utilized for agricultural use, supply as drinking water after treatment and for pisciculture. As such the area falls under arid climatic horizon and this water body will add life to the area by supplying water for agriculture and drinking. Effluent Treatment Plant (ETP) and Sewerage Treatment Plant (STP) should be maintained atleast for 3-5 years. Regular monitoring of the water quality will be carried out as per the CPCB norms. Water quality analysis shall be carried out as per CPCB Water Quality Monitoring 2017guideline.
8.3	Post Closure Air Quality management	The post closure activities will be restricted to limited operation only in the following areas1.Dismantling of temporary infrastructures 2.Dismantling of electrical infrastructures 3.Regular maintenance works in the dumping ground 4.Post plantation care 5.Maintenance of the main haul road 6.Cleaning of suture drains and garland drains.Most of the activities does not generate continuous dust generation, except the dismantling works which will be restricted to the limited zones compared to the whole project area. Water sprinkling will be continued before the vehicle movement.Routine Environmental Monitoring (REM) of the air quality shall be monitored as per latest CPCB guidelines atleast for 3-5 years.Occasionally dust may be generated from the uncovered areas of the dumps. Regular sprinkling arrangements will be done till the areas are stabilised.Quarterly Air quality Monitoring will be done as per NAAQ standard (CPCB) guideline 2009)

8.4 Waste Management (Figures in MM3) (Tentative)

Year/Stage		OB Removal (Cumulative)			External Dump (Cumulative)		Internal Backfilling (Cumulative)		Embankment (Cumulative)	
(Life of the mine plus post closure period)		Top Soil	OB	Total	Top Soil	OB	Top Soil	OB	Top Soil	OB
Up to Base year	2023	1.72	18.72	20.44	1.72	18.72				
Y-1	2023-24	2.66	38.89	41.55	2.65	38.68			0.01	0.21
Y-3	2025-26	4.95	94.29	99.23	4.94	94.07			0.01	0.21
Y-5	2027-28	10.20	179.60	189.80	10.19	136.81		42.57	0.01	0.21
Y-10	2032-33	30.66	701.14	731.80	18.42	437.96	12.23	262.96	0.01	0.21
Y-15	2037-38	52.84	1197.46	1250.30		464.99	52.83	732.26	0.01	0.21
Y-20	2042-43	71.18	1689.12	1760.30		234.83	71.17	1454.09	0.01	0.21
Y-25	2047-48	85.32	2174.98	2260.30			85.31	2174.77	0.01	0.21
Y-30	2052-53	93.04	2617.26	2710.30			93.03	2617.05	0.01	0.21
Y-31	2053-54	93.13	2641.46	2734.58			93.12	2641.24	0.01	0.21
Post Closure										
Y-34	2056-57	93.13	2641.46	2734.58			93.12	2641.24	0.01	0.21

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

Year/Stage		Top Soil Removal Plan	Top Soil Used				
(Life of the mine plus post closure period)			Spreading Over Embankment	Spreading Over Backfill area	Spreading Over External OB Dump area	Used in Green Belt area	Total Utilised
Up to Base year	2023	1.72					
Y-1	2023-24	2.66	0.01				0.01
Y-3	2025-26	4.95	0.01				0.01
Y-5	2027-28	10.20	0.01				0.01
Y-10	2032-33	30.66	0.01	12.23			12.24
Y-15	2037-38	52.84	0.01	52.83			52.84
Y-20	2042-43	71.18	0.01	71.17			71.18
Y-25	2047-48	85.32	0.01	85.31			85.32
Y-30	2052-53	93.04	0.01	93.03			93.04
Y-31	2053-54	93.13	0.01	93.12			93.13
Post Closure							
Y-34	2056-57	93.13	0.01	93.12			93.13

S.No	Parameters	Details
8.6	Management of Coal Rejects.	Since the project does not envisaged any washery, generation of rejects are not associated.
8.7	Restoration of Land used for Infrastructure.	Survey for 3 monsoon seasons should be done then carry out compaction of the land before any infrastructure to be built over it. All infrastructures will be dismantled excluding the office and Vocational Training center which will be handed over to the state government.
8.8	Disposal of Mining Machinery.	Mining machineries are to be deployed by Contracting agency. They will be taking out the machineries at the end of mine life and will utilize in their other projects. Scrapped machineries will be auctioned to the authorized agencies.
8.9	Safety & Security.	Thorough inspection of the mine and OB dump areas for assessing the left over closure jobs of already reclaimed internal dump areas Inspection of infrastructure and water body area for their safe reclamation and abatement of any leftover dangers Action required making drainage and any fire areas safe for future period Making 2 meter high fencing wall against excavated void are to prevent inadvertent entry as per requirement Making safe approach road from surface to left out pit bottom for future uses, as void becomes a water body Completing the survey of total reclaimed areas like mined areas, internal dump, mine faces, quarry fencing and other areas to complete and update the Mine plans under Coal mine Regulation

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			3.10
	Air quality management	Ls			3.10
	Waste Management	M CUM			
	Barbed wire fencing around dump	m			
	Barbed wire fencing around the pit	m	20000	1000	2.00
	Filling of Void - Rehanding of Crown dump	MM3			
	Top Soil Management	MM3	93.13	40000000	372.52
	Technical And Biological Reclamation of Mined out of land and OB Dump	Ha	2119.4	200000	42.39
	Plantation over virgin area including green belt	Ha	46.26	50000	0.23
	Manpower Cost and Supervision	LS			10.00
	Total wall around the dump	m	8000	6500	5.20
	Garland dram	m	20000	325	0.65
	Garland drain around the dump	m	5500	325	0.18
	Any other Activity				
	Any other Activity - 2				
Dismentaling of infrastrucure & Disposal/ rehabilitation of mining Machinery	Dismentaling of workshop	Ls			3.00
	Rehabilitation of the dismentaled fascilities	Ls			2.00
	Dismentaling of pump and pipes/ other fascilities	Ls			5.00
	Dismentaling of stowing bunker, provisioning of pumps for borewell pumping arrangement				
	Dismentaling of UG equipment				
	Rearranging water pipeline to dump top park/Agriculture land	Ls			2.00
	Dismentaling of power lines	LS			2.00
	Any other Activity				
Safety and Security	Barbed wire fencing around dump				
	Barbed wire fencing around the pit	m			
	Barbed wire fencing with Masonalry piller				
	Concrete wall with Masonalry pillers around the pit	m			
	Securing air shaft and installation of borewall piamp				

	Securing of incline				
	Concrete wall fencing around the water body	M	6000	50000	30.00
	Boundary wall around the water body				
	Stabilisation (viz benching, pitching etc) of side walls of the water body	LS			5.00
	Toe wall around the dump				
	Garland Drain				
	Garland Drain around the dump				
	Drainage channel from main Ob dump				
	Any other Activity				
Technical and Biological Reclamation of mined out of land and OB Dump	Filling of Void	Ha			
	Top soil management	MM3			
	OB Rehandling for backfilling	MM3			
	Terracing, blanketing with soil and vegetation of External OB Dump	Ha			
	Paripharel road, gates, view point, cemented steps on bank	LS			1.00
	Expenditure on development of Agriculture land				
	Landscaping and Plantation	Ls	1512.61	100000	15.13
	Any other Activity				
Post Closure management and supervision	Power Cost	Ls			1.50
	Post mining water quality management	Ls			0.50
	Post mining air quality management	Ls			0.50
	Subsidence monitoring for 5 years	Ls			
	Waste management	Ls			
	Manpower Cost and supervision	Ls			
	Manpower Cost and supervision				3.00
Others	Enterprenuership development(vocational/skill development training for sustainable income of affected people)				3.80
	Golden Handshake/Retrenchment benefits to 100 employees of OC				5.00
	Golden Handshake/Retrenchment benefits to 200 employees of UG				
	Onetime financial grant to societies/ institutions/ organisations which is dependent upon the project				5.00
	Provide Jobs in other mines of company				
	Continuation of other services like running of school etc				
	Any other Activity				
Total					523.80

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	NOVEMBER 2022	152.1
Escalation rate of Closure cost		1.256
	UG	OC
Cost "Rs. Crs/Ha	0.015	0.09

Closure Cost "Rs. Crs/Ha"	0.019	0.113
Project Area "Ha"	0	2119.40
Amount to be depostied into Escrow Account "Rs. in Crs	0	239.492
Amount already deposited into Escrow Account "Rs. in Crs	0	17.80
Net Amount to be deposited into Escrow Account "Rs. in Crs	0	221.692
Rate of componding of Annual Closure Cost		5.00%
Balance Life of the project "in Yrs	9	31
Annual Closure Cost "Rs. in Crs"	0	7.151
Amount to be deposited into Escrow Account after compounding @ of 5% "Rs. in Crs"		506.010

Amount to be deposited into Escrow

Year	OC	Year	UG	Total
1	7.151	1	0	7.151
2	7.509	2	0	7.509
3	7.884	3	0	7.884
4	8.278	4	0	8.278
5	8.692	5	0	8.692
6	9.127	6	0	9.127
7	9.583	7	0	9.583
8	10.062	8	0	10.062
9	10.565	9	0	10.565
10	11.094			11.094
11	11.648			11.648
12	12.231			12.231
13	12.842			12.842
14	13.484			13.484
15	14.158			14.158
16	14.866			14.866
17	15.61			15.61
18	16.39			16.39
19	17.21			17.21
20	18.07			18.07
21	18.974			18.974
22	19.922			19.922
23	20.919			20.919
24	21.964			21.964
25	23.063			23.063
26	24.216			24.216
27	25.427			25.427
28	26.698			26.698
29	28.033			28.033
30	29.434			29.434
31	30.906			30.906
Total	506.010		0.000	506.010

Annexures

Annexure 1A1

Government of India

Ministry of Coal

O/o the Nominated Authority

World Trade Tower, New Delhi

Office of the nominated authority constituted under section 6 of the Coal Mines (Special Provisions) Act, 2015.

Allotment order under clause (c) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13

In re: **Talaipalli Coal Mine** (the "mine") particulars of which is specified in **Annexure I**

Order no.: 103/31/2015/NA

Date: September 08, 2015

In favour of: **NTPC Limited** incorporated in India under the Companies Act, 1956 with corporate identity number L40101DL1975GOI007966, whose registered office is at NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi - 110003, India (the "Allottee").

For utilisation in: End Use Plant situated at Dist. Raigarh, Chhattisgarh, as more particularly described below (the "End Use Plant")

S. No.	Name of Specified End Use Plant	Address	Configuration	Capacity
1	Lara STPP	Dist. Raigarh, Chhattisgarh	5 x 800 MW	4000 MW

**MW stands for Mega Watt*

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

AND WHEREAS the allottee is eligible to receive this allotment order with respect to the mine as described in this allotment order, 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 allottee was also the prior allottee of such Schedule I coal mine;

AND WHEREAS, the allottee has deposited the additional levy payable under sub-section (3) of section 5 of the Act on or prior to the due date specified under rule 18 of the rules;

AND WHEREAS the allottee has furnished a performance bank guarantee dated April 28, 2015 for an amount equal to INR 4,12,58,88,000 (Indian Rupees Four Hundred Twelve Crore Fifty Eight Lakh and Eighty Eight Thousand) issued by State Bank of India in accordance with the allotment document read with sub-section (6) and sub-section (12) of sections 8 of the Act and sub-rule (4) rule 13 of the rules;

AND WHEREAS the allottee has entered into an Allotment Agreement dated March 30, 2015 (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 September 08, 2015 ("allotment date") and in accordance with sub-section (4) of section 8 read with sub-section (12) section 8 of the Act, with respect to the mine, the following shall stand fully and absolutely transferred and vested in the allottee, namely: -

(a) all the rights, title, interest and liabilities as were available to the prior allottee;

(b) entitlement to a mining lease to be granted by the State Government with the terms and conditions of the Allotment Agreement 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) in the event the secured creditor elects to continue the facility arrangements and security interest, the Allottee shall continue the credit or banking facilities or other lending arrangements to which the prior allottee was a party in terms of clause (a) of sub-section (1) of section 12 of the Act;

2. The Allottee 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 This Allotment 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	Talaipalli
Latitude	22°13'35" N to 22°16'08" N
Longitude	83°25'49" E to 83°30'22" E
Coalfield	Mand Raigarh
Villages	Talaipalli, Bhichinara, Nayarampur, Kudurmoha, Raikera, Chotigada, Ajitgarh & Salehpali
Tehsil/Taluka	Ghargoda
District	Raigarh
State	Chhattisgarh

Part B – Description of Land in relation to the mine

Type of Land: Freehold Land for Mining as per Mining Lease

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
1	Raikara	18/1	02-Feb-15	1.767
2	Raikara	18/2	02-Feb-15	0.202
3	Raikara	20/1	02-Feb-15	0.680
4	Raikara	20/3	02-Feb-15	0.202
5	Raikara	20/5	02-Feb-15	0.405
6	Raikara	22/1	02-Feb-15	0.409
7	Raikara	22/2	02-Feb-15	0.089
8	Raikara	28/1	02-Feb-15	0.440
9	Raikara	29/1	02-Feb-15	0.107
10	Raikara	31	02-Feb-15	0.324
11	Raikara	32/1	02-Feb-15	1.582
12	Raikara	33/1	02-Feb-15	0.612
13	Raikara	36/1	02-Feb-15	0.447
14	Raikara	36/2	02-Feb-15	0.447
15	Raikara	36/3	02-Feb-15	0.447
16	Raikara	36/4	02-Feb-15	0.448
17	Raikara	38	02-Feb-15	0.255
18	Raikara	39/1	02-Feb-15	0.077
19	Raikara	39/2	02-Feb-15	0.557
20	Raikara	40/1	02-Feb-15	0.255
21	Raikara	40/2	02-Feb-15	0.162
22	Raikara	40/4	02-Feb-15	0.324
23	Raikara	40/5	02-Feb-15	0.284
24	Raikara	40/6	02-Feb-15	0.238
25	Raikara	40/7	02-Feb-15	0.237
26	Raikara	40/8	02-Feb-15	0.237
27	Raikara	41/1	02-Feb-15	0.543
28	Raikara	41/2	02-Feb-15	0.343
29	Raikara	41/3	02-Feb-15	0.332
30	Raikara	41/4	02-Feb-15	0.134
31	Raikara	42	02-Feb-15	0.348
32	Raikara	43	02-Feb-15	0.154
33	Raikara	45/2	02-Feb-15	0.182
34	Raikara	45/3	02-Feb-15	0.364
35	Raikara	45/4	02-Feb-15	0.364
36	Raikara	45/5	02-Feb-15	0.405
37	Raikara	45/7	02-Feb-15	0.028
38	Raikara	45/8	02-Feb-15	0.030
39	Raikara	45/9	02-Feb-15	0.040
40	Raikara	45/10	02-Feb-15	0.996
41	Raikara	45/11	02-Feb-15	0.303
42	Raikara	46	02-Feb-15	0.781
43	Raikara	47	02-Feb-15	0.967

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
44	Raikara	49/2	02-Feb-15	0.412
45	Raikara	50	02-Feb-15	0.445
46	Raikara	52	02-Feb-15	0.218
47	Raikara	53/2	02-Feb-15	0.304
48	Raikara	54/2	02-Feb-15	0.611
49	Raikara	55/1	02-Feb-15	0.971
50	Raikara	55/2	02-Feb-15	0.198
51	Raikara	57	02-Feb-15	0.397
52	Raikara	58	02-Feb-15	0.121
53	Raikara	60	02-Feb-15	0.700
54	Raikara	63	02-Feb-15	1.655
55	Raikara	64/1	02-Feb-15	0.486
56	Raikara	64/2	02-Feb-15	0.121
57	Raikara	65/1	02-Feb-15	0.392
58	Raikara	67/1	02-Feb-15	2.614
59	Raikara	67/2	02-Feb-15	0.575
60	Raikara	68	02-Feb-15	0.279
61	Raikara	69/1	02-Feb-15	0.397
62	Raikara	69/2	02-Feb-15	0.202
63	Raikara	70/4	02-Feb-15	0.382
64	Raikara	73/4	02-Feb-15	0.870
65	Raikara	74/2	02-Feb-15	0.032
66	Raikara	74/3	02-Feb-15	0.032
67	Raikara	74/4	02-Feb-15	0.037
68	Raikara	75/1	02-Feb-15	0.165
69	Raikara	79	02-Feb-15	0.206
70	Raikara	80/1	02-Feb-15	0.166
71	Raikara	80/2	02-Feb-15	0.178
72	Raikara	80/4	02-Feb-15	0.040
73	Raikara	80/5	02-Feb-15	0.089
74	Raikara	81/1	02-Feb-15	0.222
75	Raikara	81/6	02-Feb-15	0.065
76	Raikara	81/7	02-Feb-15	0.154
77	Raikara	82/1	02-Feb-15	0.348
78	Raikara	83/2	02-Feb-15	0.179
79	Raikara	83/6	02-Feb-15	0.065
80	Raikara	83/9	02-Feb-15	0.186
81	Raikara	85	02-Feb-15	0.530
82	Raikara	86/1	02-Feb-15	0.097
83	Raikara	86/2	02-Feb-15	0.490
84	Raikara	87	02-Feb-15	0.291
85	Raikara	91/4	02-Feb-15	0.486
86	Raikara	92	02-Feb-15	0.263
87	Raikara	93	02-Feb-15	0.182
88	Raikara	94/2	02-Feb-15	0.377
89	Raikara	94/3	02-Feb-15	0.417

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
90	Raikara	94/4	02-Feb-15	0.304
91	Raikara	94/5	02-Feb-15	0.526
92	Raikara	95/1	02-Feb-15	0.330
93	Raikara	95/2	02-Feb-15	0.330
94	Raikara	96	02-Feb-15	0.486
95	Raikara	97	02-Feb-15	0.299
96	Raikara	98	02-Feb-15	0.219
97	Raikara	102	02-Feb-15	0.644
98	Raikara	103/1	02-Feb-15	0.798
99	Raikara	103/2	02-Feb-15	0.242
100	Raikara	107/2	02-Feb-15	0.374
101	Raikara	107/4	02-Feb-15	0.202
102	Raikara	108/1	02-Feb-15	0.275
103	Raikara	108/2	02-Feb-15	0.263
104	Raikara	108/3	02-Feb-15	0.134
105	Raikara	108/4	02-Feb-15	0.539
106	Raikara	108/5	02-Feb-15	0.540
107	Raikara	108/6	02-Feb-15	0.230
108	Raikara	110	02-Feb-15	0.376
109	Raikara	111	02-Feb-15	0.368
110	Raikara	113/2	02-Feb-15	0.227
111	Raikara	114	02-Feb-15	0.737
112	Raikara	117	02-Feb-15	0.174
113	Raikara	118/1	02-Feb-15	0.158
114	Raikara	118/2	02-Feb-15	0.117
115	Raikara	119	02-Feb-15	1.145
116	Raikara	121/2	02-Feb-15	0.076
117	Raikara	122/1	02-Feb-15	0.119
118	Raikara	122/2	02-Feb-15	0.089
119	Raikara	122/4	02-Feb-15	0.138
120	Raikara	122/5	02-Feb-15	0.053
121	Raikara	122/6	02-Feb-15	0.069
122	Raikara	123/1	02-Feb-15	0.311
123	Raikara	125	02-Feb-15	0.138
124	Raikara	129/1	02-Feb-15	0.728
125	Raikara	130/1	02-Feb-15	0.101
126	Raikara	130/2	02-Feb-15	0.271
127	Raikara	130/3	02-Feb-15	0.417
128	Raikara	133	02-Feb-15	0.405
129	Raikara	137/2	02-Feb-15	0.089
130	Raikara	140	02-Feb-15	0.190
131	Raikara	142	02-Feb-15	0.405
132	Raikara	143	02-Feb-15	0.405
133	Raikara	145	02-Feb-15	0.729
134	Raikara	148/1	02-Feb-15	1.028
135	Raikara	148/2	02-Feb-15	0.643

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
136	Raikara	148/3	02-Feb-15	0.093
137	Raikara	150/1	02-Feb-15	0.635
138	Raikara	150/3	02-Feb-15	0.162
139	Raikara	152	02-Feb-15	0.352
140	Raikara	154	02-Feb-15	0.304
141	Raikara	156/1	02-Feb-15	0.205
142	Raikara	156/2	02-Feb-15	0.206
143	Raikara	156/3	02-Feb-15	0.206
144	Raikara	156/4	02-Feb-15	0.110
145	Raikara	156/6	02-Feb-15	0.121
146	Raikara	157/1	02-Feb-15	0.068
147	Raikara	157/2	02-Feb-15	1.019
148	Raikara	161	02-Feb-15	0.084
149	Raikara	163/2	02-Feb-15	0.013
150	Raikara	166	02-Feb-15	0.259
151	Raikara	168/1	02-Feb-15	1.783
152	Raikara	169	02-Feb-15	1.226
153	Raikara	170/3	02-Feb-15	0.862
154	Raikara	171/1	02-Feb-15	0.527
155	Raikara	171/2	02-Feb-15	2.324
156	Raikara	171/3	02-Feb-15	0.717
157	Raikara	171/4	02-Feb-15	0.384
158	Raikara	171/5	02-Feb-15	0.793
159	Raikara	171/6	02-Feb-15	0.174
160	Raikara	171/7	02-Feb-15	0.635
161	Raikara	171/9	02-Feb-15	0.518
162	Raikara	171/10	02-Feb-15	0.364
163	Raikara	171/11	02-Feb-15	0.364
164	Raikara	171/12	02-Feb-15	0.688
165	Raikara	171/13	02-Feb-15	0.405
166	Raikara	171/14	02-Feb-15	0.101
167	Raikara	172/1	02-Feb-15	0.069
168	Raikara	172/2	02-Feb-15	0.202
169	Raikara	172/3	02-Feb-15	0.069
170	Raikara	172/4	02-Feb-15	0.069
171	Raikara	173	02-Feb-15	2.784
172	Raikara	175/1	02-Feb-15	0.330
173	Raikara	177/1	02-Feb-15	0.417
174	Raikara	177/2	02-Feb-15	0.420
175	Raikara	178/1	02-Feb-15	1.214
176	Raikara	178/2	02-Feb-15	0.809
177	Raikara	178/3	02-Feb-15	1.064
178	Raikara	178/5	02-Feb-15	1.214
179	Raikara	179/1	02-Feb-15	0.202
180	Raikara	179/2	02-Feb-15	1.793
181	Raikara	179/3	02-Feb-15	1.794

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
182	Raikara	179/4	02-Feb-15	1.794
183	Raikara	179/5	02-Feb-15	1.794
184	Raikara	179/7	02-Feb-15	0.809
185	Raikara	181/1	02-Feb-15	0.364
186	Raikara	181/2	02-Feb-15	0.243
187	Raikara	183	02-Feb-15	1.214
188	Raikara	184/3	02-Feb-15	0.385
189	Raikara	184/4	02-Feb-15	0.405
190	Raikara	190	02-Feb-15	0.995
191	Raikara	193/2	02-Feb-15	0.278
192	Raikara	193/3	02-Feb-15	0.130
193	Raikara	195	02-Feb-15	1.053
194	Raikara	196	02-Feb-15	1.048
195	Raikara	197/2	02-Feb-15	0.526
196	Raikara	198/1	02-Feb-15	0.629
197	Raikara	198/2	02-Feb-15	0.629
198	Raikara	198/3	02-Feb-15	0.629
199	Raikara	198/4	02-Feb-15	0.630
200	Raikara	199	02-Feb-15	0.397
201	Raikara	201	02-Feb-15	0.393
202	Raikara	204/2	02-Feb-15	0.110
203	Raikara	205	02-Feb-15	0.134
204	Raikara	206/1	02-Feb-15	0.325
205	Raikara	206/3	02-Feb-15	0.294
206	Raikara	207	02-Feb-15	0.806
207	Raikara	208/1	02-Feb-15	0.295
208	Raikara	208/2	02-Feb-15	0.339
209	Raikara	208/3	02-Feb-15	0.372
210	Raikara	208/5	02-Feb-15	0.267
211	Raikara	209/2	02-Feb-15	0.607
212	Raikara	211	02-Feb-15	0.704
213	Raikara	212/4	02-Feb-15	1.500
214	Raikara	213	02-Feb-15	0.729
215	Raikara	214/2	02-Feb-15	0.959
216	Raikara	215/1	02-Feb-15	0.134
217	Raikara	215/2	02-Feb-15	0.134
218	Raikara	215/5	02-Feb-15	0.134
219	Raikara	215/7	02-Feb-15	0.271
220	Raikara	217/2	02-Feb-15	0.667
221	Raikara	217/3	02-Feb-15	0.324
222	Raikara	218	02-Feb-15	0.943
223	Raikara	220/2	02-Feb-15	1.418
224	Raikara	224	02-Feb-15	1.542
225	Raikara	225/1	02-Feb-15	1.599
226	Raikara	225/2	02-Feb-15	1.598
227	Raikara	228/1	02-Feb-15	0.270

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
228	Raikara	233/1	02-Feb-15	1.048
229	Raikara	233/2	02-Feb-15	0.162
230	Raikara	236	02-Feb-15	0.484
231	Raikara	237	02-Feb-15	0.405
232	Raikara	239/1	02-Feb-15	0.182
233	Raikara	239/2	02-Feb-15	0.210
234	Raikara	239/3	02-Feb-15	0.449
235	Raikara	240/2	02-Feb-15	0.587
236	Raikara	240/4	02-Feb-15	0.364
237	Raikara	241/1	02-Feb-15	0.317
238	Raikara	241/3	02-Feb-15	0.378
239	Raikara	241/6	02-Feb-15	0.061
240	Raikara	242/2	02-Feb-15	1.610
241	Raikara	244	02-Feb-15	0.113
242	Raikara	245	02-Feb-15	0.809
243	Raikara	247/1	02-Feb-15	0.098
244	Raikara	248/1	02-Feb-15	0.405
245	Raikara	248/3	02-Feb-15	0.135
246	Raikara	248/4	02-Feb-15	0.135
247	Raikara	251	02-Feb-15	0.190
248	Raikara	252/2	02-Feb-15	0.802
249	Raikara	253	02-Feb-15	0.878
250	Raikara	254/2	02-Feb-15	1.456
251	Raikara	254/4	02-Feb-15	0.377
252	Raikara	254/5	02-Feb-15	0.377
253	Raikara	255	02-Feb-15	0.769
254	Raikara	256	02-Feb-15	1.392
255	Raikara	259	02-Feb-15	0.947
256	Raikara	261	02-Feb-15	0.154
257	Raikara	264	02-Feb-15	1.052
258	Raikara	265	02-Feb-15	1.275
259	Raikara	266	02-Feb-15	0.551
260	Raikara	267/1	02-Feb-15	1.998
261	Raikara	267/2	02-Feb-15	2.347
262	Raikara	268	02-Feb-15	0.802
263	Raikara	270/3	02-Feb-15	0.141
264	Raikara	270/5	02-Feb-15	0.405
265	Raikara	272	02-Feb-15	0.360
266	Raikara	273/1	02-Feb-15	0.154
267	Raikara	273/3	02-Feb-15	0.194
268	Raikara	274/4	02-Feb-15	0.061
269	Raikara	277	02-Feb-15	0.202
270	Raikara	280	02-Feb-15	0.849
271	Raikara	281/1	02-Feb-15	0.204
272	Raikara	281/2	02-Feb-15	0.286
273	Raikara	282/2	02-Feb-15	0.206

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
274	Raikara	282/4	02-Feb-15	0.182
275	Raikara	282/6	02-Feb-15	0.065
276	Raikara	283/1	02-Feb-15	0.368
277	Raikara	284/2	02-Feb-15	0.299
278	Raikara	284/3	02-Feb-15	0.283
279	Raikara	284/4	02-Feb-15	0.283
280	Raikara	284/5	02-Feb-15	0.283
281	Raikara	285	02-Feb-15	0.397
282	Raikara	286	02-Feb-15	1.210
283	Raikara	287/1	02-Feb-15	0.476
284	Raikara	288/1	02-Feb-15	0.085
285	Raikara	288/2	02-Feb-15	0.300
286	Raikara	289/2	02-Feb-15	0.277
287	Raikara	293/1	02-Feb-15	0.077
288	Raikara	294	02-Feb-15	0.555
289	Raikara	295/2	02-Feb-15	0.459
290	Raikara	297/1	02-Feb-15	0.081
291	Raikara	298/1	02-Feb-15	0.218
292	Raikara	300/2	02-Feb-15	0.101
293	Raikara	303/2	02-Feb-15	0.242
294	Raikara	303/5	02-Feb-15	0.053
295	Raikara	303/6	02-Feb-15	0.053
296	Raikara	303/7	02-Feb-15	0.053
297	Raikara	304/3	02-Feb-15	0.338
298	Raikara	308	02-Feb-15	0.591
299	Raikara	310/1	02-Feb-15	0.164
300	Raikara	310/2	02-Feb-15	0.176
301	Raikara	314/1	02-Feb-15	0.101
302	Raikara	314/2	02-Feb-15	0.664
303	Raikara	315	02-Feb-15	0.202
304	Raikara	316	02-Feb-15	0.166
305	Raikara	318	02-Feb-15	0.559
306	Raikara	319/2	02-Feb-15	0.093
307	Raikara	319/3	02-Feb-15	0.529
308	Raikara	319/4	02-Feb-15	0.161
309	Raikara	319/5	02-Feb-15	0.141
310	Raikara	319/6	02-Feb-15	0.182
311	Raikara	319/7	02-Feb-15	0.020
312	Raikara	319/8	02-Feb-15	0.101
313	Raikara	320	02-Feb-15	0.162
314	Raikara	321	02-Feb-15	0.142
315	Raikara	324	02-Feb-15	0.681
316	Raikara	325	02-Feb-15	0.162
317	Raikara	326	02-Feb-15	0.607
318	Raikara	327/2	02-Feb-15	0.435
319	Raikara	327/3	02-Feb-15	1.673

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
320	Raikara	327/5	02-Feb-15	0.946
321	Raikara	328/1	02-Feb-15	0.825
322	Raikara	328/3	02-Feb-15	0.417
323	Raikara	328/4	02-Feb-15	0.409
324	Raikara	329	02-Feb-15	0.190
325	Raikara	331	02-Feb-15	0.563
326	Raikara	333/2	02-Feb-15	0.809
327	Raikara	333/3	02-Feb-15	0.202
328	Raikara	334	02-Feb-15	0.255
329	Raikara	335/1	02-Feb-15	0.534
330	Raikara	335/2	02-Feb-15	0.383
331	Raikara	337/1	02-Feb-15	0.029
332	Raikara	339/1	02-Feb-15	0.372
333	Raikara	339/10	02-Feb-15	0.210
334	Raikara	340	02-Feb-15	0.567
335	Raikara	341	02-Feb-15	1.238
336	Raikara	342/2	02-Feb-15	1.214
337	Raikara	342/3	02-Feb-15	1.416
338	Raikara	342/5	02-Feb-15	1.436
339	Raikara	342/6	02-Feb-15	1.410
340	Raikara	342/10	02-Feb-15	1.335
341	Raikara	342/11	02-Feb-15	1.672
342	Raikara	346/2	02-Feb-15	1.672
343	Raikara	346/5	02-Feb-15	0.202
344	Raikara	346/6	02-Feb-15	0.445
345	Raikara	354/6	02-Feb-15	0.749
346	Raikara	354/7	02-Feb-15	0.182
347	Raikara	364/2	02-Feb-15	0.890
348	Raikara	364/3	02-Feb-15	0.607
349	Raikara	375/3	02-Feb-15	0.809
350	Raikara	384/1	02-Feb-15	0.134
351	Raikara	395/2	02-Feb-15	0.850
352	Raikara	396	02-Feb-15	0.202
353	Raikara	398/1	02-Feb-15	0.170
354	Raikara	398/2	02-Feb-15	0.712
355	Raikara	398/3	02-Feb-15	0.764
356	Raikara	398/5	02-Feb-15	0.445
357	Raikara	398/6	02-Feb-15	0.260
358	Raikara	400/1	02-Feb-15	0.405
359	Raikara	400/4	02-Feb-15	0.243
360	Raikara	494	02-Feb-15	0.073
361	Raikara	495	02-Feb-15	0.595
362	Raikara	496/1	02-Feb-15	0.101
363	Raikara	496/2	02-Feb-15	0.227
364	Raikara	497/4	02-Feb-15	0.178
365	Raikara	499	02-Feb-15	0.405

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
366	Raikara	501	02-Feb-15	0.821
367	Raikara	505/1	02-Feb-15	0.116
368	Raikara	505/2	02-Feb-15	0.364
369	Raikara	505/3	02-Feb-15	0.405
370	Raikara	505/9	02-Feb-15	0.248
371	Raikara	505/11	02-Feb-15	0.243
372	Raikara	505/12	02-Feb-15	0.405
373	Raikara	505/13	02-Feb-15	0.202
374	Raikara	505/14	02-Feb-15	1.057
375	Raikara	506/1	02-Feb-15	0.061
376	Raikara	506/4	02-Feb-15	0.162
377	Raikara	515/18	02-Feb-15	0.036
378	Raikara	515/19	02-Feb-15	0.069
379	Raikara	515/20	02-Feb-15	0.016
380	Raikara	538/2	02-Feb-15	0.041
381	Raikara	538/3	02-Feb-15	0.032
382	Raikara	539/2	02-Feb-15	0.059
383	Raikara	540	02-Feb-15	0.251
384	Raikara	542/1	02-Feb-15	0.061
385	Raikara	450/2	02-Feb-15	0.330
386	Raikara	450/3	02-Feb-15	0.331
387	Talaipalli	2/12	02-Feb-15	0.080
388	Talaipalli	2/13	02-Feb-15	0.080
389	Talaipalli	6	02-Feb-15	1.088
390	Talaipalli	8/1	02-Feb-15	0.585
391	Talaipalli	8/4	02-Feb-15	0.160
392	Talaipalli	11/2	02-Feb-15	0.260
393	Talaipalli	11/3	02-Feb-15	0.405
394	Talaipalli	22/1	02-Feb-15	0.400
395	Talaipalli	22/2	02-Feb-15	0.425
396	Talaipalli	24/7	02-Feb-15	0.222
397	Talaipalli	26/2	02-Feb-15	0.226
398	Talaipalli	26/3	02-Feb-15	0.226
399	Talaipalli	26/4	02-Feb-15	0.089
400	Talaipalli	26/5	02-Feb-15	0.089
401	Talaipalli	26/8	02-Feb-15	0.960
402	Talaipalli	26/10	02-Feb-15	0.154
403	Talaipalli	26/11	02-Feb-15	0.202
404	Talaipalli	26/12	02-Feb-15	0.202
405	Talaipalli	26/13	02-Feb-15	0.069
406	Talaipalli	26/14	02-Feb-15	0.251
407	Talaipalli	26/15	02-Feb-15	0.166
408	Talaipalli	26/16	02-Feb-15	0.170
409	Talaipalli	26/17	02-Feb-15	0.251
410	Talaipalli	26/20	02-Feb-15	0.089
411	Talaipalli	26/21	02-Feb-15	0.089

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
412	Talaipalli	26/22	02-Feb-15	0.194
413	Talaipalli	26/23	02-Feb-15	0.081
414	Talaipalli	26/25	02-Feb-15	0.105
415	Talaipalli	26/26	02-Feb-15	0.085
416	Talaipalli	26/28	02-Feb-15	0.162
417	Talaipalli	26/31	02-Feb-15	0.174
418	Talaipalli	26/33	02-Feb-15	0.097
419	Talaipalli	26/35	02-Feb-15	0.426
420	Talaipalli	26/37	02-Feb-15	0.089
421	Talaipalli	26/38	02-Feb-15	0.069
422	Talaipalli	26/40	02-Feb-15	0.182
423	Talaipalli	26/41	02-Feb-15	0.182
424	Talaipalli	26/42	02-Feb-15	0.150
425	Talaipalli	26/43	02-Feb-15	0.150
426	Talaipalli	26/44	02-Feb-15	0.065
427	Talaipalli	26/45	02-Feb-15	0.081
428	Talaipalli	26/47	02-Feb-15	0.372
429	Talaipalli	26/48	02-Feb-15	0.677
430	Talaipalli	26/49	02-Feb-15	0.129
431	Talaipalli	26/50	02-Feb-15	0.053
432	Talaipalli	26/51	02-Feb-15	1.174
433	Talaipalli	26/52	02-Feb-15	0.142
434	Talaipalli	26/54	02-Feb-15	0.182
435	Talaipalli	26/55	02-Feb-15	0.182
436	Talaipalli	26/56	02-Feb-15	0.210
437	Talaipalli	26/57	02-Feb-15	0.182
438	Talaipalli	26/59	02-Feb-15	0.406
439	Talaipalli	26/60	02-Feb-15	0.784
440	Talaipalli	26/61	02-Feb-15	0.486
441	Talaipalli	26/63	02-Feb-15	0.150
442	Talaipalli	26/64	02-Feb-15	0.210
443	Talaipalli	29/7	02-Feb-15	0.636
444	Talaipalli	29/13	02-Feb-15	0.405
445	Talaipalli	30/1	02-Feb-15	0.357
446	Talaipalli	30/2	02-Feb-15	0.357
447	Talaipalli	30/3	02-Feb-15	0.358
448	Talaipalli	31/5	02-Feb-15	0.182
449	Talaipalli	32/1	02-Feb-15	0.068
450	Talaipalli	32/4	02-Feb-15	0.068
451	Talaipalli	32/5	02-Feb-15	0.060
452	Talaipalli	33/7	02-Feb-15	0.202
453	Talaipalli	39	02-Feb-15	0.360
454	Talaipalli	40/1	02-Feb-15	1.663
455	Talaipalli	40/4	02-Feb-15	1.019
456	Talaipalli	40/5	02-Feb-15	1.244
457	Talaipalli	40/6	02-Feb-15	0.243

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
458	Talaipalli	43/1	02-Feb-15	0.425
459	Talaipalli	43/2	02-Feb-15	0.162
460	Talaipalli	44	02-Feb-15	2.161
461	Talaipalli	45	02-Feb-15	1.238
462	Talaipalli	46	02-Feb-15	0.279
463	Talaipalli	48/2	02-Feb-15	0.202
464	Talaipalli	51/1	02-Feb-15	2.083
465	Talaipalli	51/2	02-Feb-15	1.334
466	Talaipalli	54	02-Feb-15	0.995
467	Talaipalli	56	02-Feb-15	0.433
468	Talaipalli	58/2	02-Feb-15	0.120
469	Talaipalli	59	02-Feb-15	0.202
470	Talaipalli	63/5	02-Feb-15	1.026
471	Talaipalli	65/2	02-Feb-15	0.081
472	Talaipalli	65/4	02-Feb-15	0.071
473	Talaipalli	65/6	02-Feb-15	0.071
474	Talaipalli	66/2	02-Feb-15	0.413
475	Talaipalli	70/1	02-Feb-15	0.559
476	Talaipalli	70/2	02-Feb-15	0.809
477	Talaipalli	70/3	02-Feb-15	0.162
478	Talaipalli	73/2	02-Feb-15	0.283
479	Talaipalli	76/1	02-Feb-15	0.243
480	Talaipalli	76/3	02-Feb-15	0.101
481	Talaipalli	82	02-Feb-15	0.061
482	Talaipalli	84	02-Feb-15	1.028
483	Talaipalli	86/2	02-Feb-15	0.809
484	Talaipalli	87/2	02-Feb-15	0.401
485	Talaipalli	87/3	02-Feb-15	0.312
486	Talaipalli	87/4	02-Feb-15	1.574
487	Talaipalli	87/7	02-Feb-15	0.380
488	Talaipalli	87/8	02-Feb-15	0.308
489	Talaipalli	87/10	02-Feb-15	0.882
490	Talaipalli	87/11	02-Feb-15	0.551
491	Talaipalli	87/12	02-Feb-15	0.214
492	Talaipalli	87/13	02-Feb-15	1.238
493	Talaipalli	87/14	02-Feb-15	0.166
494	Talaipalli	87/18	02-Feb-15	0.312
495	Talaipalli	87/20	02-Feb-15	0.170
496	Talaipalli	93/1	02-Feb-15	0.263
497	Talaipalli	93/2	02-Feb-15	0.258
498	Talaipalli	93/3	02-Feb-15	0.258
499	Talaipalli	93/4	02-Feb-15	0.259
500	Talaipalli	93/8	02-Feb-15	0.174
501	Talaipalli	93/9	02-Feb-15	0.061
502	Talaipalli	93/10	02-Feb-15	0.142
503	Talaipalli	93/12	02-Feb-15	0.142

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
504	Talaipalli	93/13	02-Feb-15	0.405
505	Talaipalli	97/1	02-Feb-15	0.162
506	Talaipalli	97/4	02-Feb-15	0.481
507	Talaipalli	97/5	02-Feb-15	0.297
508	Talaipalli	100	02-Feb-15	0.405
509	Talaipalli	101/1	02-Feb-15	0.109
510	Talaipalli	101/2	02-Feb-15	0.190
511	Talaipalli	101/4	02-Feb-15	0.341
512	Talaipalli	101/7	02-Feb-15	0.210
513	Talaipalli	101/8	02-Feb-15	0.325
514	Talaipalli	101/9	02-Feb-15	0.129
515	Talaipalli	101/10	02-Feb-15	0.210
516	Talaipalli	101/11	02-Feb-15	0.268
517	Talaipalli	101/12	02-Feb-15	0.283
518	Talaipalli	101/14	02-Feb-15	0.085
519	Talaipalli	101/15	02-Feb-15	0.113
520	Talaipalli	101/17	02-Feb-15	0.081
521	Talaipalli	101/18	02-Feb-15	0.113
522	Talaipalli	101/20	02-Feb-15	0.049
523	Talaipalli	101/22	02-Feb-15	0.032
524	Talaipalli	114/1	02-Feb-15	0.308
525	Talaipalli	116	02-Feb-15	3.903
526	Talaipalli	119/3	02-Feb-15	0.138
527	Talaipalli	119/4	02-Feb-15	0.566
528	Talaipalli	121/2	02-Feb-15	0.158
529	Talaipalli	121/3	02-Feb-15	0.060
530	Talaipalli	121/4	02-Feb-15	0.048
531	Talaipalli	121/6	02-Feb-15	0.280
532	Talaipalli	121/8	02-Feb-15	0.060
533	Talaipalli	121/12	02-Feb-15	0.032
534	Talaipalli	123	02-Feb-15	1.461
535	Talaipalli	126/3	02-Feb-15	0.251
536	Talaipalli	126/6	02-Feb-15	0.077
537	Talaipalli	126/7	02-Feb-15	0.291
538	Talaipalli	126/9	02-Feb-15	0.077
539	Talaipalli	126/11	02-Feb-15	0.174
540	Talaipalli	130/2	02-Feb-15	0.105
541	Talaipalli	130/3	02-Feb-15	0.145
542	Talaipalli	130/4	02-Feb-15	0.138
543	Talaipalli	130/5	02-Feb-15	0.182
544	Talaipalli	130/6	02-Feb-15	0.162
545	Talaipalli	130/8	02-Feb-15	0.097
546	Talaipalli	130/9	02-Feb-15	0.105
547	Talaipalli	130/11	02-Feb-15	0.182
548	Talaipalli	130/12	02-Feb-15	0.243
549	Talaipalli	130/15	02-Feb-15	0.202

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
550	Talaipalli	130/16	02-Feb-15	0.447
551	Talaipalli	131/1	02-Feb-15	0.093
552	Talaipalli	131/2	02-Feb-15	0.093
553	Talaipalli	131/4	02-Feb-15	0.030
554	Talaipalli	131/6	02-Feb-15	0.061
	Total			**241.465**

Note: Land Rights vested on NTPC Limited by virtue of Section 11 notification under CBA Act.

Type of Land: Leasehold Land for Mining as per Mining Lease

Nature	Area (Hectares)
Government Land	-
Private Land	-
Forest Land	766.39

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	CWIP - Railway Siding	Railway Siding (Being Amount paid as Codal Charges)
2	Other Buildings	Office At Thalaipali Adm

C2- Mine Infrastructure: Land for Compensatory Afforestation

Type of Land: Freehold Land for Compensatory Afforestation

Nil

Type of Land: Leasehold Land for Compensatory Afforestation

Nature	Area (Hectares)
Government Land	-
Private Land	-
Forest Land	-

C3- Mine Infrastructure: Resettlement and Rehabilitation Land

Type of Land: Resettlement and Rehabilitation Freehold Land

Nil

Type of Land: Resettlement and Rehabilitation Leasehold Land

Nature	Area (Hectares)
Government Land	-
Private Land	-
Forest Land	-

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

S. No	Statutory Clearance	Ministry/ Agency	Letter No.	Date
1.	**Approval of Mining Plan and Mine Closure Plan** Mining Plan (February, 2010)	Ministry of Coal	No.13016/29/2003-CA-I (Vol.III)	31.03.2010

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

S. No	Statutory Clearance	Ministry/ Agency	Letter No.	Date
1.	Opening of Escrow Account	Ministry of Coal – CCO		05.04.2014
2.	Environment Clearance	Ministry of Environment and Forests	No. J-11015/279/2009-IA.II(M)	02.01.2013
3.	Forest Clearance – a) Stage 1	Ministry of Environment and Forests	F. No.8-18/2012-FC	05.11.2012
	b) Stage 2		F. No.8-18/2012-FC	28/29.01.2014

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

S. No	Statutory Clearance	Ministry/ Agency	Letter No.	Date
1.	Consent to establish	Chhattisgarh Environment Conservation Board	No. 6466/TS/CECB/2015	06.01.2015

Annexure 2A

ANNEXURE-VIIIC		
CARDINAL POINTS OF TALAIPALLI COAL BLOCK		
POINT NO	LONGITUDE (WGS84)	LATTITUDE (WGS84)
P-0	83° 29' 42.381" E	22° 14' 43.085" N
P-1	83° 29' 45.262" E	22° 14' 41.094" N
P-2	83° 29' 48.143" E	22° 14' 39.103" N
P-3	83° 29' 51.024" E	22° 14' 37.111" N
P-4	83° 29' 53.905" E	22° 14' 35.120" N
P-5	83° 29' 56.786" E	22° 14' 33.129" N
P-6	83° 29' 59.667" E	22° 14' 31.137" N
P-7	83° 30' 2.548" E	22° 14' 29.146" N
P-8	83° 30' 5.429" E	22° 14' 27.154" N
P-9	83° 30' 8.309" E	22° 14' 25.163" N
P-10	83° 30' 11.190" E	22° 14' 23.172" N
P-11	83° 30' 14.071" E	22° 14' 21.180" N
P-12	83° 30' 11.954" E	22° 14' 18.738" N
P-13	83° 30' 9.814" E	22° 14' 16.780" N
P-14	83° 30' 6.528" E	22° 14' 14.811" N
P-15	83° 30' 6.228" E	22° 14' 14.703" N
P-16	83° 30' 5.569" E	22° 14' 14.744" N
P-17	83° 30' 4.840" E	22° 14' 14.978" N
P-18	83° 30' 3.891" E	22° 14' 15.481" N
P-19	83° 30' 2.441" E	22° 14' 16.259" N
P-20	83° 30' 0.927" E	22° 14' 16.848" N
P-21	83° 29' 59.067" E	22° 14' 17.346" N
P-22	83° 29' 58.194" E	22° 14' 17.369" N
P-23	83° 29' 57.459" E	22° 14' 17.199" N
P-24	83° 29' 56.726" E	22° 14' 16.809" N
P-25	83° 29' 56.201" E	22° 14' 16.252" N
P-26	83° 29' 55.552" E	22° 14' 15.385" N
P-27	83° 29' 54.946" E	22° 14' 14.299" N
P-28	83° 29' 54.351" E	22° 14' 12.722" N
P-29	83° 29' 54.054" E	22° 14' 11.569" N
P-30	83° 29' 53.562" E	22° 14' 9.562" N
P-31	83° 29' 53.278" E	22° 14' 8.813" N
P-32	83° 29' 52.773" E	22° 14' 7.856" N
P-33	83° 29' 52.009" E	22° 14' 6.932" N
P-34	83° 29' 51.411" E	22° 14' 6.388" N
P-35	83° 29' 50.968" E	22° 14' 6.180" N
P-36	83° 29' 50.524" E	22° 14' 6.145" N
P-37	83° 29' 49.951" E	22° 14' 6.203" N
P-38	83° 29' 49.303" E	22° 14' 6.382" N
P-39	83° 29' 48.581" E	22° 14' 6.646" N
P-40	83° 29' 47.775" E	22° 14' 7.039" N
P-41	83° 29' 47.015" E	22° 14' 7.674" N
P-42	83° 29' 46.074" E	22° 14' 8.478" N
P-43	83° 29' 43.827" E	22° 14' 10.084" N
P-44	83° 29' 42.565" E	22° 14' 10.543" N
P-45	83° 29' 41.374" E	22° 14' 10.840" N
P-46	83° 29' 39.109" E	22° 14' 10.994" N
P-47	83° 29' 37.410" E	22° 14' 11.000" N
P-48	83° 29' 36.301" E	22° 14' 10.770" N
P-49	83° 29' 34.771" E	22° 14' 10.324" N
P-50	83° 29' 33.857" E	22° 14' 9.973" N
P-51	83° 29' 32.985" E	22° 14' 9.570" N
P-52	83° 29' 32.155" E	22° 14' 9.012" N
P-53	83° 29' 31.146" E	22° 14' 8.053" N
P-54	83° 29' 30.001" E	22° 14' 6.617" N
P-55	83° 29' 28.913" E	22° 14' 4.444" N
P-56	83° 29' 27.772" E	22° 14' 1.936" N
P-57	83° 29' 27.416" E	22° 14' 0.799" N
P-58	83° 29' 27.356" E	22° 14' 0.074" N
P-59	83° 29' 27.604" E	22° 13' 59.031" N
P-60	83° 29' 27.883" E	22° 13' 58.348" N
	83° 29' 28.539" E	22° 13' 57.253" N

ANNEXURE-VIIIC		
P-62	83° 29' 28.929" E	22° 13' 56.763" N
P-63	83° 29' 29.000" E	22° 13' 56.531" N
P-64	83° 29' 28.918" E	22° 13' 56.092" N
P-65	83° 29' 28.725" E	22° 13' 55.852" N
P-66	83° 29' 28.409" E	22° 13' 55.083" N
P-67	83° 29' 27.843" E	22° 13' 54.268" N
P-68	83° 29' 27.315" E	22° 13' 53.427" N
P-69	83° 29' 26.957" E	22° 13' 52.652" N
P-70	83° 29' 26.574" E	22° 13' 51.321" N
P-71	83° 29' 26.390" E	22° 13' 50.368" N
P-72	83° 29' 26.594" E	22° 13' 49.643" N
P-73	83° 29' 27.249" E	22° 13' 48.896" N
P-74	83° 29' 28.209" E	22° 13' 48.008" N
P-75	83° 29' 25.416" E	22° 13' 45.934" N
P-76	83° 29' 22.623" E	22° 13' 43.860" N
P-77	83° 29' 19.830" E	22° 13' 41.786" N
P-78	83° 29' 17.038" E	22° 13' 39.712" N
P-79	83° 29' 14.245" E	22° 13' 37.638" N
P-80	83° 29' 11.453" E	22° 13' 35.564" N
P-81	83° 29' 8.660" E	22° 13' 33.490" N
P-82	83° 29' 5.867" E	22° 13' 31.416" N
P-83	83° 29' 3.075" E	22° 13' 29.342" N
P-84	83° 29' 0.282" E	22° 13' 27.267" N
P-85	83° 28' 57.490" E	22° 13' 25.193" N
P-86	83° 28' 54.698" E	22° 13' 23.119" N
P-87	83° 28' 51.905" E	22° 13' 21.045" N
P-88	83° 28' 48.443" E	22° 13' 21.936" N
P-89	83° 28' 44.980" E	22° 13' 22.827" N
P-90	83° 28' 41.518" E	22° 13' 23.718" N
P-91	83° 28' 38.056" E	22° 13' 24.609" N
P-92	83° 28' 34.593" E	22° 13' 25.499" N
P-93	83° 28' 31.131" E	22° 13' 26.390" N
P-94	83° 28' 27.668" E	22° 13' 27.281" N
P-95	83° 28' 24.206" E	22° 13' 28.172" N
P-96	83° 28' 20.744" E	22° 13' 29.063" N
P-97	83° 28' 17.281" E	22° 13' 29.953" N
P-98	83° 28' 13.819" E	22° 13' 30.844" N
P-99	83° 28' 10.356" E	22° 13' 31.735" N
P-100	83° 28' 6.894" E	22° 13' 32.625" N
P-101	83° 28' 3.431" E	22° 13' 33.516" N
P-102	83° 27' 59.969" E	22° 13' 34.407" N
P-103	83° 27' 56.506" E	22° 13' 35.297" N
P-104	83° 27' 53.044" E	22° 13' 36.188" N
P-105	83° 27' 49.581" E	22° 13' 37.079" N
P-106	83° 27' 46.119" E	22° 13' 37.969" N
P-107	83° 27' 42.656" E	22° 13' 38.860" N
P-108	83° 27' 39.193" E	22° 13' 39.750" N
P-109	83° 27' 35.623" E	22° 13' 39.719" N
P-110	83° 27' 32.052" E	22° 13' 39.688" N
P-111	83° 27' 28.482" E	22° 13' 39.656" N
P-112	83° 27' 24.911" E	22° 13' 39.625" N
P-113	83° 27' 21.341" E	22° 13' 39.594" N
P-114	83° 27' 17.771" E	22° 13' 39.562" N
P-115	83° 27' 14.200" E	22° 13' 39.531" N
P-116	83° 27' 10.630" E	22° 13' 39.499" N
P-117	83° 27' 7.059" E	22° 13' 39.468" N
P-118	83° 27' 3.489" E	22° 13' 39.436" N
P-119	83° 26' 59.918" E	22° 13' 39.405" N
P-120	83° 26' 56.348" E	22° 13' 39.373" N
P-121	83° 26' 52.777" E	22° 13' 39.342" N
P-122	83° 26' 49.207" E	22° 13' 39.310" N
P-123	83° 26' 45.636" E	22° 13' 39.279" N
P-124	83° 26' 42.066" E	22° 13' 39.247" N
P-125	83° 26' 38.495" E	22° 13' 39.215" N
P-126	83° 26' 34.925" E	22° 13' 39.184" N
P-127	83° 26' 31.354" E	22° 13' 39.152" N
P-128	83° 26' 27.784" E	22° 13' 39.120" N
	83° 26' 24.213" E	22° 13' 39.089" N

ANNEXURE-VIIIC		
P-130	83° 26' 20.643" E	22° 13' 39.057" N
P-131	83° 26' 17.072" E	22° 13' 39.025" N
P-132	83° 26' 13.502" E	22° 13' 38.993" N
P-133	83° 26' 9.931" E	22° 13' 38.962" N
P-134	83° 26' 6.361" E	22° 13' 38.930" N
P-135	83° 26' 2.790" E	22° 13' 38.898" N
P-136	83° 25' 59.220" E	22° 13' 38.866" N
P-137	83° 25' 55.649" E	22° 13' 38.834" N
P-138	83° 25' 52.079" E	22° 13' 38.802" N
P-139	83° 25' 48.509" E	22° 13' 38.770" N
P-140	83° 25' 44.938" E	22° 13' 38.738" N
P-141	83° 25' 41.368" E	22° 13' 38.706" N
P-142	83° 25' 41.345" E	22° 13' 42.254" N
P-143	83° 25' 41.323" E	22° 13' 45.801" N
P-144	83° 25' 41.301" E	22° 13' 49.348" N
P-145	83° 25' 41.278" E	22° 13' 52.896" N
P-146	83° 25' 41.256" E	22° 13' 56.443" N
P-147	83° 25' 41.234" E	22° 13' 59.991" N
P-148	83° 25' 41.211" E	22° 14' 3.538" N
P-149	83° 25' 41.189" E	22° 14' 7.085" N
P-150	83° 25' 41.167" E	22° 14' 10.633" N
P-151	83° 25' 44.729" E	22° 14' 10.676" N
P-152	83° 25' 48.292" E	22° 14' 10.720" N
P-153	83° 25' 51.854" E	22° 14' 10.764" N
P-154	83° 25' 55.416" E	22° 14' 10.806" N
P-155	83° 25' 56.979" E	22° 14' 10.852" N
P-156	83° 26' 2.541" E	22° 14' 10.895" N
P-157	83° 26' 6.104" E	22° 14' 10.939" N
P-158	83° 26' 9.666" E	22° 14' 10.983" N
P-159	83° 26' 13.228" E	22° 14' 11.026" N
P-160	83° 26' 16.791" E	22° 14' 11.070" N
P-161	83° 26' 20.353" E	22° 14' 11.114" N
P-162	83° 26' 20.331" E	22° 14' 14.419" N
P-163	83° 26' 20.310" E	22° 14' 17.724" N
P-164	83° 26' 20.288" E	22° 14' 21.029" N
P-165	83° 26' 20.266" E	22° 14' 24.335" N
P-166	83° 26' 20.244" E	22° 14' 27.640" N
P-167	83° 26' 20.222" E	22° 14' 30.945" N
P-168	83° 26' 20.201" E	22° 14' 34.251" N
P-169	83° 26' 20.179" E	22° 14' 37.556" N
P-170	83° 26' 20.157" E	22° 14' 40.861" N
P-171	83° 26' 20.135" E	22° 14' 44.167" N
P-172	83° 26' 20.113" E	22° 14' 47.472" N
P-173	83° 26' 20.092" E	22° 14' 50.777" N
P-174	83° 26' 20.070" E	22° 14' 54.082" N
P-175	83° 26' 20.048" E	22° 14' 57.388" N
P-176	83° 26' 20.026" E	22° 15' 0.693" N
P-177	83° 26' 20.004" E	22° 15' 3.998" N
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P-179	83° 26' 19.961" E	22° 15' 10.609" N
P-180	83° 26' 19.939" E	22° 15' 13.914" N
P-181	83° 26' 19.917" E	22° 15' 17.220" N
P-182	83° 26' 19.895" E	22° 15' 20.525" N
P-183	83° 26' 19.874" E	22° 15' 23.830" N
P-184	83° 26' 19.852" E	22° 15' 27.135" N
P-185	83° 26' 19.830" E	22° 15' 30.441" N
P-186	83° 26' 19.808" E	22° 15' 33.746" N
P-187	83° 26' 19.786" E	22° 15' 37.051" N
P-188	83° 26' 19.765" E	22° 15' 40.357" N
P-189	83° 26' 19.743" E	22° 15' 43.662" N
P-190	83° 26' 19.721" E	22° 15' 46.967" N
P-191	83° 26' 19.699" E	22° 15' 50.273" N
P-192	83° 26' 19.677" E	22° 15' 53.578" N
P-193	83° 26' 22.402" E	22° 15' 56.082" N
P-194	83° 26' 25.126" E	22° 15' 58.585" N
P-195	83° 26' 27.850" E	22° 16' 1.089" N
P-196	83° 26' 30.575" E	22° 16' 3.593" N
	83° 26' 33.299" E	22° 16' 6.096" N

ANNEXURE-VIIIC		
P-198	83° 26' 35.023" E	22° 16' 8.600" N
P-199	83° 26' 38.748" E	22° 16' 11.103" N
P-200	83° 26' 42.004" E	22° 16' 9.691" N
P-201	83° 26' 45.261" E	22° 16' 8.278" N
P-202	83° 26' 48.517" E	22° 16' 6.865" N
P-203	83° 26' 51.774" E	22° 16' 5.453" N
P-204	83° 26' 55.030" E	22° 16' 4.040" N
P-205	83° 26' 58.287" E	22° 16' 2.627" N
P-206	83° 27' 1.543" E	22° 16' 1.214" N
P-207	83° 27' 4.800" E	22° 15' 59.802" N
P-208	83° 27' 8.056" E	22° 15' 58.389" N
P-209	83° 27' 8.064" E	22° 15' 54.395" N
P-210	83° 27' 8.072" E	22° 15' 50.402" N
P-211	83° 27' 8.080" E	22° 15' 46.409" N
P-212	83° 27' 8.086" E	22° 15' 42.416" N
P-213	83° 27' 11.411" E	22° 15' 41.273" N
P-214	83° 27' 14.734" E	22° 15' 40.130" N
P-215	83° 27' 18.058" E	22° 15' 38.988" N
P-216	83° 27' 21.381" E	22° 15' 37.845" N
P-217	83° 27' 24.704" E	22° 15' 36.702" N
P-218	83° 27' 28.027" E	22° 15' 35.560" N
P-219	83° 27' 31.351" E	22° 15' 34.417" N
P-220	83° 27' 34.674" E	22° 15' 33.274" N
P-221	83° 27' 37.997" E	22° 15' 32.132" N
P-222	83° 27' 41.320" E	22° 15' 30.989" N
P-223	83° 27' 44.643" E	22° 15' 29.846" N
P-224	83° 27' 47.966" E	22° 15' 28.703" N
P-225	83° 27' 51.289" E	22° 15' 27.561" N
P-226	83° 27' 54.613" E	22° 15' 26.418" N
P-227	83° 27' 57.936" E	22° 15' 25.275" N
P-228	83° 28' 1.259" E	22° 15' 24.132" N
P-229	83° 28' 4.582" E	22° 15' 22.989" N
P-230	83° 28' 7.905" E	22° 15' 21.846" N
P-231	83° 28' 11.228" E	22° 15' 20.703" N
P-232	83° 28' 14.551" E	22° 15' 19.560" N
P-233	83° 28' 17.874" E	22° 15' 18.417" N
P-234	83° 28' 21.197" E	22° 15' 17.274" N
P-235	83° 28' 24.520" E	22° 15' 16.131" N
P-236	83° 28' 27.843" E	22° 15' 14.988" N
P-237	83° 28' 31.166" E	22° 15' 13.845" N
P-238	83° 28' 34.488" E	22° 15' 12.702" N
P-239	83° 28' 37.811" E	22° 15' 11.559" N
P-240	83° 28' 41.134" E	22° 15' 10.416" N
P-241	83° 28' 40.226" E	22° 15' 6.067" N
P-242	83° 28' 39.318" E	22° 15' 1.716" N
P-243	83° 28' 43.082" E	22° 15' 2.752" N
P-244	83° 28' 46.845" E	22° 15' 3.787" N
P-245	83° 28' 50.609" E	22° 15' 4.821" N
P-246	83° 28' 54.373" E	22° 15' 5.855" N
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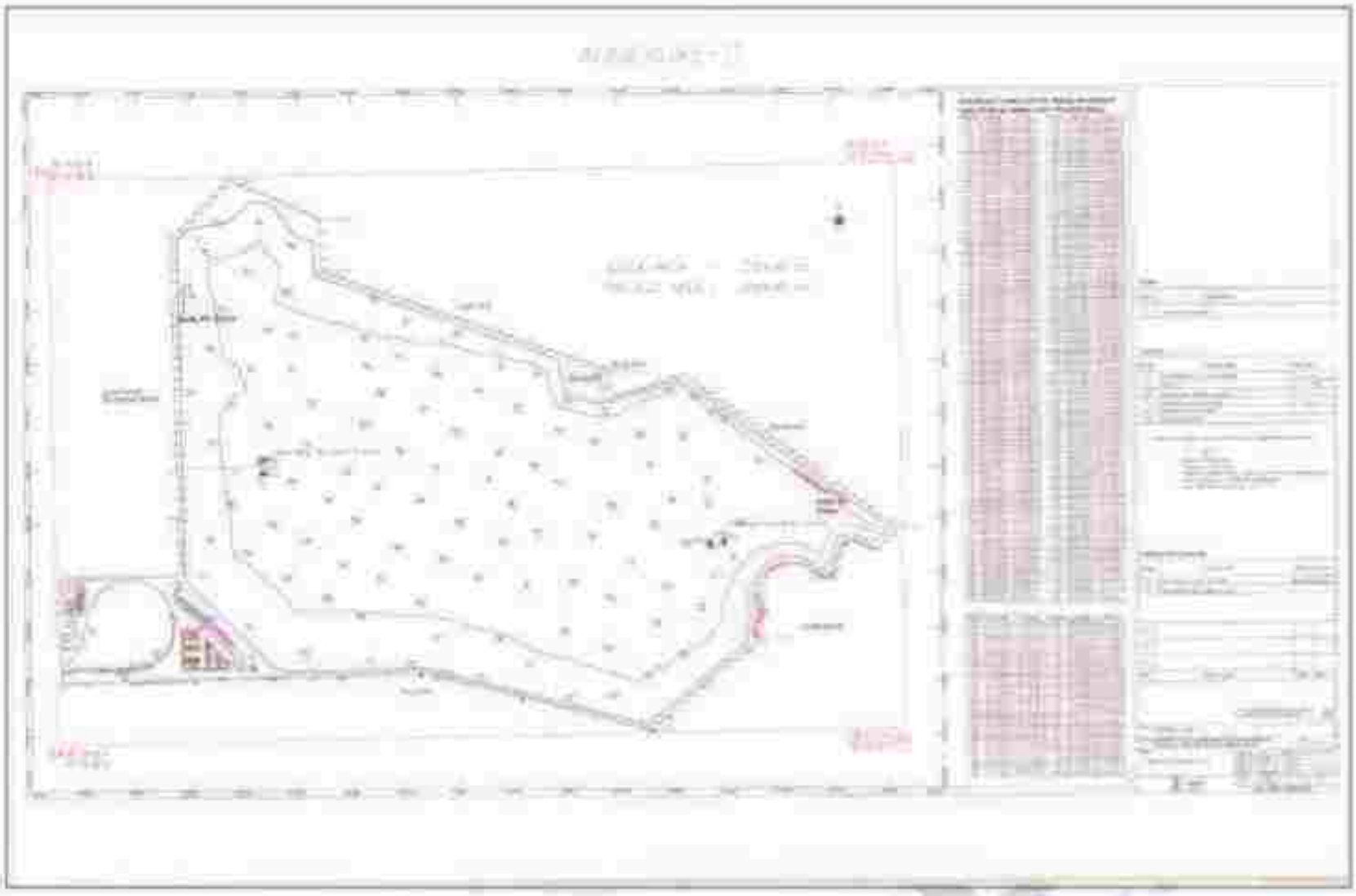
P-248	83° 29' 1.408" E	22° 15' 7.932" N
P-249	83° 29' 4.926" E	22° 15' 8.971" N
P-250	83° 29' 7.807" E	22° 15' 6.980" N
P-251	83° 29' 10.688" E	22° 15' 4.989" N
P-252	83° 29' 13.570" E	22° 15' 2.998" N
P-253	83° 29' 16.451" E	22° 15' 1.006" N
P-254	83° 29' 19.332" E	22° 14' 59.015" N
P-255	83° 29' 22.213" E	22° 14' 57.024" N
P-256	83° 29' 25.095" E	22° 14' 55.033" N
P-257	83° 29' 27.976" E	22° 14' 53.042" N
P-258	83° 29' 30.857" E	22° 14' 51.050" N
P-259	83° 29' 33.738" E	22° 14' 49.059" N
P-260	83° 29' 36.619" E	22° 14' 47.068" N
P-261	83° 29' 39.500" E	22° 14' 45.077" N
P-262	83° 29' 42.381" E	22° 14' 43.085" N
NOTE: Boundary points are software generated from georeferenced block boundary of Talaipalli coal block		

Annexure 2B



Annexure-3A1

एनटीपीसी NTPC

एन टी पी सी लिमिटेड
NTPC Limited

Annexure IIIA1

Subject: Approval of Mining Plan and undertakings as per Annexure III of the Ministry of Coal guidelines dated 29.05.2020 with respect to Talaipalli coal mine allocated to NTPC for its Lara Super Thermal Power Station

NTPC Board authorised **Regional Executive Director (RED) (Coal Mining)** to approve the Mining Plans/Mine Closure Plans, associated documents pertaining to these plans for the Coal Mining Projects and any subsequent revision/modification thereof, to be submitted to Ministry of Coal or any statutory authority in connection with development of coal mining projects. **(Annexure A)**

As **Regional Executive Director (Coal Mining)**, I am undertaking the following:

1. Correctness of data used in preparation of Mining Plan.
2. Certified that Central Mine Planning and Design Institute with MPPA Certificate No.: NABET/APVI-MPPA/A0/10 issued on 20.10.2021 has been verified **(Annexure B)**.
3. Acceptance of the Mining Plan with recommendation for approval.
4. Undertaking 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 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 if wherever specific permission will be required the company will approach the concerned authorities.
6. Financial Assurance for implementation.
7. Undertaking 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.
8. Undertaking that the protective measures contained in the mine closure plan including 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 rehabilitation works carried out as envisaged in the approved mine closure plans (Progressive and Final Closure).
9. Undertaking 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.

(Partha Mazumdar)
Regional Executive Director (Coal Mining)

[illegible]

Visit: [illegible]

EXTRACTS FROM THE MINUTES OF 417th MEETING OF THE BOARD OF DIRECTORS HELD ON WEDNESDAY, 25th FEBRUARY 2015

Item No.417.2.13	**Approval of Mining Plan & Mine Closure Plans of Coal Mining Projects of NTPC and nomination of "Owner" as per the Mines Act 1952 for Pakri-Barwadih and all other coal mining blocks allocated / to be re-allocated /to be formally allocated to NTPC**

XX XX XX XX XX XX

XX XX XX XX XX XX

The Board, after discussions, passed the following resolution:

Resolved that Regional Executive Director (Coal Mining) be and is hereby authorised to approve the Mining Plans/Mine Closure Plans, associated documents pertaining to these plans for Coal Mining Projects and any subsequent revision/updation thereof, to be submitted to Ministry of Coal or any statutory authority in connection with development of coal mine projects.

Further resolved that Shri Sharad Anand, Regional Executive Director (Coal Mining) be nominated as "Owner" as per the Mines Act, 1952 for Pakri-Barwadih and for all other coal mining blocks already allocated / to be re-allocated /to be formally allocated to NTPC.

*****

CERTIFIED TRUE COPY

QUALITY COUNCIL OF INDIA

Creating an Ecosystem for Quality

NABET

National Accreditation Board for Education and Training

NABET

CERTIFICATE OF ACCREDITATION

Under the QCI-NABET Scheme
for
Prospecting/Exploration & Mining Plan Preparing Agency

Central Mine Planning and Design Institute

Address: Gondwana Place, 18, URBANO RAVI NEHRU MARG

SCOPE	Preparation of Comprehensive Mining Plan, Mining Project Report (PR), Pre-feasibility Report (PFR) / Feasibility Report Preparation

Note: Status of Approved Project Certificates and Technical Area Schemes are available in Ex. SC Minutes dated 09.07.2021 on QCI-NABET website.

In accordance with scope of accreditation, compliance to the terms and conditions mentioned in NABET's letter of accreditation letter no. QCI/NABET/ATRA/APRIL/21-22/1958 dated 01.10.2021, the certificate is awarded to the applicant for the entire Sector of Central Mine Planning and Design Institute following the accreditation cycle.

M. Dhanda / NABET
Issue Date: 03.08.2021

Certificate No.
NABET/EIA/MINES/0218

Valid Upto
30.06.2024

Annexure-IV

13016/29/2003-CA-I (Vol. III)
Government of India
Ministry of Coal
.....

New Delhi, the dated 31st March, 2010

To

Dy. General Manager (PE-MP&D),
1st Floor, Engineering Office Complex,
Sector-24, Noida-201301
(U.P.)

Subject: **Approval of Mining Plan (February, 2010) in respect of Talaipalli Coal Block in Mand Raigarh, in the State of Chhattisgarh for captive mining of coal by M/s. NTPC Ltd.**

Sir,

I am directed to refer to your letter No.CC/PEM/7014/MP/02 dated 10.11.2009 submitting therewith Mining Plan (February, 2010) for Talaipalli coal block in Mand Raigarh in the State of Chhattisgarh, for captive mining of coal by M/s. National Thermal Power Corporation Ltd. to be read alongwith allocattee Company's letter dated 05/02/2010 and to say that the mining plan has been considered in this Ministry and the approval of the competent authority is hereby conveyed under Section 5 (2) (b) of the Mines & Minerals (Development & Regulations) Act, 1957 subject to the following conditions:-

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

ii) Mining lease to be acquired shall not encroach into any other coal block.

iii) The approval of 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 Plan duly signed by the competent authority are returned herewith with request that a copy of the approved mining plan 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 the block.

Enc:as above.

Yours faithfully,

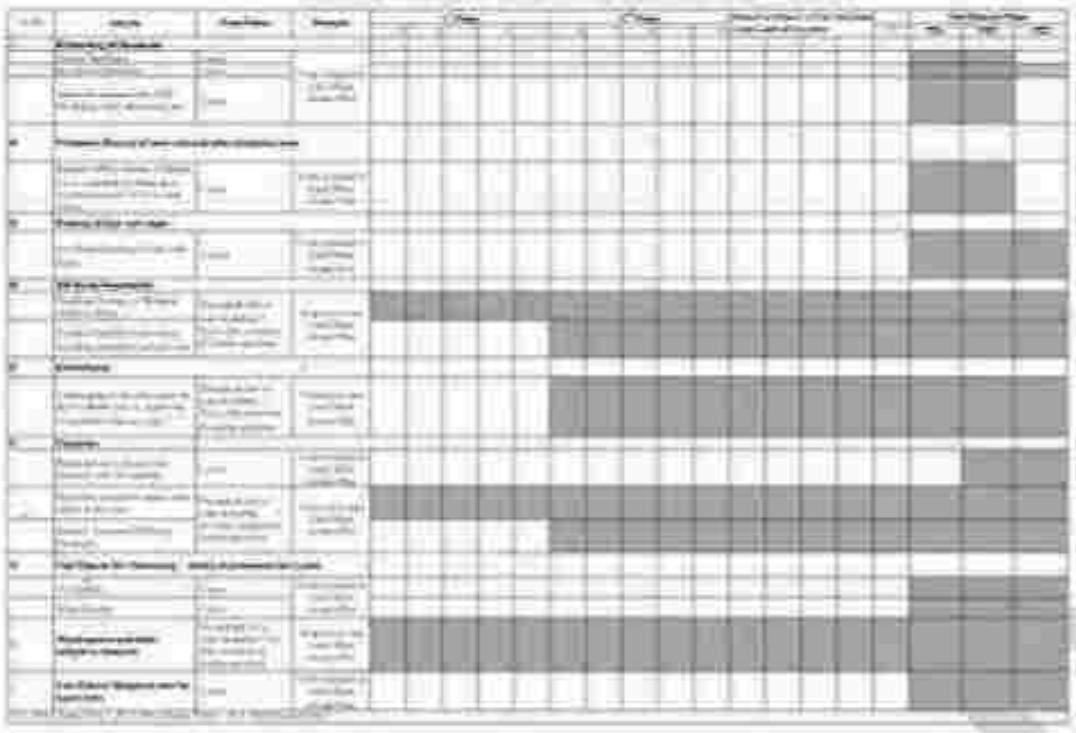
(V.S.Rathi)
Under Secretary to the Government of India

Copy to:-

1. Under Secretary, CPAM Section, Ministry of Coal, for information and record.
2. The Coal Controller, 1-Council House Street, Kolkata.

Annexure-5

Annexure-V



bharatkosh.gov.in
Government of India Receipt Portal

RECEIPT

Transaction Ref.No. 1512220009288 Dated: Dec 15 2022 12:03PM

Received from M/S. NTPC LIMITED with Transaction Ref.No. 1512220009288

Dated Dec 15 2022 12:03PM the sum of INR 550100 (Five Lakhs Fifty Thousand One Hundred Only) through Internet based Online payment in the account of

Coal and Lignite, , Application Processing fee- Mining Plan of NTPC Talaipalli,

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

Printed On: 15-12-2022 12:7:21

Courtesy :- Controller General of Accounts

Annexure 7

TO WHOM IT MAY CONCERN

The Mining Plan & Mine Closure Plan of Talaipalli Coal Mine formulated by Mining Plan Preparing Agency-Central Mine Planning and Design Institute, QCI Number- NABET/APA-MPPA/IA/010 which was sent for expert review to Mining Plan Preparing Agency-MECON Limited, QCI Number- NABET/APA-MPPA/IA/015 .

The Mining Plan & Mine Closure Plan of Talaipalli 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

MECON Limited

Vivekananda Path, P.O.Doranda, Ranchi, Jharkhand, Pin 834002

NABET/APA-MPPA/IA/015

8217396581

Additional Annexure-8

Annexure VIIIA

No.J-11015/279/2009 - IA.II(M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhawan,
C.G.O.Complex, Lodi Road New
New Delhi -110003.
Dated: 02 January, 2013

To

The General Manager,
M/s NTPC,
Engineering complex,
A-8A, Sector-24,
NOIDA - 20 130 1.

Sub: Talaipalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity of a total project area of 2349.35 ha) of M/s NTPC located in villages Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajiigarh, & Salehpali, Tehsil Gharghoda, district Raigarh, Chhattisgrah - Environmental Clearance - reg.

Sir,

This is with reference to letter No. CC:ESE:7011:2009:GEN: dated 25.09.2009 along with application for Terms of Reference (TOR) for a new Talaipalli Opencast-cum-Underground Coalmine and this Ministry's letter dated 23.11.2009 granting the TOR and your letter No. CC:ESE:7011:2009:GEN: dated 30.03.2011 for environmental clearance and subsequent letters dated 20.09.2011, 21.10.2011, and 22.02.2012 on the aforesaid subject. The Ministry of Environment & Forests has considered the application. It is noted that the proposal is for opening a new Talaipalli Opencast-cum-Underground Coalmine project of 18.72 MTPA production capacity in a total project area of 2349.35 ha located in Tehsil Gahrghoda in district Raigarh, Chhattisgarh. The mine is captive to the company's Lara Super Thermal Power Project (4000MW) located at a distance of 60km. There are no National Parks, WL Sanctuaries, Biosphere Reserves within the 10 km study area. There are 5 blocks of Reserve Forest (RFs) Silot, Rai, Tolgi East,Tolgi West, Deodongri found within 10 Km radius of study area. A number of endangered species such as elephant, bear and leopard are reported in the study area. The total project area of 2349.35 ha includes ML of an area of 2113 ha and an area of 236.35 ha of land outside the ML which is required for colony, R&R colony and MGR. The MGR route passes through an elephant migratory corridor. Of the total project area, 1320.99 ha is private land, 261.97 ha is Govt. land, 766.393 ha is forestland. Forestry clearance has been obtained vide letter of the FC Division no. 8-18/2012-FC dated 5th November, 2012. The break-up of land use for the project is given below:

S.No.	Particular	Private	Govt.	Forest	Total
1	Mine lease area	1200.90	202.00	710.10	2113
2	Colony	6.317	30.25	-	36.567
3	R&R Colony	-	19.22	-	19.22
4	MGR corridor	113.77	10.50	56.293	180.563
	Total	**1320.987**	**261.97**	**766.393**	**2349.35**

1.2 River Kelo flows 60m along the eastern boundary of the ML and Pajhar nala at 3.5 km. A number of first order/second order streams originate from the ML. Kurra nala is a seasonal nala originating from the northern side of the block and passes through the block and joins River Kelo. It is proposed to divert Kurra nala flowing through the ML into a Channel (diversion canal) which would be constructed along the northern side of the block and ultimately join River Kelo. A detailed Area Drainage Study comprising run off characterization, flood frequency analysis, etc has been carried out. Based on

EC-Talaipalli

1

the study, the diversion channel has been designed taking into consideration the realignment of the channel with the River to its original path. The Channel Diversion Plan has been submitted to the Flood & Irrigation Dept., Govt. of Chhattisgarh.

1.3 Of the total ML area, 2079.34 ha is for the mine, 26 ha is for infrastructure and an embankment proposed along River Kelo and 7.66 ha is for green belt. It is proposed to leave a 60m wide forestland between River Kelo and quarry area undisturbed due to safety reasons as a study carried out has indicated that the exposure of coal seam left out after mining is prone to catching fire. Grade of coal is E-G with ash content upto 52%. Mining technology for OC mining would be shovel-dumper and Board & Pillar and Continuous Miner for UG mine. There are 21 coal horizons and it would be unsafe to work the top seams by UG mining. The lower 4 seams are planned by UG mining. UG mining would commence 20 years after commencement of OC mining. The parting between OC and UG mining is about 33m-51 m. Ultimate working depth is 404m bgl. The total estimated OB generation from the mine is 3777.07 Mm3, of which 264.52 Mm3 of OB would be stored in external OB dump of 446 ha in northern side of 90m from ground level. During the initial years, 264.52 Mm3 of OB would be temporarily accommodated in temporary external dumps of 60m-90m height in coal bearing area of 446 ha within the mine lease, which would be re-handled during the 5th year of mine operation when backfilling begins and continues upto 20th year and concurrent backfilling would implemented beyond 20th year and until 52nd year of mine operations. As a result, land acquisition of 446 ha of land for external OB dump is not required. At the post mining stage, there would be no permanent external dump outside the coal block. In addition, 80 ha of an isolated patch of backfilled area raised to a height of 60m would be re-handled back into the mine void and the height of the internal dump would be match with nearby topography/ground level. Of the total ML area of 2079.34 ha, 1848.38 ha would be simultaneously backfilled and reclaimed with plantation and the balance 230.96 ha would be left as a void and final void depth of 60m by backfilling into the final pit void.

1.4 The total estimated water requirement of the project is 2390 m3/d, of which 750m3/d is for domestic use and 1640 m3/d is for the mine operation. A detailed hydrological study of the area has been carried out and the falls under "Safe Category" as far as ground water development is concerned. Water table is in the range of 6.10-7.20m bgl (pre-monsoon) and 2.9-12.3 m bgl (post-monsoon). Confined aquifer is at the depth of 200m. Water harvesting measures and monitoring of ground water and surface waters would be implemented.

1.5 A Conservation Plan for endangered wildlife of the area was drawn and submitted to the State Government. The Wild life conservation plan includes provision for the safe passage/corridor for the elephants, creation of underpass along elevated MGR, with passageway for free movement of herds of elephants, reducing speeds of train in elephant passages, development of plantation of fodder, habitat restoration. A budgetary provision of Rs 5 crores has been made for wild life conservation. The Plan for afforestation has been submitted to Chhattisgarh State Forest Department as part of the diversion proposal of 1532 acre land in Dharamanjai garh and Raigarh at the cost of Rs 13.75 crores. An estimated 56, 727 TPD of coal would be transported through an MGR system of 180.54 ha of land upto Kotaraliya Railway Siding to the linked Lara Super Thermal Power Station at a distance of 60km. The MGR would pass through an elephant migratory corridor. It is proposed to create underpass along MGR for the safe passage of elephants as overhead multiple tubed conveyors covering such a long distance is not techno-economically feasible. However, adequate number of over/under passes would be constructed along the MGR route, visited/reported/inhabited by elephants in the area in consultation with PCCF (WL), and at least 5 under/over passes shall be created particularly along the 7km stretch of the 70km MGR route, which forms a part of the elephant migratory corridor. In the rest of the route wherever required, similar under/overpasses shall be created. A detailed study has been initiated.

1.6 The project involves R&R of 1595 PAFs, which includes 635 land and homestead losers and 960 land losers. R&R Plan has been prepared after a detailed survey was carried out and after 10 VDAC meetings and Gram Sabhas and meetings with DC, for a total cost of Rs 677 crores, of which rehabilitation plan is for Rs 214 crores. CSR plan has been prepared for Rs 40 crores. Since the project falls in a notified tribal area, a Plan for Tribal Development for Rs 5 crores has been prepared. Capital costs for EMP is Rs 1018.80 lakhs with an annual recurring budget of Rs 5.66/T of coal. Public Hearing was held on 10.12.2010. Life of the OC mine is 52 years and UG mine is 30 years. Total capital cost of the project is Rs 6000 crores.

2. The Ministry of Environment & Forests hereby accords environmental clearance for the above mentioned **Talaipalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity of a total project area of 2349.35 ha) of M/s National Thermal Power Corporation**

EC/Talaipalli

(NTPC) Ltd. located in Tehsil Gharghoda, district Raigarh, Chhattisgrah under the Environmental Impact Assessment Notification, 2006 and subsequent amendments thereto and Circulars there under subject to the compliance of the terms and conditions mentioned below:

A. Specific Conditions

i. The maximum production capacity shall not exceed 18 MTPA for opencast mining and 0.72 MTPA for underground mining.

ii. The Plan for diversion of Kurra nala shall be modified to include a major stream flowing through the ML towards the north side. The diversion channel shall be designed taking into consideration the realignment of the channel to join with River Kelo to its original path. Approval of the Flood & Irrigation Department, Govt. Of Chhattisgarh shall be obtained for plan for diversion of Kurra Nala and the stream. The proposed embankment along the diverted channel shall be stabilised with plantation using a mix of native species. Stone pitching shall be done towards forest area.

iii. Top soil of an estimated 25.32 Mm3 generated during initial 9 years shall be stacked properly within the mineralised area with proper slope at earmarked site(s) and shall be used concurrently for reclamation and development of green belt within a year of its generation.

iv. During the initial 4 years of opencast mining, an estimated 264.52 Mm3 of OB generated to be accommodated in temporary external dumps of 60m height in a coal bearing area of 446 ha within the mine lease, shall be re-handled during the 5th year of mine operation when backfilling begins. In addition, 80 ha of an isolated patch of ext. OB dump shall also be rehandled back into the mine void. At the post mining stage, there shall be no permanent external dump outside the coal block.

v. Reclamation of areas after rehandling of temporary external OB dumps and backfilled decoaled voids and habitat restoration of the mined out area shall be carried out by developing a 3-tier native forest ecosystem using native species found in the pre-mining forest ecosystem. A nursery of native species found in pre-mining eco-system shall be developed for reclamation and for habitat f eco-restoration. Afforestation plan shall also include reintroduction of species on which the tribals are dependent for minor forest produce for their livelihoods.

vi. Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilised for watering the mine area, roads, green belt development, etc. The drains shall be regularly desilted and maintained properly.

vii. Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also be provided for adequate retention period to allow proper settling of silt material.

viii. Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.

ix. No groundwater shall be used for the mine operations except for drinking purpose and during the initial years of mine operation. Any additional water requirement envisaged for mine operations shall be obtained from mine pit water, by recycle/reuse to the maximum extent and from rainwater harvesting measures.

x. Regular monitoring of groundwater level and quality shall be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality including TDS and TSS in May and in monsoon. Data thus collected shall be submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.

xi. A Plan for recharging and monitoring of ground water in the impact zone and implemented in consultation with the State Ground Water Board, which includes creation of ponds and wells in impact zone and check dams in River Kelo, Pajhar Nadi in consultation with concerned Government Dept. A suitable scheme for supply of drinking water to 8 surrounding villages shall also be prepared in consultation with State Government, particularly where village wells go dry in the impact zone.

xii. ETP shall also be provided for workshop, and CHP. Effluents shall be treated to conform to

EC Tallasani

prescribed standards, particularly for pH and TSS in case of discharge into any watercourse within or outside the lease.

xiii. An STP shall be provided for the township/colony to treat the domestic effluents to prescribed standards and for their reuse in project activities and in development of green belt in the colony.

xiv. Industrial wastewater (workshop and wastewater) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed for treatment of workshop effluents.

xv. No fly ash from the linked TPPs shall be used in backfilling of the decoaled void without undertaking an environmental feasibility study and without prior approval of this Ministry under EIA Notification, 2006.

xvi. Controlled blasting shall be practiced only during daytime with use of delay electric detonators. Drills shall be wet operated. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.

xvii. Crushers at the CHP shall be operated with high efficiency bag filters, water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system, haulage roads, transfer points, etc. Hoppers of the coal crushing unit shall be fitted with high efficiency bag filters and mist spray water sprinkling system shall be installed and operated effectively at all times of operation to check fugitive emissions from crushing operations, transfer points, stockyards.

xviii. All approach roads shall be black topped and swept regularly with mechanical sweepers and internal roads and major haul roads shall be black topped or concreted and provided with mobile and fixed type sprinklers. A 3-tier avenue plantation using local species shall be developed along the main roads, and approach roads to the mine. In addition, green belt shall be developed using local species all along the periphery of the site, along the areas such as crushing unit, and stockyards, which shall be properly maintained. Water sprinkling arrangements shall be established and functional during transfer and loading of coal.

xix. A Conservation Plan for the endangered faunal species reported in the study area and for the medicinal plants found in and around the project area shall be implemented in consultation with the State Forest and Wildlife Departments. An in-situ conservatory of species found in the pre-mining original ecosystem and rare and endangered plant species including medicinal plants species found in the study area during pre-mining phase shall be established and species reintroduced during mine reclamation and habitat restoration. The Conservation Plan shall include conservation of areas within the project boundary to be left undisturbed as free passageways for the wildlife to reach the forests in the study area. The Conservation Plan shall also include activities of mine reclamation and wildlife habitat restoration of mined out areas within the core zone and project area using native species representative of the forest ecosystem during the pre-mining phase. Separate funds of Rs. 5 crores as capital costs shall be earmarked for implementation of the various activities under the Conservation Plan. The status of the Conservation Plan including expenditure (capital and revenue) shall be reported once a year as part of the monitoring report to this Ministry and to the MOEF Regional Office, Bhopal. The proponent shall also participate in the Regional Wildlife Conservation Plan (RWLCP) for the study area prepared by the State Wildlife Dept. and in addition to the above funds shall also contribute financially for implementation of the RWLCP. Habitat development/conservation measures along the migratory route/habitats of elephants found/visiting the area shall form a part of the Regional Action Plan.

xx. The proponent shall ensure that the 70 km stretch of MGR which includes a part of the elephant migratory corridor provides safe passageway for the elephants, the number and locations of which shall be finalised after a detailed study in consultation with the State Forest and Wildlife Departments, Govt. of Chhattisgarh and inputs from Dr Raman Sukumar, Professor and Chairman, Centre for Ecological Sciences, Indian Institute of Science, Bangalore. Adequate number of over/under passes shall be constructed along the MGR route, visited/reported/inhabited by elephants in the area in consultation with PCCF (WL), and atleast 5 under/over passes shall be created particularly along the 7km stretch of the 70km MGR route, which forms a part of the elephant migratory corridor. In the rest of the route wherever required, similar under/overpasses shall be created. The WL Plan shall include measures for awareness for conservation of wildlife, training to the drivers of MGR for use of siren, horn, fire crackers to move animals away from railway tracks, avoiding use of MGR during time of maximum animal movement.

EC Talwandi

xxi. An Environment Cell/Panel of experts consisting of WL expert, ecologist, sociologist and hydrology shall be created to verse the implementation of the WL Conservation Plan and Plan for Habitat/eco-restoration. No cacti species shall be used in reclamation and eco-restoration of the mine.

xxii. Area brought under afforestation shall be not less than 1876.04 ha which includes, backfilled area (1848.38 ha), which includes area reclaimed after re-handling of temporary external OB dumps and topsoil dump, embankment (15 ha) along ML boundary, infrastructure area (5 ha), along roads, green belt (7.66ha), and in undisturbed areas/safety zone and in colony outside the ML by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha.

xxiii. A Progressive Mine Closure Plan shall be implemented by reclamation of 1848.38 ha of the total quarry area of 2079.34 ha by backfilling and reclamation and by afforestation, to create a 3-storey forest ecosystem, by planting native species in consultation with the local DFO/Agriculture Department/relevant institution. The density of the trees shall be around 2500 plants per ha. The balance 230.96 ha void left as a water body of a max. depth of 60m which shall be gently sloped and the upper benches stabilised with grass and plantation.

xxiv. R&R Plan prepared for the 8 villages in the core zone - Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotigada, Ajigarh and Salehpali with 635 land and homestead losers and 960 land losers shall be implemented within an agreed time-frame of 3-5 years and shall be not less than the norms laid down/approval by the State Government and shall not be inferior than that in the National R&R Policy and shall be completed within the agreed time-frame. R&R shall include specific income generation schemes and setting up of SHGs and cooperatives, and activities and assistance under the Tribal development Plan for the tribals being displaced and provision of annuities for the under-privileged sections. The provision also includes a Corpus Fund for the maintenance of the Resettlement site. The status of the implementation of the R&R Plan along with financial status of the activities undertaken shall be uploaded on the company website and updated at least once in a year.

xxv. The Project cost shall include a Tribal Development Plan for a minimum costs of Rs 10 crores. The activities for Tribal Development under CSR and R&R shall be dovetailed with the District Tribal Welfare Plan being prepared annually by the State Government which should be used to prepare and dovetail the activities. Training/capacity development and skill development shall form an integral part of CSR and R&R Action Plan, wherein project affected youth are given training in it is for enhancing their skill for direct/indirect employment. A colony for outsourced personnel shall be provided. The R&R Action Plan shall also provide for annuities to vulnerable persons of the society as per R&R Policy of Govt. of Chhattisgarh. A female social scientist shall also be included for implementation of R&R and CSR.

xxvi. The proponent shall implement activities undertaken under CSR for neighboring villages in the study area for the life of the project. The activities shall include establishing/strengthening of schools roads, drainage and sanitation, community halls, drinking water in the villages and skill development of the local communities. The CSR Plan shall also include Tribal Welfare activities for the tribals and their skill development for alternate livelihood and addressing issues such as availability of minor forest produce for the tribal/local communities. The details of the activities and expenditure made thereon in each of the villages taken up under CSR shall be displayed on the company's website and updated at least once in six months. The socio-economic development of the villages shall be monitored over the life of the project using indices such as the UNDP Human Development Index.

xxvii. For monitoring land use pattern and for post mining land use, a time series of landuse maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for anyone particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhopal.

xxviii. A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests for approval 5 years in advance of final mine closure for approval. The Plan shall include habitat restoration of the project area consisting of a 3storey forest ecosystem, using a mix of native species found in the pre-mining ecosystem in the study area.

xxix. The approved Mining Plan shall be modified to integrate Specific Conditions No. (iv), (v) and (xxiii) and approval obtained prior to start of mining operations.

EC-Talaipalli

5

B. General Conditions

i. No change in technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.

ii. No change in the calendar plan including quantum of mineral coal and waste being produced shall be made.

iii. Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for monitoring PM_{10}, $PM_{2.5}$, SOz and NOx. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, in the particulate matter etc. shall be carried out at least once in six months.

iv. Data on ambient air quality (PM_{10}, $PM_{2.5}$, S02 and NOx.) and heavy metals such as Hg, As, Ni, Cr, etc) and other monitoring data shall be regularly submitted to the Ministry including its Regional *Office* at Bhopal and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognised under the EP Rules, 1986 shall be furnished as part of the compliance report.

v. Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs.

vi. Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, and treated so as to conform to the standaeds including for heavy metals before discharge prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.

vii. Vehicular emissions shall be kept under control and regularly monitored.

viii. Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analysed through a laboratory recognised under EP Rules, 1986.

ix. Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.

Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed.

x. A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company.

xi. The funds earmarked for environmental protection measures shall e kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its Regional Office at Bhopal.

xii. The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution control Board and may also be seen at the website of the ministry of Environment & Forests at http://envfor.nic.in

xiii. A copy of the environmental clearance letter shall be marked to concerned Panchayat/Zila Parishad, Municipal Corporation or Urban Local Body and local NGO, if any, from whom any suggestion/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on the company's website.

xiv. A copy of the clearance letter shall be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional *Office*, District Industry Centre and Collector's Office/Tehsildar's *Office* for 30 days.

EC-Talaipalli

xv. The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated EC conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in the public domain. The monitoring data of environmental quality parameters (air, water, noise and soil) and critical pollutants such as PM10, PM2.5, SO_2 and NO_x (ambient and stack if any) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mines office and in corporate office and on the company's website.

xvi. The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the MOEF, the respective Zonal offices of CPCB and the SPCB.

xvii. The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/information/monitoring reports.

xviii. The environmental statement for each financial year ending 31st March in Form-V is mandated to be submitted by the project proponent tot the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MOEF by E-mail.

3. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment (Protection) Act, 1986.

5. The above conditions will be enforced *inter-alia*, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules. The proponent shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.

(Dr. Manoranjan Hota)
Director

Copy to:

1. Secretary, Ministry of Coal, New Delhi.
2. DG (F) and Special Secretary, Ministry of Environment and Forests, New Delhi.
3. Secretary, Department of Environment & Forests, Government of Chhattisgarh, Secretariat, Raipur.
4. Principal Chief Conservator of Forests and CWLW, Govt. of Chhattisgarh, Raipur.
5. Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, E-2/240 Arear Colony, Bhopal - 462016.
6. Chairman, Chhattisgarh State Environment Conservation Board, 1-Tilak Nagar, Shiv Mandir Chowk, Main Road, Avanti Vihar, RAIPUR-Chhattisgarh - 492001.
7. Chairman, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi -110032.
8. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
9. District Collector, Raigarh, Government of Chhattisgarh.
10. Monitoring File 11. Guard File 12. Record File.

(Dr. Manoranjan Hota)
Director

EC/Tallaipalli

HOD, Env Engg : For Information please

2/1/13

Government of India
Ministry of Environment, Forest & Climate Change

Indira Paryavaran Bhawan
Aliganj Road,
Jor Bagh, New Delhi

No. J-11015/279/2009-IA-II(M) Pt. file

Dated: 28th October, 2015

To,

The Managing Director,
M/s NTPC Limited,
NTPC Bhawan, Scope Complex,
7, Institutional Area, Lodhi Road,
New Delhi -110003
Email: partham@ntpc.co.in

RED(CM) GM(IA-TS) 19/11

Sub: Revalidation/Transfer of Environmental Clearance of Talaipalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity) in a project area of 2349.35 ha) in villages Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajiligarh, & Salehpali, Tehsil Gharghoda, District Raigarh (Chhattisgrah) – reg.

The Ministry of Environment, Forest and Climate Change (MoEFCC), in accordance with the Environmental Impact Assessment (EIA) Notification, 2006 and subsequent amendment thereto had accorded Environmental Clearance (EC) for **Talaipalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity) in a project area of 2349.35 ha) in villages Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajiligarh, & Salehpali, Tehsil Gharghoda, District Raigarh (Chhattisgrah) to M/s National Thermal Power Corporation Limited** subject to compliance of terms and conditions stipulated therein vide letter No. **J-11015/279/2009-IA.II (M) dated 2nd January, 2013.**

WHEREAS the Hon'ble Supreme Court of India vide judgment dated 25th August, 2014 read with the order dated 24th September, 2014 has cancelled the allocation of 204 coal blocks and issued directions with regard to such coal blocks wherein the Central Government in pursuance of the said directions has to take immediate action to implement the said order.

Pr(efloor)/DIR (C)
Pr(power)/DIR (O)
Pr(mines)/DIR (T)
Pr(coal)/DIR (IR)
Pr(पर्यावरण)/DIR (FRO)
Pr(फिल्म)/DIR (F)
Pr(mines)( )/RED( )
No Pro ( )/ED( )

Page 1 of 3

Revalidation/Transfer_Talaipalli_NTPC to NTPC

प्राप्तिदर
19 NOV 2015
पर्यावरण, वन एवं जल. मं. भारत सरकार

WHEREAS in pursuance of the judgment and order of the Hon'ble Supreme Court, the nominated authority has, in accordance with provisions of the Coal Mines (Special Provisions) Second Ordinance, 2014 and the Coal Mines (Special Provisions) Rules, 2014 conducted the auction of the mines.

WHEREAS Ministry of Coal (MOC) vide letter No. **13016/38/2015-CA-III dated 18th September, 2015** has informed that, their Ministry has allotted 8 Coal Mines through allotment routes to 3 different allottees. MOC has requested this Ministry to facilitate transfer of the Environment Clearance and Forest Clearance of these blocks to the successful allottees.

WHEREAS Ministry of Coal vide **Allotment** Order under clause (c) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13 and Order No. **103/31/2015/NA dated 8th September, 2015** has allotted the **Talaipalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity) in a project area of 2349.35 ha) in villages Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajligarh, & Salehpali, Tehsil Gharghoda, District Raigarh (Chhattisgrah) to M/s National Thermal Power Corporation Limited** as the successful allottee.

WHEREAS vide Gazette Notification S.O. 811 (E) Notification dated 23.03.2015, MOEFCC has made amendments to paragraph 11 in the Gazette Notification S.O.1533 (E) dated 14th September, 2006. Vide the said amendment; where an allocation of coal block is cancelled in any legal proceeding; or by the Government in accordance with law, the environmental clearance granted in respect of such coal block may be transferred, subject to the same validity period as was initially granted, to any legal person to whom such block is subsequently allocated, and in such case, obtaining of "no objection" from either the holder of environment clearance or from the regulatory authority concerned shall not be necessary and no reference shall be made to the Expert Appraisal Committee or the State Level Expert Appraisal Committee concerned.

WHEREAS in light of the MOC Allotment Order No. **103/31/2015/NA** dated **8th September, 2015,** transfer of EC may not be warranted as the Successful Allottee **M/s National Thermal Power Corporation Limited** is already in possession of EC letter No. **J-11015/279/2009-IA.II (M) dated 2nd January, 2013.**

However, the said EC may be considered for revalidation in favour of **M/s National Thermal Power Corporation Limited** for **Talaipalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity) in a project area of 2349.35 ha) in villages Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajligarh, & Salehpali, Tehsil Gharghoda, District Raigarh (Chhattisgrah)** subject to the following conditions:

(i) Any change in scope of work will attract the provisions of the Environment (Protection) Act, 1986 and Environmental Impact Assessment Notification, 2006 in conjunction with the subsequent amendments / circulars.

(ii) All conditions stipulated in the EC letter No.**J-11015/279/2009-IA.II (M) dated 2nd January, 2013** shall remain unchanged.

(iii) The allottee shall be liable, if any, for any act of violation of the EP Act, 1986 / EIA Notification 2006/subsequent amendments and circulars which it has inherited during the revalidation/ transfer.

(iv) Allottee shall be liable for compliance of all court directions, if any.

(P. R. Sakhare)
Scientist C

Copy to :

1. The Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. The Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, E-2/240 Arera Colony, Bhopal – 462016.
3. The Secretary, Department of Environment & Forests, Government of Chhattisgarh, Secretariat, Raipur
4. The Member Secretary, Chhattisgarh State Environment Conservation Board, 1- Tilak Nagar, Shiv Mandir Chowk, Main Road, Avanti Vihar, Raipur – Chhattisgarh – 492001.,
5. The Member Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, Delhi -110 032
6. The Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi
7. The Advisor, Coal India Limited, SCOPE Minar, Core-I, 4th Floor, Vikas Marg, Laxmi nagar, New Delhi.
8. The District Collector, **Raigarh**, Government of Chhattisgarh
9. Monitoring File 10. Guard File 11. Record File 12. Notice Board

(P. R. Sakhare)
Scientist C

J-11015/279/2009-IA.II (M)
Government of India
Ministry of Environment, Forest & Climate Change
Impact Assessment Division
***

Indira Paryavaran Bhavan,
Vayu Wing, 3rd Floor, Aliganj,
Jor Bagh Road, New Delhi-110 003

Dated: 6th November, 2019

To,

Dr. Vijay Kumar- General Manager (Environment)
M/s National Thermal Corporation Ltd
Engineering Office Complex,
Sector 24, **Noida** - 201301 (UP),

Email:environment.ntpc@gmail.com

Sub: Talaipalli Coal Mining Project (OC at 18 MTPA capacity and UG at 0.72 MTPA Capacity) of M/s National Thermal Power Corporation Limited in mine lease area of 2349.35 ha, located in villages Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajijgarh and Salehpalli, in Tehsil Gharghoda, District Raigarh (Chhattisgarh)- Amendment in Environmental Clearance-reg.

Sir,

This refers to your online proposal No. IA/CG/CMIN/114462/2019 dated 14th August, 2019, on the above mentioned subject.

2. The Ministry of Environment, Forest and Climate Change has granted environmental clearance on 2nd January, 2013 in favour of M/s National Thermal Power Corporation Limited for Talaipalli Coal Mining Project (OC at 18 MTPA capacity and UG at 0.72 MTPA Capacity) in mine lease area of 2349.35 ha located in villages Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajijgarh and Salehpalli, in Tehsil Gharghoda, District Raigarh (Chhattisgarh).

3. Subsequent to deallocation by Hon'ble Supreme Court of India judgment dated 25th August, 2014 read with order dated 24th September, 2014 and reallocation to M/s National Thermal Power Corporation Limited as the successful allottee by Ministry of Coal vide MOC Allotment Order No. 103/31/2015/NA dated 8th September, 2015, the EC was revalidated vide Ministry's letter dated 28th October, 2015.

4. The amendment in environmental clearance has been sought with respect to supply of coal from Talaipalli Coal Mine Project to Lara STPP over a distance of 68.4 km as interim arrangement for a period of 24 months i.e. from January,

2020 to December, 2021 or till the commissioning of MGR, whichever is earlier. The amendment has been sought in the said EC with the General condition No. B(I) and B(II) stipulated therein, as below:

B(I) No changes in technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests
B(II) No change in calendar plan including quantum of mineral coal and waste being produced shall be made.

5. The proposal was considered by the Expert Appraisal Committee (EAC) in the Ministry for Thermal & Coal Mining Sector in itsmeeting held on 3-4 October, 2019.The EAC, after deliberations, has recommended for grant of permission for transportation of 2,575 TPD of coal by road with 20 Tonne Tippers/ Dumpers (258 Tippers to and fro per day) from Talaipalli CMP to Lara STPP over a distance of 68.4 km as an interim arrangement for a period of 24 months i.e. from January, 2020 to December, 2021 or till the commissioning of MGR, whichever is earlier; and to start coal production from South Pit with a production capacity of 0.94 MTPA for two years subject to following conditions.

(i) Adequate dust suppression measures shall be taken along the transportation route.

(ii) The PP shall expedite the commissioning of MGR as early as possible

(iii) No transportation of coal by road is allowed after commencement of the MGR.

(iv) All the mitigation measures proposed in Traffic Impact Assessment study shall be complied.

6. Based on recommendations of the EAC, Ministry of Environment, Forest and Climate Change hereby accords approval for amendment in the environmental clearance dated 2nd January, 2013 and subsequent revalidation of EC dated 28th October, 2015, for the above said project, as recommended by the EAC and stated in **para 5** above.

7. All other terms and conditions stipulated in the environmental clearance dated2nd January, 2013 and subsequent revalidation of EC dated 28th October, 2015, shall remain unchanged.

(Dr. R.B. Lal)
Additional Director / Scientist 'E'

Copy to:-

1. The Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. The Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, E-2/240 Arera Colony, Bhopal – 462016.

3. The Secretary, Department of Environment & Forests, Government of Chhattisgarh, Secretariat, Raipur
4. The Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi
5. The Member Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, Delhi -110 032
6. The Member Secretary, Chhattisgarh State Environment Conservation Board, 1- Tilak Nagar, Shiv MandirChowk, Main Road, Avanti Vihar, Raipur – Chhattisgarh – 492001..
7. The District Collector, Raigarh, Government of Chhattisgarh
8. Monitoring File10. Guard File 11. Record File 12. Notice Board.

(Dr. R.B. Lal)
Additional Director / Scientist 'E'

Annexure VIII-B

F. No. 8-18/2012 - FC
Government of India
Ministry of Environment & Forests
(FC Division)

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi - 110510
Date: 28th January, 2014

To

The Principal Secretary (Forests),
Government of Chhattisgarh,
Raipur.

Sub: **Diversion of 766.393 ha of forest land for Talaipalli Coal Mining Project and construction of Railway Line, in favour of National Thermal Power Corporation (NTPC) in Raigad and Dharamjaigarh Forest Divisions, Chhattisgarh regarding.**

Sir,

I am directed to refer to the Govt. of Chhattisgarh letter no. F. 5-30/2011/10-2 dated 15th March, 2012 on above mentioned subject seeking prior approval of the Central Government under Section-2 of the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee constituted under section-3 of the said Act, 'in-principle' approval was granted vide this Ministry's letter of even number dated 5.09.2012 subject to fulfillment of certain conditions prescribed therein. The State Government has furnished compliance report in respect of the condition stipulated in the 'in-principle' approval and has requested the Central Government to grant final approval.

In this connection, I am directed to say that on the basis of the compliance report furnished by the State Government, vide letter no. Bio-Prabandh/Khanij/331-27/1709 dated 8.10. 2013 and 24.12.2013 final approval of the Central Government is hereby granted under section-2 of the Forest (Conservation) Act, 1980 for diversion of 766.393 ha of forest land for Talaipalli Coal Mining Project and construction of Railway Line, in favour of National Thermal Power Corporation (NTPC) in Raigad and Dharamjaigarh Forest Divisions, Chhattisgarh subject to fulfillment of the following conditions:

(i) Legal status of the diverted forest land shall remain unchanged;

(ii) Compensatory afforestation over the degraded forest land, twice in extent to the forest land being diverted shall be raised and maintained by the State Forest Department from the funds already realized from the User Agency;

(iii) The User Agency shall pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;

(iv) The period of diversion of the said forest land under this approval shall be for a period coterminous with the period of the mining lease proposed to be granted under the Mines and Minerals (Development & Regulating) Act, 1957, or Rules framed there under, subject to a maximum period of 30 years;

(v) User agency either himself or through the State Forest Department shall undertake gap planting and soil and moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.40), if any, located in the area within 100 m. from outer perimeter of the mining lease;

(vi) The user agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, to the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities are satisfactorily executed.

(vii) The User Agency either himself or through the State Forest Department shall undertake fencing, protection and afforestation of the safety zone area (7.5 meter strip all along the outer boundary of the mining lease or mining cluster, as applicable, and such other areas as specified in the approved mining plan) in accordance with undertaking given by the user agency;

(viii) The State Forest Department shall undertake afforestation on degraded forest land, one and half time in extent to the area used for safety zone from the funds already realized from the user agency;

(ix) The boundary of safety zone shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar;

(x) In case of under-ground mines, areas on surface shall be fenced and afforested from the funds to be provided by the user agency.

(xi) The user agency shall ensure that at least part of fly ash not used otherwise shall be used for back filling.

(xii) The user agency shall have a social welfare department to keep track of socio-economic conditions of all the project affected people.

(xiii) The user agency shall undertake comprehensive greening in the surrounding villages.

(xiv) The user Agency shall implement the R & R Plan as per the R & R Policy of State Government in consonance with National R&R Policy, Government of India before the commencement of the project work and implementation. The said R & R Plan will be monitored by the State Government/Regional Office of MoEF along with indicators for monitoring and expected observable milestones.

(xv) The user agency shall undertake de-silting of the village tanks and other water bodies located within five km from the mine lease boundary so as to mitigate the impact of siltation of such tanks/water bodies, whenever required.

(xvi) Following activities shall be undertaken by the User Agency as per the Plan of Rs. 256.22 lakhs and undertaking submitted by them to implement this Plan:

(a) Appropriate mitigative measures to minimize soil erosion and choking of streams;

(b) Planting of adequate drought hardy plant species and sowing of seeds in the appropriate area within the mining lease to arrest soil erosion;

(c) Construction of check dams, retention toe walls along the contour to arrest sliding down of the excavated material;

(d) Stabilize the overburden dumps by appropriate grading/benching so as to ensure that that angles of repose at any given place is less than 28°; and

(e) Strict adherence to the prescribed top soil management.

(xvii) No labour camp shall be established on the forest land;

(xviii) The User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;

(xix) The boundary of the diverted forest land, mining lease and safety zone, as applicable, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar;

(xx) The layout plan of the proposal shall not be changed without the prior approval of the Central Government;

(xxi) The forest land shall not be used for any purpose other than that specified in the proposal;

(xxii) The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government;

(xxiii) No damage to the flora and fauna of the adjoining area shall be caused;

(xxiv) Any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department;

(xxv) The user agency shall submit the annual self compliance report in respect of the above conditions to the State Government and to the concerned Regional Office of the Ministry regularly;

(xxvi) Any other condition that the concerned Regional Office of the Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife; and

(xxvii) All other conditions stipulated in the Stage-I approval for which the user agency has submitted undertakings shall be complied with.

(xxviii) The User Agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations and Guidelines, for the time being in force, as applicable to the project.

Yours faithfully

(Priya Ranjan)
Sr. Assistant Inspector General of Forests

Copy for favour of information to:

1. The Principal Chief Conservator of Forest, Govt. of Chhattisgarh, Raipur
2. The Addl. PCCF (Central), Regional Office Bhopal, MoEF
3. The Nodal Officer (FCA), O/o the PCCF, Govt. of Chhattisgarh, Raipur.
4. The User Agency (NTPC Limited, Talaipalli Coal Mining Project, Lalitenga Road, Ghorghoda, District Raigarh-496 111, Chhattisgarh).
5. Monitoring Cell.
6. Guard File.

(Priya Ranjan)
Sr. Assistant Inspector General of Forests

F. No.8-18/2012 - FC
Government of India
Ministry of Environment & Forests
(FC Division)

Indira Paryavaran Bhawan
Jor Bagh Road, Aliganj
New Delhi - 110 003
Dated 22nd May, 2015

To

The Principal Secretary (Power),
Government of Chhattisgarh,
Raipur.

Sub: Transfer of lease in context of diversion of 766.293 ha of forest land for Talaipalli Coal Mining in favour of M/s National Thermal Power Corporation (NTPC) from the original user agency i.e. M/s WTPC in whose favour forest land was diverted to M/s NTPC in whose favour the coal block was recommended/ allotted by the Ministry of Coal - regarding.

Sir,

I am directed to refer to the Ministry of Coal's letter no. 13016/36/2014-CA-II dated 18th September, 2014 on the above subject requesting this Ministry to consider the approval under the Forest (Conservation) Act, 1980 for diversion of 766.293 ha of forest land for Talaipalli Coal Mining in favour of M/s National Thermal Power Corporation (NTPC) from the original user agency i.e. M/s WTPC in whose favour forest land was diverted to M/s NTPC in whose favour the coal block was recommended/ allotted by the Ministry of Coal.

After careful examination of the proposal in accordance with para 7.4 of the Guidelines read with the Guidelines dated 31.03.2010, 03.05.2013 and 31.03.2015 under the Forest (Conservation) Act, 1980 for transfer of approvals granted by the Central Government and on the basis of recommendations of the Ministry of Coal, **the Central Government hereby accords the approval for lease transfer subject to following conditions:**

(i) A bank guarantee (BG) of the NPV or Rs.1,90,00,000 (1 Lakh) whichever is less, will be realized from the user coal agency and will be deposited in the account of Ad-hoc CAMPA before execution of lease in favour of the new user agency.

(ii) Reimbursement of amount paid by the original user agency shall be dealt with in the manner as provided in the Coal Mines (Special Provisions) Second Ordinance, 2014 and Rules framed there under.

(iii) The new user agency shall pay the NPV as per the approval granted under FC Act if not paid earlier. The new user agency shall also furnish an undertaking to pay the additional NPV, if so determined by the Hon'ble Supreme Court of India.

(iv) **The new user agency shall accept the following conditions:**

1. Legal status of the diverted forest land shall remain unchanged.
2. Compensatory afforestation over the degraded forest land twice the area of the mine lease and proposed to be afforested shall be raised **within two years from the stage of this letter, if already not done**, and maintained thereafter as per approved plan by the State Forest Department at the cost of the User Agency.
3. At the time of payment of the Net Present Value (NPV) of the user agency, the User Agency shall furnish an undertaking to pay the additional amount of NPV, if so determined as per the final decision of the Hon'ble Supreme Court of India.
4. The State Govt. shall ensure the following activities as per approved plan of Rs.734.55 lakh under the supervision of the State Forest Department.

(iii) Mitigation measures in shape of soil erosion and control of slopes, shall be implemented within a period of three years with effect from the date of Stage-II clearance in accordance with the approved plan in consultation with the State Forest Department.

(iv) Plantation of adequate density (using plant species and spacing of plants as the appropriate one) within the mining lease as shown with contours in accordance with the approved scheme.

(v) Construction of check dams, retaining wall, walls to arrest sliding down of the overburden material along the contour in accordance with the approved scheme; and

(vi) The damage shall be caused to the natural land use and the site mining will follow the top soil management plan.

7. Fencing, protection and regeneration of the safety zone area (7.5 meters strip all along the boundary boundary of the mining lease area as recommended by the state govt.) shall be done within three year in the consent cum Stage-II Clearance. Besides the aforementioned no degradable forest land to be adopted (for whatever purpose) over & above the area under safety zone shall also be done at the project cost. The degraded forest land (DFL) or wasteland will be addressed in the Stage-II & CA with these plan and afforestation will be done within three years (**if not already done**) from the date of Stage-II clearance.

8. All the possible and technically feasible, the User Agency shall undertake by involving local community, the afforestation measures in the blocks within the lease area, as well as other, the roads outside the lease area (leased) under the approval in consultation with the State Forest Department of the respective area.

9. Period of validity of the said forest land under this approval shall be of a period co-terminus with the period of the mining lease granted to be granted under the Mines and Minerals (Development and Regulation) Act, 1957, as amended and the Rules framed there under;

10. User agency either himself or through the State Forest Department shall undertake eco-plantation and soil and moisture conservation activities to restock and regenerate the degraded open forests (density) areas already less than 0.4(0.4) ha/ha, located in the lease within 100 m boundary pursuant to the mining lease;

11. The user agency shall undertake mining in a phased manner after taking the care for reclamation of the mined out area. The conservation reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, or the concerned State Government and the concerned Regional Office of the Ministry. It is to assure that the annual report that the activities indicated in the reclamation conservation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities are satisfactorily executed.

12. The State Forest Department shall undertake afforestation on degraded forest land, and soil and moisture conservation activities in the area and for safety zone from the funds already realized from the user agency.

13. The boundary of the forest land mining lease wherever applicable, shall be demarcated on ground at the project cost, by erecting iron pipe with cement concrete pillars, each inscribed with its serial number, distance from pillar to pillar and GPS co-ordinates.

14. No open cast mining, blasting operations shall be carried out within the forest land.

15. The user agency shall ensure that at least part of the pit and mine waste shall be used for back filling.

16. The user agency shall have a spiral written dependence in case such of supervisory conditions of all the project officer(s) given.

17. The user agency shall undertake compensatory planting in the non-forest villages.

18. The user Agency shall implement the R & R Plan as per the R & R Policy of Coal Controller or consistent with National R&R Policy, Government of India before the commencement of the project work and implementation. The said R & R Plan will be

22.5.19

Copy for:

1. The Principal Chief Conservator of Forest, Govt. of Chhattisgarh, Raipur.
2. The SERC (S.E.C.R. zone), Regional Office, Nagpur.
3. The Nodal Officer (CCA), O/o the PCCF, Govt. of Chhattisgarh, Raipur.
4. The User Agency.
5. Monitoring Cell.
6. Guard File.

(Sandeep Sharma)
Assistant Inspector General of Forests (IC)

Additional Annexure-10

ANNEXURE-VIIIC

CARDINAL POINTS OF TALAIPALLI COAL BLOCK

POINT NO	LONGITUDE (WGS84)	LATTITUDE (WGS84)
P-0	83° 29' 42.381" E	22° 14' 43.085" N
P-1	83° 29' 45.262" E	22° 14' 41.084" N
P-2	83° 29' 48.143" E	22° 14' 39.103" N
P-3	83° 29' 51.024" E	22° 14' 37.111" N
P-4	83° 29' 53.905" E	22° 14' 35.120" N
P-5	83° 29' 56.786" E	22° 14' 33.129" N
P-6	83° 29' 59.667" E	22° 14' 31.137" N
P-7	83° 30' 2.548" E	22° 14' 29.146" N
P-8	83° 30' 5.429" E	22° 14' 27.154" N
P-9	83° 30' 8.309" E	22° 14' 25.163" N
P-10	83° 30' 11.190" E	22° 14' 23.172" N
P-11	83° 30' 14.071" E	22° 14' 21.180" N
P-12	83° 30' 11.954" E	22° 14' 18.738" N
P-13	83° 30' 9.814" E	22° 14' 16.780" N
P-14	83° 30' 6.528" E	22° 14' 14.811" N
P-15	83° 30' 6.228" E	22° 14' 14.703" N
P-16	83° 30' 5.569" E	22° 14' 14.744" N
P-17	83° 30' 4.840" E	22° 14' 14.978" N
P-18	83° 30' 3.891" E	22° 14' 15.481" N
P-19	83° 30' 2.441" E	22° 14' 16.259" N
P-20	83° 30' 0.927" E	22° 14' 16.848" N
P-21	83° 29' 59.063" E	22° 14' 17.346" N
P-22	83° 29' 58.194" E	22° 14' 17.369" N
P-23	83° 29' 57.459" E	22° 14' 17.199" N
P-24	83° 29' 56.726" E	22° 14' 16.809" N
P-25	83° 29' 56.201" E	22° 14' 16.252" N
P-26	83° 29' 55.552" E	22° 14' 15.385" N
P-27	83° 29' 54.946" E	22° 14' 14.299" N
P-28	83° 29' 54.351" E	22° 14' 12.722" N
P-29	83° 29' 54.054" E	22° 14' 11.569" N
P-30	83° 29' 53.562" E	22° 14' 9.562" N
P-31	83° 29' 53.278" E	22° 14' 8.813" N
P-32	83° 29' 52.773" E	22° 14' 7.856" N
P-33	83° 29' 52.009" E	22° 14' 6.932" N
P-34	83° 29' 51.411" E	22° 14' 6.388" N
P-35	83° 29' 50.968" E	22° 14' 6.180" N
P-36	83° 29' 50.524" E	22° 14' 6.145" N
P-37	83° 29' 49.951" E	22° 14' 6.203" N
P-38	83° 29' 49.303" E	22° 14' 6.382" N
P-39	83° 29' 48.581" E	22° 14' 6.646" N
P-40	83° 29' 47.775" E	22° 14' 7.039" N
P-41	83° 29' 47.015" E	22° 14' 7.574" N
P-42	83° 29' 46.074" E	22° 14' 8.478" N
P-43	83° 29' 43.827" E	22° 14' 10.084" N
P-44	83° 29' 42.565" E	22° 14' 10.543" N
P-45	83° 29' 41.374" E	22° 14' 10.840" N

P-46	83° 29' 39.109" E	22° 14' 10.994" N
P-47	83° 29' 37.410" E	22° 14' 11.000" N
P-48	83° 29' 36.301" E	22° 14' 10.770" N
P-49	83° 29' 34.771" E	22° 14' 10.324" N
P-50	83° 29' 33.857" E	22° 14' 9.973" N
P-51	83° 29' 32.985" E	22° 14' 9.570" N
P-52	83° 29' 32.155" E	22° 14' 9.012" N
P-53	83° 29' 31.146" E	22° 14' 8.053" N
P-54	83° 29' 30.001" E	22° 14' 6.617" N
P-55	83° 29' 28.913" E	22° 14' 4.444" N
P-56	83° 29' 27.772" E	22° 14' 1.936" N
P-57	83° 29' 27.416" E	22° 14' 0.799" N
P-58	83° 29' 27.356" E	22° 14' 0.074" N
P-59	83° 29' 27.604" E	22° 13' 59.031" N
P-60	83° 29' 27.883" E	22° 13' 58.348" N
P-61	83° 29' 28.539" E	22° 13' 57.253" N
P-62	83° 29' 28.929" E	22° 13' 56.763" N
P-63	83° 29' 29.000" E	22° 13' 56.531" N
P-64	83° 29' 28.918" E	22° 13' 56.092" N
P-65	83° 29' 28.725" E	22° 13' 55.652" N
P-66	83° 29' 28.409" E	22° 13' 55.083" N
P-67	83° 29' 27.843" E	22° 13' 54.268" N
P-68	83° 29' 27.315" E	22° 13' 53.427" N
P-69	83° 29' 26.957" E	22° 13' 52.652" N
P-70	83° 29' 26.574" E	22° 13' 51.321" N
P-71	83° 29' 26.390" E	22° 13' 50.368" N
P-72	83° 29' 26.594" E	22° 13' 49.643" N
P-73	83° 29' 27.249" E	22° 13' 48.896" N
P-74	83° 29' 28.209" E	22° 13' 48.008" N
P-75	83° 29' 25.416" E	22° 13' 45.934" N
P-76	83° 29' 22.623" E	22° 13' 43.860" N
P-77	83° 29' 19.830" E	22° 13' 41.786" N
P-78	83° 29' 17.038" E	22° 13' 39.712" N
P-79	83° 29' 14.245" E	22° 13' 37.638" N
P-80	83° 29' 11.453" E	22° 13' 35.564" N
P-81	83° 29' 8.660" E	22° 13' 33.490" N
P-82	83° 29' 5.867" E	22° 13' 31.416" N
P-83	83° 29' 3.075" E	22° 13' 29.342" N
P-84	83° 29' 0.282" E	22° 13' 27.267" N
P-85	83° 28' 57.490" E	22° 13' 25.193" N
P-86	83° 28' 54.698" E	22° 13' 23.119" N
P-87	83° 28' 51.905" E	22° 13' 21.045" N
P-88	83° 28' 48.443" E	22° 13' 21.936" N
P-89	83° 28' 44.980" E	22° 13' 22.827" N
P-90	83° 28' 41.518" E	22° 13' 23.718" N
P-91	83° 28' 38.056" E	22° 13' 24.609" N
P-92	83° 28' 34.593" E	22° 13' 25.499" N
P-93	83° 28' 31.131" E	22° 13' 26.390" N
P-94	83° 28' 27.668" E	22° 13' 27.281" N
P-95	83° 28' 24.206" E	22° 13' 28.172" N

P-96	83° 28' 20.744" E	22° 13' 29.063" N
P-97	83° 28' 17.281" E	22° 13' 29.953" N
P-98	83° 28' 13.819" E	22° 13' 30.844" N
P-99	83° 28' 10.356" E	22° 13' 31.735" N
P-100	83° 28' 6.894" E	22° 13' 32.625" N
P-101	83° 28' 3.431" E	22° 13' 33.516" N
P-102	83° 27' 59.969" E	22° 13' 34.407" N
P-103	83° 27' 56.506" E	22° 13' 35.297" N
P-104	83° 27' 53.044" E	22° 13' 36.188" N
P-105	83° 27' 49.581" E	22° 13' 37.079" N
P-106	83° 27' 46.119" E	22° 13' 37.969" N
P-107	83° 27' 42.656" E	22° 13' 38.860" N
P-108	83° 27' 39.193" E	22° 13' 39.750" N
P-109	83° 27' 35.623" E	22° 13' 39.719" N
P-110	83° 27' 32.052" E	22° 13' 39.688" N
P-111	83° 27' 28.482" E	22° 13' 39.656" N
P-112	83° 27' 24.911" E	22° 13' 39.625" N
P-113	83° 27' 21.341" E	22° 13' 39.594" N
P-114	83° 27' 17.771" E	22° 13' 39.562" N
P-115	83° 27' 14.200" E	22° 13' 39.531" N
P-116	83° 27' 10.630" E	22° 13' 39.499" N
P-117	83° 27' 7.059" E	22° 13' 39.468" N
P-118	83° 27' 3.489" E	22° 13' 39.436" N
P-119	83° 26' 59.918" E	22° 13' 39.405" N
P-120	83° 26' 56.348" E	22° 13' 39.373" N
P-121	83° 26' 52.777" E	22° 13' 39.342" N
P-122	83° 26' 49.207" E	22° 13' 39.310" N
P-123	83° 26' 45.636" E	22° 13' 39.279" N
P-124	83° 26' 42.066" E	22° 13' 39.247" N
P-125	83° 26' 38.495" E	22° 13' 39.215" N
P-126	83° 26' 34.925" E	22° 13' 39.184" N
P-127	83° 26' 31.354" E	22° 13' 39.152" N
P-128	83° 26' 27.784" E	22° 13' 39.120" N
P-129	83° 26' 24.213" E	22° 13' 39.089" N
P-130	83° 26' 20.643" E	22° 13' 39.057" N
P-131	83° 26' 17.072" E	22° 13' 39.025" N
P-132	83° 26' 13.502" E	22° 13' 38.993" N
P-133	83° 26' 9.931" E	22° 13' 38.962" N
P-134	83° 26' 6.361" E	22° 13' 38.930" N
P-135	83° 26' 2.790" E	22° 13' 38.898" N
P-136	83° 25' 59.220" E	22° 13' 38.866" N
P-137	83° 25' 55.649" E	22° 13' 38.834" N
P-138	83° 25' 52.079" E	22° 13' 38.802" N
P-139	83° 25' 48.509" E	22° 13' 38.770" N
P-140	83° 25' 44.938" E	22° 13' 38.738" N
P-141	83° 25' 41.368" E	22° 13' 38.706" N
P-142	83° 25' 41.345" E	22° 13' 42.254" N
P-143	83° 25' 41.323" E	22° 13' 45.801" N
P-144	83° 25' 41.301" E	22° 13' 49.348" N
P-145	83° 25' 41.278" E	22° 13' 52.896" N

P-146	83° 25' 41.256" E	22° 13' 56.443" N
P-147	83° 25' 41.234" E	22° 13' 59.991" N
P-148	83° 25' 41.211" E	22° 14' 3.538" N
P-149	83° 25' 41.189" E	22° 14' 7.085" N
P-150	83° 25' 41.167" E	22° 14' 10.633" N
P-151	83° 25' 44.729" E	22° 14' 10.676" N
P-152	83° 25' 48.292" E	22° 14' 10.720" N
P-153	83° 25' 51.854" E	22° 14' 10.764" N
P-154	83° 25' 55.416" E	22° 14' 10.808" N
P-155	83° 25' 58.979" E	22° 14' 10.852" N
P-156	83° 26' 2.541" E	22° 14' 10.895" N
P-157	83° 26' 6.104" E	22° 14' 10.939" N
P-158	83° 26' 9.666" E	22° 14' 10.983" N
P-159	83° 26' 13.228" E	22° 14' 11.026" N
P-160	83° 26' 16.791" E	22° 14' 11.070" N
P-161	83° 26' 20.353" E	22° 14' 11.114" N
P-162	83° 26' 20.331" E	22° 14' 14.419" N
P-163	83° 26' 20.310" E	22° 14' 17.724" N
P-164	83° 26' 20.288" E	22° 14' 21.029" N
P-165	83° 26' 20.266" E	22° 14' 24.335" N
P-166	83° 26' 20.244" E	22° 14' 27.640" N
P-167	83° 26' 20.222" E	22° 14' 30.945" N
P-168	83° 26' 20.201" E	22° 14' 34.251" N
P-169	83° 26' 20.179" E	22° 14' 37.556" N
P-170	83° 26' 20.157" E	22° 14' 40.861" N
P-171	83° 26' 20.135" E	22° 14' 44.167" N
P-172	83° 26' 20.113" E	22° 14' 47.472" N
P-173	83° 26' 20.092" E	22° 14' 50.777" N
P-174	83° 26' 20.070" E	22° 14' 54.082" N
P-175	83° 26' 20.048" E	22° 14' 57.388" N
P-176	83° 26' 20.026" E	22° 15' 0.693" N
P-177	83° 26' 20.004" E	22° 15' 3.998" N
P-178	83° 26' 19.983" E	22° 15' 7.304" N
P-179	83° 26' 19.961" E	22° 15' 10.609" N
P-180	83° 26' 19.939" E	22° 15' 13.914" N
P-181	83° 26' 19.917" E	22° 15' 17.220" N
P-182	83° 26' 19.895" E	22° 15' 20.525" N
P-183	83° 26' 19.874" E	22° 15' 23.830" N
P-184	83° 26' 19.852" E	22° 15' 27.135" N
P-185	83° 26' 19.830" E	22° 15' 30.441" N
P-186	83° 26' 19.808" E	22° 15' 33.746" N
P-187	83° 26' 19.786" E	22° 15' 37.051" N
P-188	83° 26' 19.765" E	22° 15' 40.357" N
P-189	83° 26' 19.743" E	22° 15' 43.662" N
P-190	83° 26' 19.721" E	22° 15' 46.967" N
P-191	83° 26' 19.699" E	22° 15' 50.273" N
P-192	83° 26' 19.677" E	22° 15' 53.578" N
P-193	83° 26' 22.402" E	22° 15' 56.082" N
P-194	83° 26' 25.126" E	22° 15' 58.585" N
P-195	83° 26' 27.850" E	22° 16' 1.089" N

P-196	83° 26' 30.575" E	22° 16' 3.593" N
P-197	83° 26' 33.299" E	22° 16' 6.096" N
P-198	83° 26' 36.023" E	22° 16' 8.600" N
P-199	83° 26' 38.748" E	22° 16' 11.103" N
P-200	83° 26' 42.004" E	22° 16' 9.691" N
P-201	83° 26' 45.261" E	22° 16' 8.278" N
P-202	83° 26' 48.517" E	22° 16' 6.865" N
P-203	83° 26' 51.774" E	22° 16' 5.453" N
P-204	83° 26' 55.030" E	22° 16' 4.040" N
P-205	83° 26' 58.287" E	22° 16' 2.627" N
P-206	83° 27' 1.543" E	22° 16' 1.214" N
P-207	83° 27' 4.800" E	22° 15' 59.802" N
P-208	83° 27' 8.056" E	22° 15' 58.389" N
P-209	83° 27' 8.064" E	22° 15' 54.395" N
P-210	83° 27' 8.072" E	22° 15' 50.402" N
P-211	83° 27' 8.080" E	22° 15' 46.409" N
P-212	83° 27' 8.088" E	22° 15' 42.416" N
P-213	83° 27' 11.411" E	22° 15' 41.273" N
P-214	83° 27' 14.734" E	22° 15' 40.130" N
P-215	83° 27' 18.058" E	22° 15' 38.988" N
P-216	83° 27' 21.381" E	22° 15' 37.845" N
P-217	83° 27' 24.704" E	22° 15' 36.702" N
P-218	83° 27' 28.027" E	22° 15' 35.560" N
P-219	83° 27' 31.351" E	22° 15' 34.417" N
P-220	83° 27' 34.674" E	22° 15' 33.274" N
P-221	83° 27' 37.997" E	22° 15' 32.132" N
P-222	83° 27' 41.320" E	22° 15' 30.989" N
P-223	83° 27' 44.643" E	22° 15' 29.846" N
P-224	83° 27' 47.966" E	22° 15' 28.703" N
P-225	83° 27' 51.289" E	22° 15' 27.561" N
P-226	83° 27' 54.613" E	22° 15' 26.418" N
P-227	83° 27' 57.936" E	22° 15' 25.275" N
P-228	83° 28' 1.259" E	22° 15' 24.132" N
P-229	83° 28' 4.582" E	22° 15' 22.989" N
P-230	83° 28' 7.905" E	22° 15' 21.846" N
P-231	83° 28' 11.228" E	22° 15' 20.703" N
P-232	83° 28' 14.551" E	22° 15' 19.560" N
P-233	83° 28' 17.874" E	22° 15' 18.417" N
P-234	83° 28' 21.197" E	22° 15' 17.274" N
P-235	83° 28' 24.520" E	22° 15' 16.131" N
P-236	83° 28' 27.843" E	22° 15' 14.988" N
P-237	83° 28' 31.166" E	22° 15' 13.845" N
P-238	83° 28' 34.488" E	22° 15' 12.702" N
P-239	83° 28' 37.811" E	22° 15' 11.559" N
P-240	83° 28' 41.134" E	22° 15' 10.416" N
P-241	83° 28' 40.226" E	22° 15' 6.067" N
P-242	83° 28' 39.318" E	22° 15' 1.718" N
P-243	83° 28' 43.082" E	22° 15' 2.752" N
P-244	83° 28' 46.845" E	22° 15' 3.787" N
P-245	83° 28' 50.609" E	22° 15' 4.821" N

P-246	83° 28' 54.373" E	22° 15' 5.855" N
P-247	83° 28' 57.890" E	22° 15' 6.894" N
P-248	83° 29' 1.408" E	22° 15' 7.932" N
P-249	83° 29' 4.926" E	22° 15' 8.971" N
P-250	83° 29' 7.807" E	22° 15' 6.980" N
P-251	83° 29' 10.688" E	22° 15' 4.989" N
P-252	83° 29' 13.570" E	22° 15' 2.998" N
P-253	83° 29' 16.451" E	22° 15' 1.006" N
P-254	83° 29' 19.332" E	22° 14' 59.015" N
P-255	83° 29' 22.213" E	22° 14' 57.024" N
P-256	83° 29' 25.095" E	22° 14' 55.033" N
P-257	83° 29' 27.976" E	22° 14' 53.042" N
P-258	83° 29' 30.857" E	22° 14' 51.050" N
P-259	83° 29' 33.738" E	22° 14' 49.059" N
P-260	83° 29' 36.619" E	22° 14' 47.068" N
P-261	83° 29' 39.500" E	22° 14' 45.077" N
P-262	83° 29' 42.381" E	22° 14' 43.085" N

NOTE: Boundary points are software generated from georeferenced block boundary of Talaipalli coal block

Annexure VIIID

Hydrogeology of Area in & around 10 km. radius of Talaipalli Coal Mining Project of National Thermal Power Corporation Limited

At- Village Talaipalli, Block-Gharghoda, District- Raigarh, Chhattisgarh State

Prepared by
Earth & Environment,
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IRC Village, Nayapalli, Bhubaneswar-751015

Hydrogeology of Area in & around 10 km. radius of **Talaipalli Coal Mining Project of National Thermal Power Corporation Limited**

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CHAPTER-I

INTRODUCTION

1.1 GENERAL:

National Thermal Power Corporation (NTPC) Ltd. is the leading power generating listed company in the country under Ministry of Power, Govt of India, engaged in generation of Power with existing installed capacity of 43,128 MW 9including 5,974 MW through JVs) comprising of 38 NTPC Stations (17 Coal based stations, 7 combined cycle gas/liquid fuel based stations),7 joint Venture stations (6 coal based and one gas based) and 7 renewable energy projects. NTPC is the largest power generating major in the country. It has also diversified into hydro power, coal mining, power equipment manufacturing, oil & gas exploration, power trading and distribution. With an increasing presence in the power.value chain, NTPC is well on its way to become an integrated power major.

The existing power plants of NTPC are accorded long term coal linkages from CIL and Singareni Collieries Co. Ltd (SCCL). To meet the short term shortages, NTPC is also importing coal. Considering the gap in demand and existing linkages for coal, NTPC has decided to diversify into coal mining through backward integration and has been allotted coal mining blocks.

Talaipalli coal mining block in the state of Chhattisgarh is one such block allotted to NTPC by Ministry of Coal (MoC), vide letter No. 13016/29/2003-CA-1, dated 25.01.2006, for meeting coal requirement for the proposed 4000 MW Lara Integrated Power Project to come up about 60 kms away from the coal block in Chhattisgarh State.

As per the directive of Ministry of Coal, NTPC Ltd. submitted a mining plan in Feb 2010 for Talaipalli Coal Block in Mand, Raigarh in the state of Chhattisgarh. The Ministry of Coal vide their letter No. 13016/29/2003-CA-I (Vol III), dated 31st March, 2010 has approved the mining capacity by Open Cast – 18.0 MTPA and 0.72 MTPA from Underground operations.
Environmental Clearance was accorded by the Ministry of Environment and Forest vide letter No.J-11015/279/2009-I A II (M) dt.02.01.2013 for the proposed Talaipalli Coal Mine

Project (OpenCast at 18MTPA Capacity & Under Ground at 0.72 MTPA Capacity of a total project area of 2349.35ha.).

The entire coal produced from this block will be transported by Merry Go Round (MGR) rail system for a total length of approximately 60 km between the mine and the power plant.

1.2 BRIEF PROJECT PROFILE:

This coal block has Tolge Pahar in the north, Proposed Palma Coal Block (South Eastern Coalfields Ltd.), in the east, Silot Pahar in the south and proposed Chirnpatapani Coal Block (South Eastern Coalfields Ltd.) in the West Talaipalli block is about 55 km away from Raigarh and is close to Tehsil Headquarters at Gharghoda situated on Raigarh-Ambikapur State Highway. The nearest railway station is Raigarh lying on the Mumbai-Howrah main line of SE railways.

Kelo River is flowing through the south-eastern part of the present area, and constitutes the main drainage system.

This coal block has coal seams/splits from XLA to IIL (26 split seams/sections) with gross geological reserves of 1400.58 Mt. of power grade coal of varying grades. Dip of seams is varying between 4° to 8°. Opencast coal mining has been proposed up to the basal seam III and the balance are considered for by below ground method of mining. Since opencast mining ensures much higher percentage of extraction of coal reserves, the proposed strategy is considered best from the point of view of coal conservation. The Opencast Mine will have maximum depth of 404 m. Below ground mining development is proposed to commence after about 20 yrs of start of opencast mining. Coal requirement for Linked Power Station has been indicated at about 18 MTPA, which is projected to be achieved in the Opencast Mine in the 5th year of coal production. The proposed opencast mine will have a life of 52 years, including the build-up period of the Project.

The total O.C mineable coal reserves have been estimated as 843.68 Mt at the corresponding OB of 3777.07 Mm^3 at an average SR of 4.48 m^3/t.

The capacity of underground mine to be worked through a pair of vertical shafts is assessed at 0.72 MTPA at 100% rated capacity or 0.60 MTPA at 85% level. The life of below ground mine will be 30 years including development period.

NTPC intends to mine the entire property in a scientific manner with due regard to the conditions laid out by Ministry of Environment & Forest and with full emphasis on Environmental conservation and safety.

1.3 LOCATION OF THE PROJECT:

Talaipalli coal block mine lease area of 2113 ha is bounded by latitude 22° 13' 35" to 22° 16' 08" N and longitude 83° 25' 49" to 83° 30' 22" E. It is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. Talaipalli block is covered by Survey of India topo sheet No. 64N/7 &N/8 (RF 1:50000). The location map is shown in figure no 1.1.

1.4 MINING METHODS

To ensure availability of adequate quantity of coal, it has been planned to commence mechanized mining operations by having two independent opencast mines at eastern & western extremities. Both the quarries would advance towards southwards as also towards each other to finally merge into one entity after about 20 years of mine operation. Internal dump will start once sufficient void space gets available from 5th year of mine operation. This de-coaled area can be used for internal dumping. Initially overburden will be placed as external dump within the mine property.

Fig.1.1: Location of Talaipalli Coal Mining Project of M/s. NTPC Ltd

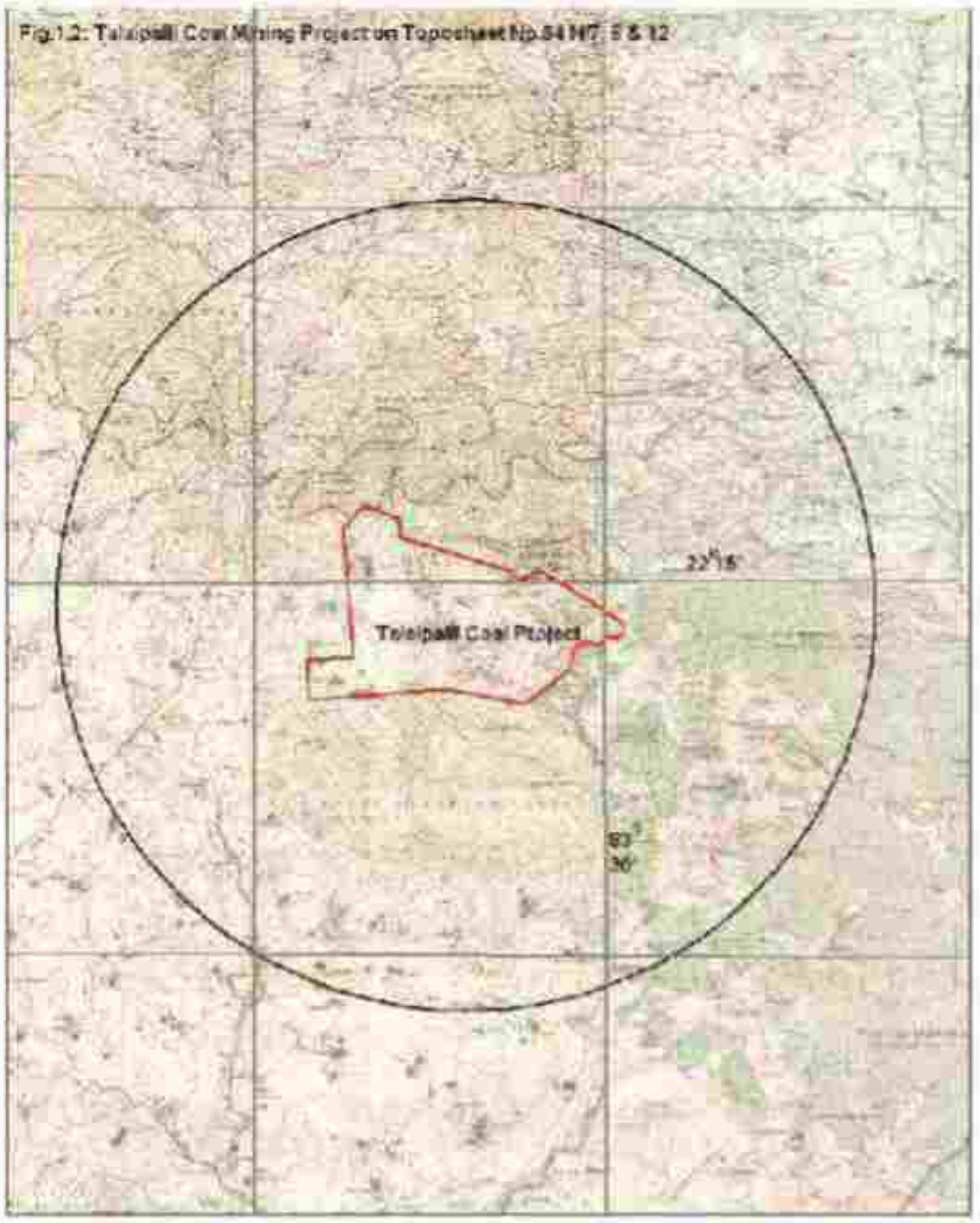


Fig.1.2: Talaipalli Coal Mining Project on Toposheet No.64 N7, 8 & 12

After the Opencast mine is exhausted, underground mining will commence. It will be serviced by two vertical shafts. The coal production target is fixed at 0.60 Million Tonnes per annum from the Underground Mine and the expected life of the mine will be 34 years including construction period of 4 years. II Seam, which will be the main seam for UG mining with patches in other seams in the packet of UG mining seams, has general thickness of 0.50m to 2.50m.Two Continuous Miner districts will provide the production. The mine parameters for opencast mine are given at Table No.1.1

Table 1.1: Opencast Mine Main Parameters

Sl. No.	Parameters	Unit	Value
1	Maximum depth	m	404
2	Maximum strike length		
	along the Mine Floor	Km	6.02
	along the Mine Surface	Km	6.69
3	Minimum strike length		
	along the Mine Floor	Km	0.75
	along the Mine Surface	Km	1.37
4	Maximum dip rise length		
	on the Mine Floor	Km	4.12
	on the Mine Surface	Km	4.76
5	Minimum dip rise length		
	on the Mine Floor	Km	2.60
	on the Mine Surface	Km	3.06
6	Area		
	On the Mine Floor	ha	2027.79
	On the Mine Surface	ha	2079.34

1.5 WATER REQUIREMENT:

The total water requirement for domestic and various industrial purpose for initial 5 years of mining operations is estimated to be 2390 m^3/day. Out of this about 692 m^3/day is expected to be recovered and reused and thus the net water requirement will be about 1698 m^3/day with the following break up.

Table 1.2: Break-up of Water Requirement *All values in m³/day*

Estimated Water Requirement for Initial Five Years of Mining Operation (m³/day)

Sl. No	Purpose	Source of Water	Total Water Requirement	Recycled Quantity	Use of recycled Water	Balance / Actual Water Requirement
A	DOMESTIC					
1	Mines	Bore well	150	120	Dust suppression ,Green Belt Development etc	30
2	Colony	Bore well/sump water	600	540	Dust suppression ,Green Belt Development etc	60
B	INDUSTRIAL					
1	Vehicle wash	Sump Water	40	32	Vehicle wash	8
2	Dust suppression & Green belt development	Sump Water	1600	0	Dust suppression ,Green Belt Development etc	1600
	Total		2390	692		1698

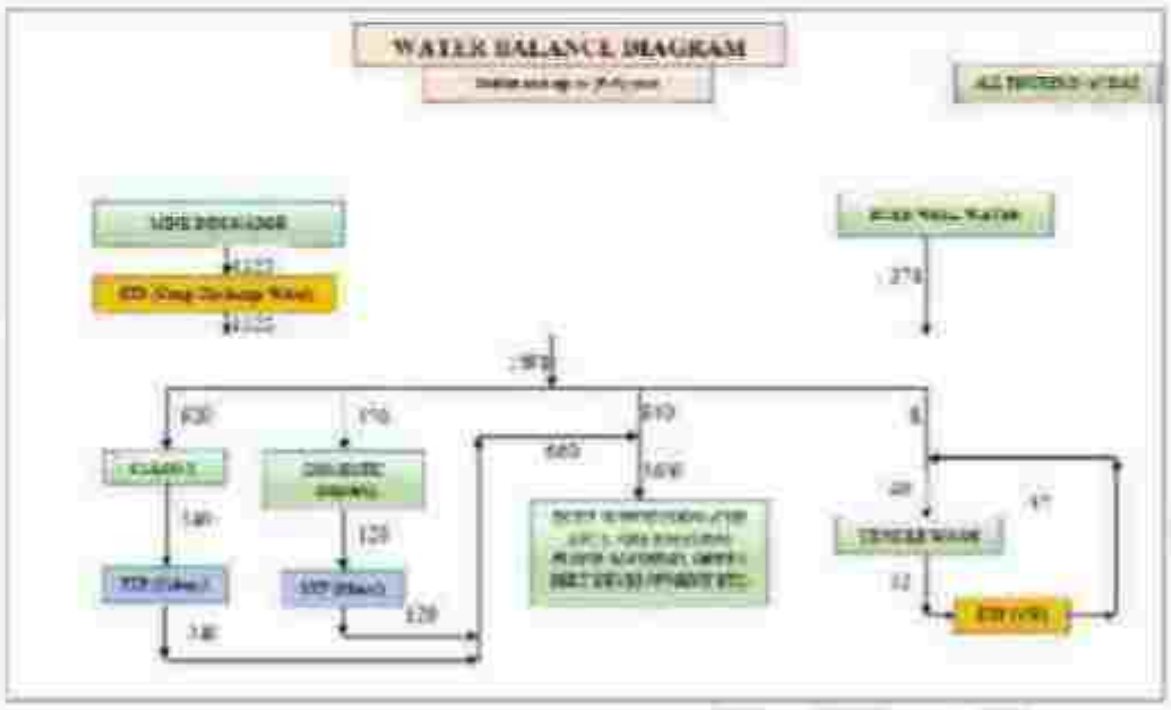
Note : Recovery / Waste water generation of 80% from Mines,90% from colony and 80 % from vehicle wash is considered
Part of Bore well water shall be used for Industrial Purposes subject to adequacy of sump water availability

SOURCE OF WATER

The principal source of water for the project is the pit de-watering water. Ground water is required for initial period during mining development and construction of infrastructure. Since the mining activities will intersect water table, mining quarry needs to be de-watered for safe mining. Based on the hydrological investigation, it is estimated that about 936 m^3/day of water will have to be pumped out of the mine at the end of 1st year of mining and 1320 m^3/day will be available at the end of 2nd year. Pit de-watering water will be used for dust suppression, fire fighting, vehicle washing, green belt creation, etc. and also for drinking and domestic uses after treatment if necessary. During the initial stage, pit de-watering water is not sufficient for the requirement. So requirement will be met from ground water source through bore wells. Use of ground water will be stopped once pit de-watering water is sufficient for the total requirement.

The water balance diagram is given in Figure no 1.3, shown below.

Figure No – 1.3



At-Village Talaipalli, Block-Gharghoda, Raigarh District, Chhattisgarh State

CHAPTER-2

OBJECTIVE OF HYDROGEOLOGICAL SURVEY

2.1 Objectives

The detail hydrogeological investigation of the buffer zone has been undertaken with the following objectives.

i) To decipher the present hydrogeological scenario of the study area.
ii) To decipher the aquifer geometry in the area.
iii) To evaluate the status of the ground water storage.
iv) To assess the hydraulic characteristics of the aquifer present in the area.
v) To evaluate the status of ground water resource and its utilization and ground water budget.
vi) To assess the hydro-chemical characteristics of ground water present in the area.
vii) To quantify the volume of de-watering from the mining pit.

2.2 Methodology of Investigation

The geology of the area and subsurface conditions have been interpreted based on the exploratory data collected from different agencies, like Geological Survey of India, Central Ground Water Board, Govt. of India. Intensive well inventory of the area have been undertaken to establish the groundwater flow regimes. The hydrogeological properties of the aquifer existing in the study area have been evaluated through conducting aquifer performance test on representative wells. The pumping test conducted includes constant rate of pumping and observation of water level change at regular interval of time. The test data has been analyzed using standard computer added techniques. The ground water resource has been calculated as per the norms of GEC, 97 of Ministry of Water Resources, Govt. of India. Climate data of the area has been taken from the IMD.

2.3 Study Area & its Profile

The area under present study has been taken as a circular area of 10km. radius keeping Talaipalli Coal Mining Project at the center here called as buffer zone. The study area falls under the Survey of India Topo-sheets No. 64 N/7,8,11 & 12. It is bounded by 22°09'17.98" to 22°22' 05.424" N. Latitudes and 83°22' 10.51" to 83° 33' 49.92" E. Longitudes. The index map of the study area is shown in fig.no.2.1.The total study area is 314sq.km.

The study area belongs to north-eastern part of Raigarh district in Chattisgarh state.The study area falls in Gharghoda, Lailungs and Tamnar blocks of Raigarh district. The maximum area of the buffer zone lies in the Gharghoda block. The block-wise area of the study area is shown in table no.2.1.

The area is characterized by denudational hill ranges in the north with intervening valleys, plateaus in the south, rivers, nalas, reserved forest and water bodies. The surface elevation varies from 600m to 300m above M.S.L. The general surface gradient is from north to south. The major reserved forests in the area are Tolge west Reserved Forest, Silot RF, Rampur RF and Deodongri RF. The area is drained by river Kelo and its tributaries and other small streams. The river Kelo flows in the eastern part in north to south direction.

The area is underlain by rocks of the Gondwana Super Group and granite gneiss.

The study area is approacheable by road from Gharghoda, the block head quarter. There exist a I net work of roads in the study area.

The area is sparsely populated with few isolated hamlets. The main hamlets are Raikera, Bhalumunda, Bajarmura, Milupara, Hinjhar, Pelma, Mariakachhar, Gondpara, Katharipali, Diyagori,Chhinkhol, Bhakura, Phulkanda, Kurunjkhol, Urba and Muskati etc.

Table 2.1: Block-wise area of the study Area

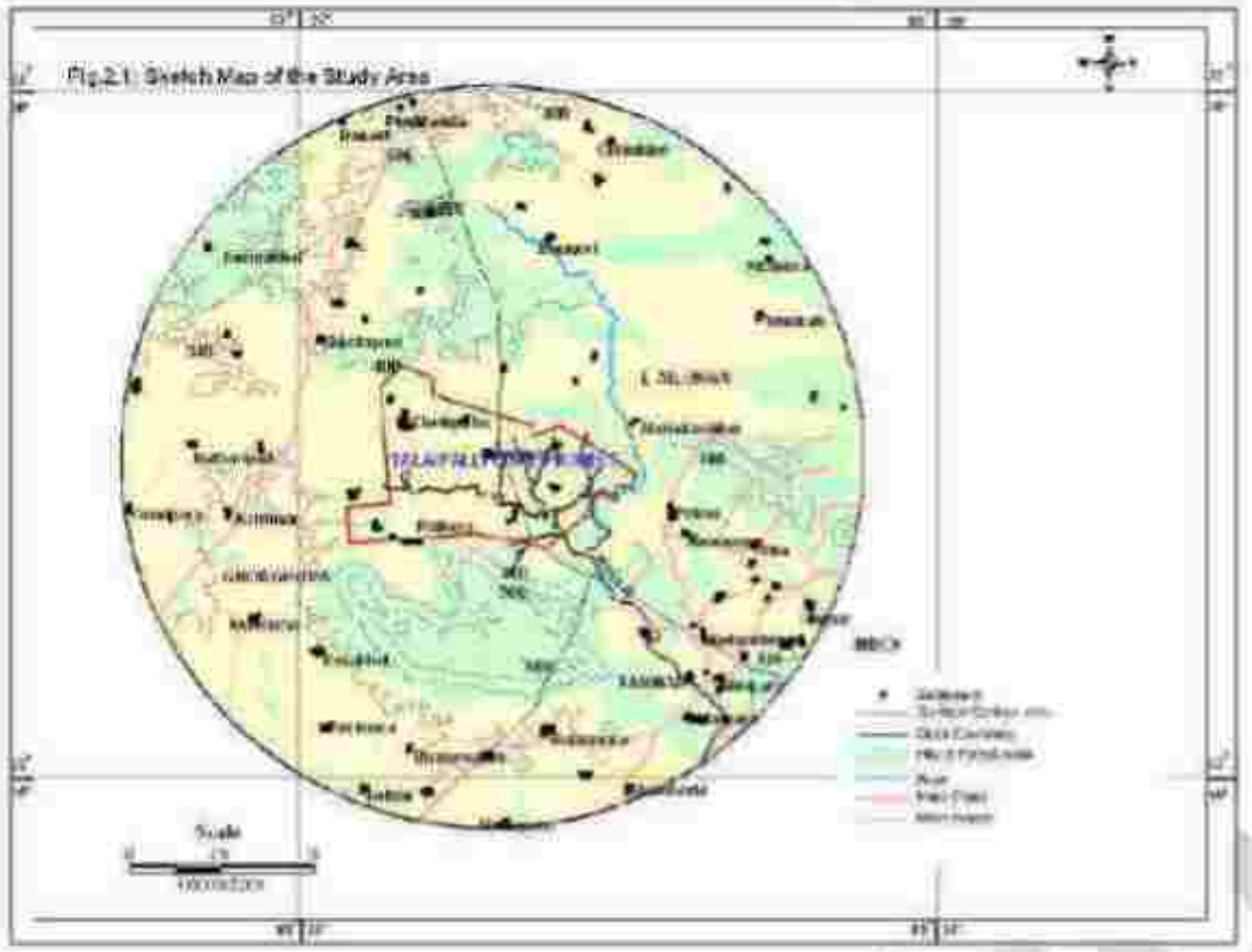
Sl.No.	Block	Area (in sq.km)
1	Gharghoda	160.23
2	Lailunga	122.4
3	Tamnar	31.37
	Total	**314.0**

Landuse Pattern

The total buffer zone area of all the rural villages as per the 2001 census data works out to 30233 Ha with the following classification:

	Area in Ha	in %
Forest land	3682.0	12.18
Irrigated land	534.0	1.77
Un-irrigated land	16017.0	52.97
Cultivable waste Land	5926.0	19.60
Land not available for cultivation	4074.0	13.48
Total	30233.0	100.00

From the above it is seen that village Forest and un-irrigated land constitutes about 65.15% of the total buffer zone area.



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CHAPTER-3

CLIMATE

The study area experiences a tropical climate with a hot and dry summer and pleasant winter intervened by south-west monsoon season. The summer season extends from March to middle of June followed by rainy season from mid-June to mid-October. The winter season extends from November till the end of February.

3.2 Temperature

The temperature in the study area starts rising from March to May, which is the hottest month of the year with mean daily maximum temperature 43°C. However in 2005 June was the hottest month with a maximum temperature of 48°C. With the advent of monsoon, temperature starts reducing and the winter season starts from November. December is the coldest month of the year with mean daily maximum temperature of about 27°C and the temperature coming down to a minimum of about 6°C.

3.3 Humidity and Wind

Humidity of the air is generally high during south-west monsoon period and low during winter months. The relative humidity varies from 26% to 84% throughout the year. The mean monthly potential evapo-transpiration value ranges from 4mm in December to 470mm in May.

Wind is generally light to moderate. Wind velocity increases during summer and south-west monsoon months. The mean annual wind speed is 3.3km/hr.

3.4 Rainfall

The south-west monsoon is the principal source of precipitation in the study area. The average annual rainfall of the study area is 1165 mm (2004-2010). About 92% of the total rainfall is received during the period from June to September. July and August are the wettest months of the year.

Table.3.1: Monthly Rainfall in Raigarh District, Chhattisgarh

Month/ Year	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
2004	18.8	0	0	0	0	168.5	289.2	474.8	61.9	36.6	0	0	1049.8
2005	37.5	8.2	0	0	0	277.1	427.6	310.4	121.6	64.4	0	0	1246.8
2006	0	0	0	0	91.2	117.5	308.2	430.6	110.2	26.1	5.3	0	1089.1
2007	0	35.2	17.2	0	29.6	233.1	342.3	318.2	239.5	40.1	36.6	0	1291.8
2008	22.4	21.3	27.8	31.5	2.3	256.7	298.1	586.5	261.5	5.8	0	0	1513.9
2009	0	0	0	0	0	15.3	650.4	194.8	92.2	25.5	0	0	978.2
2010	0	0	0	0	0	117.1	319.5	251.4	251.2	21.3	7.3	20.5	988.3
Av	**11.2**	**9.2**	**6.4**	**4.5**	**17.6**	**169.3**	**376.5**	**366.7**	**162.6**	**31.4**	**7.0**	**2.9**	**1165.4**

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.	Avg.
Avg. min. Temperature ^{0}C	13.59	16.31	20.37	24.89	27.66	27.15	25.13	25.13	24.70	22.13	16.17	13.45	21.65
Avg. max. temperature ^{0}C	27.67	30.32	35.59	39.71	41.69	37.41	31.68	31.15	32.06	32.54	30.57	27.84	33.84
Monthly avg. relative humidity %													
8.30 Hrs	67	60	47	44	44	65	84	86	81	71	65	67	65
17.30 Hrs	47	37	27	24	27	52	76	79	75	61	52	51	51

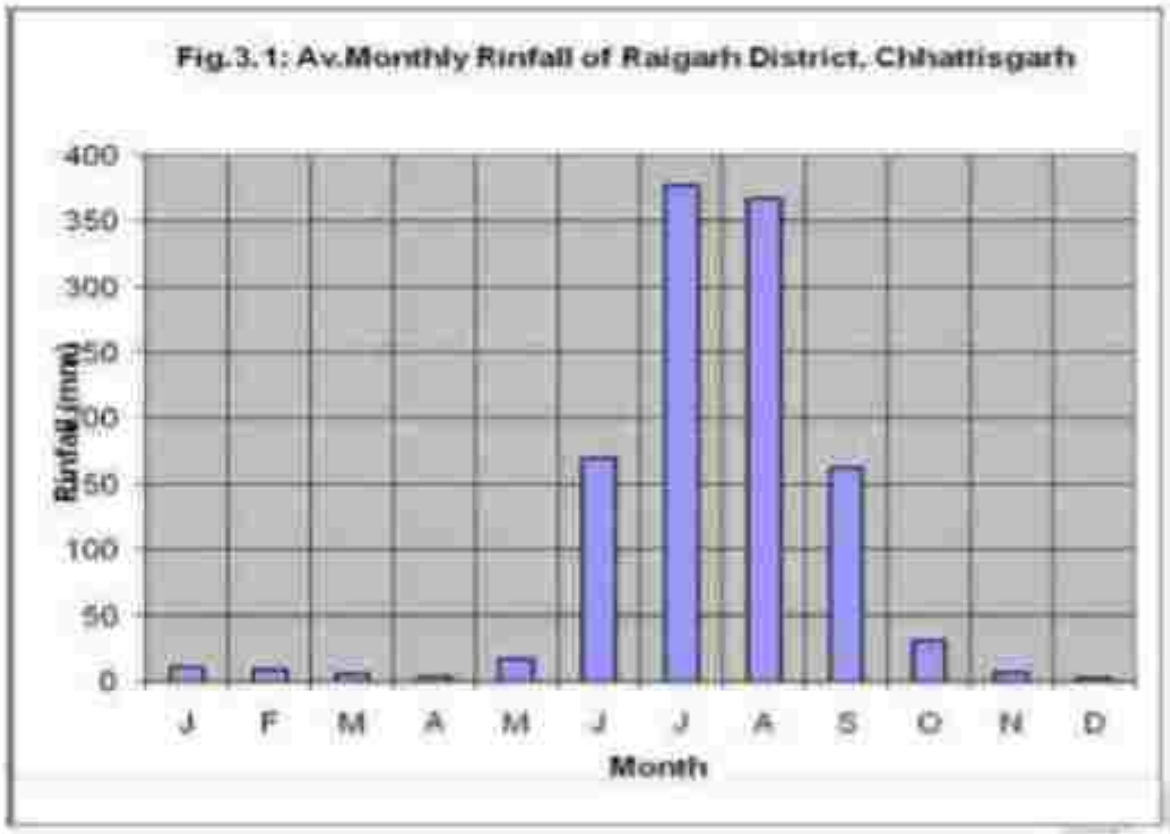


Fig.3.1: Av.Monthly Rinfall of Raigarh District, Chhattisgarh
400
350
300
50
00
50
100
50
0
Rinfall (mm)
J
F
M
A
M
J
J
A
S
O
N
D
Month

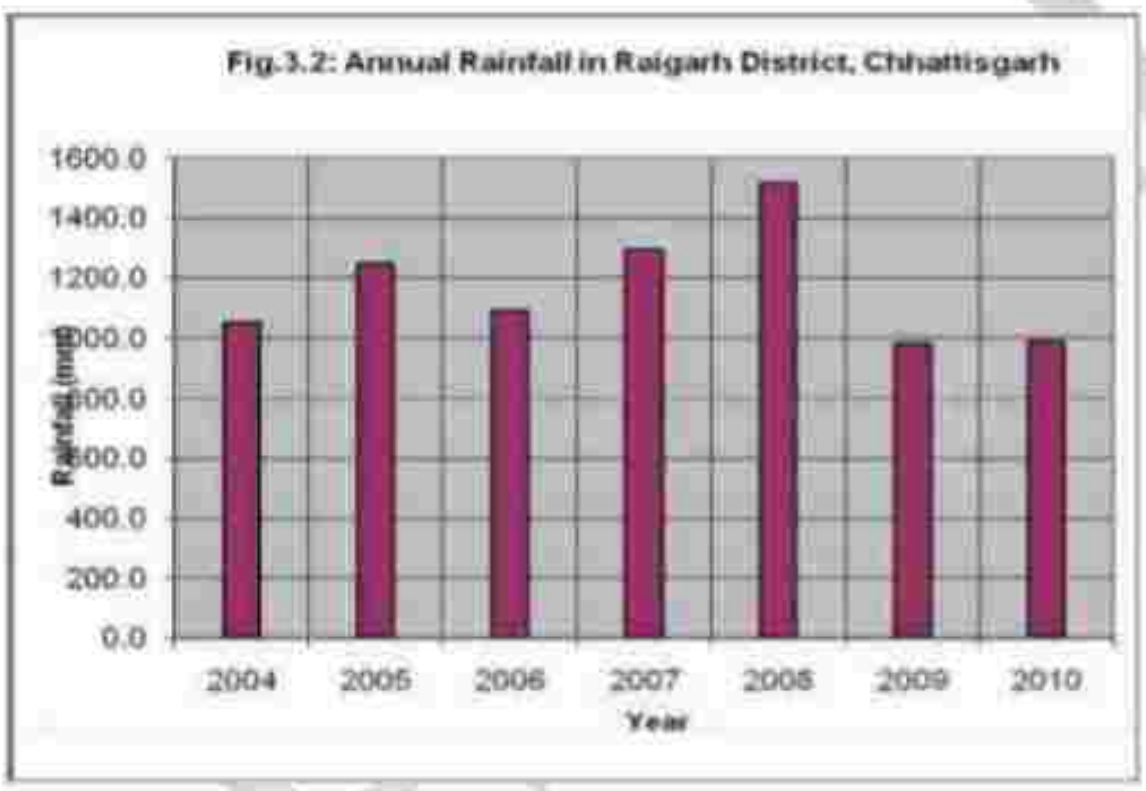


Fig.3.2: Annual Rainfall in Raigarh District, Chhattisgarh
1600.0
1400.0
1200.0
000.0
600.0
400.0
200.0
0.0
Rainfall (mm)
2004
2005
2006
2007
2008
2009
2010
Year

Fig.3.3: Max & Min Temperature

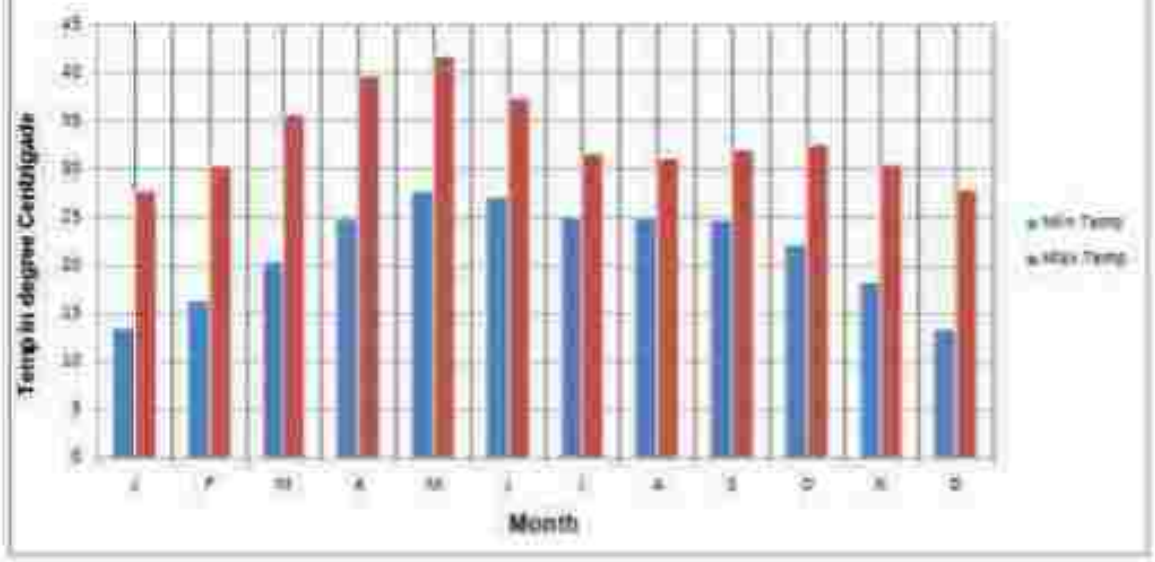
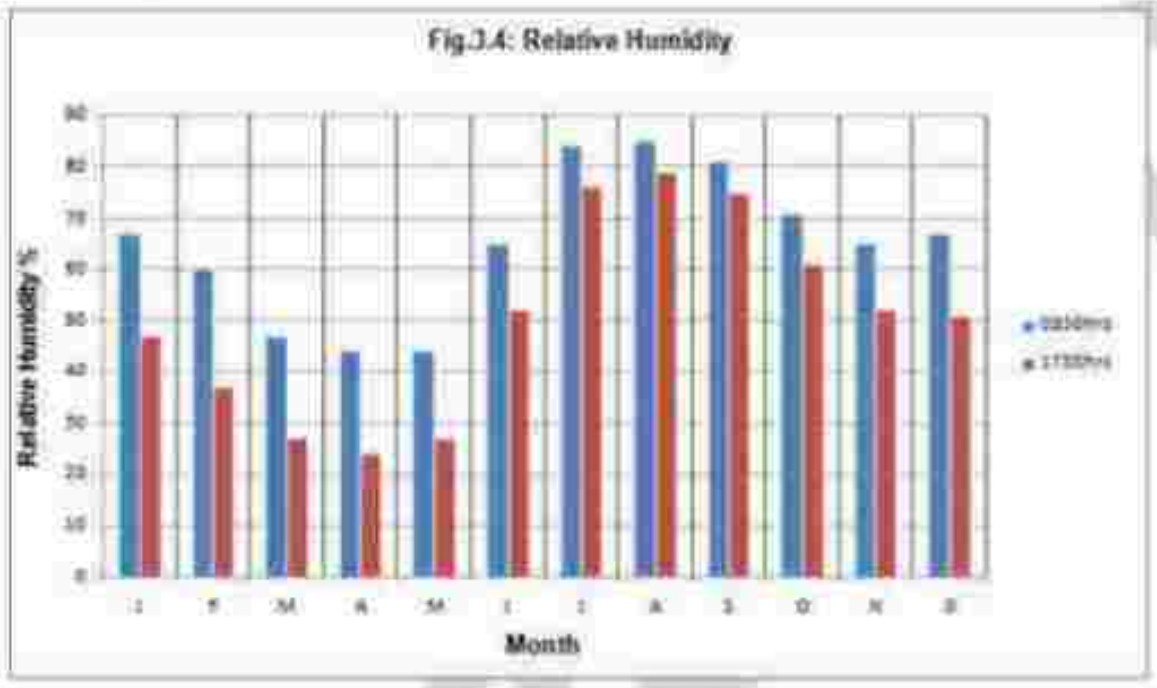


Fig.3.4: Relative Humidity



CHAPTER-4

HYDRO-GEOMORPHOLOGY

Geomorphic features control the occurrence and movement of ground water. Satellite remote sensing is being widely used for assessment of natural resources due to its synoptic coverage. A hydro-geomorphological map of 10km radius buffer zone of the project has been prepared through interpretation of remote sensing data along with field ground checking. The map shows presence of the following hydro-geomorphic units.

Denudational Hill

This is formed due to differential erosion and weathering so that a more resistant formation or intrusion stand as mountains or hills. More than two-third of the study area is covered with denudational hills. Entire northern part and south-central part is covered with the hills. Denudational hills with moderately-high slope facilitate surface run off and scope for ground water recharge in these area is poor.

Plateau/Pediplain

These are high land with flat surface. Entire south of the study area is covered with platea/pediplain. Surface runoff is moderate and scope for ground water recharging is good.

Valley Fill

These constitute colluvial deposits of varying lithology. These are in fact broad depressions between mountains normally filled with colluvial deposits. Ground water potential of this unit is very good.

Mesa

These structural features occurs with few patches in south. Gondwana sandstone constitute the features. They have steep slope and hence surface runoff is high. Scope for ground water recharging is meager.

Flood Plain

Floof plain occurs all along the river Kelo. It is good source of ground water.

River

Kelo is the major river flowing in a north to south direction. The river along with its tributaries is a good source of ground water recharging

Water Body

The area is dotted with numerous village ponds and a reservoirs. These are good sources of ground water recharging.

The geomorphic units are shown in fig no.4.1

DRAINAGE

The drainage pattern of the area is controlled by underlying geological formation and structural features such as surface elevation, strike, folds, faults and lineaments. Kelo river is the main drainage in the area. The Kelo nadi flows in the north to south direction in eastern prt of the study area. Tedipara, Jabanara nala , Mardala nala and Khardhova nala are other streams flow in the study area.

The drainage lines exhibits in the buffer area are in subdendritic to subparallel pattern. Though the streams and rivers in the area are controlled by the lithology and structure, slope plays an important role in controlling the direction of flow. The drainage density varies throughout the area with high diversity in the hilly region and low drainage density in the plains. Some of the streams are perennial in nature. But the lower order channels are ephemeral.

The drainage in the area is shown in fig no.4.2

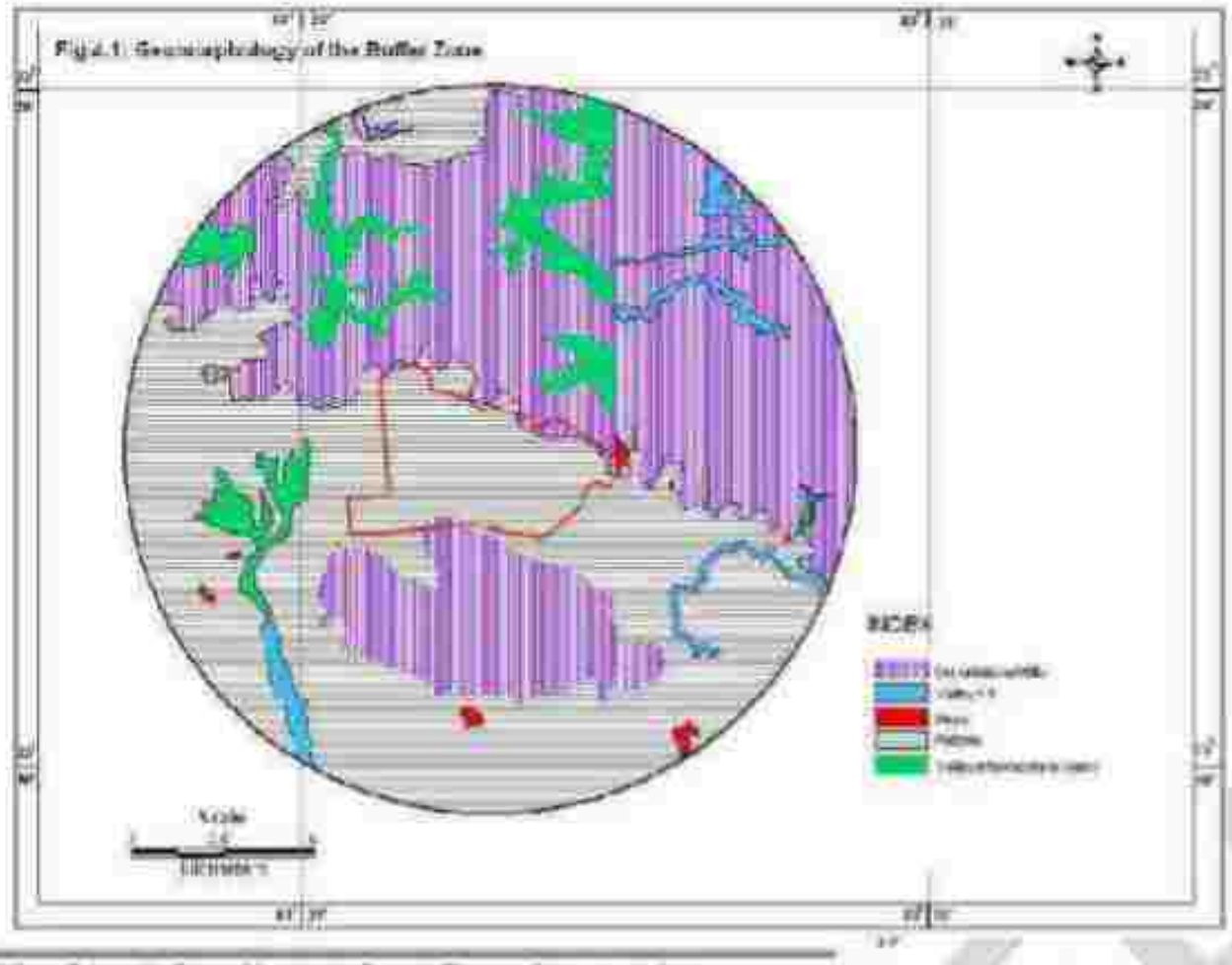


Fig.4.1: Geomorphology of the Buffer Zone

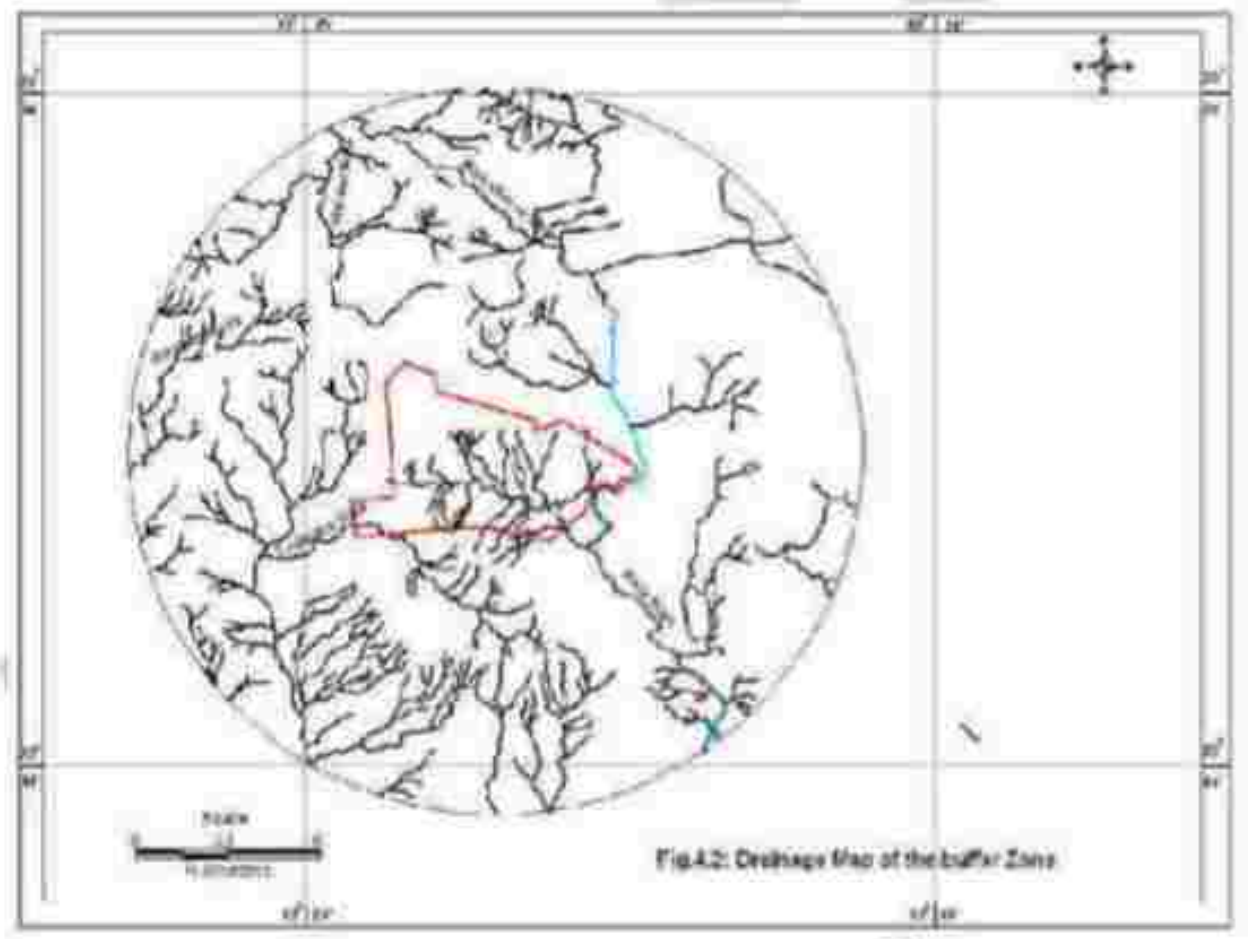


Fig.4.2: Drainage Map of the buffer Zone

CHAPTER-5

GEOLOGY

The buffer zone is covered with semi-consolidated formation of Gondwana Super Group underlained by crystalline rocks of Chhotanagpur Gneissic Complex. The generalized stratigraphic succession of the area is given below.

Table 5.1: Regional Stratigraphic Succession

Age	Group	Formation	Lithology
Quaternary	Recent to Subrecent		Alluvium-Clay, silt
Permian	Gondwana Super Group	Kamthi	Ferruginous sandstone, Clay, shale,grit
		Barakar	Sandstone,siltstone,shale with coal and fire clay
Proterozoic	Chhotanagpur Gneissic Complex		Granite gneiss,migmatites,composite gneiss

Chhotanagpur Gneissic Complex:

Gneissic complex occupies north-eastern part of the area. It is generally coarse and porphyritic and contains quartz, microcline, orthoclase, oligoclase, biotite, a little apatite and occasionally green hornblende. Tourmaline is frequently seen but abundant in the pegmatite phase.

Gondwana Super Group

Barakar

It consists of white to fawn coloured sandstones and grits with occasional conglomerates and beds of shale. It consists of much carbonaceous matter in the form of streaks , lenticles and seams of coal. In several cases the coal seams are associated with beds of fire clay.

Kamthi

It comprises of red and grey argillaceous sandstones and conglomerates with interstratified shales. The beds contain patches and nodules of ferruginous material.

Alluvium

The unconsolidated formation of Quaternary age comprising alluvium, clay, silt, etc. in several isolated patches and near major river courses.

The geology map of the study area is shown in fig.no.5.1

Geology of Talaipalli Block

Talaipalli Block is located in the eastern part of Mand-Raigarh Coalfield. The geology of the block is in conformity with the regional set up. Major part of Talaipalli block is covered by the rocks of Barakar formations. Barren measure occurs in the southern part of the block. However a small patch of Barren Measure is also noticed in the north western part of the block. The geological succession evolved on the basis of exploration data generated in the block is given in the Table 5.2

Table No.5.2: Geological Succession in Talaipalli Block

Formation	Thickness (m)	Lithology
Recent	0.50 – 18.00	Soil, alluvium
Barren Measures	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakars	30 – 596	Fine, medium and coarse grained felspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir	1.00 – 54.30	Khakee, greenish shales & sandstone, occassional pebbly
Basement		Metamorphics

DESCRIPTION OF FORMATION

Metamorphics: Precambrian metamorphic rock constitute the basement of the basin. These are composed of quartzite, mica-schist, granite gneiss and at places intruded by pegmatites or vein quartz. The metamorphics have been intersected in 7 boreholes (MNRT-53, 62, RT-6, 9, 12, 13 & 14). The thickness of metamorphics in boreholes varies from 1.00m (MNRT-62) to 9.90m (RT-9).

Talchir Formation : The rocks of Talchir formation are not exposed within the block boundary. It is encountered in boreholes RT–5,6,9,10,12,13 &14. The thickness of Talchir as intersected in boreholes varies from 1.20m (RT-12) to 54.30m (RT-10). Talchir formation consists of greyish white to greenish grey sandstone and shale, occasionally khakee in colour. At places it is embedded with pebbles of quartzite, mica-schist, granite gneiss and of pegmatite.

Barakar Formation : The major part of the block is covered with Barakar formation. Thickness of Barakar formation as intersected in borehole varies from 30 – 596 m. Barakar formation constitute fine to coarse grained, white to grey feldspathic, micaceous sandstone, shale and carbonaceous shale with economic coal horizons. A total of 27 coal seams have been encountered in this formation besides a few local seams / bands.

Barren Measure Formation : This formation has occupied the southern part of the block. Besides a small patch of barren measure is preserved in the northern part of the block due to opposite dip of faults formation of graben. This formation is intersected in 15 boreholes with thickness varying from 18.80 m (MNRT-27) to 143.00 m (MNRT-24). Barren Measure Formation is represented by predominantly grey shale with minor sandstone and intercalation of sandstone and shale.

Igneous Intrusives : The block is free from any igneous intrusives.

Soil & Alluvium : Major part of the block is covered by a layer of soil and alluvium. The weathering has affected all the strata below soil to a varying extent. The thickness of soil ranges from 0.50m (MNRT-7, 8) to 18 m (MNRT-59). The depth of weathered zone varies from 6.00 m (MNRT-34) to 27.30 m (MNRT-5).

Structure of the Block

The Talaipalli block is mostly covered with soil. Hence the structural interpretation is mainly based on the sub-surface data obtained during the coarse of exploratory drilling. The general strike of the bed is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from 4° to 8° towards South-west.

A total of 12 numbers of faults have been deciphered from the subsurface data out of which faults F1-F1, F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. Remaining area is structurally free except two relatively minor faults. All the faults as interpreted based on intersections in boreholes is detailed at Table 5.3.

Table- 5.3- Details of Faults

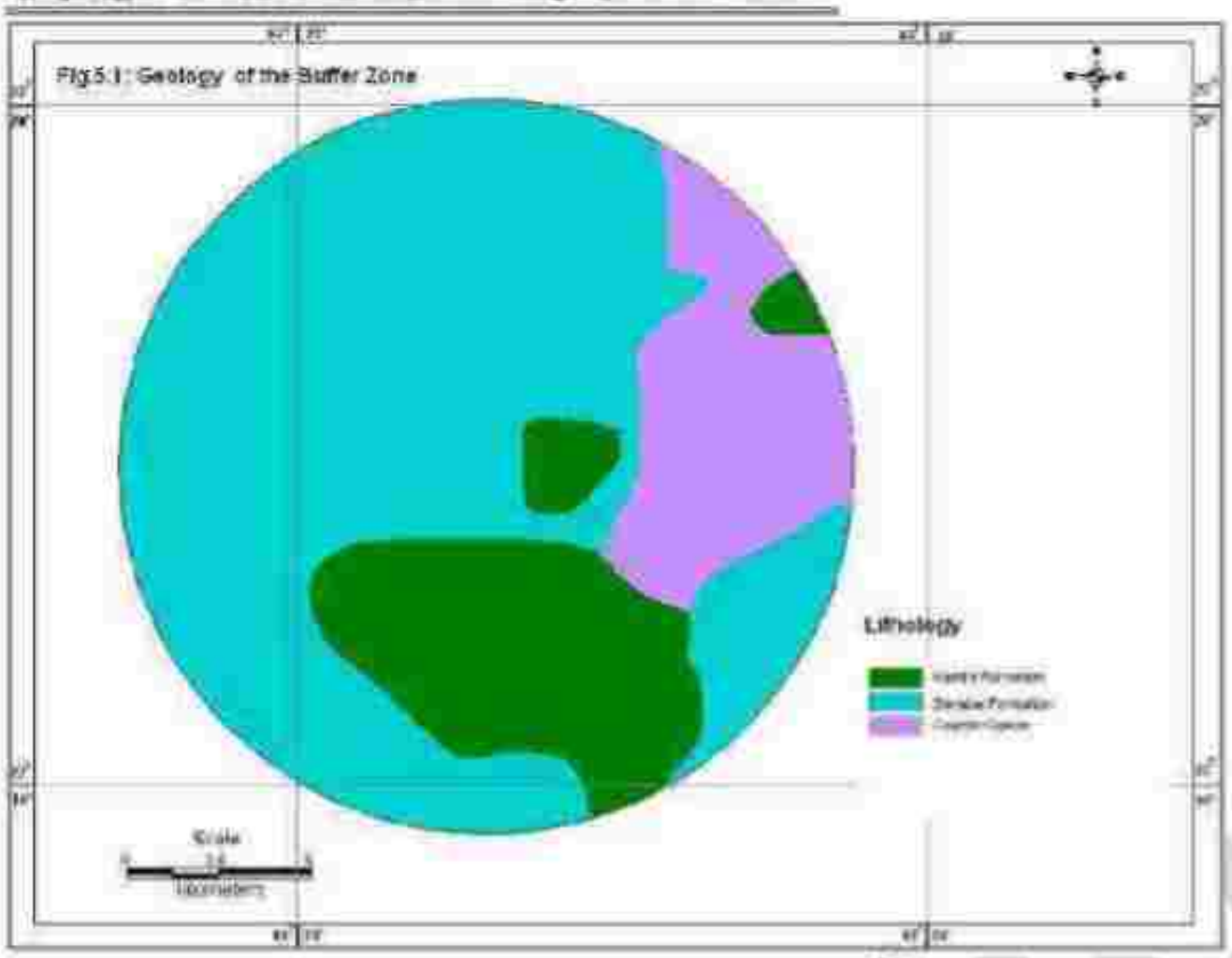
Fault No.	Location	Trend	Nature of fault	Throw	Remarks
F1-F1	Northern part passing near BH No. MNRT-24, 87, 22 & 35	East-West to ENE, NE-SW dipping northerly	Dip fault	20m. – 85m.	Throw of fault increases towards west due to abutment of fault F3, F2 and F5
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 – 10m	
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	30-35 m	The throw of fault increases towards MNRT -43 due to the abutment of fault F3 with fault F4
F4-F4	Northern part near BH MNRT-31,24, 43 & 62	East-West dipping northerly	Dip fault	30-150m	The throw of fault increases due to abutment of fault F5, F6, F7, F8 & F9
F5-F5	Northern western part through BH MNRT-62	East-West	Strike fault	35 m	
F6-F6	Northern part passing through MNRT-31	WNE-ESE dipping westerly	Oblique fault	15 – 25 m	
F7-F7	Northern part passing through MNRT-11	NW - SE	Oblique fault	20 m	

F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	60-105 m	The cumulative throw of fault F7,F8 & F9 resulted in the reduction of 105m of strata in MNRT-5
F9-F9	Northern part passing through MNRT-101 RT-4 & MNRT-11	East – West to curvilinear	Strike/ Oblique fault	25m	
F10-F10	Northern part passing through RT-7	NE-SW	Oblique curvilinear	0 -10 m	
F11-F11	Southern part	NW-SE	Curvilinear	0 – 10 m	
F12-F12	Southern part	NW-SE	Oblique	25 m	

COAL SEAMS

Detailed exploration in Talaipalli Block has revealed the presence of coal bearing horizons belonging to Barakar Formations. These carbonaceous horizons could be distinctly demarcated as upper, middle and lower columns of Barakar formation. Altogether 26 workable coal seams are developed in the block. Besides these workable seams there are few non workable persistent bands occurring throughout the block. All the 26 seams are mainly composed of coal, shaly coal, carbonaceous shale and shale. The coal is dull in appearance high in moisture and is of non-coking type. The seams are not effected by any igneous intrusive.

Seam XLA is the top most seam in the block, developed persistently in the southern part of the block over a limited area. Seam-X has split into 4 major sections as X-LA, X-LB, X-Top and X Bottom. X Bottom seam underlies the X Top seam and is the thickest coal seam among X group of seam. Similarly seam-IX has 3 sections, IX-L2, IX-L1 & IX) seam-VI has 3 sections, VI Top, VI Middle and VI Bottom, seam V has 3 splits as V Top, V Middle, V Bottom. Seam IV has 4 sections, IV Top, IV Middle, IV L & IV Bottom. Seam-III has two splits as seam III L and seam III. Whereas seam-II has 5 splits, sections as II L3, II L2, II L1, II and II L. Seam-I is poorly developed in the block and do not attain workable thickness.



CHAPTER-6

AQUIFER SYSTEM

The study area is covered with rocks of Proterozoic to Permian age with some small isolated pockets of Recent to Sub-recent alluvium. Based on the nature, the rocks are broadly grouped into 3 major aquifer systems i.e.

(i) Hard Rock Aquifer System
Comprising crystalline metamorphics of Chhotanagpur Gneissic Complex
(ii) Soft Rocks. Comprising semi-consolidated crystalline rocks belonging to Gondwana Super Group
(iii) Soft Rocks. younger alluvium

Aquifer Properties

Hard Rock: It compises of crystalline metamorphics of Chhotanagpur Gneissic Complex. These are mainly composed of quartz mica schists and quartz with granite gneiss intruded by granite and dolerite. These rocks are devoid of primary porosity. Ground water occurs in secondary porosity in top weathered zone and in fractures in deeper zone. The top weathered mantle and shallow fractures mainly constitute the shallow aquifers. The thickness of weathered mantle varies from 5 to 20m bgl. The shallow fracture zone extend down to depth of 60m bgl. Ground water occurs under phreatic conditions. The shallow aquifers are being tapped through dug wells, dug cum borewells and shallow tubewells. Ground water occurs under confined to semi-confined conditions in deep fractures. Usually 3 to 4 sets of fractures are encountered upto depth of 100 to 150m.These aquifers are being tapped through tubewells.

Soft Rocks-Semi-Consolidated : Gondwana Group of rocks constitute semi-consolidated aquifer systems. Barakar and Kamthi formations constitute the Super Group. Ferruginous sandstone and clay form the Kamthi formation. Sandstone, shale and coal form the Barakar formation. Sandstone is subarkosic in composition, fine to coarse grained, poor to moderately sorted. The shale are generally black and carbonaceous. The rocks possess both primary & secondary porosity. Ground water in these formation occurs in phreatic, semi-confined & confined conditions. The top

weathered zone followed by fractured zone provide sufficient water to wells. In Barakar formation fractured aquifer down to depth of 450m persists. The deeper fractured aquifers are more productive than shallow aquifers. Tubewells tapping aquifers beyond 200m produces good discharge.

The Transmissivity and storativity of Barakar formations range between 3 to 143 m^2/day and $1.72x10^{-2}$ to $7.86x10^{-4}$ respectively.

Soft Rocks Alluvium

The alluvium in pockets are good potential aquifers in shallow zones and are developed through filter point wells.

PUMPING TEST

Aquifer characteristics are necessary in order to assess the ground water potential of the area. It is essential to know aquifer parameters such as yield, transmissivity and storativity etc. For this purpose two aquifer performance tests was conducted. Drawdown during recouperation was measured at interval. Residual Drawdown (RDD) and time were plotted on a semi -log paper and analyzed by applying Theis's Recovery formula mentioned below-

Transmissivity (T) = (2.30X Q) / (4 π ΔS)

Where Q is the yield of well in m^3/day recorded during pumping

ΔS is the drawdown for one log cycle

These data along with respective analysis and plotting of data on semi-log graph sheet are shown in fig.no.6.1. Basic data of APT is given below:

AQUIFER PERFORMANCE TEST-1

Aquifer performance test was conducted in a well in Bichhinara village. The details are as below:

Formation	: Barakar Sandstone
Water level	: 3.8 m.bgl (below ground level)
MP (Measuring Point)	: 0.85m
Duration of pumping	: 100min
Discharge	: 2.1 lps
Δs	: 1.0 m

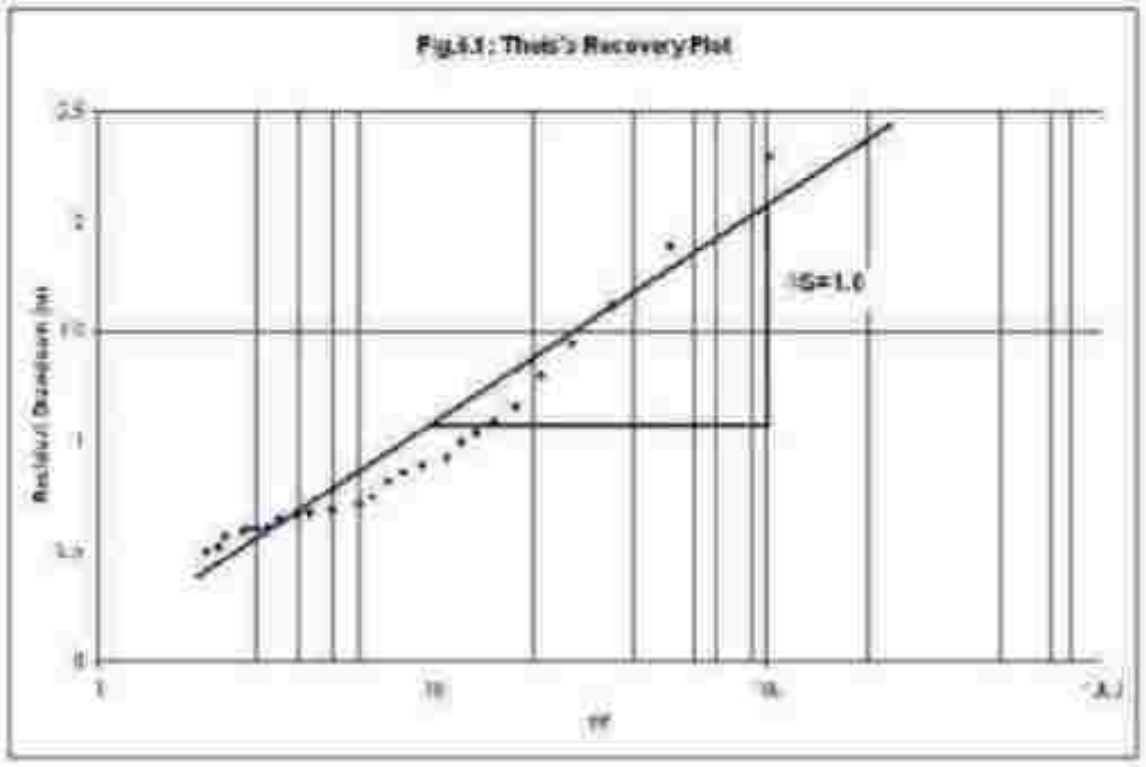
Transmissivity = **(2.30X Q) / (4 π ΔS) m2/day**

=(2.3x181.5)/(4x3.1428x1.0)

=33.25

Table 6.1: Pumping Test Data of Well at Bichhinara

Time (minute) since pumping		t/t'	Depth to Water Level (m.bmp)	Residual Drawdown (m)
Started (t)	Stopped (t')			
101	1	101	6.95	2.3
102	2	51	6.54	1.89
103	3	34.3	6.27	1.62
104	4	26	6.1	1.45
105	5	21	5.95	1.3
106	6	17.7	5.81	1.16
107	7	15.3	5.74	1.09
108	8	13.5	5.69	1.04
109	9	12.1	5.65	1
110	10	11	5.58	0.93
112	12	9.3	5.54	0.89
114	14	8.1	5.51	0.86
116	16	7.3	5.47	0.82
118	18	6.6	5.4	0.75
120	20	6	5.37	0.72
125	25	5	5.34	0.69
130	30	4.3	5.33	0.68
135	35	3.9	5.32	0.67
140	40	3.5	5.3	0.65
145	45	3.2	5.26	0.61
150	50	3	5.25	0.6
155	55	2.8	5.25	0.6
160	60	2.7	5.24	0.59
170	70	2.4	5.22	0.57
180	80	2.3	5.17	0.52
190	90	2.1	5.15	0.5



CHAPTER-7

WATER LEVEL REGIME

A total 20 nos. of observation wells were established in the study area. The water level of the wells were monitored during the pre & post-monsoon 2013. The location and details of the wells are given in the table no.7.1 & fig.7.1.

Pre-Monsoon, 2013 Depth to Water Level.

The pre-monsoon depth to water level vanes in the range between 5.4m.bgl and 13.87m.bgl. Maximum water level was observed at Lauthamura which was 13.87m.bgl. The depth to water level contour map was prepared and shown in fig. 7.2. The map depicts that water level in major part of the area lies between 7 and 9mBGL. Water level is deep in the north & north-western part of the area which is in between 11 and 14m and shallow in the south and south-east part which lies between 5.5 to 9m BGL.

Post-Monsoon , 2013 Depth to Water Level

The post-monsoon depth to water level varies in the range between 3.8m.bgl and 8.3m.bgl. Maximum water level was observed at Raikera which was 8.3m.bgl. The depth to water level contour map was prepared and shown in fig.7.3. The map depicts that water level is shallow in the south-eastern part of the area and is deep in the north-west part of the area.

Water Level Fluctuation (Pre to Post-monsoon)

All the observation wells show rise in water level during post-monsoon period. The rise in water level is in the range of 1.2m. to 7.0m. Maximum rise in water level was observed at Chimtapani which was 7m. Fluctuation contour map was prepared and shown in fig.no.7.4. The map depicts that north-west part of the study area show maximum rise in water level in the range between 4 to 7m.

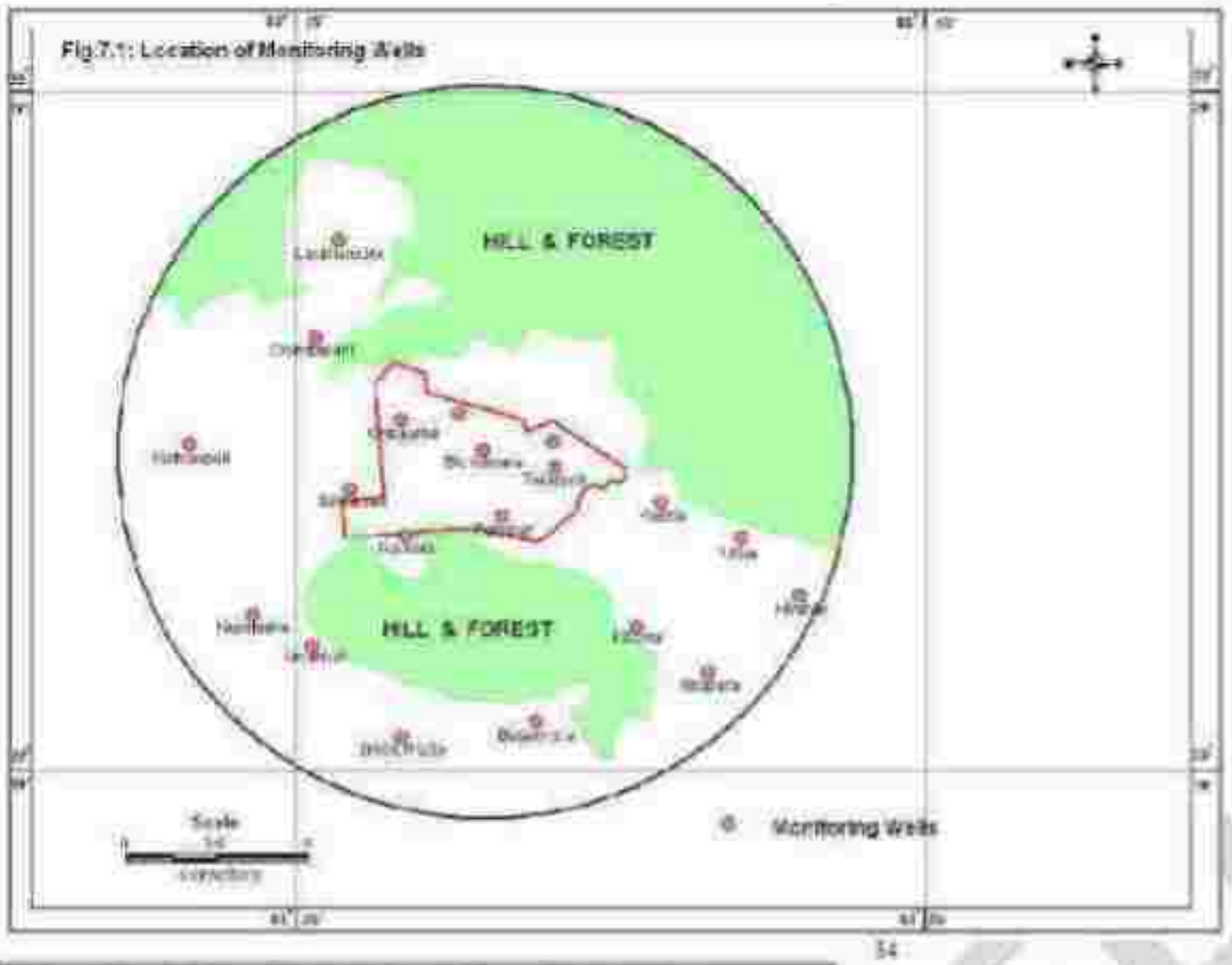
Water Table Elevation

Water table elevation map has been prepared and shown in fig no.7.5. The map depicts that water table elevation varies from 450m to 280mamsl during post-monsoon.2013 Water table is at higher elevation in the north and gradually decline in the south. Ground water flow direction is from north to south.

Table No.7.1: Water Level Data of Monitoring Stations

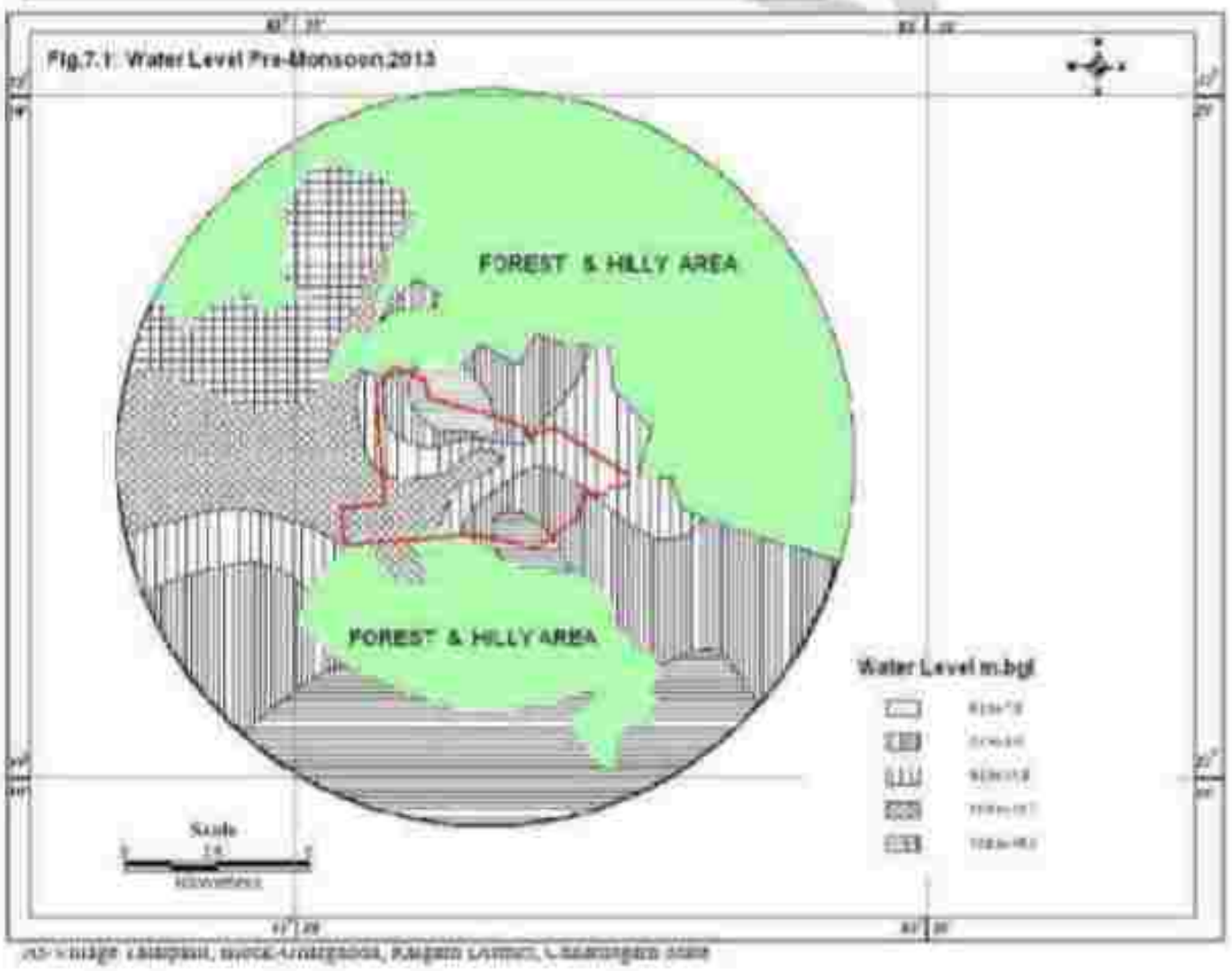
Sl. No	Well Location	Longitude	Latitude	Water Level,Pre-Monsoon,2013 (m.bgl)	Water Level,Post-Monsoon,2013 (m.bgl)	Water Level Fluctuation in m.
1	Salhepali	83.431	22.236	11.6	6.4	5.2
2	Chhgurha	83.44463	22.253	8.5	5.54	2.96
3	Raikera	83.4457	22.2244	12.1	8.3	3.8
4	Bichhinara	83.466	22.2456	11.5	5.7	5.8
5	Ajigarh	83.4596	22.2545	5.4	4.2	1.2
6	Rampur	83.471	22.229	6.8	3.8	3
7	Kudhur Mauha	83.48447	22.2473	9.3	6.2	3.1
8	Katharipali	83.3684	22.2469	12.36	7.89	4.47
9	Chintapani	83.4215	22.27286	13.42	6.38	7.04
10	Lauthamura	83.428	22.297	13.87	7.21	6.66
11	Nundarha	83.40519	22.20507	7.9	4.92	2.98
12	Bhalumuda	83.4447	22.175	5.6	3.91	1.69
13	Bajarmura	83.46	22.179	6.2	4.21	1.99
14	Milupara	83.5256	22.191	6.78	4.17	2.61
15	Khiarra	83.5068	22.202	7.32	3.67	3.65
16	Hinjhar	83.55	22.2098	8.54	5.33	3.21
17	Urba	83.5346	22.2239	8.6	5.51	3.09
18	Pelma	83.5135	22.2326	9.26	4.87	4.39
19	Talaipali	83.48527	22.24095	9.63	5.67	3.96
20	Kerakhoi	83.42082	22.19761	7.18	3.22	3.96

Fig.7.1: Location of Monitoring Wells

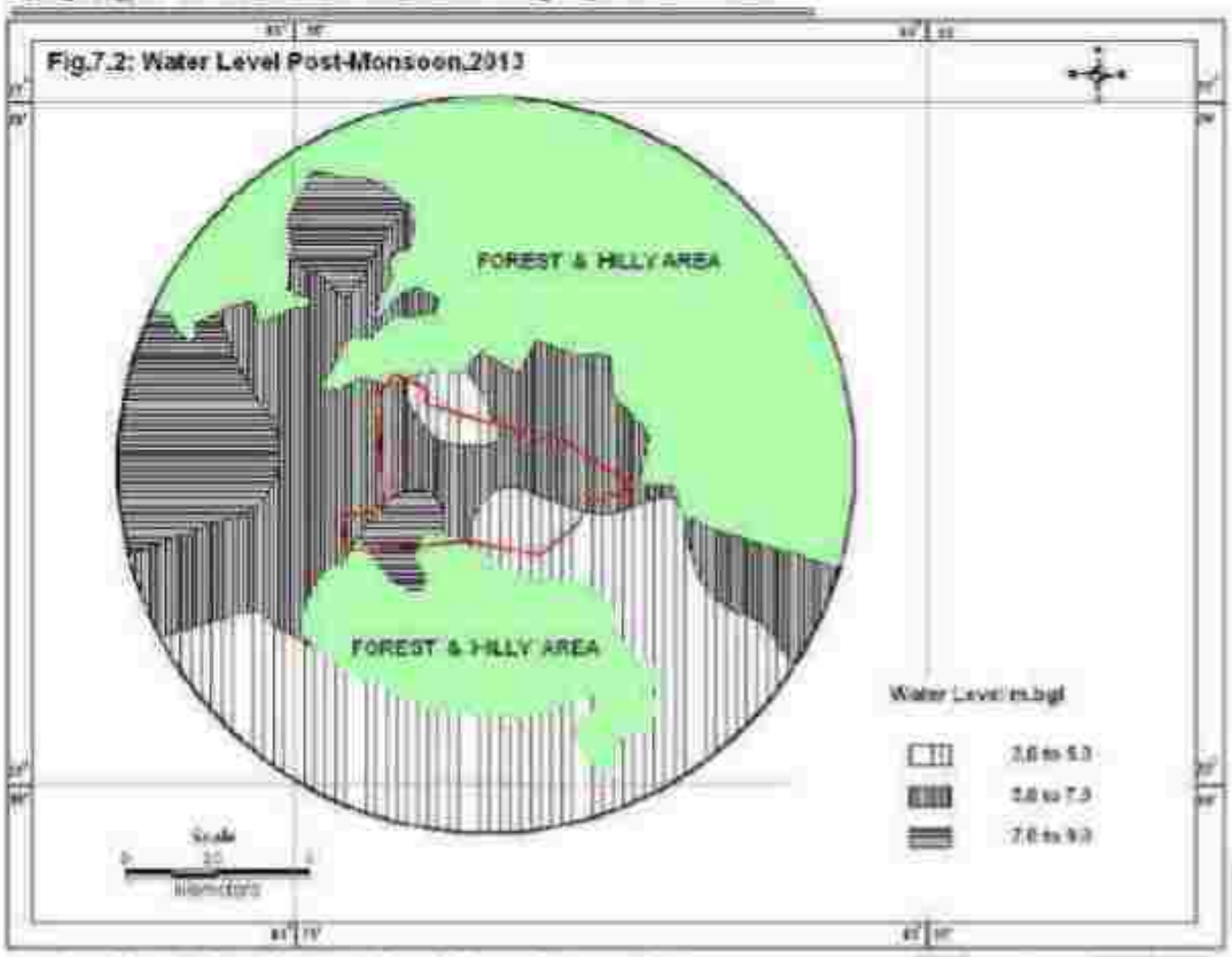


At-Village Talaipalli, Block-Gharghoda, Raigarh District, Chhattisgarh State

Fig.7.1: Water Level Pre-Monsoon,2013

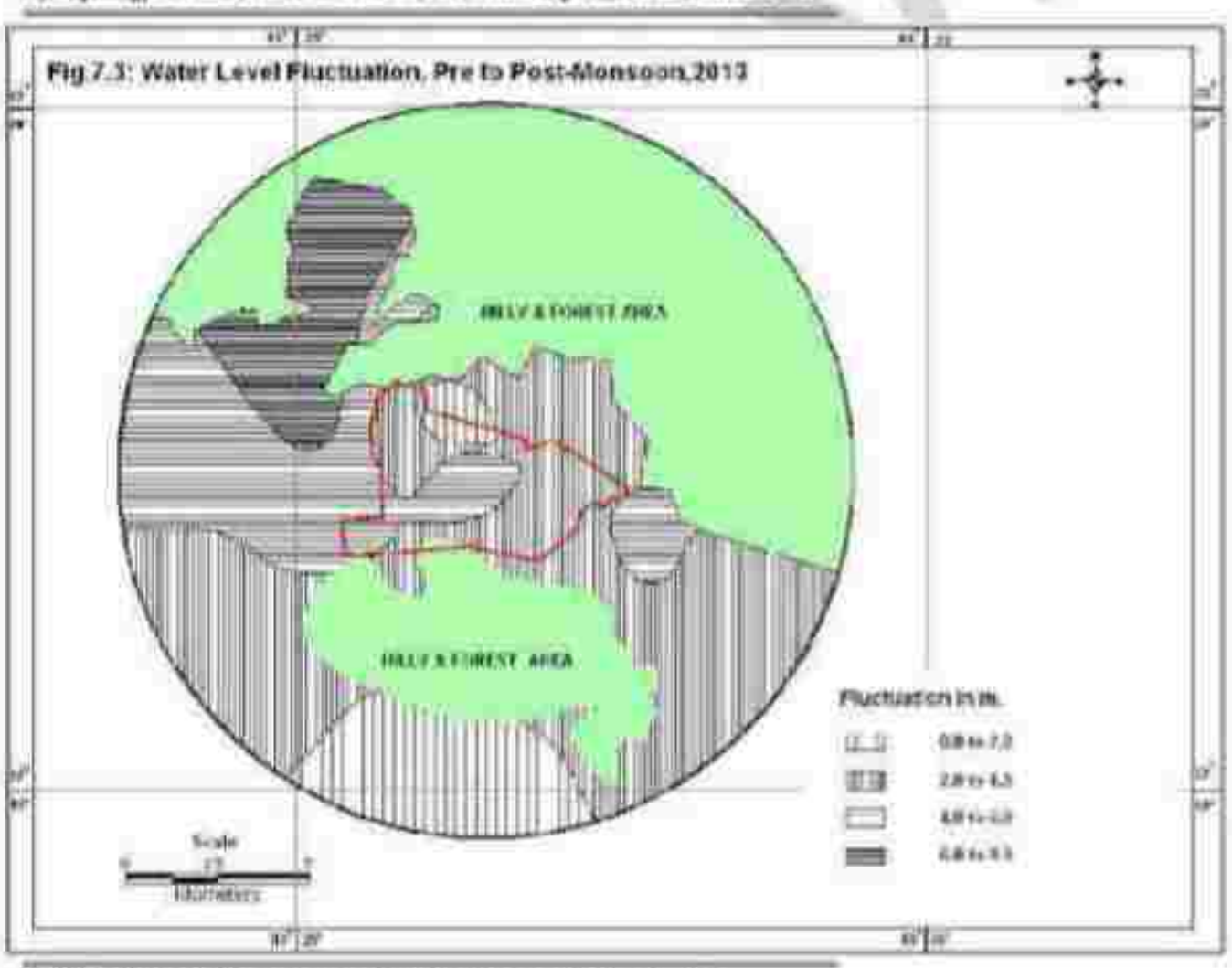


At- Village Talaipalli, Block-Gharghoda, Raigarh District, Chhattisgarh State



At-Village Talaipalli, Block-Gharghoda, Raigarh District, Chhattisgarh State

Hydrogeology of 10km Buffer Zone of Talaipalli Coal Mining Project of M/s NTPC Ltd



At-Village Talaipalli, Block-Gharghoda, Raigarh District, Chhattisgarh State

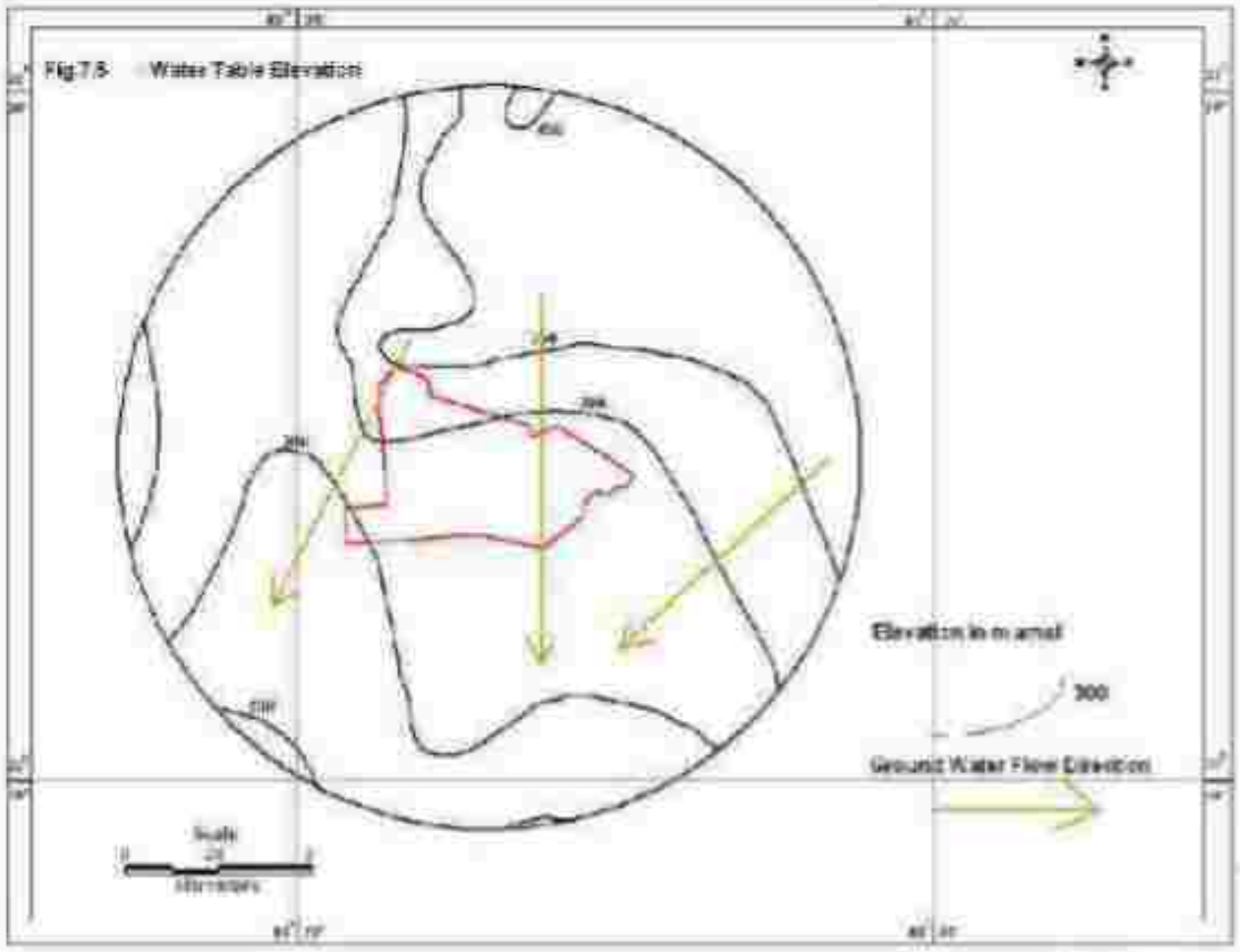


Fig-7.5 Water Table Elevation

CHAPTER-8

MINE DRAINAGE

De-watering in Open Cast Mines of Talaipalli Coal Mining Project

The Talaipalli Coal Mining Project spreads over an area of 2113 hectares of land. The surface elevation of mining lease area varies between 340m.amsl and 280m.amsl. Water Table elevation (based on the water level data of dug wells tapping phreatic aquifer & measured during post-monsoon,2013) surrounding the Mines varies in between 325 and 280m.amsl. The ground water flow direction is from north to south. The elevation map is shown in fig 8.1.

Fig.8.1: Water Table Elevation, Post-Monsoon, 2013 Surrounding Mines (m.amsl)

At-Village Talaipalli, Block-Gharghoda, Raigarh District, Chhattisgarh State

The pit bottom at the end of the 1st year will be at 300mamsl. **Hence mining activities will intersect water table during the first year of mining.** The table below shows the year wise mining development.

The groundwater level must be pulled down to create dry conditions in the mining area so that the generally low strength aquifer sequence material can be safely excavated. Mine dewatering is usually undertaken for a variety of geo-technical (material strength considerations), mining and safety reasons also.

Table 8.1: Year Wise Development Of Various Stages Of Mining

Year	Top RL of Pit (m.amsl)	Bottom RL of Pit (m.amsl)	Depth of Pit in m.	Pit length in m.	Pit width in m.
Year-1	345	300	45	1260	214
Year-2	345	250	95	1457	618
Year-3	345	225	120	1457	1025
Year-4	345	175	170	1457	1260
Year-5	345	150	195	1457	1408
Conceptual Period	345	0	345	6303	287

The main objective is to find out the total volume of ground water which needs to be pumped out from the Pits for safe mining operations.

Ground water intersection

The groundwater inflow to a mining excavation is mainly a consequence of the interaction of groundwater system, hydrogeological characteristics of the rock mass and the mining geometry. The water inflow regime is determined by the incision of one or more aquifers by the mining exaction and the relative hydrogeological characteristics of the various aquifers.

The groundwater inflow in the vicinity of mining excavation can be estimated by using **Darcy's equation for laminar flow through porous media**.

$Q = T\ i\ w$

Where Q is the flow in m^3/day

T is the transmissivity in m^2/day

i is the hydraulic gradient

w is the width of the aquifer exposed

Transmissivity of the aquifer has been evaluated from the pumping test carried out and the transmissivity value is 33.25m^2/day. The hydraulic gradient has been evaluated from the water table elevation map of the area and the gradient is 0.00955. The width of aquifer perpendicular to the flow direction is varying with the progress of mining of coal. The width of mining pit is perpendicular to the ground water flow direction. Hence in this case the width of coal block is the width of aquifer exposed. The table no.9.1 shows the progressive width of coal pit with progress of mining.

Putting all these values in the equation, the approximate volume of ground water ingress to the pit has been evaluated which needs to be pumped out from the pit for safe mining. The table no.9.2 shows the volume of ground water to be available for de-watering.

Table No.8.2: Approximate volume of mining de-watering water

Year of mining	Transmissivity (m^2/day)	Hydraulic Gradient (i)	length(m)	Width (m)	Q (m^3/day) from mining length faces	Q (m^3/day) from mining width faces	Total Q m^3/day
(1)	(2)	(3)	(4)	(5)	(6) 2x3x4x2(No. of faces)	(7) 2X3X5X2(No.of faces)	(8)
1	33.25	0.00955	1260	214	800	136	936
2			1457	618	925	392	1318
3			1457	1025	925	651	1576
4			1457	1260	925	800	1725
5			1457	1408	925	894	1819

The table 9.2 shows that 936 m^3/day of pit water will be available at the end of first year of mining and 1320 m3/day will be available at the end of 2nd year. The quantity will increase with time with the progress of mining in increase of pit width. The evaluated volume of pit water is approximate. Once mining activity starts the volume will be re-evaluated periodically taking other methods.

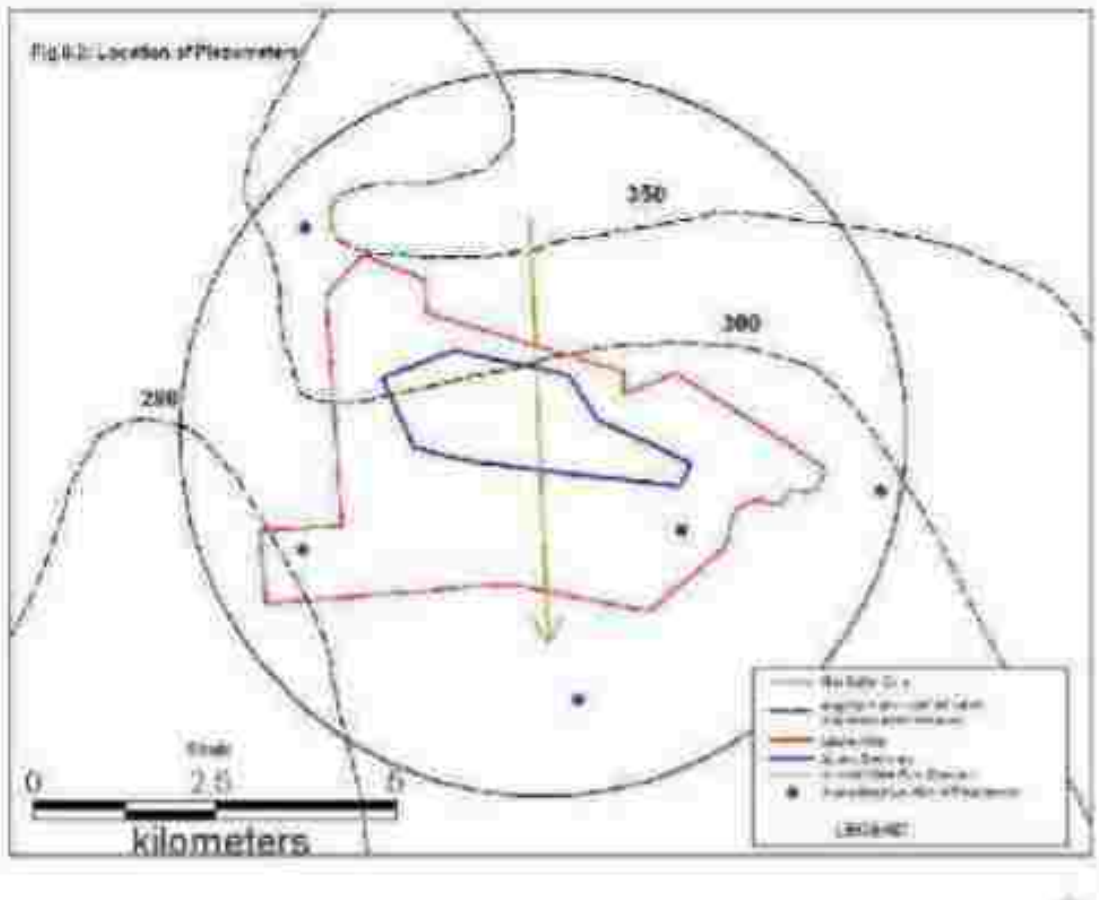
USE OF PIT DE-WATERED WATER

The pumped out pit water will be put to gainful uses. Mines requires water mainly for dust suppression, green belt development and for drinking and domestic uses for colony, drinking for mining site and uses in site office. Pit water will be used for dust

suppression and green belt development and will also be used for domestic and drinking purposes after treatment. Use of pi de-watering water is shown in water balance diagram in fig.no.1.3. Excess pit water will be recharged to ground water system at suitable locations.

GROUND WATER REGIME MONITORING

In order to find out the impact of mine de-watering, on the regional ground water regime monitoring of ground water will be carried out at regular interval. A well net work of observation wells will be established surrounding the quarry. For phreatic aquifer, water level will be measured through established dug wells. For deeper aquifer, 5nos. of piezometers will be established in the area. The location of the piezometers is shown in fig no.8.2.



CHAPTER-9

GROUND WATER QUALITY

In order to assess the chemical quality of ground water in the buffer zone, six (6) nos. of water samples were collected and analyzed. The table 9.1 shows the quality of ground water in the area. Five water samples from streams were also collected and analyzed. The result is shown in fig 9.2.

A perusal of the table no 9.1 indicates, the distribution of various constituents vary greatly in the area. Concentrations of the above parameters are well within the permissible limits as per the BIS standards.

pH of ground water samples varies from 6.52 to 8.26 indicating slightly acidic nature of the water. The maximum permissible limit for pH as prescribed by B.I.S (1991) in drinking water supply is 6.50 to 8.50. The ground water has pH values within prescribed limits and suitable for drinking purposes.

The results of chemical analysis of ground water samples indicate that there is less variation in conductivity in the area. The EC value of ground water varies between 164 and 470 micro-mhos/cm at 25°c. The range of electrical conductivity values shows that the ground water of the area is fresh.

The major sources of chloride in ground water are from rainwater, evaporite deposits and seepage from sewage and industrial effluents containing common salt. The chloride concentration in ground water varies from 8.2 to 39.5 mg/l indicating the quality of water within this aquifer is portable.

The main sources of nitrate in ground water are industrial wastes, sewage and animal wastes and agricultural sources. The nitrate concentration in shallow ground water has been recorded from 0.57 to 18.4mg/l. The nitrate concentration in ground water in the area is well within the permissible limit of 100mg/l as prescribed by BIS,1991.

The fluoride concentration in the area lies between 0.21 to 1.24mg/l. The fluoride concentration is within the permissible limit as prescribed by BIS, 1991.

The ground water samples of the area show that water is fit for drinking as well as for domestic purposes.

Table 9.1 Chemical Quality of Ground Water

Sl.No	Parameters	Chuligude	Salleipali	NayaRampur	Tillaigali	Aligarh	Pelma	Limits IS 10500
	A.General & Physical							
1	Appearance	Clear	Turbid	Turbid	Turbid	Turbid	Turbid	
2	Color(Hazen Units)	<10	<10	<10	<10	<10	<10	25
3	Turbidity(NTU)	<1	11	8	7	8	9	10
4	Electrical Conductivity@25Oc	164	285	470	360	465	387	-
5	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
6	Ph	6.52	8.24	7.21	6.82	8.25	6.86	6.5-8.5
	B.CHEMICAL-INORGANIC							
7	Total Dissolved Solids	56	172	282	216	279	270	2000
8	Total Hardness (CaCo3)	74	122	129	116	182.4	169	600
9	Calcium Hardness	35	81.5	77.6	52.4	76	56.28	
10	Magnesium Hardness	39	41	48.4	64	106	52.7	
11	Magnesium	9.5	9.96	11.7	15.6	26	12.8	100
12	Calcium	14	33	31	21	30.4	22.5	200
13	Total Alkalinity	36.2	115	135	135	187	117	600
14	Chloride	19.3	8.2	39.5	11.6	11.1	25	1000
15	Sulphates	7.14	9.52	17.1	10	7	26.5	400
16	Fluorides	0.21	0.591	0.59	0.58	1.24	0.36	1.5
17	Nitrates	18.4	9.57	10.63	9.7	1.49	BDL	45
18	Manganese	BDL	0.223	0.169	0.062	0.164	0.07	0.1
19	Copper	BDL	BDL	BDL	BDL	BDL	BDL	1.5
20	Total iron	0.095	1.852	0.972	0.833	0.878	0.977	1
21	Residual Chlorine	BDL	BDL	BDL	BDL	BDL	BDL	0.2

22	Temperature	28	27	27	28	26	28	
23	Dissolved Oxygen	6.69	6.24	6.16	6.76	6.45	6.75	NA
24	Total Suspended Solids	BDL	35	66	48	54	62	NA
25	BOD	BDL	BDL	BDL	BDL	BDL	BDL	NA
26	COD	BDL	BDL	BDL	13	BDL	5	NA
27	Phosphates	1.32	2.1	1.8	0.4	3.4	5.57	NA
28	Sodium	9.672	5.2	6.4	20.201	8.8	15.89	NA
29	Potassium	13.1	BDL	BDL	13.557	BDL	25.5	NA
30	Reactive Silica	3.48	15.5	10.4	2.09	15.4	30.3	NA
31	Oil & Grease	5	BDL	BDL	BDL	BDL	6	NA
32	Phenolic Compounds	Absent	Absent	Absent	Absent	Absent	Absent	0.002

Table 9.2: Quality of Surface Water

Sl.No	Parameters	Kelo Nadi (up-stream)	Kelo Nadi (down-stream)	Rampur (stream)	Pajhar Nadi (upstream)	Pajhar Nadi (downstream)	Limits IS 10500
	A General & Physical						
1	Appearance	Turbid	Turbid	Turbid	Slightly Turbid	Turbid	-
2	Color(Hazen Units)	15	20	25	15	20	25
3	Turbidity(NTU)	22	30	54	5	6	10
4	Electrical Conductivity@25Oc	92.2	94	127	180	879	-
5	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
6	Ph	7.31	6.73	7.22	7.56	7.08	6.5-8.5
	B CHEMICAL INORGANIC						
7	Total Dissolved Solids	64	64	88	125	550	2000
8	Total Hardness (CaCo3)	37	44.6	33	82.6	272	600
9	Calcium Hardness	29	36.3	25.5	35.3	146	
10	Magnesium Hardness	8	19.4	9.7	27.3	126	
11	Magnesium	1.9	4.71	2.3	6.63	30.6	100
12	Calcium	11.6	10	9.3	14.1	58.4	200
13	Total Alkalinity	37.1	40.2	50	62	184	600
14	Chloride	6.74	5.7	5.8	11	134	1000
15	Sulphates	4.3	2.38	8	21.4	4.3	400
16	Fluorides	0.26	0.33	0.28	0.365	0.377	1.5
17	Nitrates	3.76	2.53	5.44	3.61	0.423	45
18	Manganese	0.016	0.02	0.14	0.016	BDL	0.3
19	Copper	BDL	BDL	BDL	BDL	BDL	1.5

20	Total Iron	0.765	0.902	0.8	0.248	0.573	1
21	Residual Chlorine	BDL	BDL	BDL	BDL	BDL	0.2
22	Temperature	28	28	27	27	28	
23	Dissolved Oxygen	6.45	6.64	6.45	6.11	6.70	NA
24	Total Suspended Solids	220	258	215	8	84	NA
25	BOD	BDL	BDL	BDL	BDL	BDL	NA
26	COD	BDL	BDL	BDL	10	5	NA
27	Phosphates	2.1	2.5	2.1	2.43	2.8	NA
28	Sodium	5.2	5.3	5.2	5.438	7.5	NA
29	Potassium	BDL	BDL	BDL	2.504	2.1	NA
30	Reactive Silica	19.5	21.7	19.5	7.48	8.1	NA
31	Oil & Grease	BDL	BDL	BDL	BDL	BDL	NA
32	Phenolic Compounds	Absent	Absent	Absent	Absent	Absent	0.002

Note: Concentration are in mg/l, BDL: Below Detectable Level

CHAPTER-10

DYNAMIC GROUND WATER RESOURCES

Rainfall is the principal source of ground water recharge in the study are/buffer zone. For estimation of ground water resources and stage of ground water development in the buffer zone, GEC (Ground Water Resource Estimation Committee, 1997) norms have been adopted and are described below.

A) Ground Water Recharge

a) Monsoon Ground Water Recharge

I) Based on Rainfall Infiltration Method

Total Area	: 314 sq.km
Area suitable for recharge	: 154sq.km
Average Rainfall	: 1165 mm
Infiltration factor	: 20%
Annual Recharge	: 35.882 MCM

II) Based on Water Table Fluctuation Method

Area suitable for recharge	: 154 sq.km
Mean water level fluctuation	: 3.00m
Specific yield	: 9%
Maximum Ground Water Recharge	: 41.58 MCM

The ground water resource estimated by Water table fluctuation method is more. Therefore as per the norms of GEC, resources by infiltration method is to be adopted.

b) Recharge through other sources

Recharge through other sources primarily constitutes recharge through surface water irrigation. Return recharge from surface water irrigation is estimated to be 30% of the applied water for irrigation. As per the district irrigation department, about 534 ha of land is irrigated in the study area. If the gross irrigation requirement is taken as 0.5 ham. As per the norms of Ground Water Resource Estimation Committee (GEC 97), total applied water will work out to be 272 Ham. The return seepage will be 30% of 267 Ham i.e. 80.1 ham or 0.801 MCM.

c) Hence annual ground water resources will be

35.882 MCM+0.801 MCM
=36.683 MCM

B) Ground Water Draft

Ground water is mainly used for domestic, irrigation and industrial need. To estimate the ground water use, Census data of 2001 have been used for population and irrigated area.

Draft for Drinking Use

Population using groundwater as drinking water	: 39241
Per Capita	: 70 lit/day
Annual Ground Water Use	: 1.019716 MCM

Irrigation Use

About 534 ha of land is being irrigated through ground water. Considering 50 cm/ha of ground water use, total ground water need for irrigation works out to be 2.67 MCM.

Industrial Use

In the study area there is no industry hence ground water requirement for industrial use has been taken to be zero.

Total Ground Water Utilization

1.019716MCM+ 2.67 MCM+0 MCM

= 3.68972 MCM

Ground Water Balance

Annual Resources =36.683 MCM

Annual Utilisation =3.68972 MCM

Balance GW=32.99328 MCM

Stage of Ground Water Development

The stage of ground water development in an area is taken as the ratio of Gross annual draft for all uses to the total utilizable ground water resource or net annual ground water availability

Thus the stage of ground water development (in %) in the buffer zone is

$$= \frac{\text{Net Ground Water Draft}}{\text{Net Ground Water Availability}} \times 100$$

$$= (3.68972/36.683) \times 100$$

=10.058 %

The unit of assessment as per GEC norms are categorized for ground water development based on two criteria

i. Stage of Development
ii. Long term trend of pre & post monsoon water level

Since the buffer zone represents an area where stage of development is 10.058 % and there is no long term decline of pre & post monsoon water level , the area is categorized as safe.

CHAPTER-11

CONCLUSION

Talaipalli Coal Mining Project of National Thermal Power Corporation Ltd is located in Gharghoda Block of Raigarh district, Chhattisgarh State. The mining lease area is spread over an area of 2113 hectares of land. The Mining Lease area falls in the Survey of India topo-sheet no. 64 N/7 & 8 and is bounded by North latitude 22° 13' 35" to 22° 16' 08" N and longitude 83° 25' 49" to 83° 30' 22" E.

The mining will be carried out through open cast methods with Shovel –dumper combination & Continuous Surface Miner.

The climate of the area is tropical monsoon climate with average annual rainfall of 1185mm with annual maximum and minimum temperature of 43°C and 6° C respectively.

The area is characterized by denudational hill ranges in the north with intervening valleys, plateaus in the south, rivers, nalas, reserved forest and water bodies. The surface elevation varies from 600m to 300m above M.S.L. The general surface gradient is from north to south. The major reserved forests in the area are Tolge west Reserved Forest, Silot RF, Rampur RF and Deodongri RF. The area is drained by river Kelo and its tributaries and other small streams. The river Kelo flows in the eastern part in north to south direction.

The area is underlain by rocks of the Gondwana Super Group and granite gneiss.

The coalfield displays the complete sequence of Lower Gondwana rocks from Talchir to Kamthi.

The pre-monsoon depth to water level varies in the range between 5.4m.bgl and 13.87m.bgl. The post-monsoon depth to water level varies in the range between 3.8m.bgl and 8.3m.bgl. The stage of ground water development of the study area has been calculated to be 10.058%.

The ground water samples of the area show that water is fit for drinking as well as for domestic purposes.

The surface elevation of mining lease area varies between 340m amsl and 280m amsl. On an average depth to water table in the mining area lies at 325m amsl. At the end of 1st year of mining activity the bottom will be 300mamsl.So mining activities will intersect

water table. De-watering of mining pit is necessary for safe mining. The quantum of probable de-watering water available at the end of 1st year has been estimated to be 936 m^3/day ,1320 m^3/day at the end of 2nd year and 1819 at the 5th year of mining. The quantity will increase with progress of mining activity. The pit de-watering water will be used for dust suppression , green belt development and drinking and domestic uses etc. The excess de-watering water if any will be recharged to ground water system at hydrogeologically suitable place through recharging structures. The quantity of de-watering water will be assessed every year.

Additional Annexure-12

Annexure-VIIIE

छत्तीसगढ़ शासन
खनिज साधन विभाग
मंत्रालय
महानदी भवन, नया रायपुर-492002

क्रमांक एफ 3-1/2016/12 रायपुर, दिनांक जनवरी, 2016

प्रति,

कलेक्टर,
जिला रायगढ़
(छत्तीसगढ़)

विषय :- जिला रायगढ़, तहसील धरमजयगढ़ एवं तिमुल्ला जिला कोरबा अंतर्गत रामाईपाली की आवंटित रामाईपाली कोल ब्लॉक के संबंध में।

उपर्युक्त के परिप्रेक्ष्य में जिला रायगढ़, तहसील धरमजयगढ़ एवं तिमुल्ला जिला कोरबा अंतर्गत रामाईपाली की आवंटित सीमा के संबंध में भारत सरकार, कोयला मंत्रालय द्वारा जारी द्वारा एमटीपीसी के पत्र दिनांक 21.01.2016 के परिप्रेक्ष्य में अपने क्रमांक 13015/59/2015-CA-III, दिनांक 12.02.2016 द्वारा अधिसूचित किया गया है, जिसकी छायाप्रति निबन्धानुसार आवश्यक कार्यवाही हेतु संलग्न प्रेषित है।

संलग्न:- उपरोक्तानुसार.

हस्ताक्षर/-
(श्री एस. भारतीदासन)
अवर सचिव
छत्तीसगढ़ शासन
खनिज साधन विभाग

पृ0 क्रमांक एफ 3-1/2016/12 रायपुर, दिनांक 22 FEB 2016

प्रतिलिपि :-

1. कलेक्टर, सरगुजा(अंबिकापुर), कोरिया (बैकुण्ठपुर), कोरबा, जांजगीर-चांपा, रायगढ़, जशपुर(जशपुरनगर), बिलासपुर, मुंगेली एवं गौरेला-पेन्ड्रा-मरवाही।
2. सीएमडी एमएसटीसीएल लिमिटेड, रामाईपाली आवंटित कोलब्लॉक, तिमुल्ला तेह. धरमजयगढ़ जिला रायगढ़(छत्तीसगढ़) की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु अग्रेषित।

24-02-16
GM(P)

अवर सचिव
छत्तीसगढ़ शासन
खनिज साधन विभाग

F.No. 13015/59/2015-CA-III
Government of India
Ministry of Coal

Shastri Bhawan, New Delhi
Dated the 7th February, 2018

To
The Under Secretary,
(Attn. Shri Sanjay Bakhshi)
Mineral Resources Department,
Government of Chattisgarh,
Mahanadi Bhawan, Naya Raipur

Subject: **Non-applicability of Mining Lease for the land acquired under the Coal Bearing Areas (Acquisition & Development) Act, 1957**

Sir,

I am directed to say that the Ministry is in receipt of a letter dated NTPC Limited (NTPC) dated 21.01.2018 wherein they have stated that Adjoining Areas/Core Repentance (ARC), Government of Chhattisgarh (GoC) vide their letter dated 12.10.2015 has desired that NTPC should apply for Mining Lease in reference to Clause 3 (a) of the Allotment Order issued by this Ministry on 08.05.2013 for Talaipalli coal block. Further, the letter from NTPC states that NTPC, GoC has advised to obtain a clarification from the Ministry regarding applicability/non-applicability of Mining Lease in case of Land being acquired under Coal Bearing Areas (Acquisition & Development) Act, 1957.

2. The position with regard to the above mentioned of GoC is clarified herewith "by virtue of the provisions in Section 10 and 11 of the Coal Bearing Areas (Acquisition & Development) Act, 1957, the land or the rights in or over the land acquired under the Act vests absolutely with the Central Government or the person, that is a Government Company". Accordingly, since the land acquired under the Act vests absolutely in the Government Company (NTPC), there is no further necessity for execution of Mining Lease with the State Government.

3. In view of the above, execution of Mining Lease for Talaipalli coal block as well as other two coal blocks, namely, Bharti & Dharamjaigarh in regard of existing area (land) acquired under the Coal Bearing Areas (Acquisition & Development) Act, 1957, by NTPC with the GoC is not required as the land acquired under the Act vests absolutely with NTPC.

Yours faithfully,

(Pradeep Kumar)
Under Secretary to the Government of India
Tel. No. 23072636

Copy to:
Regional Executive Director (Coal Mining)
(Attn. Shri Dhanvir Anand)
NTPC Limited

ANNEXURE-VIIIF

NOTE ON UNDERGROUND MINING

1.1 DISPOSITION OF SEAMS AND SELECTION OF MINING TECHNOLOGY

Mechanized opencast mining of various coal seams commencing from the topmost X seam to IV seam has been planned. The various coal seams/ splits available below IV seam and the partings between various such horizons is detailed at Table 1.1.

Table – 1.1 - Thickness of Seams/Partings below III Seam

Coal Seams	Seam (m)		Parting (m)		Dominant Thickness (m)
	Minimum	Maximum	Minimum	Maximum	
III L	0.12	3.25			0.50-1.5
Parting			24.57	44.55	33.0-39.0
III	0.66	5.97			2.0-5.5
Parting			31.1	55.93	33.0-51.0
Parting			31.1	55.93	33.0-51.0
II L3	0.5	3.09			<0.90
Parting			13.39	40.9	28.0-38.0
II L2	0.07	2.68			<0.90
Parting			5	60.39	35
II L1	0.05	1.54			<0.90
Parting			1.27	20.59	3.0-14.0
II	0.13	5.92			0.50-2.50
Parting			0.37	3.89	0.50-2.0
II L	0.05	2.45			<0.90
Parting			Around 35.0 m		
I	0.22	0.55			-

From the above table, it is evident that Seam IIIL below Seam IV (the proposed quarry floor) has thickness varying from 0.12m to 3.25m although the seam has

1

not acquired workable thickness in the the mining area as the prevalent thickness in 83%of boreholes vanes from 0.5m to 1.50m.

The seam below seam IIIL is Seam III which has acquired workable thickness in the mining area (the prevalent seam thickness is 2.0 to 5.50 m in 86% of boreholes). The bottommost Seam IV has been planned to be worked by Opencast. The Final stage plan of the OC workings has proposed to fill the workings with OB upto a height of 120m above the surface height. A void has been proposed to be left in the OC workings and would normally be filled with water. The OB dumps of the OC workings are watercharged during rainy season. The parting betweem Seam III and Seam IV is less than 60m in most of the mining area. There would be dead load of the 120m high dump on the surface of the Underground workings. Considering the height of the dump, the depth of the Seam III workings (more than 250m in most of the area), the water filled void on the surface and water charged strata of OB on the surface of the mine during rainy season, the seam III has been considered to be unsafe to work by UG method.

Detailed study of the Geological Report has revealed that possibility of any belowground mining in Seam IIL1 and IIL does not exist due to poor development of the carbonaceous horizons. Seam II has developed working thickness in the block barring eastern side. Seam IIL2 & Seam IIL3 have attained workable thickness in north west and south west areas of the coal block in very small areas. The seam IIL2 and II L3 have workable area at a depth higher than 500m in the south western side. These seams have developed workable thickness in a very small area in the North Western side at a depth higher than 300m. Accessing these areas from Seam II would involve thin seam drivage or drivage of drifts. This is considered to be non economical as the workable reserves are meagre.

The Seam Folio plans of Seam II indicate that this seam has the very good potential to be mined by underground mining operation as it has developed workable thickness for UG mining in the mining area on from the central to western portion. The prevalent workable thickness of the II Seam varies from

1.5 to 5m. The depth of the workings vary from 230m to greater than 600m in the dipmost portion of the mining area.

In CIL mines, Bord & Pillar method using SDL / LHD is in vogue. This is a semi mechanized technology and involves Blasting operations. The work force is well versed with the various operations. The manpower deployment in the working districts being high and the production to the tune of 100 tons per day with SDL and 150 tons per day with LHD machine is being achieved in Indian mines. Due to low productivity and high manpower deployment this technology, it would not be profitable to work by SDL/LHD.

The two prevalent methods for Mass production deployed in the Indian Mines are Continuous Miner Technology and Longwall technology.

Continuous Miner Technology on Bord & Pillar method is in operation in many mines of CIL. This technology is very flexible and the blasting operations cycle is also not used in this method. The shuttle car used in the CM package is a coal hauling machine is tyre mounted likely the LHDs being used in the CIL mines. The continuous Miner machine is available in wide cutting ranges. These days CM on hiring basis is being used in many mines of CIL and the production to the tune of 2000 tpd and more is being achieved in mines. In the hiring mode of CM technology, the district manpower is provided by the private party. The CM technology is delployable in mines upto a depth of around 400m .

CM technology is normally not deployed in high depth mines due to the consideration of load bearing capacity of max pillars size of 48m x 48m permitted by the Coal Mines Regulations. The geomining conditions of high depth and dead load of 120m of backfilled OB on surface do not permit the deployment of CM technology in this mine.

Powered Support Longwall (PSLW) technology is generally suitable where comparatively large area free from faults and geological disturbances available for deployment. Long panels can be made for final extraction, as the method is highly inflexible. The property should not have large and abrupt variation in seam thickness. Besides, as the method involves cutting/shearing (no blasting) and the

rate of extraction is very high, it ensures better percentage of extraction, ease of management and is safer. Longwall panels operate on "straight line" extraction method.

A number of Longwall faces have been operated in the mines of CIL in collaboration with European Companies and even with Chinese collaboration. Till date the best results have been given by the Chinese packages. Longwall packages also require additional gate road drivage equipment. A provision of atleast two CM packages for winning the districts and main dip drivages be made. Two road headers would be required for gate road drivage of the mine. ***Considering the high depth and the dead load of 120m OB on surface, the seam II has been proposed to be worked by Longwall technology.***

1.2 GEOLOGICAL RESERVES

The distribution of geological reserves in Seam II is given in Table-1.2.

Table-1.2 - Thickness-wise Geological Reserves

SN	Coal Seam	Thickness zone (m)	Geological Reserves (m.tes)
1	Seam II	1.2-1.5 1.5-1.8 >1.8	2.21 7.74 28.29
Total			38.24

The extractable reserves, excluding fault barriers, panel barriers and boundary barriers, are given at Table-1.3.

Table-1.3 - Extractable Reserves vis-à-vis Geological Reserves

SN	Coal Seam	Geological Reserves (M.T)	Extractable Reserves (M.T)
1	Seam II	38.24	28.25

1.3 MAIN MINE ENTRIES

Considering the availability of land as per the OC planning of higher seams, the only option suitable for the mine is working by two shafts. One of the shafts can shall be used as return airshaft and the coal handling and manwinding shall be carried from the other shaft. The depth of the shafts has been considered to be 245 m.

Though it is ideal to locate such mine openings around middle of the area considered for belowground workings, yet existence of opencast mining operations does not permit to have such a choice. Possibility of working by belowground method through two independent mine units, so as to get higher production capacity was also considered. It is found that sizeable coal reserves of opencast mine get blocked as also the opencast mine operations would be constrained by such planning. Therefore, only one belowground mine unit has been considered at this project.

1.4 MINE CAPACITY AND LIFE OF THE MINE

Use of one set of Longwall in average seam thickness of about 3.0m with provision of adequate gate/trunk transport is likely to produce on an average of about 1.7 MTPA. The two CMs having productivity of 0.5Mty are likely to produce 1 Mty per annum. The total extractable reserves are to the tune of 28.24 MT. The reserves for Longwall alongwith roadheaders drivage would last for around 10 years and those for CM would last for 12 years. The life of underground workings is expected to be 12 years from completion of Opencast workings. The sinking of shafts and construction of surface infrastucture are proposed to be carried out as parallel activity with OC workings.

1.5 MINE VENTILATION

The working belowground mines in Mand-Raigarh Coalfield are placed in Degree-I category of gassiness. It is, therefore, expected that the proposed underground mine workings at Talaipalli Coal block would also fall in same Degree-I of gassiness. However a scientific study for the purpose would be carried out. Accordingly, ventilation provisions in this are based on Degree-I gassiness. These provisions may need to be altered if any change in degree of gassiness is found on actual determination as required by statute.

Exhaust ventilation system is considered for the proposed mine with one of the shafts provided with a main mechanical ventilator with suitably designed air lock arrangements & evasee.

A PV300 or equivalent fan with 350 KW motor would be suitable for the mine.

ANNEXURE-VIIIG

For Internal use of NTPC

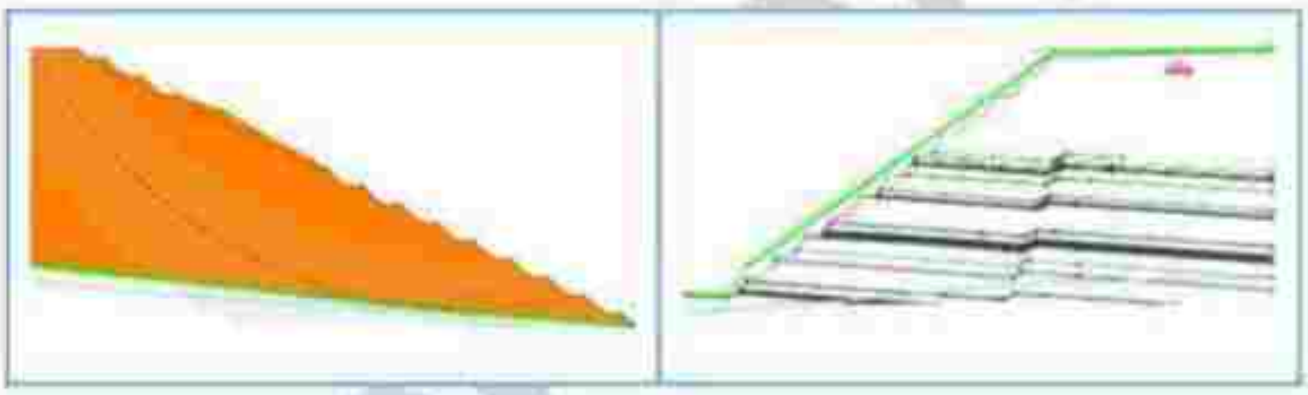
cmpdi

A Mini Ratna Company

SCIENTIFIC STUDY OF PIT AND DUMP SLOPE STABILITY

FOR

TALAIPALLI COAL MINING PROJECT



SEPTEMBER 2022

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CHAPTER 1

BACKGROUND

1.1 INTRODUCTION

Talaipalli coal mining block in the state of Chhattisgarh was initially allotted to NTPC by Ministry of Coal (MoC), vide letter no.13016/29/2003-CA-1, dated 25.01.2006, for meeting coal requirement for the proposed 4000MW Lara Integrated Power Project which is approximately 60 kms away from the coal block.

Talaipalli Block lies in the eastern part of Mand-Raigarh Coalfield in the state of Chhattisgarh. At the time of allotment, the block was regionally explored by GSI by drilling 15 holes (6434.55m) and estimated coal reserves of 964.88 million tonnes of indicated category were assessed.

On receiving Letter of Award (LOA) from Ministry of Coal, NTPC Ltd issued Work order to MECL to carry out detailed exploration in the block. MECL drilled about 102 boreholes (39854.75 mtrs. of drilling) in approximately 20 sq. km. block area for which the Geological Report (GR) was submitted to NTPC on 29.09.08.

On receipt of GR, NTPC awarded the consultancy for preparation of Mining Plan and Feasibility Report for this block to Advance Coal Management & Marketing Pvt. Ltd. (ACMM), New Delhi. The Mining Plan was prepared by ACMM in 2009 for a rated capacity of 18.00 Mty based on the aforementioned GR which was later approved by the Ministry of Coal on 31.03.2010. Subsequently, all statutory clearances were obtained on the basis of the approved Mining Plan.

However, as a consequence to the Judgment of the Hon'ble Supreme Court in September 2014, the block allocation was cancelled which was later re-allotted to NTPC on 08.09.2015.

NTPC planned to develop and operate the mine through outsourcing by appointing a Mine Developer and Operator(MDO) with scope of works viz. overburden removal, extraction

of coal, construction of CHP & other fixed mine infrastructures, compliance of statutory obligations and other associated activities.

Meanwhile, all requisite statutory clearances and permissions were obtained from the respective statutory bodies. The major statutory clearances out of the above are furnished below:

Table 1-1 Major Statutory Clearances with Obtaining Date

Activity	Date of Achievement
Env. Clearance	02.01.13/13.11.15
Forest Clearance	St-I : 05.11.12; St-II: 29.01.14; 23.05.17(Rev)
Consent to Establish	06.01.15
Consent to Operate	17.03.16
Tripartite Escrow Agreement (Banker, CCO & NTPC)	15.05.14 & 04.09.17
DGMS Permission	19.01.18
Coal Controllers permission	31.01.18

1.2 NEED FOR THIS REPORT

M/s TEMPL was appointed as MDO on 26.08.2020 by NTPC for development and operation of Talaipalli Coal Block.

The Technical Feasibility Note on Talaipalli Coal Block was prepared by CMPDI and was submitted to NTPC and M/S TEMPL in September 2021. The approved Mining Plan was reviewed and it was found to be not feasible. CMPDI recommended revision of the Approved Mining Plan.

Against this backdrop, NTPC has awarded the consultancy service to CMPDI for Scientific Stability Analysis of proposed Pit and Dumps in the Mining Plan Talaipalli Coal Block which is being prepared by CMPDI.

1.3 SCOPE OF THE STUDY

The scientific stability analysis Report for the Pit & Dumps as per the mining plan includes the following.

- Stability assessment of the proposed Dumps and Pits Slope designs geometry as the Mining plan
- Suitable remedial measures for safe dump managements.
- Slope monitoring Technics to be adopted.

1.4 BASE DOCUMENT

The mining plan prepared by CMPDIL is the base document

CHAPTER 2

PROJECT SITE INFORMATION

2.1 LOCATION

Talaipalli coal block having an area of 2115.5 ha is bounded by latitude 22° 13' 35" & 22° 16' 08" N and longitude 83° 25' 49" & 83° 30' 22"E. It is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. Talaipalli block roughly forms a rectangle, the longer axis is NW-SE direction forming the length of the block, and the shorter axis NE-SW direction forming the width. The block boundary allocated to NTPC Ltd., was pillared by Boundary Pillers BP-1 to BP-65. The Kelo river forms the eastern boundary of the block and the boundary line passes through Naya Rampur & Raikera village in the south of Sajepalli, west of Chotiguda forming the western boundary. Ajugarh and Kudur-Mauha village forming the northern boundary.

Talaipalli block is covered by Survey of India top sheet No. 64N/7 &N/8 (RF 1:50000). The block is mostly covered by cultivated land while south-eastern part of the block has Reserve & protected forest cover. Talaipalli, Kudhur-Mauha, Ajugarh, Chotiguda, Bichhinara, Naya Rampur, Raikera and Sajhepalli are numerous villages located within the block.

2.2 COMMUNICATION

Talaipalli block is about 55 km away from Raigarh township and is close to Tehsil Headquarters at Gharghoda which lies on Raigarh-Ambikapur State Highway. Talaipalli village is situated in the block & it is about 20 km NE from Gharghoda and is connected with Gharghoda partly by all-weather Gharghoda-Lelunga road. Gharghoda is about 35 km. North of Raigarh Railway Station which is on Howrah-Bombay Main Line of South Eastern Railway. A large part of the area of investigation is practically unaccessible during monsoon. The nearest railway station is Raigarh which is 55 km away from Talaipalli block lying on the Mumbai-Howrah main line of SE railways.

2.3 PHYSIOGRAPHY AND DRAINAGE

The topography of Talaipalli block is mostly covered by softer horizon and in general represents an undulating terrain bounded by Tolge Pahar in the north and Silot Pahar (580m) in the south. The general ground level elevation of the area varies between 280 m and 340m above MSL.

Kelo River is flowing through the south-eastern part of the present area, constitute the main drainage system. The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area. This subsidiary stream channel is fed by number of small tributaries rising from hills both from north and south.

2.4 CLIMATE

The area experiences a sub- tropical climate with very hot and dry summer. In the summer season from March to June, temperature rises to 45° C during the peak period. The monsoon period extends from mid-June to September with an average annual mean rainfall of 1620 mm. The winter season starts from November and continues upto February. During winter the temperature goes down to 18.6° C.

CHAPTER 3

GEOLOGY AND EXPLORATION

3.1 GEOLOGY OF TALAIPALLI BLOCK

Talaipalli Block is located in the eastern part of Mand-Raigarh Coalfield. The geology of the block is in conformity with the regional set up. Major part of Talaipalli block is covered by the rocks of Barakar formations. Barren measure occurs in the southern part of the block. However a small patch of Barren Measure is also noticed in the north western part of the block.

The geological succession evolved on the basis of exploration data generated in the block is given in the Table 3-2 below:

Table 3-2: Geological Succession in Talaipalli Block

Formation	Thickness (m)	Lithology
Recent	0.50 – 18.00	Soil, alluvium
Barren Measures	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakara	30 – 596	Fine, medium and coarse grained felspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir	1.00 – 54.30	Khakee,greenish shales & sandstone,occassional pebbly
Basement		Metamorphics

3.1.1 DESCRIPTION OF FORMATION

- **Metamorphics:** Precambrian metamorphic rock constitute the basement of the basin. These are composed of quartzite, mica-schist, granite gneiss and at places intruded by pegmatites or vein quartz. The metamorphics have been intersected in

7 boreholes (MNRT-53, 62, RT-6, 9, 12, 13 & 14). The thickness of metamorphics in boreholes varies from 1.00m (MNRT-62) to 9.90m (RT-9).

- **Talchir Formation :** The rocks of Talchir formation are not exposed within the block boundary. It is encountered in boreholes RT-5,6,9,10,12,13 &14. The thickness of Talchir as intersected in boreholes varies from 1.20m (RT-12) to 54.30m (RT-10). Talchir formation consists of greyish white to greenish grey sandstone and shale, occasionally khakee in colour. At places it is embedded with pebbles of quartzite, mica-schist, granite gneiss and of pegmatite.
- **Barakar Formation :** The major part of the block is covered with Barakar formation. Thickness of Barakar formation as intersected in borehole varies from 30 – 596 m. Barakar formation constitute fine to coarse grained, white to grey feldspathic, micaceous sandstone, shale and carbonaceous shale with economic coal horizons. A total of 27 coal seams have been encountered in this formation besides a few local seams / bands.
- **Barren Measure Formation :** This formation has occupied the southern part of the block. Besides a small patch of barren measure is preserved in the northern part of the block due to opposite dip of faults formation of graben. This formation is intersected in 15 boreholes with thickness varying from 18.80 m (MNRT-27) to 143.00 m (MNRT-24). Barren Measure Formation is represented by predominantly grey shale with minor sandstone and intercalation of sandstone and shale.
- **Igneous Intrusives :** The block is free from any igneous intrusives.
- **Soil & Alluvium :** Major part of the block is covered by a layer of soil and alluvium. The weathering has affected all the strata below soil to a varying extent. The thickness of soil ranges from 0.50m (MNRT-7, 8) to 18 m (MNRT-59). The depth of weathered zone varies from 6.00 m (MNRT-34) to 27.30 m (MNRT-5).

3.1.2 STRUCTURE OF THE BLOCK

The general strike of the bed is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from 4^0 to 8^0 towards South-west.

The Geological Plan of the Talaipalli Coal Block is given in Fig. 2-1 below:

Figure 3-1: Geological Plan of Talaipalli Coal Block

The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data out of which three faults namely fault F1-F1, F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. The faults details are furnished in Table 2-2 below.

Table 3-2: Details of Faults

Fault No.	Location	Trend	Nature of fault	Throw
F1-F1	Northern part passing near BH No. MNRT-24, 87, 22 & 35	East-West to ENE, NE-SW dipping northerly	Dip fault	20m – 85 m
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 – 10m.
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	30-35 m.

Fault No.	Location	Trend	Nature of fault	Throw
F4-F4	Northern part near BH MNRT-31, 24, 43 & 62	East-West dipping northerly	Dip fault	30 – 150 m
F5-F5	Northern western part through BH MNRT-62	East-West	Strike fault	35 m
F6-F6	Northern part passing through MNRT-31	WNE-ESE dipping westerly	Oblique fault	15 – 25 m
F7-F7	Northern part passing through MNRT-11	NW - SE	Oblique fault	20 m
F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	60-105 m
F9-F9	Northern part passing through MNRT-101 RT-4 & MNRT-11	East – West to curvilinear	Strike Oblique Fault	25m
F10-F10	Northern part passing through RT-7	NE-SW	Oblique curvilinear	0 -10 m
F11-F11	Southern part	NW-SE	Curvilinear	0 – 10 m
F12-F12	Southern part	NW-SE	Oblique	25 m

3.1.3 COAL SEAMS

A total of 27 Coal Seams have been encountered in Talaipalli Block. The sequence of coal seams is given below:

Seam I is poorly developed in the block. Hence resource of this seam has not been assessed.

Out of the above, seams workable by opencast are: from topmost X LA to IV BOT seam due to constraint of space for dumping. The remaining have underground potential. Seams viz. X L-D, X L-C, X LB, IX L1, VIIIL, VIL, V Top, V L1, V Bottom, III, I L1 & I Bottom are poorly developed in the block. Hence resource of these seams has not been assessed.

The sequence of coal seams and parting is given Table 3-4 below:

Table 3-3 Sequence of Coal Seams & Parting

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X Lo	0.2	3.08			0.50-3.00
	Parting			5.61	33.9	6.0-34.5
2	X Up	0.2	3.29			0.50-3.00
	Parting			8.87	38.89	9.0-39.0
3	X Top	0.4	3.6			3.00-3.00
	Parking			0.7	3	1.0-3.0
4	X Bot	3.8	8.1			5.5-8.0
	Parting			2.1	30.15	3.5-35.5
5	IX Lo	3.2	9.55			3.0-9.0
	Parting			13.59	21.54	17.0-19.5
6	IX Lo	0.36	3.80			3.0-3.0
	Parting			5.65	11.87	6.0-9.0
7	IX	0.86	6.36			3.5-6.0
	Parting			6.5	16.15	9.0-12.0
8	VIII	0.06	6.64			4.0-6.5
	Parting			17.68	43.01	20.0-25.0
9	VII	0.3	3.9			0.50-3.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.27	3.42			3.0-3.0
	Parting			0.56	9.29	0.5-4.5
11	VI Bot	8.09	30.05			3.0-8.0
	Parting			0.85	5.38	3.0-3.0
12	VI Bot	0.48	4.96			0.50-3.0
	Parting			2.8	23.45	14.0-21.0
13	V Top	0.5	3.05			0.50-3.50
	Parting			8.09	38.94	33.5-38.5
14	V Mid	0.35	8.73			0.50-3.50
	Parting			4.55	35.85	0.00-32.0
15	V Bot	0.3	5.4			0.50-3.0
	Parting			30.16	80.54	37.0-38.0
16	IV Top	0.54	9.78			3.5-9.0
	Parting			6.9	20.93	8.0-10.0
17	IV Mid	0.09	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.28	4.99			0.50-3.0
	Parting			0.7	4.53	0.50-2.0
19	IV Bot	0.55	5.67			3.5-8.5
	Parting			8.06	31.54	34.0-37.0
20	III L	0.3	8.23			0.50-3.0
	Parting			24.57	44.55	33.0-35.0
21	III	0.66	5.97			3.0-5.5
	Parting			31.1	55.98	33.0-53.0
22	II Lo	0.5	3.08			0.50
	Parting			19.99	49.8	28.0-39.0
23	II Up	0.07	2.68			0.50
	Parting			5	50.01	25
24	II	0.08	3.54			0.50
	Parting			8.27	30.55	8.0-34.0
25	I	0.33	5.92			3.5-5.5
	Parting			0.87	9.88	0.50-3.0
26	I L	0.05	2.45			0.50
	Parting			Assumed 30.0 m		
27	I	0.22	0.50			27

3.1.4 RESERVES

As per GR, a Net Geological Reserve of 1267.145 million tonnes of coal reserves including both opencast and underground reserves varying in grade from 'A' to 'G' have been established in the block. Out of this, 40.278 million tonnes of reserves fall in the indicated category and remaining 1226.867 million tonnes are proved reserves.

CHAPTER 4

METHOD OF MINING

4.1 PROPOSED METHOD OF MINING

Considering the geo-mining characteristics of the block, dumping space constraints and for **conservation of resource**, it is proposed to extract the coal reserves upto Seam IV BOT using open cast mining Method because of following reasons –

i)Occurrence of multiple seam with a significant number having low thickness between 0.5m-1.5m. Also, some seams are thick and are above 5m in thickness. Coal loss in such seam conditions can be minimized by opencast mining method.

ii) The existence of very low cover for entry to bottom-most seam considered (Seam-IV BOT) in the eastern part of the block makes opencast mining an obvious choice.

The deposit has therefore been proposed for mining by opencast method up to the Seam IV BOT Floor. Seam below IV BOT shall be considered for UG mining after exhaustion of OC mine.

4.2 CHOICE OF TECHNOLOGY

The operational factors include

- Multi-Seam operation involving 19 seams horizons
- Effective seam thickness varying from 1.00 to 9.00 m with majority of seams having less effective thickness varying from 1.00 to 2.50m.
- Mild seam gradient.
- OB with varying parting thickness

Based on the above factors surface miner has been considered for extraction of coal as surface miner eliminates blasting in coal. Blasting in comparatively less thick coal seams leads to higher contamination of extracted coal.

As removal of overburden with varying parting thickness requires flexible operation, shovel-dumper combination with conventional system of mining i.e. inclined slicing has been considered for removal of overburden.

For a rated capacity of 25.0 Mty, it is proposed to deploy 10-12 cum Hydraulic Shovel backhoe and 20-22 Cum Hydraulic shovel backhoe with 100T and 200T Rear Dumper respectively for OB. For thin parting lower size equipment shall be deployed. For Coal, Surface Miner with Front End Loader and 60T Dumper shall be deployed.

4.3 CONSTRAINTS ON MINE DEVELOPMENT

The following constraints in opencast working of the deposit have been envisaged:

- The block area being surrounded by coal bearing blocks and hills in all sides, availability of any land for external dumping, outside the block area appears remote.
- Kelo river flowing along the north-eastern side of the block
- Presence of about 08 villages (fully or partly) within the proposed mining area.
- High initial Depth of base seam in the western side due to presence of several faults and high stripping ratio especially in the western side of the block requires huge amount of temporary external dump in the dip side which needs to be re-handled later.

4.4 PIT DELINEATION: MINE BOUNDARY OPTIONS

As the block area is surrounded by coal bearing blocks on all sides and reserve forest, there is no availability of any land for external dumping outside the block area.

The mine boundary for the pit has been delineated taking into consideration block boundary, surface features, strip ratio and **external dump space required for continuity of mining.**

Considering the above, the pit is formulated with maximum possible external OB dump on the dip side within the block to be re-handled later and internal dumping in the decoaled area.

Pit optimization has been done considering constraint on space availability for dumping of waste.

The pit boundary has been fixed leaving safety barrier, conveyor corridor along the eastern, southern and western boundary. Also, the infrastructural facilities (MGR, Silos, workshop etc) is proposed to be located in the south-west corner of the block.

The proposed Pit has been formulated considering Seam IV as base seam . Seam IV has been taken as the base seam for the pit since going upto Seam III which is only 4-4.5m thick and is 50-60m below seam IV increases the OB handling to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~27? Mt of Coal. So, Opencast mining for the Talaipalli coal block has been proposed upto Seam IV as suggested above to maximize the recovery of coal.

Considering the above quarry surface within the block has been delineated as follow:

North	East	South	West
50m from Block boundary, foothill of the Tolga Hill in NW and leaving area for UG infrastructure in north near BH MNRT-92.	60m from edge of Kelo river and 50m from Block boundary	50m from block boundary	50m from Block boundary and leaving area for infrastructure in south-west

4.5 RATED CAPACITY:

Revised Mining Plan for Talaipalli Coal Block has been prepared for a rated capacity of 25.0 Mty of Coal from Opencast mine. This output is considered based on thickness of multiple coal seams (19 No. of Coal Horizons for OCP) and strike length of ~5 Km

4.6 BASIC PROJECT AND MINE PARAMETERS:

The basic project parameters and mine parameters is given below:

Sl. No.	Parameters	Unit	Value
1	Net Geological Reserve	Mt	1267.145
2	Extractable Reserve by OC method	Mt	651.56
3	OB Volume	Mcum	2734.58
4	Stripping ratio	Cum/t	4.33
5	Target Capacity	Mt/year	25
6	Tentative Mine life	Years	31

Job No: 0310022055 16

Sl. No.	Parameters	Unit	Value
1	Maximum depth	m	340
2	Usual strike length:		
	along the Mine Floor	m	4800
	along the Mine Surface	m	5300
4	Usual dip rise length:		
	on the Mine Floor	Km	2500
	on the Mine Surface	Km	3200
6	Area:		
	On the Mine Floor	ha	1301.10
	On the Mine Surface	ha	1839.85

4.7 SEQUENCE OF MINING:

The block has NW-SE strike of around 5 km. Opencast mining for the Talaipalli coal block has been proposed upto Seam IV as suggested above to maximize the recovery of coal and effective dump management. It has been proposed to mine maxumum area in the block with due consideration to space required within the block for external dumping and infrastructures. The peak rated capacity for the block is proposed to be 25.00 Mty.

To ensure availability of adequate quantity of coal and early reaching of target capacity, a two-entry scenario has been envisaged one on the north eastern side and the other on the north-western side. Seam IV will be accessed from both the side which will form the base of the quarry. Then working front of both the quarry will advance towards south and towards each other eventually merging into a single quarry with full strike length after about 9-10 years.

In the initial years, simultaneous working of mechanized opencast mine and the projected belowground mine may pose operational problems due to massive production from the opencast unit. As such, it is considered prudent to start underground mine work after exhaustion of opencast workings.

OB will be transported through flank roads to temporary external OB dumps in dip side and Internal OB dumps. Coal is proposed to be transported through ramps and flank roads. Coal from both pit in initial years and also after merger of the pit will be transported to mobile coal handling

arrangement at the surface in both eastern and western side and thereafter to Coal dispatch center by surface conveyors.

It is proposed to use conventional method of mining viz. inclined slicing with excavators/ loaders loading coal and waste into Dumpers for hauling.

The mining operation in the block is continuing in the southern part of the block since October 2019 through outsourcing means upto seam VIII. This south pit is projected to extract 1.88 Mt of coal by the end of FY 2022-23. This pit will remain in operation for another 3 years after FY 2022-23. The projected coal production and OB removal from this south pit is given below:

Year	Calendar Year	Existing South Pit	
		Coal (Mte)	OB (Mcum)
Upto Base Yr FY 2022-23	Upto Base Yr	2.81	16.01
1	2023-24	1.50	11.10
2	2024-25	2.03	11.77
3	2025-26	1.58	5.91
Total		**7.92**	**44.80**

Moreover, the work for mining operation through outsourcing means in the north-western side has already been awarded for 5 years upto Seam VIII. The pit will be opened in the north west side as per the proposed mine entry and the mine will produce about 14.60 Mt of coal with 46.63 Mcum of OB removal in the 5 years. This OB will be dumped south of the proposed western pit near the pit and will have to be re-handled to proposed temporary external dump in the southern part of the block after 5 years.

The proposed coal production and OB removal from the eastern and western pit for first 5 years of operation is given below:

Year	Calendar Year	West Pit		East Pit		Total Coal (Mt)	Total OB (Mcum)
		Coal (Mt)	OB (Mcum)	Coal (Mt)	OB (Mcum)		
Upto Base Yr FY 2022-23		0.60	4.43			0.60	4.43
1	2023-24	1.02	6.29	0.98	8.71	2.00	15.00
2	2024-25	2.03	8.50	1.97	9.50	4.00	18.00
3	2025-26	4.05	10.94	1.95	11.06	6.00	22.00
4	2026-27	4.00	11.02	5.00	23.98	9.00	35.00
5	2027-28	3.03	5.44	11.37	50.13	14.40	55.57
Total		**14.69**	**46.63**	**21.31**	**98.37**	**36.00**	**145.00**

4.8 MINING SYSTEM PARAMETERS :

Elements of mining system have been determined in accordance with the parameters of excavation, transport equipment and parameters of drilling and blasting. However, the space constraint for dumping the OB has been the most important factor taken into consideration for designing the mining system, since the mining system plays an important role for determining the void created for internal dump

Top OB and thick partings:

Bench height :10-15 m with 20cum electric-hydraulic shovel/backhoe

Bench width :Working-40-45m, Non-working- 25m

Bench slope :70 deg

Parting between seams;

Bench height :as per inter-burden thickness with 10-12 cum electric-hydraulic shovel/ backhoe

Bench width :Working- 40-45m, Non-working- 25m

Bench slope :70 deg

Coal:

Bench height : Seam height with Surface Miner

Bench width : 40-45m

Bench slope : 70 deg

Dump:

Bench height : 30m

Bench width : 30m

Bench slope : 37 deg

4.9 WASTE DISPOSAL STRATEGY:

It is envisaged that initially for 3 years, all the OB generated will be dumped externally from both the eastern and western pit. This temporary external dump is proposed to be located in the southern side of the block. Once sufficient void is created after 3 years of operation, internal dumping will

start in eastern pit while in the Western pit, internal dumping can be started only from 8th year of operation once the base seam is reached.

The external dumping will continue till 13th year and thereafter from 14th year, this external dump (the OB part) will have to be re-handled back into the quarry void for smooth mine advancement. However, re-handling of 3.73 Mcum/year of Top Soil for spreading over internal dump will start from 10th year only.

Out of the total OB of 2734.58 Mcum, it is estimated that 533.53 Mcum (~19.5%) will be required to be temporarily dumped externally. This 533.53 Mcum will be re-handled back into the quarry after sufficient space is available for accommodation of waste from 14th year and will be re-handled upto 25th year. The lead for re-handling would be around 3.5 km. The Strip ratio for the project including re-handling will be 5.17 cum/t.

The height of the temporary external dump is proposed to be around 120m above ground level upto an RL of +420m and final height of the internal dump is proposed to be 120m above ground level upto an RL of +420m. This will ensure optimization of the life of the mine to extract maximum mineable coal. However, a slope stability study will be imperative to determine final dump height and final dump slope as per regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020. Slope stability analysis for proposed dumps in the mining plan has been carried out and the factor of safety for dump height upto 120m from OGL was modelled using the cross sections and the material properties collected from the field. The analysis indicates a factor of safety in the range of 1.25-1.50 for various cases.

Shovel-dumper spoil dumps will be formed in benches of 30m and slope of individual dump bench will be 370(equal to angle of natural repose of OB material). The width of berm between two adjacent benches will be 30 m. Overall slope of dump works out to be 230- 240. Top soil wherever available will be stacked separately which will be used up for spreading over the completed OB dumps. For the formation of dumps and leveling of dumps, dozers will be used.

The waste disposal schedule is given below:

Year	Temporary External Dump (Mtcum)		Internal Dump (Mtcum)		Undisturbed	Total OB (Mtcum)		Refunctioning to Internal Dump (Mtcum)	
	Progressive	Cumulative	Progressive	Cumulative		Progressive	Cumulative	Progressive	Cumulative
Upto Base Yr FY 2022-23	20.44	20.44				20.44	20.44		
1	20.86	41.30	0.00	0.00	0.00	20.86	41.30		
2	29.77	71.07	0.00	0.00		29.77	71.07		
3	27.91	98.98	0.00	0.00		27.91	98.98		
4	32.29	131.27	0.77	0.77		31.52	130.50		
5	25.77	157.04	39.40	40.17		65.17	195.67		
6	19.80	176.84	41.20	81.37		61.00	256.67		
7	63.58	240.42	46.95	128.32		110.53	367.20		
8	64.92	305.34	46.80	175.12		111.72	478.92		
9	57.08	362.42	46.80	221.92		103.88	582.80		
10	53.98	416.40	46.80	268.72		100.78	683.58	3.75	3.75
11	54.69	471.09	46.20	314.92		100.89	784.47	3.75	7.47
12	54.46	525.55	77.54	392.46		132.00	916.47	3.75	11.21
13	54.46	580.01	77.54	470.00		132.00	1048.47	3.75	14.96
14			107.80	577.80		107.80	1156.27	32.49	47.45
15			102.60	680.40		102.60	1258.87	37.08	84.53
16			107.80	788.20		107.80	1366.67	42.94	127.48
17			107.80	896.00		107.80	1474.47	43.87	171.35
18			107.80	1003.80		107.80	1582.27	41.07	212.42
19			107.80	1111.60		107.80	1690.07	47.07	259.49
20			107.80	1219.40		107.80	1797.87	47.07	306.56
21			106.80	1326.20		106.80	1904.67	47.07	353.63
22			100.80	1427.00		100.80	2005.47	47.07	400.70
23			100.80	1527.80		100.80	2106.27	47.07	447.77
24			100.80	1628.60		100.80

FE Loader	6-7 cum	10
Rear Dumper (Coal Body)	60 T	60
DOZER(wheel)	450-460hp	10
COMMON		
Diesel Hydraulic Backhoe	1.5-2.0 cum	2
Water Sprinkler	70KL	10
Mobile Dust Suppression Cannon		10
Mot. Grader	280HP	8
Fire Tender		2
Vibratory Compactor	25T	4
Diesel Bowser	9KL	4
Dozers	410 HP	2
Crane	10Ton	4
Crane	25Ton	4
Crane	50Ton	1
T Handler		4
F.E.L	5-6 cum	3
Fork Lifter		4
Maintenance Van		2
RECLAMATION		
Diesel Hydraulic Backhoe	1.5-2.0 cum	2
Farm Tractor		4
Dozer	410HP	2
Grader	280HP	2
Tipping Truck	25 T	4
Job No: 0310022055		22

CHAPTER 5

STABILITY ANALYSIS

5.1 FACTORS GOVERNING THE SLOPE STABILITY

There are two main aspects of slope failure, and they are natural and manmade disturbances. The seismic activities of the earth's crust, rain, tornado, and geology come under the naturally occurring disturbance. The blasting, excavation is a manmade disturbance for slope instability. Following are the main factors that influence slope stability.

5.2 PROPERTIES OF MATERIAL FORMING THE SLOPE

a. Shear strength parameters: -

This is the basic parameter that holds the key role to control the stability of the slope. All stability analysis involves knowledge of the shearing strength of the soil but it is most difficult to comprehend it accurately. The shearing resistance of soil comprises basically of the following components:

- The frictional resistance between the individual soil particles at their contact points.
- The cohesion between the surfaces of the soil particles, i.e. the structural resistance to displacements of the soil because of the interlocking of the particles.
- The shear strength in cohesion-less results from inter-granular friction alone, while in other soils, it results from both: internal friction as well as cohesion.
- The fundamental shear strength equation proposed by French engineer Coulomb is S=C + σ Tan (Φ).

b. Hydro-geological parameters–

The effect of groundwater present within the rock mass surrounding an open pit can be detrimental to the stability of the slope (Hoek and Bray, 1981) Therefore, it is expedient to constantly monitor groundwater levels as well as pore pressure to assist in the assessment of slope stability (Ding, et al. 1998). Piezometers are important for monitoring the effectiveness of mine dewatering programs (Girard and McHugh, 2000). Measurement or calculation of water pressure is an integral part of

site investigation for slope stability studies. Information on water pressures is essential for designing and maintaining safe slopes (Girard, et al. 1998).

For hydrogeology study as part of PR, monitoring of profile of water table in and around active mining areas, through groundwater monitoring points, using dug wells/ Piezometers was carried out. The same is assumed to be representative of the hydrostatic condition of the mine bench for the current analysis.

For stability analysis of undisturbed material viz working faces and High wall phreatic line was assumed considering the groundwater level/ piezometric data for the Talaipalli block as provided by the hydrogeology dept, CMPDI.

Hydrostatic pressure/ water level condition (above the ground) within the overburden dumps (recent/old) can't be directly measured as OB dumps are not stratified Geological Formation. Study of groundwater monitoring levels maybe not be directly required in case of stability of OB dumps as it will not intersect the groundwater table of the surrounding area. However, the rate of infiltration of rainwater may be increased due to loose OB dump material.

Groundwater level and phreatic surface assumptions, piezometric levels were based on the hydrological data of the hydrogeological study of Talaipalli OCP.

5.2.1 GEOLOGY OF MINE PIT

The geology of the mine pit plays a vital role in determining the stability of the working pit. Understanding subsoil condition includes knowing seam alignment, type of material underneath. In addition to this, it is prudent to know various geological disturbances present in the mineable area.

5.2.1.1 SEISMIC FORCES

(a) Earthquake Effect

Earthquake experience by a structure depends on its dynamic characteristics and ground motions such that random motion of the ground, vibration intensity, magnitude of the earthquake; depth of focus, distance from the epicenter, and the strata on which the structure stands.

Seismic forces are considered as per "Indian standard criteria for earthquake resistant design of structures (fifth revisson) IS 1893:1984 (reprint 2002) in the following manner:-

Seismic force coefficient ah is calculated as per the above IS Code by following two methods and a higher value is taken for slope stability calculation

a) Seismic Coefficient Method,

$\alpha_h = \beta I \alpha_0$

β = Coefficient depending on the soil foundation system

I = Factor depending upon the importance of structures

α_0 = basic horizontal seismic coefficient

b) Response Spectrum method

$\alpha_h = \beta I F_0 S_a/g$

F_0 = Seismic zone factor for average acceleration spectra

S_a/g = Average acceleration coefficient for appropriate natural period and damping of structure. Value taken from T- S_a/g graph

$T = 2.9 H t (\rho/G) 1/2,$

T = Natural period of vibration for earth fill structure

Ht = Height, P = Mass density, G = modulus of rigidity

Since Talaipalli OCP, is situated in Zone III expected Ground Acceleration for zone III due to the earthquake has been calculated as follows

1. Seismic Coefficient Method,

$ah = \beta I \alpha 0$

Here

$\beta = 1.0, I = 1.5, a0 = 0.04$

Hence, $\omega_h = 0.06$

II. Response Spectrum method

$\omega_h = \beta I F0 Sa/g$

$F0 = 0.2$

Sa/g = Value taken from graph between the natural period of vibration versus average acceleration coefficient

The natural period of vibration T for earth fills structure will be calculated as follow

$T = 2.9 H t (\rho G) 1/2$, $H t = 80m$

$P = 18000 N/m3$

$G = 15 MPa \times 1000$

Hence, T = 0.239 sec.

Now $\omega_h = 1*1.5*0.2*0.16 = 0.048$

Hence it was found that the value of horizontal acceleration from a seismic coefficient method is more than the value obtained from the response spectrum method. Hence the same value was considered for uncorporating earthquake effect during stability analysis.

(b) Blasting Effect

Blasting plays a devil's role towards the stability of Pit and Dump Slopes in Mines. Generally, a blast vibration wave of low frequency has a hostile impact on stability (Dowding and Gilbert 1988). Wong and Pang(1992) suggested the Pseudo-Static approach to evaluate the blasting effect on slopes.

Hoek et al (2002) introduced the Disturbance factor due to blasting, "D" applicable to rock slope. The value of D varies from "0" to "1" where "0" signifies the minimal effect of blasting where "1" means large scale blast having a significant effect on slopes.

The ground motion is directly influenced by scaled distance and a square root of the explosive. Microsecond-delayed blasts are used for the reduction of PPV of ground vibrations which are connected with the maximum charge weight detonated per delay. Peak particle velocity has been widely accepted as a criterion for evaluating the effect of blasting. Langford and Kihlstrom have suggested a predictor equation to calculate peak particle velocity. DGMS has laid down accepted parameters in terms of PPV as shown in the table.

Table 5.1 Permissible peak particle velocity (PPV) at the foundation level of structures in mining area is in mm/sec.

	TYPE OF STRUCTURES	Dominant excitation frequency (Hz)		
		< 8 Hz	8-25 Hz	> 25 Hz
A	Building/structures not belonging to owner			
	(i) Domestic houses/structures (Kuchha, Brick in cement)	5	10	15
	(ii)Industrial building (RCC) framed structures	10	20	25
	(iii) Object of historical importance and domestic structures	2	5	10
B	Building belonging to the owner with a limited span of life			
	(i) Domestic houses/structures (Kuchha, Brick in cement)	10	15	25
	(ii) Industrial building (RCC) framed structures	15	25	50

5.3 CALCULATION OF FOS

The shear resistance of the sliding slope is assessed by an index called the factor of safety. The factor of safety gives a relatively static state of the studied slope about its mobilization. This also indicates the risk factor of failure briefly. This is a ratio of the shear resistance to shear forces developed at the sliding surface (mobilization force).

The factor of safety generally used is in the range of 1.2 to 1.5 for open-pit mines. Literature found to have categorized that slope is safe with a ratio more than the value of 1.20. Different agencies such as National Coal Board, UK, Appolonia Consulting Engineers, mine branch, Canada, GL Fiesenko, Russia, etc have envisaged a factor of safety more than 1.10 in the design of slope stability is safe if appropriate seismic acceleration is considered and more than 1.20 if seismic acceleration is not considered.

As per DGMS Tech Circular, no-3 of Dt 16.01.2020 the suggested factor of safety are as follows

- FoS greater than or equal to 1.3 for temporary slopes
- FoS is greater than or equal to 1.5 for permanent slopes

This factor of safety could either be directly calculated based on the limit equilibrium method or indirectly by numerical modeling using. The factor of safety must be greater than 1 for a stable slope. Due to uncertainties involved in determining the properties of materials, leaving some parameters in simulation for simplification, and the presence of some external factors that are not considered for simulation, it is advisable to have a minimum factor of safety of slope as 1.5. Keeping the above discussion in mind, a factor of safety of 1.2 to 1.5 is considered as short-term stability, and a factor of safety of 1.5 and above are considered for long-term stability.

5.4 SOFTWARE

5.4.1 LIMIT EQUILIBRIUM METHOD

The conventional limit equilibrium method is used in many geotechnical practices to investigate the equilibrium condition and analyze the stability of slope with varying geotechnical data and geometry. The most common methods for limit equilibrium analysis are the method of slices. The soil mass above the assumed slip surface is divided into vertical slices for purpose of analysis. Several different methods of slices are available for analyzing the circular and non-circular conditions.

In the present study limit equilibrium method has been used to compute the factor of safety using the Bishop simplified method.

The Slope analysis of OB Dump Slopes in Talaipalli Coal Mine is performed by limit equilibrium method software namely GALENA. GALENA is best on Limit Equilibrium Method where the user assumes the failure plane with certain limits and GALENA detects the Failure plane with the least factor of safety within the range

GALENA is powerful and accurate slope stability software and incorporates the Bishop Simplified method of analysis to determine the stability of slope The Bishop method is used to determine the stability of slope of the circular failure surface. It analyses the multi-layer slopes with tension cracks, earthquake forces, water pressure, and surcharge if any within or above the slope including the phreatic surfaces and piezometric pressures.

5.5 CORRELATION OF STRENGTH PROPERTIES

It is generally difficult and expensive to sample and test large samples of the rock mass. Consequently, empirical methods of determining the friction angle and cohesion of rock masses are available in the literature (Duncan C. Wyllie et all.,). In empirical methods also it is necessary to categorize the rock mass in terms of both the intact rock strength and the characteristics of the fractures/joints.

One of the methods is Strength Determination by Back Analysis of Failures. Probably the most reliable method of determining the strength of a rock mass is to back analyze a failed, or failing, slope. This procedure involves carrying out a stability analysis with the factor of safety set at 1.0 and using available information on the position of the rupture surface, the groundwater conditions at the time of failure, and any external forces such as foundation loads and earthquake motion, if applicable. In many cases, it may not be feasible to carry out a back analysis of a slope in geological conditions like those in which the new slope is to be excavated. In these circumstances, published results of rock mass shear strength can be used in the design. (Duncan C. Wyllie et all)

As an alternative to back analysis to determine the strength of fractured rock masses, an empirical method was developed by Hoek (1983) and Hoek and Brown (1988) in which the shear strength is represented as a curved envelope. This strength criterion was derived from the Griffith crack theory of rock fracture, as well as from observations of the behavior of rock masses in the laboratory and the field (Murrai 1973, Jaegee 1970).

The three parameters defining the curved strength envelope of the rock mass are the uniaxial strength of the intact rock, and two dimensionless constants m and s.

5.6 SAMPLE COLLECTION FROM COAL THE COAL FILEDS

a filed visit was made to Talaipalli OCP , for site reconnaissance and sample collection in the month of Julay 2022 . The detailed site investigations were carried out, As South Pit is operational, Ob material from the Active dump were collected based on lithe log profile of the coal filed. Main materials contributing to the formation of the dump were collected. Samples were collected at different heights and with a defined spatial variation, to cover the randomness/heterogeneity of sample. Invariably, the number of samples collected per OB dump depend on the size and heterogeneity. The details of the sample collections pictures and number of samples collected from each location are presented below. Few tests such as field moisture content (w_{field}) and sand replacement test for insitu unit weight (γ_{insitu}) were performed at insitu site.

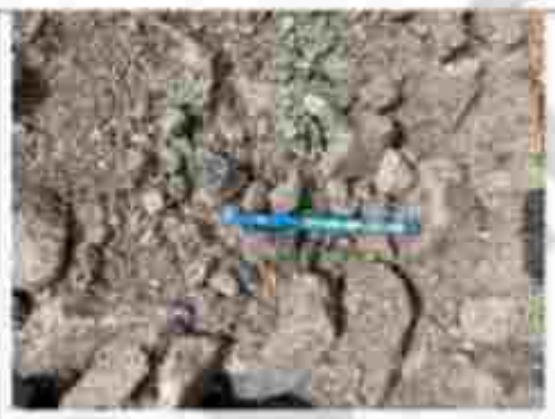


Fig 5.1 Showing sample collection, sample variation and testing of materials

5.7 INPUT PARAMETERS FOR STABILITY ANALYSIS.

The mixed material found in the interface of topsoil and coalmine overburden material is very complex in terms of both material type and its size distribution. The materials properties of these overburdened rocks or rock-soil mixture are most likely to change due to repeated exposure to weathering and particle crushing during the loading and hauling process. The crushed sandstone material being formed by similar kinds of sand grains during sedimentation possesses characteristics somewhat similar to that of sand, while the weak, weathered and crushed materials of shale tend to behave like a clay material formation when subjected to watery conditions.

Estimation of the key physic- mechanical properties of coal mine waste dumps were done considering laboratory studies (from available literature) on mixed earth rock observed in Indian coalmine waste dumps, where the properties of all major constituent materials are taken into consideration.

For high wall/working face material, each material profile is defined by referring to lithological data of the nearby borehole published in the geological report of the coalfield and using the rock lab software.

After correlating the test results from previous scientific study reports of the mine and with lithology data available from borehole along with site-specific literature review with judicial judgment values of shear strength parameters considered are given below.

5.8 METHODOLOGY OF THE STUDY

The stability analysis was done by Limit Equilibrium Method (LEM) and the Finite Element Method (FEM). These methods have been used to assess the failure mechanism and to determine the factor of safety.

5.8.1 GEOTECHNICAL ASSESSMENT OF DUMP MATERIAL

The mine is proposed to be worked by shovel-dumper combination. The stability of the slopes primarily depends on the strength properties of the dump material, orientation and geology of the dump foundation, infiltration of the rainfall, drainage, and groundwater condition within the slope. A Factor of Safety of 1.5 has been considered for the long-term stability of the dump slope. The angle of repose was 37°. The stability analyses were done to understand the condition of the proposed slopes.

The Overburden material has been assumed to be placed in the loose state which allows for any free water within the dump to drain out. Therefore, it has been considered that the dump foundation is free draining. Hence phreatic surface is considered in alignment with the dump base in the modeling for dump slopes.

5.8.2 Geotechnical Characterization of OB Dumps

Disturbed samples were collected appropriate to ground conditions and transported them to Geotechnical laboratory. Laboratory tests were conducted to determine the Index, Engineering properties and IS classification of soils. For determining shear parameters, Large Direct Shear test was carried out using 300mm×300mm size shear box.

Cohesion, which is a function of adhesive force between the particles is found to vary between 5kPa to 40kPa for the OB material. The Angle of internal friction is found to be varying between 32° to 35° for the OB material.

For rock mass from quarry , A software namely RocLab developed by Rocscince is used in this study which developed on Hoek-Brown strength criterion to derive shear strength values for a

rock mass using the available physic- mechanical properties in the geological report of Talaipalli Coal Block

Table 5.2 Strength properties of the OB and Quarry material

Properties Type of Material	Cohesion (kPa)	Friction Angle (degree)	Unit weight kg/m^3
Overburden Dump	5-40	32-35	1800
Coal	40-60	24	1700
Silt stone	**70-80**	**25**	**2000**
Sand stone	170-190	36	2400
Sandstone fine to medium grained- base	150	34	2200

5.9 STABILITY ANALYSES

Figure 5.2 shows the overall view of Talaipalli OCP and Fig 5.3 &5.4 shows cross-sections considered in the analysis. The sections along with the mine dumps, working faces have been taken in consultations with the mine planners for simulation of dump slope stability.Figure 5.5 to 5.20 below shows some of the the model and analysis results of pit and dump slope carried out in this study

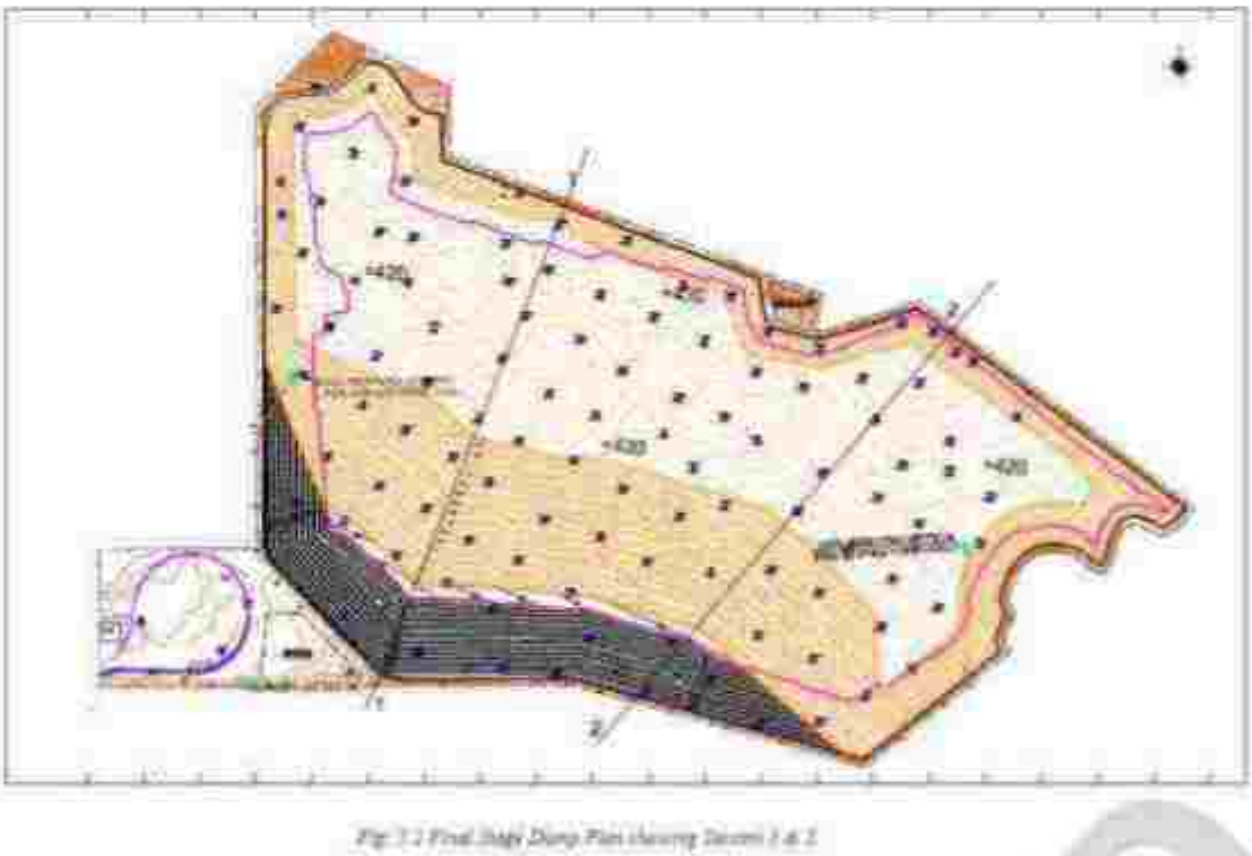


Fig: 7.2 Final Stage Dump Plan showing Sections 1 & 2

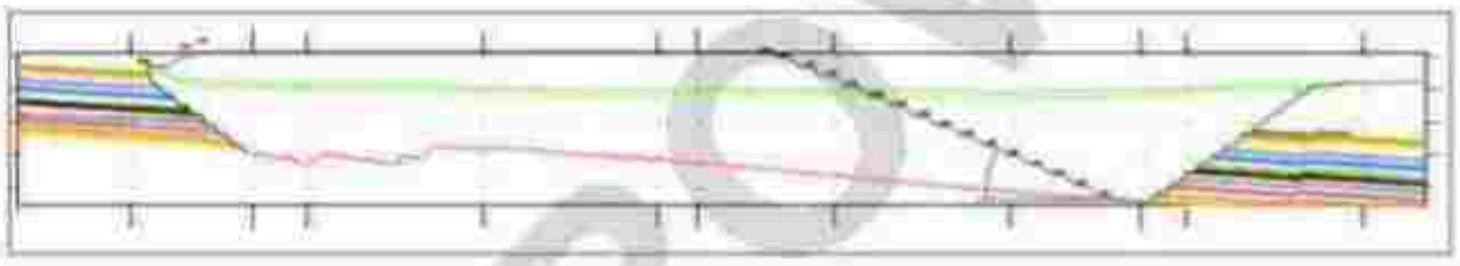


Fig: 7.3 Section 1 along Final stage Dump Plan

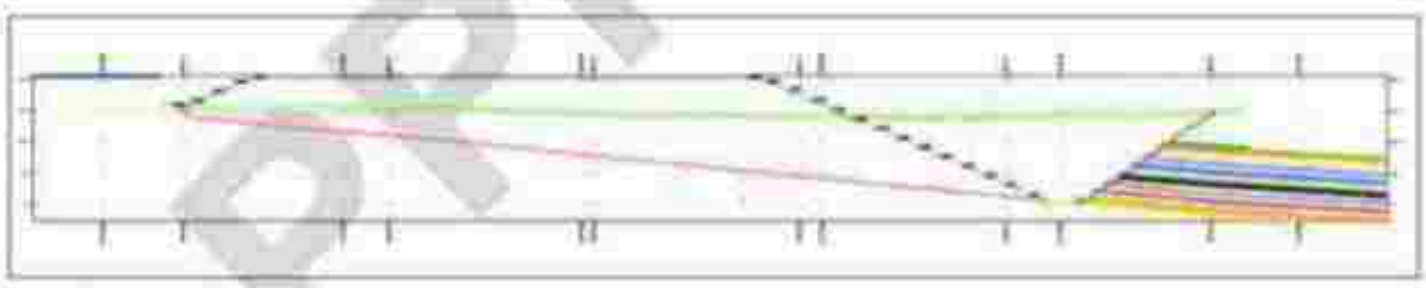


Fig: 7.4 Section 2 along Final stage Dump Plan

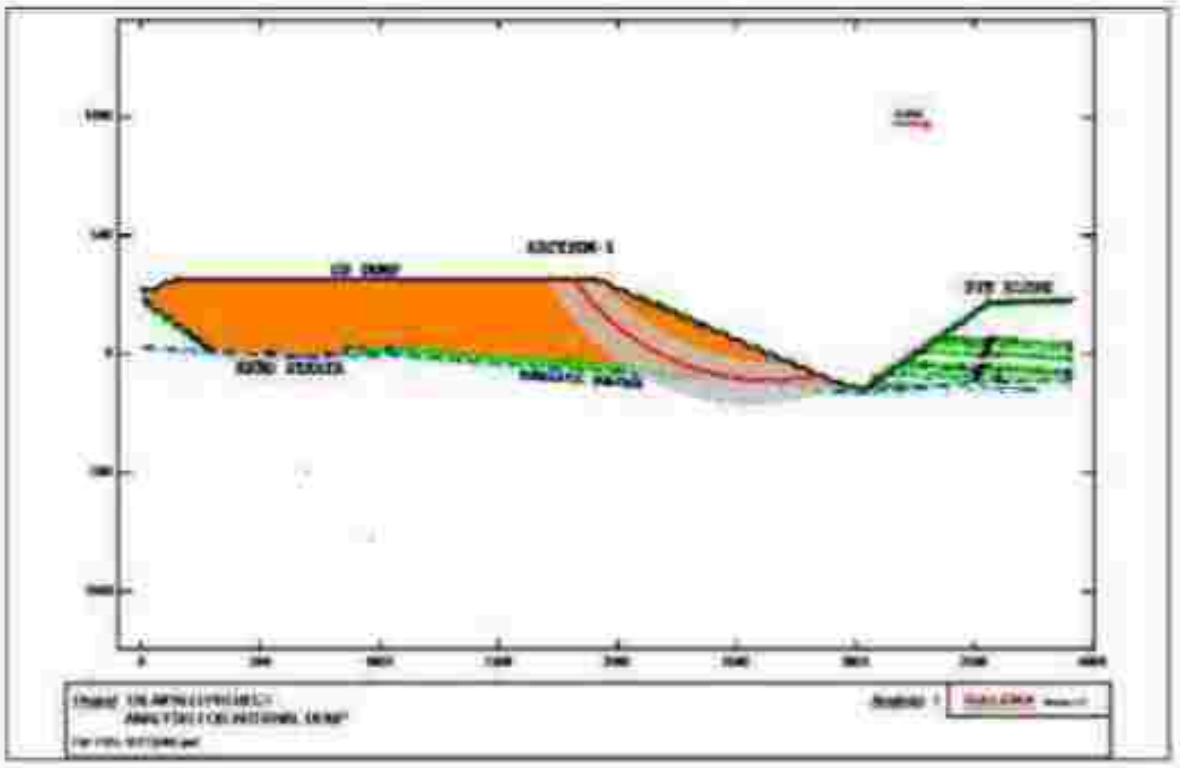


Fig: 3.5 Model-1 for Section - 1 along Final stage Dump Plan

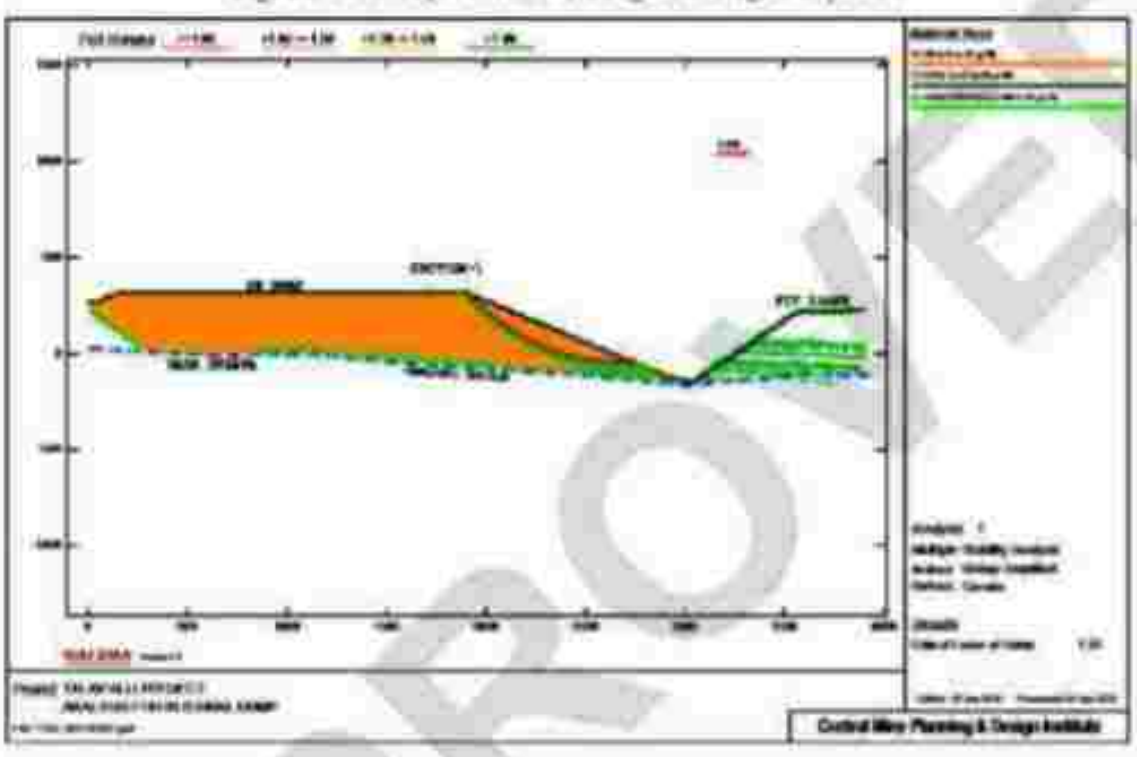


Fig: 3.6 Analysis for Model - 1 for Section -1 along Final stage Dump Plan

Fig- 5.7 Model-2 for Section -I along Final stage Dump Plan

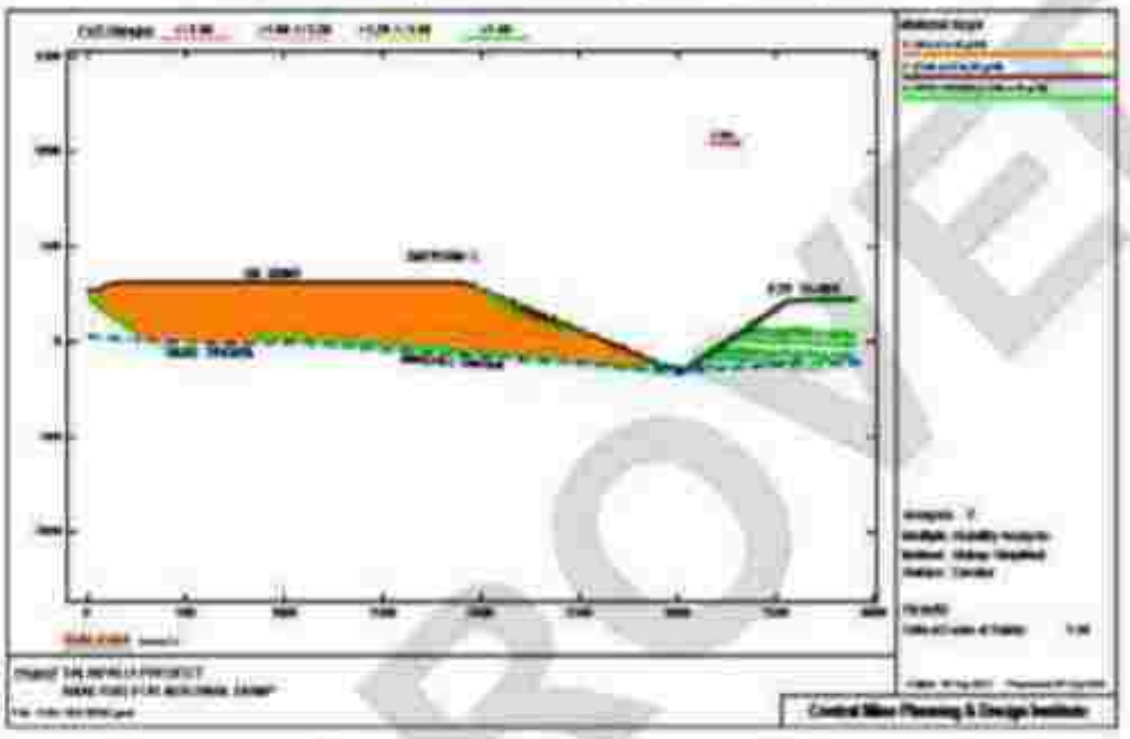


Fig- 5.8 Graphs for Model -2 for Section -I along Final stage Dump Plan

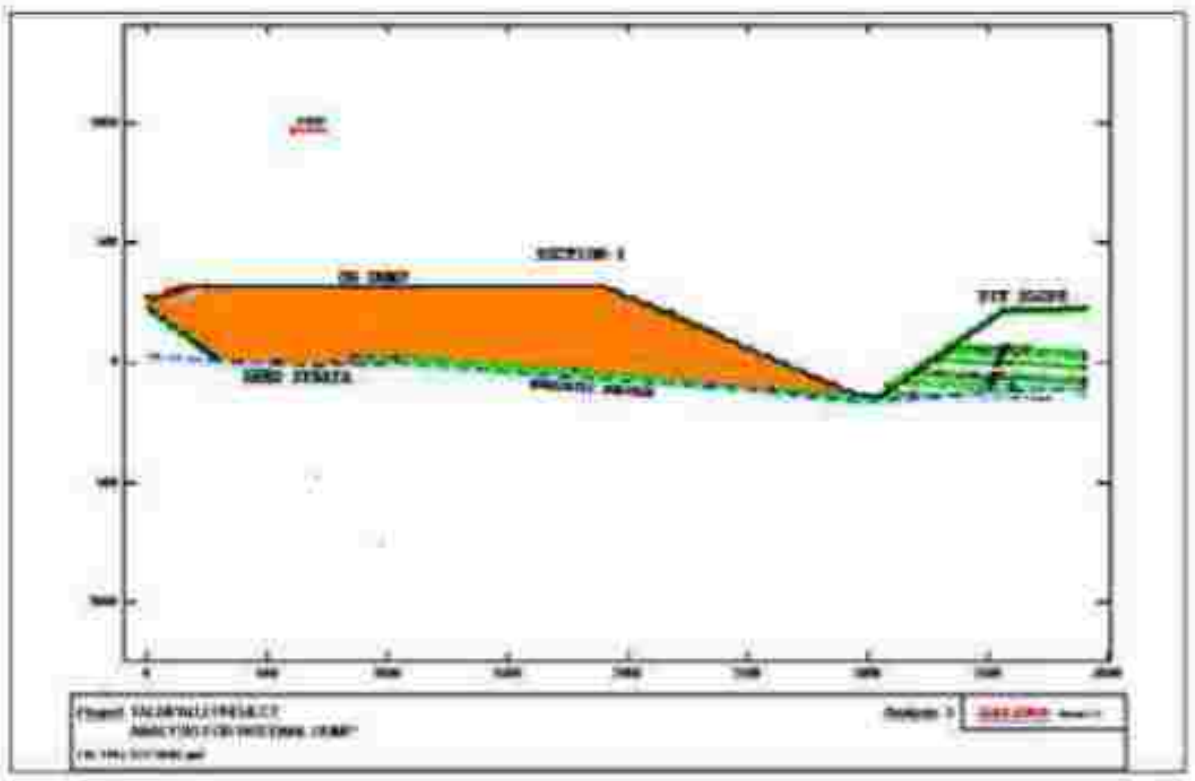


Fig. 3.9 Model-3 for Section -I along Final stage Dump Plan

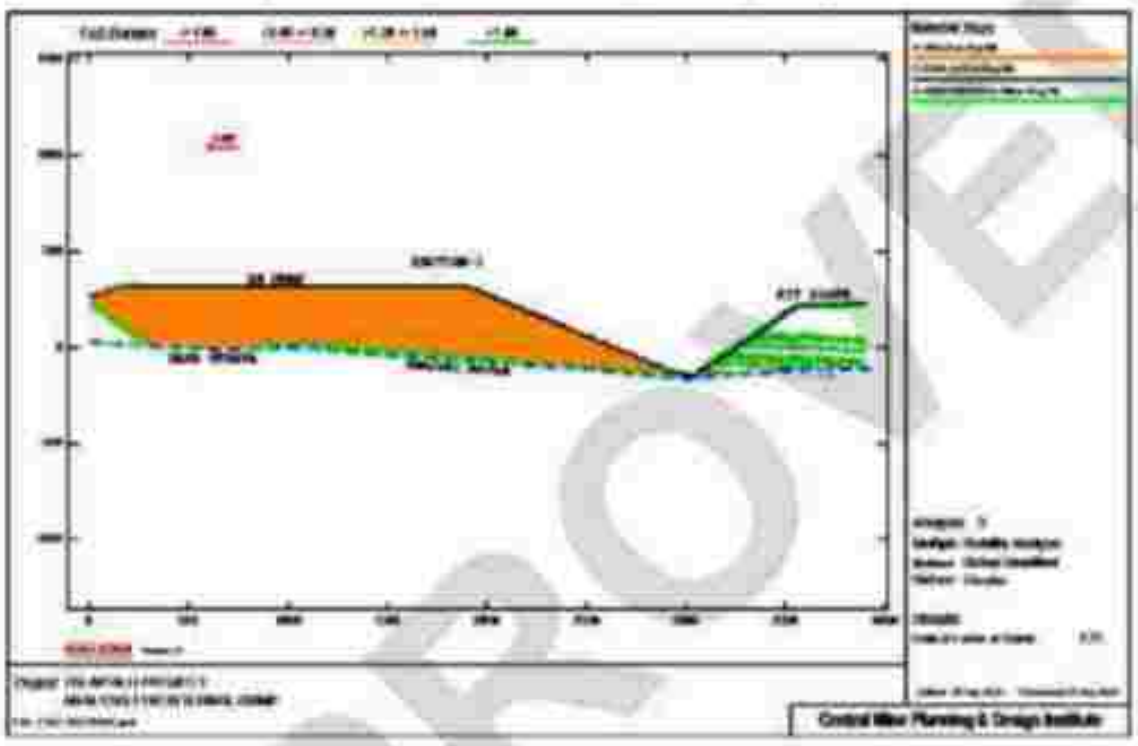


Fig. 3.10 Analysis for Model-3 for Section – I along Final stage Dump Plan

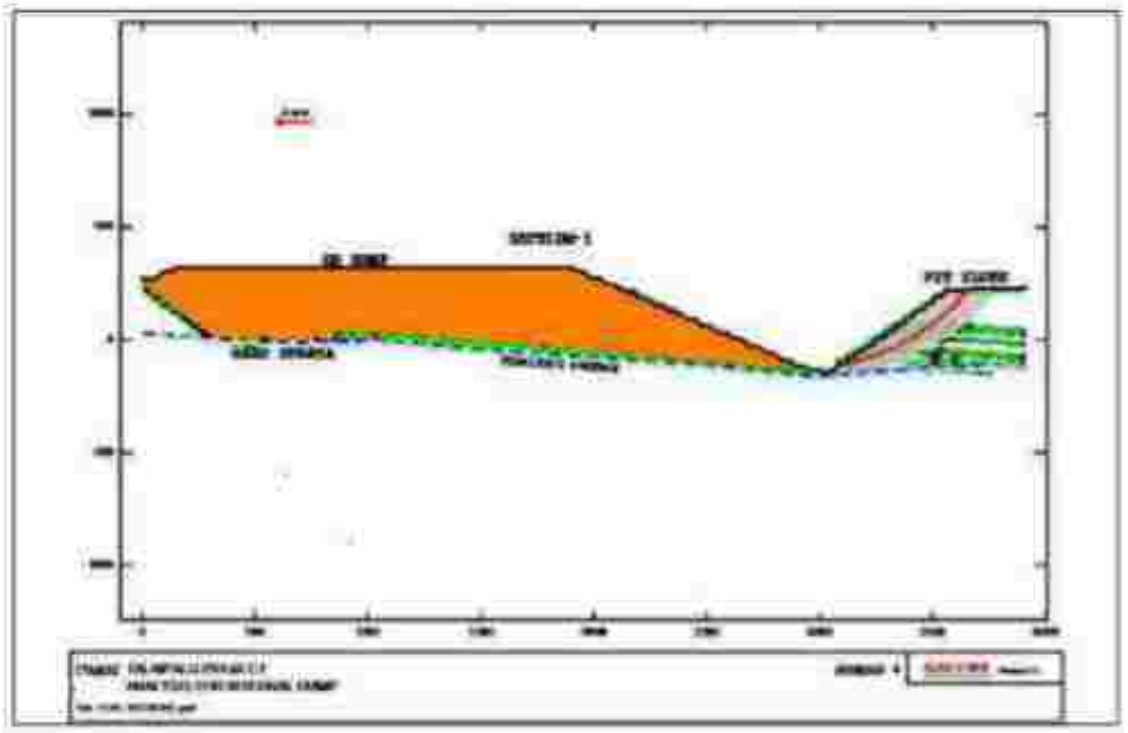


Fig: 3.11 Model-4 for Section -1 along Final stage Pit

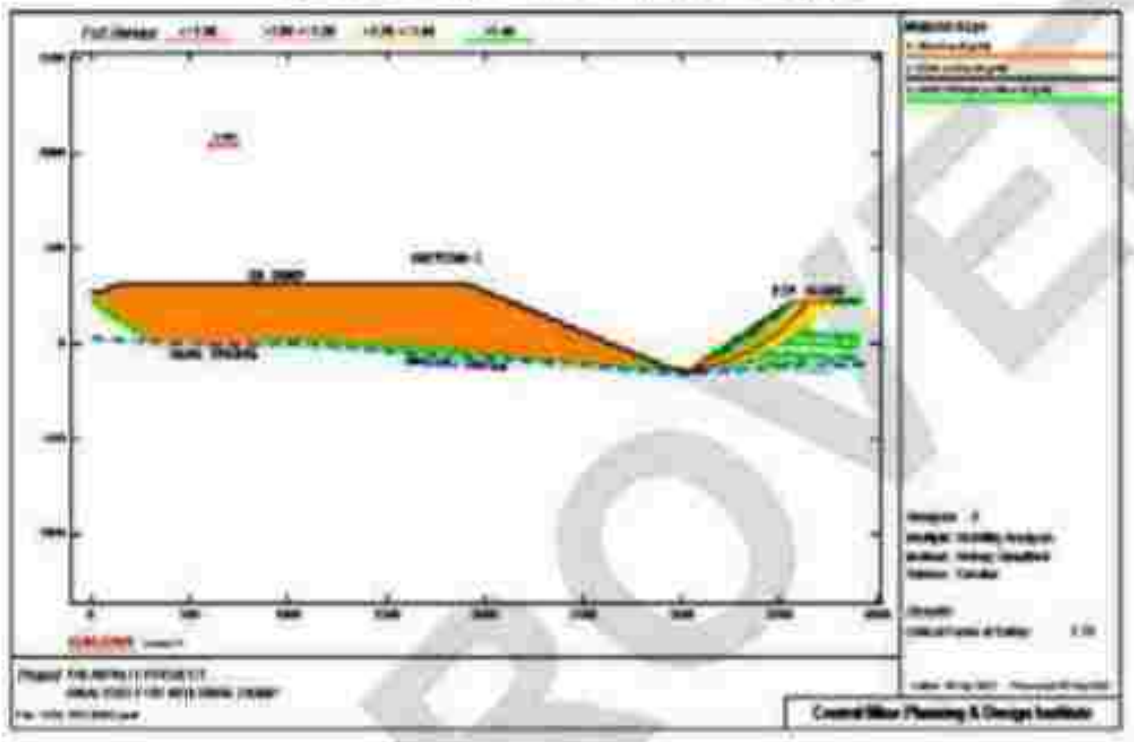


Fig: 3.12 Analysis for Model-4 for section-1 along Final stage Pit

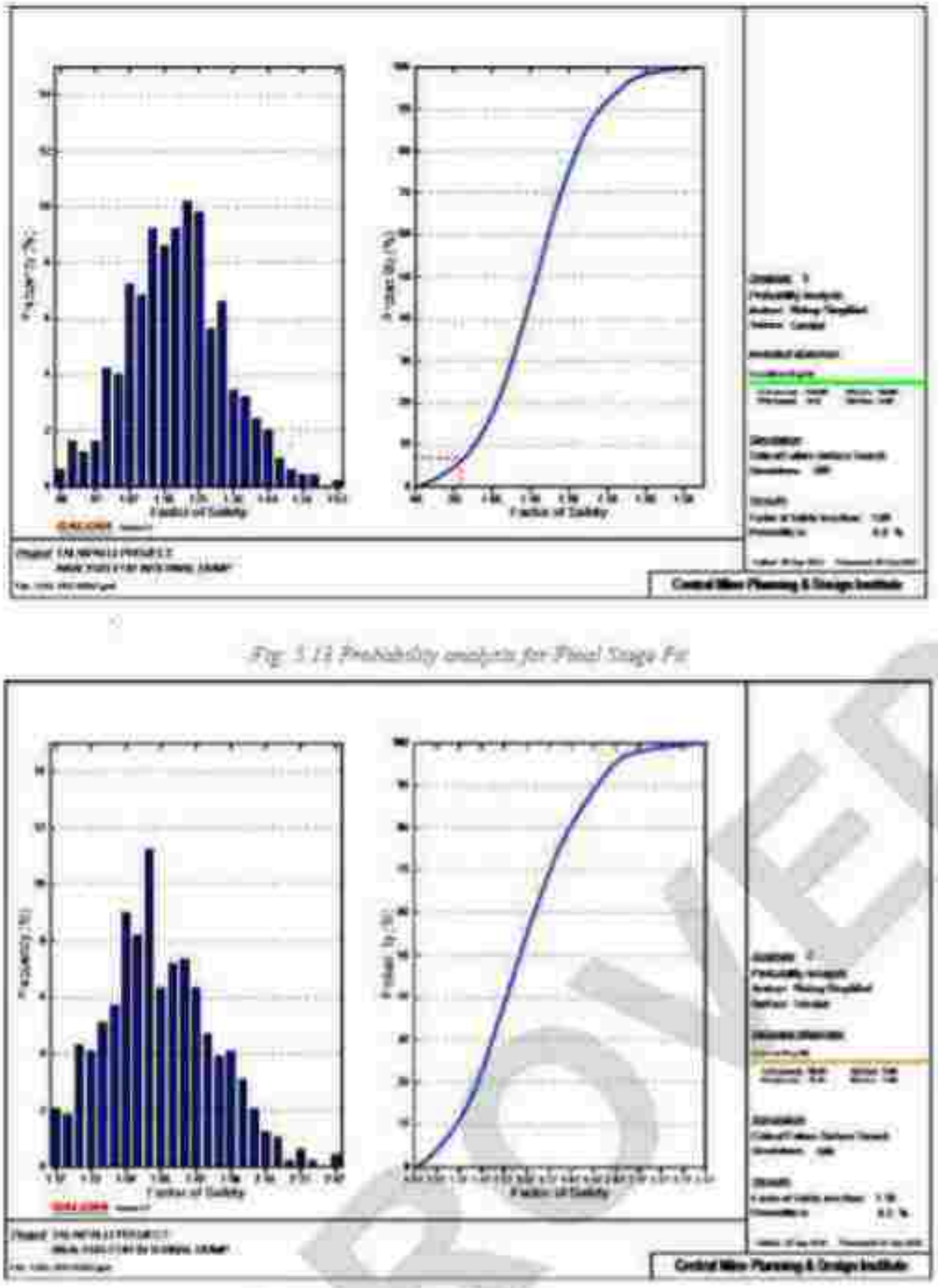


Fig. 5.13 Probability analysis for Final Stage Pit

Fig. 5.14 Probability analysis for Final Stage Dump

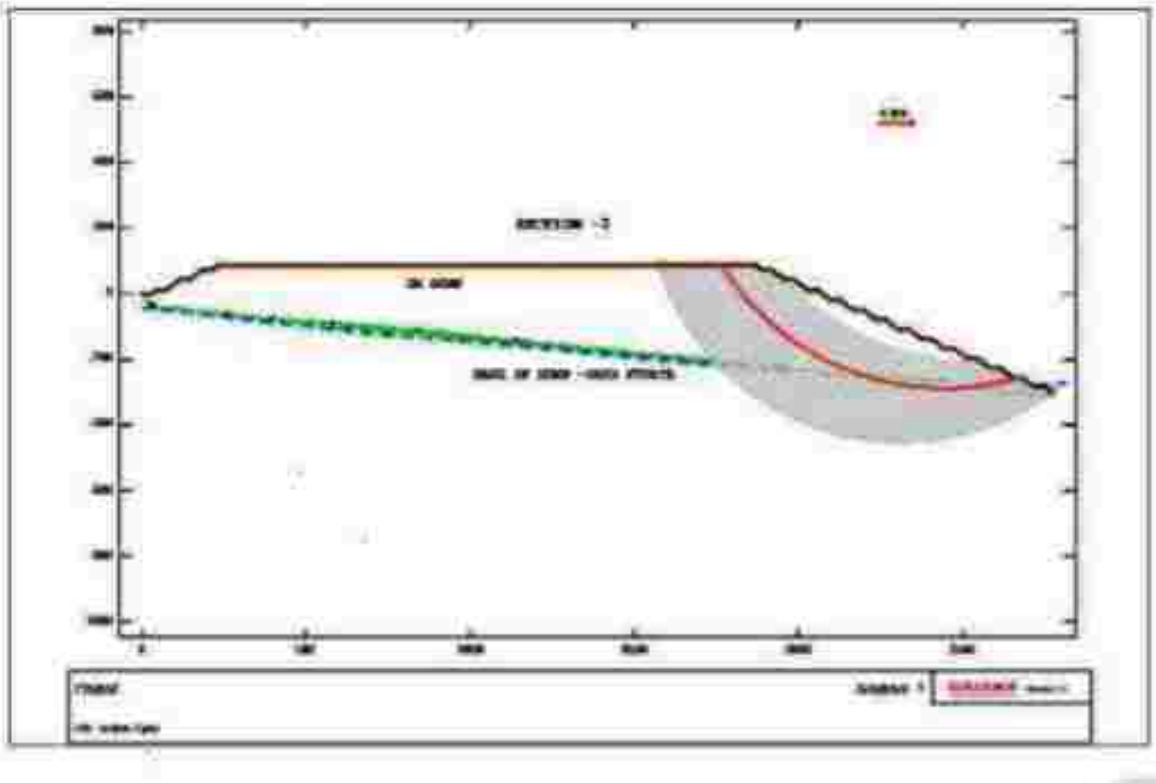


Fig. 5.15 Model-3 for Final stage Dump Plan along section 2

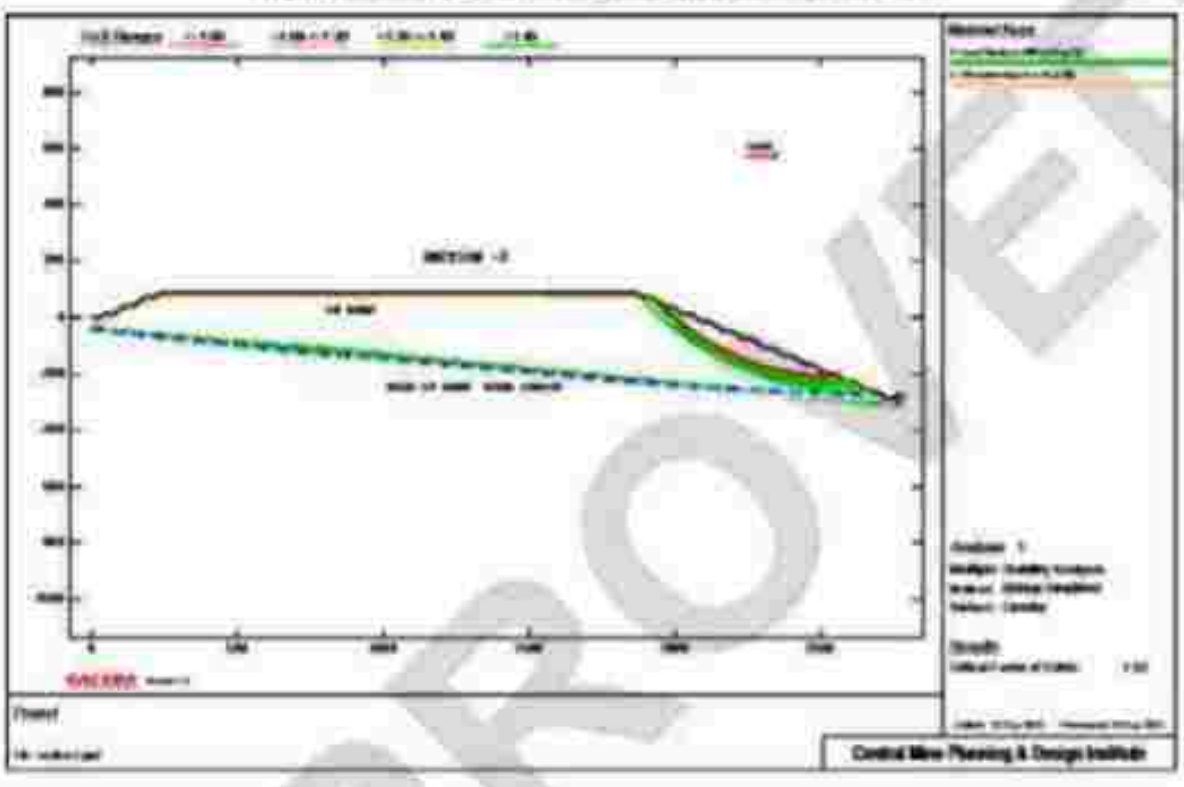


Fig 5.16 Analysis of Model-3 for Final stage Dump Plan along section 2

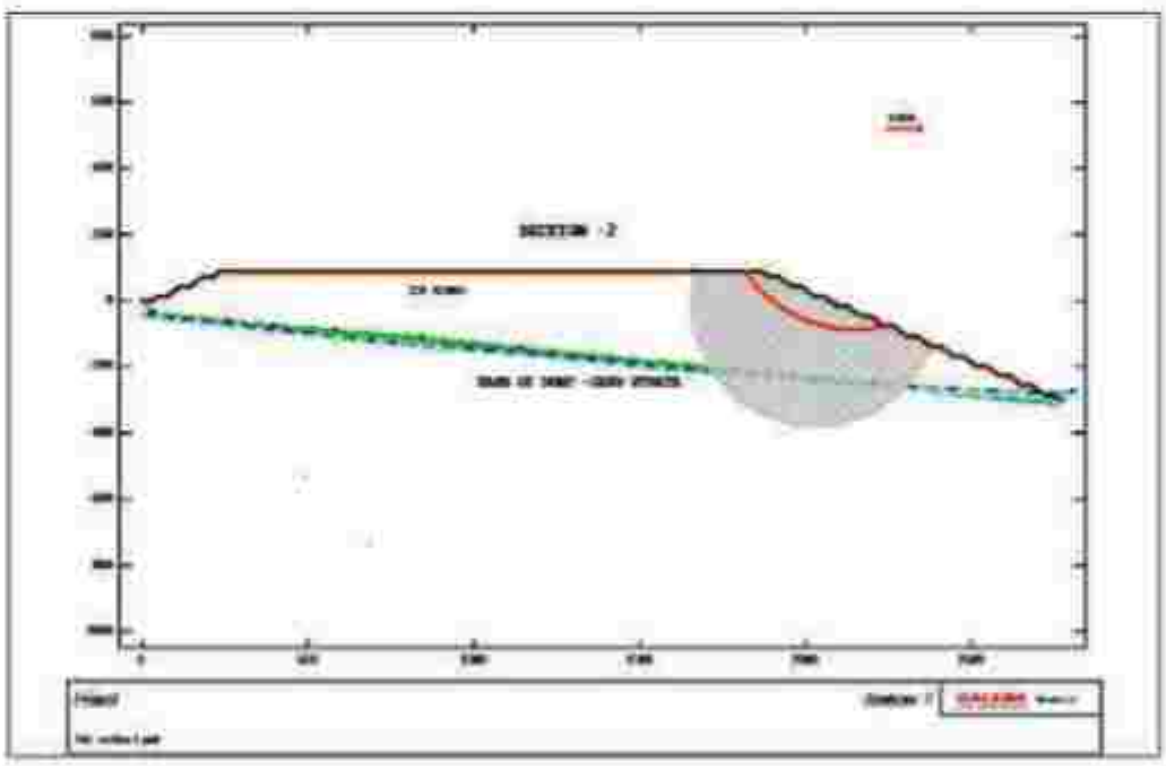


Fig. 5.17 Model-6 for Final stage Dump Plan along section 2

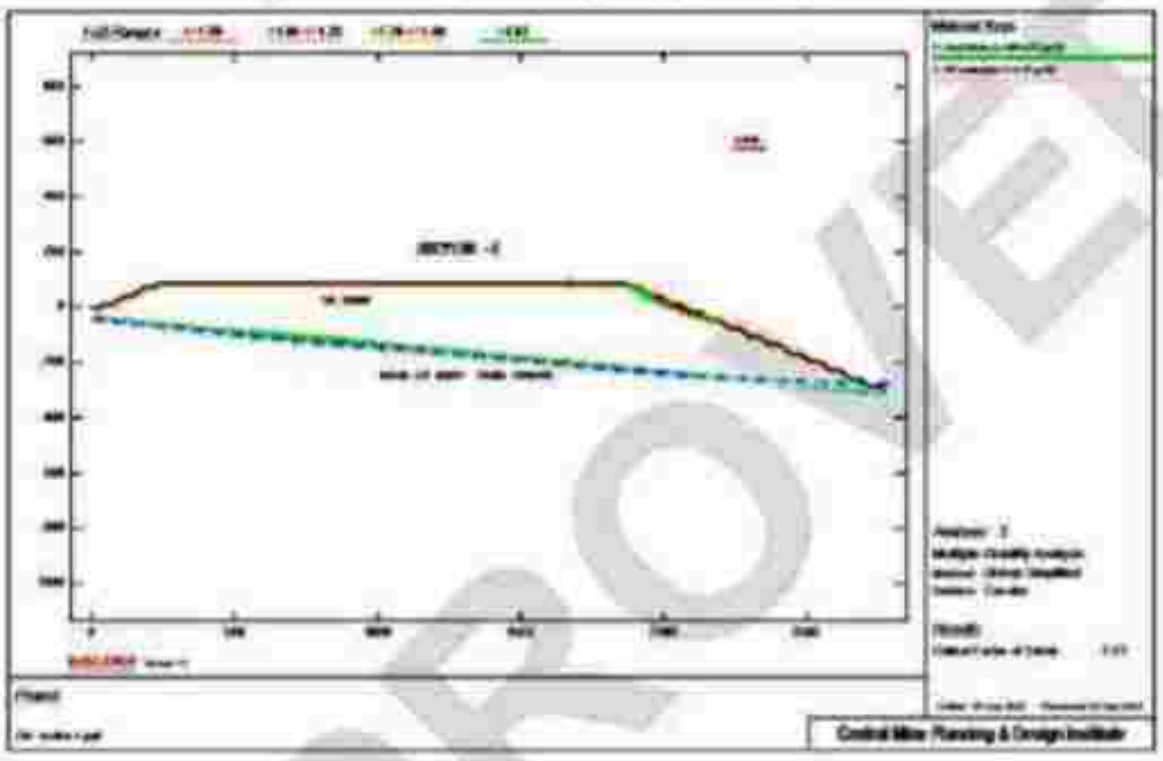


Fig. 5.18 Analysis for Model-6 for Final stage Dump Plan along section 2

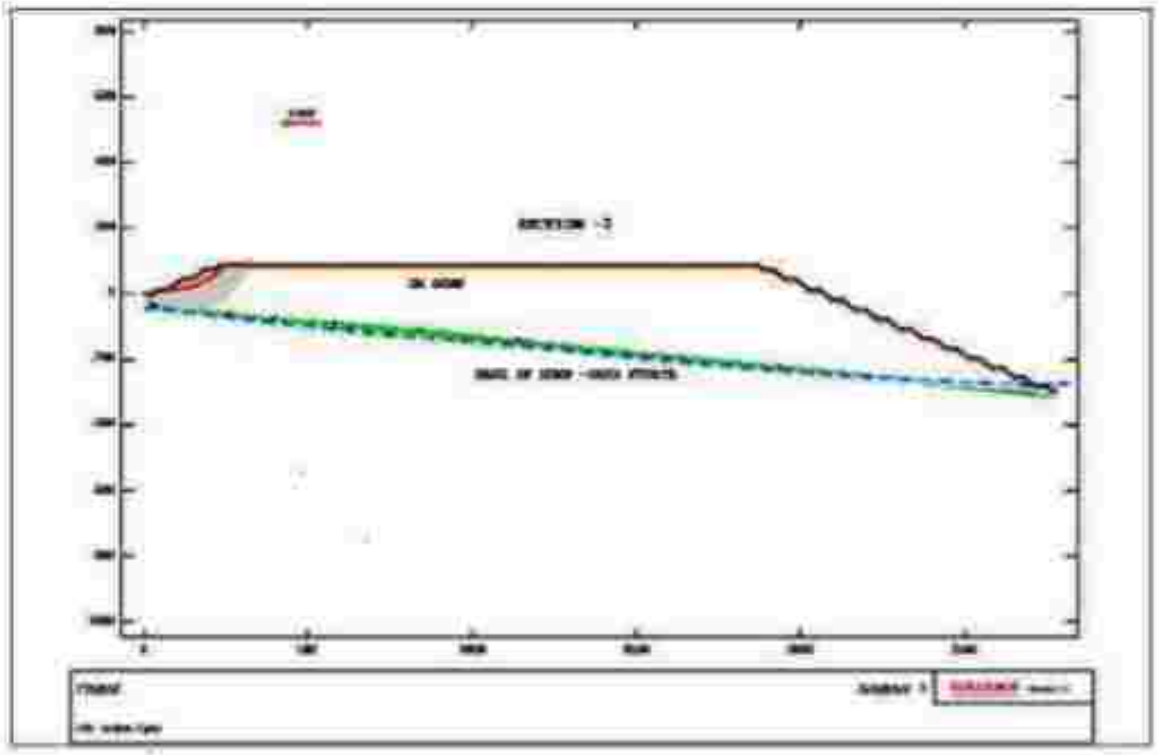


Fig. 5.19 Model-7 for Final stage Dump Plan along section 2

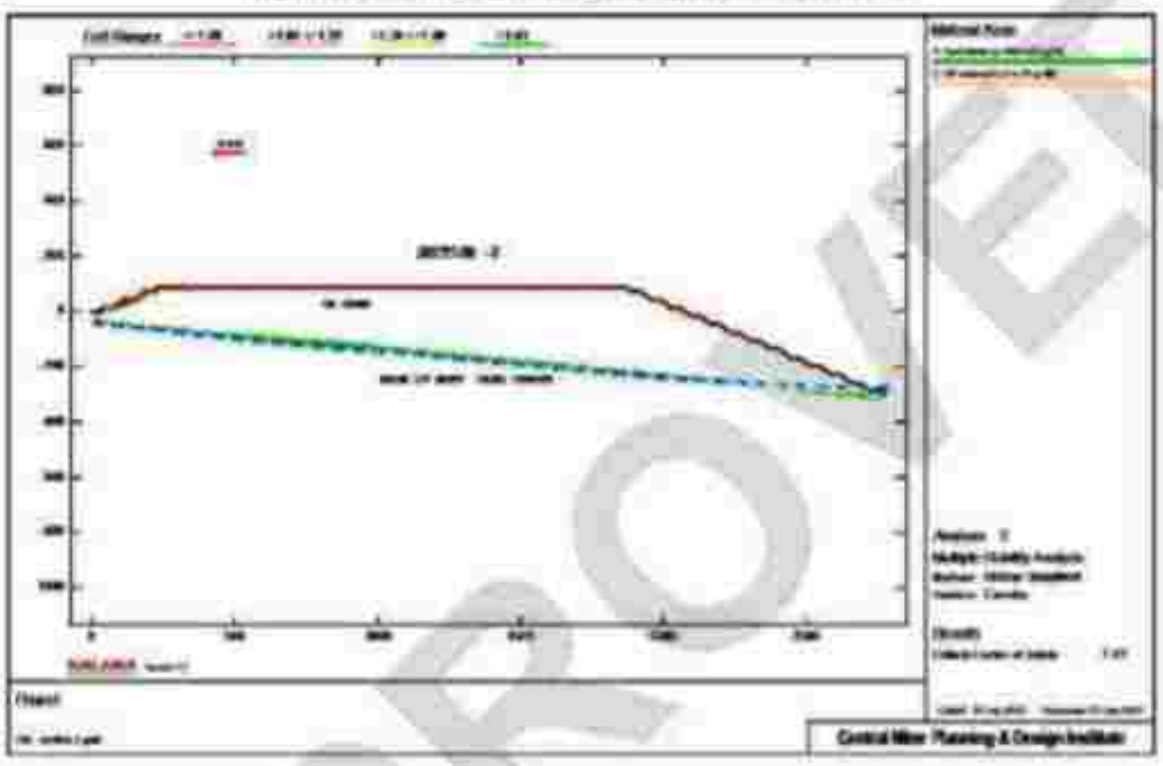


Fig. 5.20 Analysis for Model-6 for Final stage Dump Plan along section 2

Table: 5.1 Summary of Stability analysis results

S.No	Section	Analysis Description	FoS (Range)
Final stage Dump sections			
1	1-1	Final stage Internal dump section along 1-1 for whole benches	1.45-1.55
2		Final stage Internal dump section along 1-1 for intermediate benches	1.33 - 1.44
3	1-1	Final stage External dump along 1-1 (Left): top benches	1.25-1.32
4		Final stage External dump along 1-1 (Left): intermediate benches	1.30-1.35
5	2-2	Final stage Internal dump section along 2-2 for whole benches	1.44-1.53
6		Final stage Internal dump section along 2-2 for intermediate benches	1-36- 1.44
7	2-2	Final stage External dump along 2-2 (Left): top benches	1.30-1.44
8		Final stage External dump along 2-2 (Left): intermediate benches	1.45-1.50
Ultimate Pit slope			
17	1-1	Ultimate pit slope along section 1-1, analysis for whole benches	1.25 -1.31
18		Ultimate pit slope along section 1-1, analysis for intermediate benches	1.35-1.40
19	2-2	Ultimate pit slope along section 2-2 , analysis for whole benches	1.28-1.35
20		Ultimate pit slope along section 2-2 , analysis for intermediate benches	1.36-1.40

5.10 CONCLUSIONS & RECOMMENDATIONS

The stability analysis for various sections of dump slopes, pit slopes in different conditions was carried out for Talaipalli OCP. The factor of safety of 1.2 to 1.5 was taken as short term stability and Factor of safety >1.5 is for long term stability in this study. The conclusions and suggestions of the present study are summarized below. The factor of safety of proposed OB dumps varies from 1.25 to 1.55. This indicates that all the sections under consideration are stable for the short term and majority of the sections are stable for long term stability for the given conditions as indicated in the table above. The lowest FoS is observed observed is 1.25 for OB dump on section 1-1 left side. For the pit slopes the FoS varies from 1.25 to 1.40 , indicates a short term stability . From the analysis it can be inferred that the proposed dump geometry in the mining plan is clearly safe for short term stability for the given conditions. For the case of long stability, the FoS should be more than 1.5 as stipulated by DGMS. The current analysis was considered the Earthquake force in to consideration during the analysis . The analysis without considering earth quake force

results in e FoS of equivalent to 1.5 is resulted in different sections for pit and dumps slopes for the given conditions.

Considering the above analysis for current filed assessment and conditions the dump and pit geometry proposed in the mining plan can be considered safe.

5.10.1 RECOMMENDATIONS

It is observed that the slopes are short-term stable at some sections this could be due to local concentration of stress . Therefore, during the rainy season, a proper drainage system should be adopted, and precautions should be taken for patchwork.

A few small-scale failures may subsequently cause a big failure. If two or three benches are made steeper at any level in any part/depth of the pit/dump, then it may initiate failures. Although the overall slope angle may be quite low, the steeper slope angles of the three benches may increase the stress at the toe of a relatively steeper part of the slope, which may cause failures. Two or three such small failures may cause a large failure. So, benching should be done properly from top to bottom.

Dump slopes do not fail without warning and may be managed through the design of dump sequencing, re-sloping of the selected areas. Proper monitoring of dump deformations should be carried out. While formation of dumps or after attaining 60m and 90 m of dump height from dump base, a detailed study for stability assessment of dump slopes should be carried out by any reputed agency. The same should be done for pit slopes as well and if any deformation or deviation from approved plan is observed it should be brought to the notice of reputed scientific agency for further assessment.

Any unfavourably oriented structural discontinuity may be present in the mining area, which was not reported in the geological report but exposed during ongoing excavation, it may create unsafe mining conditions. Mapping of such faults in fresh exposure of the pit shall help in detecting any impending failure along those detected weak planes.

In case there are multiple fault planes, the bench design should be such that they do not strike parallel to the fault plane.

Regular monitoring of the dump slopes is also being advised. It is recommended that a qualified person ensure that the dumps are constructed as specified by the design guidelines

The bench geometry of the mine pit, the ultimate pit should strictly follow specifications as mentioned in the mining plan. In case of use of any other machinery the bench geometry will be guided by the maximum width of machinery & related DGMS guidelines.

Failure can occur at the local level even if the overall slope of the working pit is found to be safe/flat, but if the individual benches are steeper and do not follow the specified criteria. Hence it is necessary to maintain proper bench geometry having adequate bench width & proper bench height for better stability. Bench geometries stipulated in regulation 106 of CMR 2017 should adhere wherever it is practically feasible for the existing and future planned slopes or slope re-profiling.

The presence of water causes negative consequences for pit stability. Garland drains are to be provided along the crest side for smooth passage of water. Benches are to be properly graded to inhibit the formation of sludge. Semi horizontal pipes may be inserted for draining out water wherever necessary.

While forming dumps as proposed in PR, the slope profile viz bench height and bench angle should be as indicated in PR or CMR 2017 guidelines. The minimum distance between any working patch from the toe of the internal OB dump should not be less than 100m.

For any new dumps, re-handled dumps which are comparatively newer and of less height, strict measures should be taken to maintain a tier system of dumping, where each tier should not exceed a height of 30 meters.

An assessment of the engineering and structural geology, strength properties, and related geotechnical controls was thoroughly carried out in this study. These recommendations are valid with a well-developed drainage system and controlled blasting to avoid any damage on the standing final bench slope mass. The final standing slope should be kept undamaged in-situ rock mass condition. If any deviation is observed or the remedial measures are not effective, then this slope angle must be corrected accordingly.

The operating bench width should never be less than double the bench height or as recommended in DCMR 2017. The unavoidable small-scale bench failures associated with weak sandstone weathered rock and intermittent clays could be arrested on these wide benches and large-scale slope failure can be avoided. The extra-wide bench will arrest the local bench failures and there would not be any operational problem. The exposure should be made within such an area, where the bottom could be touched within a maximum of one year. This patch should be backfilled immediately. Long-term exposure reduces the strength quickly in the weak rock mass and results in slope failure.

5.11 SLOPE MONITORING PROGRAMME

Monitoring is an indispensable way to safeguard loss of mine and machinery from slope failure. The monitoring methods are generally based on the displacement of slope mass. Every slope is subjected to movement. It is crucial to judge the change of displacement or velocity which may be critical. Many researchers have contributed to analyzing the displacement pattern in mine slopes.

5.11.1 VISUAL INSPECTION

A basic element of a slope monitoring program should be visual inspection by the mine geotechnical engineer and members of the engineering staff, combined with observations by all personnel working in the mine. This qualitative, but extremely important aspect of the program should be maintained throughout the life of the mine.

Visual Monitoring is the best practice when done vigilantly. Visual inspection of any cracks, seepage in high walls helps to spot any movement. The development of tension cracks and any change in them can be carefully observed. Visual monitoring also includes demarcating weak strata based on spontaneous combustion, weathered zone, or any deformation. A diligent visual survey always helps in taking preventive measures and or safeguarding man and machinery.

5.11.2 CRACK MONITORING

Crack monitoring techniques typically consist of:

- Regular detailed mapping of location, depth, the width of cracks, rate of extension, and opening.
- Installation of targets on opposite sides of cracks to monitor rates of opening.

- Installation of surface (wireline) extensometers.
- Installation of picket lines or lines of targets that can be monitored using theodolites or precise levels to detect changes in alignment, location, or elevation along a given crack or the crest of the slope

5.11.3 MONITORING BY TOTAL STATION

These systems can be installed by mine survey personnel, generally with survey equipment in regular use at the mine. Monitoring stations or pillars are generally installed at places susceptible to displacement. It includes re-handled OB dumps, high wall, etc around the pit perimeter. This network should be tied to at least three stable reference stations well behind the pit crest. Monitoring points (prisms) are established at regular intervals on each wall of the pit and in areas identified from geotechnical investigations as more susceptible to instability.

5.11.4 MONITORING BY SLOPE STABILITY RADAR (SSR)

Slope stability Radars are state of art instruments to detect slope instability and give early warning depending upon the threshold limit. Slope stability radar can remotely scan the pit slope and dump slope within a certain range in a vertical and horizontal direction depending upon its specification. A slope stability radar continuously scans the sloping wall within its range. SSR is so precise it can detect movement up to millimeters. Slope stability's radar effectiveness is evident from the fact that it captures and stores the scanned image of the target area and any minute movement can be distinctively marked. Depending upon the critical velocities considering site-specific geo mining conditions a threshold limit can be set for slope stability radar to give out the early warning in case of undesirable movement. Slope stability radar waves can penetrate through rain, dust, and smoke to provide supreme accuracy in monitoring.

5.11.5 RECOMMENDATION FOR SLOPE MONITORING

- A dedicated geotechnical cell should be formed at the project level which should undertake frequent visual inspection and all the relevant information should be recorded.
- RL measurement of monitoring stations should be thoroughly carried out. The monitoring work is to be supervised and verified by a senior survey officer.
- Visual inspection of any cracks should be done diligently. The widening of cracks should be measured by crack meters and recorded regularly.

- For necessary equipment installations to continuously monitor slope movement, suitable capital amount provisions are made in the RPR 2021

5.12 LIMITATIONS OF THE STUDY

- Soil is a very complex material. In nature, a heterogeneous type of soil is found which has different properties at different depths and places. Therefore, accurate soil properties cannot be derived in the laboratory by merely testing a few soil samples as it is difficult to simulate the field conditions.
- Judicious judgment based on a combination of theory and practical experience from the past studies shall help to arrive at the right conclusion during making the necessary assumptions for the study.
- In the geotechnical engineering field, many uncertain factors govern the stability analysis which depends on the assumptions made for the study. As a result, the factor of safety determined may vary to some extent from study to study. In the study, all normal failure conditions are checked for the determination of FoS with the best possible assumptions and judgment.

5.13 Annexure -1 : ROCKMASS PROPERTIES

Rock Mass properties using Rockdata

Silt Stone:

Hoek-Brown Classification

sigci	35	MPa
GSI	32	
mi	7	
D	1	

Hoek-Brown Criterion

mb	0.0544086
s	1.19673e-005
a	0.519528

Failure Envelope Range

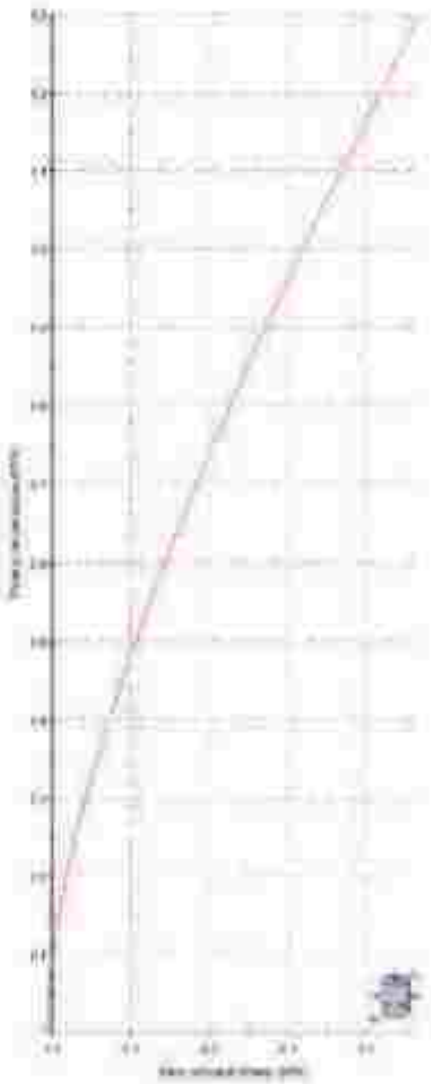
Application	Slopes	
sig3max	0.470468	MPa
Unit Weight	0.021	MN/m3
Slope Height	30	m

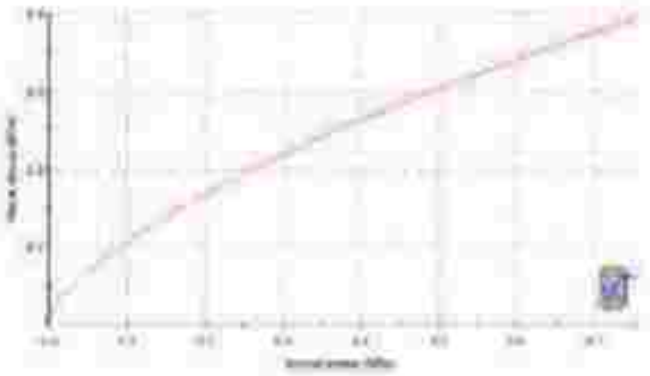
Mohr-Coulomb Fit

c	0.0704942	MPa
phi	24.4415	degrees

Rock Mass Parameters

sigt	-0.00769832	MPa
sigc	0.0970394	MPa
sigcm	0.945213	MPa
Em	1049.55	MPa





FG -Sand stone:

Hoek-Brown Classification

sigci	75	MPa
GSI	38	
mi	15	
D	1	

Hoek-Brown Criterion

mb	0.178973
s	3.25305e-005
a	0.51302

Failure Envelope Range

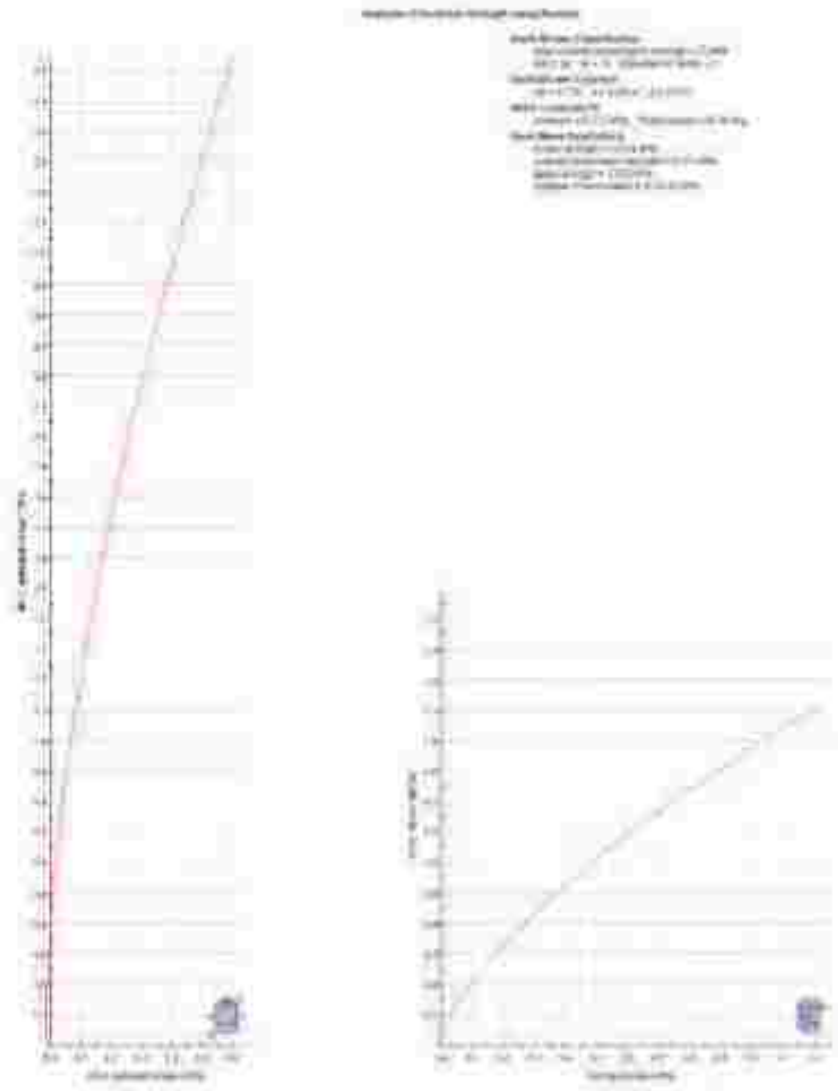
Application	Slopes	
sig3max	0.603714	MPa
Unit Weight	0.024	MN/m3
Slope Height	30	m

Mohr-Coulomb Fit

c	0.171414	MPa
phi	39.3616	degrees

Rock Mass Parameters

sigt	-0.0136322	MPa
sigc	0.373917	MPa
sigcm	3.91305	MPa
Em	2170.2	MPa



Coal- shale :

Hoek-Brown Classification

sigci	35	MPa
GSI	28	
mi	6	
D	1	

Hoek-Brown Criterion

mb	0.0350459
s	6.14421e-006
a	0.525561

Failure Envelope Range

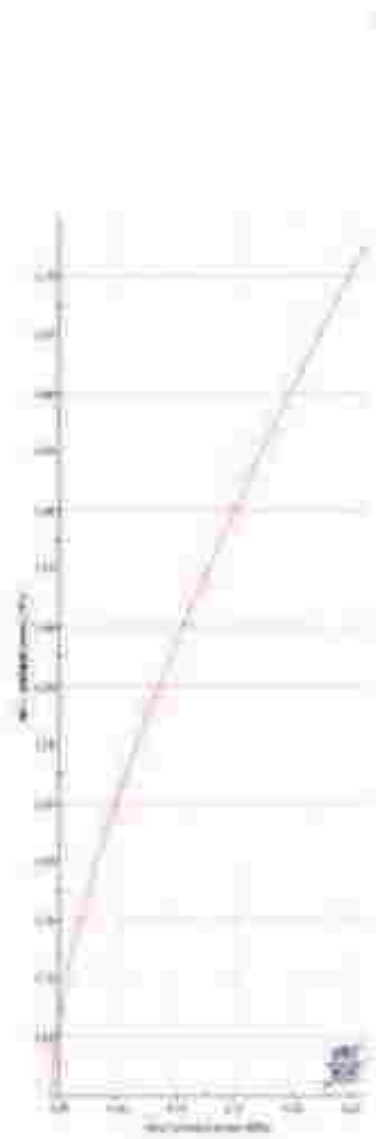
Application	Slopes	
sig3max	0.261795	MPa
Unit Weight	0.017	MN/m3
Slope Height	20	m

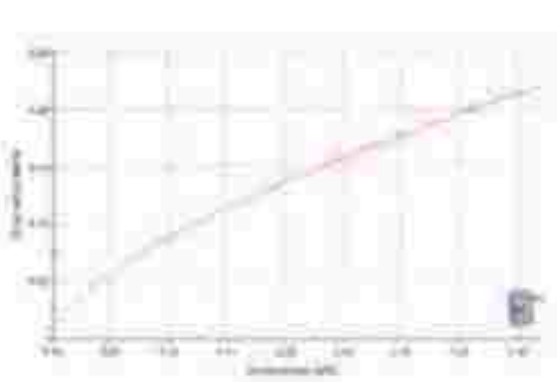
Mohr-Coulomb Fit

c	0.0395813	MPa
phi	24.5234	degrees

Rock Mass Parameters

sigt	-0.00613617	MPa
sigc	0.0638395	MPa
sigcm	0.716737	MPa
Em	833.689	MPa





Base Rock -sandstone

Hoek-Brown Classification

sigci	60	MPa
GSI	40	
mi	13	
D	1	

Job No: 021022017 55

Hoek-Brown Criterion

mb	0.178929	
s	4.53999e-005	
a	0.511368	

Failure Envelope Range

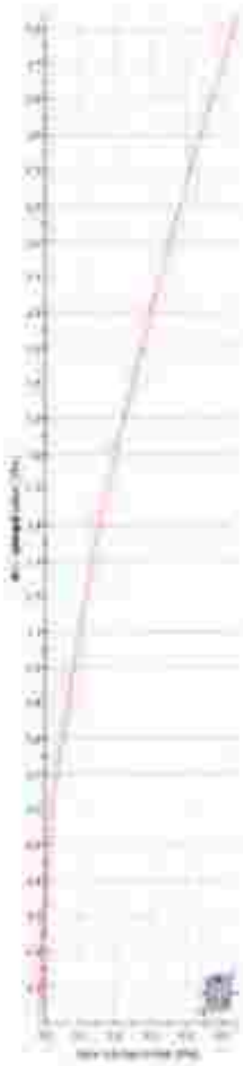
Application	Slopes	
sig3max	0.547216	MPa
Unit Weight	0.022	MN/m3
Slope Height	30	m

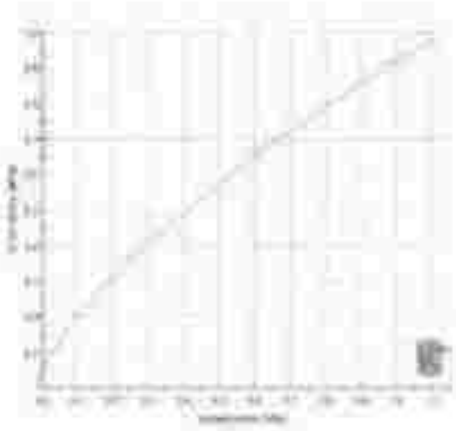
Mohr-Coulomb Fit

c	0.154202	MPa
phi	38.4268	degrees

Rock Mass Parameters

sigt	-0.0152239	MPa
sigc	0.360833	MPa
sigcm	3.16561	MPa
Em	2177.94	MPa





Ef:- /9 /Raigarh/16
Date:- 17/3/16

CHHATTISGARH ENVIRONMENT CONSERVATION BOARD
Commercial Complex, C.G. Housing Board Colony,
Kabir Nagar, Raipur (C.G.) 492 099

No 6257 /TS/CECB/20156 Raipur, dated 17/3 /2016

To,

General Manager,
M/s N.T.P.C. Limited,
Talaipalli Coal Mining Project,
Lailunga Road, Gharghoda,
District - Raigarh - 496111 (C.G).

Sub. - Grant of consent under section 25/26 of the Water (Prevention and Control of Pollution) Act, 1974.

Ref:- 1. Environmental Clearance issued by Ministry of Environment and Forests, Government of India vide letter no. J-11015/279/2009-IA.II (M), dated 02/01/2013.

2. Permission to Establish issued by, Chhattisgarh Environment Conservation Board, Raipur, vide Letter No. 5456/TS/CECB/2015, Raipur, dated 06/01/2015.

3. Your application letter no. 5073/TL/2015/CTE/05, dated 17/07/2015 and subsequent correspondence ending dated 06/02/2016.

--: oo :--

With reference to your above application, consent is hereby granted for a period of one year from the first day of the month of commissioning of the plant subject to the fulfillment of the following terms and conditions: -

This consent is valid for following products & production capacity.-

S.No.	Product	Production Capacity
1.	Open Cast Coal Mine	18.0 Million Tonnes per Annum (Eighteen point Zero Million Tonnes per Annum)
2.	Underground Coal Mine	0.72 Million Tonnes per Annum (Zero point Seven Two Million Tonnes per Annum)

Note :-

1- This consent is granted initially only for the excavation of soil, which is a part of mining process as per the proposal submitted to the Board vide letter dated 27/01/2016. Industry shall intimate regarding installation of coal handling plant along with necessary pollution control equipments and obtain prior permission of the Board for its operation.

2- This consent is granted to the industry without prejudice to the court case pending in the Court of Law and in no way to be taken as a measure of proof that industry has not violated any related environmental laws at any time in the past. Hence whatsoever may be decision of Hon'ble Court, shall be binding on the industry and this Board

Please acknowledge the receipt of this letter.

For & on behalf of
Chhattisgarh Environment Conservation Board

Member Secretary
Chhattisgarh Environment Conservation Board
Raipur (C.G.)

Endt. No. /TS/CECB/2016 Raipur, dated ___/___/2016
Copy to :-

1. Regional Officer, Regional Office, Chhattisgarh Environment Conservation Board, Raigarh (C.G.). Please ensure compliance and report, if any condition/conditions are violated by the industry.
2. Cess Section, Chhattisgarh Environment Conservation Board, Raipur (C.G).

Member Secretary
Chhattisgarh Environment Conservation Board
Raipur (C.G.)

CHHATTISGARH ENVIRONMENT CONSERVATION BOARD

Commercial Complex, C.G. Housing Board Colony,
Kabir Nagar, Raipur (C.G.) 492 099

CONSENT LETTER

No. /El/Raigarh/CECB/2016 Raipur, dated.

Sub: Consent to **M/s N.T.P.C. Limited** for the discharge of effluent under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974.

Ref: Applications Letter No. 5073/TL/2015/CTE/05, dated 17/07/2015 and subsequent correspondence ending dated 27/01/2016 of **M/s N.T.P.C. Limited,** (Expiry Date .....)

1. With reference to the above application for consent to discharge of effluent into the natural water courses under the Water (Prevention & Control of Pollution) Act, 1974, here-in-after referred to as the Act, **M/s N.T.P.C. Limited** is authorized by the State Board to discharge its industrial and other effluents arising out of their premises into the local stream/river/well in accordance with the general and special conditions as mentioned in the Annexure.
2. This consent shall be valid for a period of one year from the first day of the month of commissioning of the plant.

This consent is valid for following products & production capacity: -

S.No.	Product	Production Capacity
1.	Open Cast Coal Mine	18.0 Million Tonnes per Annum (Eighteen point Zero Million Tonnes per Annum)
2.	Underground Coal Mine	0.72 Million Tonnes per Annum (Zero point Seven Two Million Tonnes per Annum)

Note :-

1- This consent is granted initially only for the excavation of soil, which is a part of mining process as per the proposal submitted to the Board vide letter dated 27/01/2016. Industry shall intimate regarding installation of coal handling plant along with necessary pollution control equipments and obtain prior permission of the Board for its operation.

2- This consent is granted to the industry without prejudice to the court case pending in the Court of Law and in no way to be taken as a measure of proof that industry has not violated any related environmental laws at any time in the past. Hence whatsoever may be decision of Hon'ble Court, shall be binding on the industry and this Board.

Please acknowledge the receipt of this letter.

For & on behalf of
Chhattisgarh Environment Conservation Board

Member Secretary
Chhattisgarh Environment Conservation Board
Raipur (C.G.)

Seal
Enclosure: Annexure

(I)

ANNEXURE

M/s Saraipali Opencast Coal Mine

Location of Factory: Bichchhinara, Kudurmouha, Tilaipalli, Nayarampur, Raikera, Salhepalli, Chottiguda and Ajjgarh, Tehsil - Gharghoda, District - Raigarh (C.G.)

Vide consent no. / /EI/Raigarh/CECB/2016, dated: .....

A. GENERAL CONDITIONS: -

1. All discharges authorized shall be consistent with terms and conditions of this Consent Facility expansions, production increases or process Modifications which result in new or increased discharges of pollutants must be reported by submission of a new Consent, application or if such new, or increased discharge does not violate the effluent limitations specified in the Consent, by submission to the Board details of such new or increased discharges of pollutants in which case the consent may be modified to specify effluent limitations for any pollutants not identified and limited here in the discharge of any pollutant more frequently than or at a level in excess of that identified and authorized by the Consent shall constitute a violation of the terms and conditions of the Consent.

2. After notice and opportunity for the hearing, this consent may be modified, suspended or revoked by the Board in whole or in part during its term for cause including, but not limited to the following: -

   (a) Violation of any terms and conditions of this Consent.
   (b) Obtaining this Consent by misrepresentation of failure to disclose fully all relevant facts.
   (c) A change in any condition that requires temporary or permanent reduction or elimination of the authorized discharge.

3. Not withstanding para(2) above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established for a toxic pollutant which is present in the discharge authorized here in and such standard or prohibition is more stringent than any limitation upon such pollutant in this Consent the Consent shall be revised or modified in accordance with the toxic effluent

standard or prohibition that the Board may consider and the applicant shall be so notified.

4. The applicant shall allow the staff of Chhattisgarh Environment Conservation Board and/or their authorized representative, upon the Presentation of credentials:

   (a) To enter upon the applicant's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this Consent.

   (b) To have access to and copy at reasonable time any records required to be kept under the terms and conditions of this Consent.

   (c) To inspect at reasonable time any monitoring equipment or monitoring method required in this Consent; or

   (d) To sample at reasonable time any discharge of pollutants.

5. The applicant shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities of system installed or used by him to achieve compliance with the terms and conditions of this Consent.

6. The issuance of this Consent does not convey any property rights in either real or personal property or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State or local laws or regulation.

7. The Consent does not authorize or approve the construction of any physical structures or facilities or the undertaking of any work in any water course.

8. The specific effluent limitations and other pollution controls applicable to the discharge permitted here in are set forth below as specific conditions. Also set forth below are self-monitoring and reporting requirements. Unless otherwise specified, the applicant shall submit duplicate original copies of all reports to the Chhattisgarh Environment Conservation Board. Except for data determined to be confidential all such reports shall be available for public inspection at the office of the Chhattisgarh Environment Conservation Board. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provide for in section 42 of the Act.

B. SPECIAL CONDITIONS: -

1. Initial Effluent limitation during the period beginning on the effective date of this consent and lasting until one calendar year discharge from outfalls shall be limited and monitored by the applicant as specified below: -

   (a) The following shall be limited by the applicant as specified

S.No	Effluent Characteristics	Discharge Limitation				Monitoring Requirements	
		Average		Maximum		Frequency of Measurement	Type of Sample
		Mg/l	Kg/Day	Mg/l	Kg/Day		

Daily/Weekly/Monthly/Tri-monthly.

Grab/ 24 Hours Composite

In Addition to above discharge shall be limited and monitored as specified below:

S.No	Effluent Characteristics	Discharge Limitation				Monitoring Requirements	
		Average		Maximum		Frequency of Measurement*	Type of Sample †
		Mg/l	Kg/Day	Mg/l	Kg/Day		

Daily/Weekly/Monthly/Tri-monthly.
Grab/ 24 Hours Composite

For the purpose of this sub-section, the daily average discharge is the total discharge by weight during the calendar month divided by he number of days in month the production or commercial facility was operating for the purpose of the sub-section the daily maximum discharge means the total discharge by weight during any calendar day.

(b) The pH shall not be less than 5.5 or greater than 9.0

2. Final effluent Limitation :- During the period beginning from 1st day of month of commissioning of the plant and lasting until the date of expiration of this Consent, discharge from the outfalls shall be limited and monitored by the applicant as specified below:-

(a) The following shall be limited and monitored by the applicant as specified.

S. No.	Effluent Characteristics	Discharge Limitation				Monitoring Requirements	
		Average		Maximum		Frequency of Measurement*	Type of Sample †
		Mg/l	Kg/Day	Mg/l	Kg/Day		
1	B.O.D.	--	--	30	60.0	Monthly	24 hours Composite
2	C.O.D.	--	--	250	500.0		
3	S.S.	--	--	100	200.0		
	pH 5.5 to 9.0 Flow 2000 Cum/Day (Industrial & Domestic)					Daily	Grab

* Daily/Weekly/Monthly/Tri-monthly.
† Grab/ 24 Hours Composite

Additional, outfalls shall be monitored as follows:

(i) Flow, Temperature and Total solids One per month

(ii) Grab Samples Maximum discharge temperature above upstream receiving water shall be in accordance with the standard of ISI at 40° C.

(iii) Uniform as per ISI 2490 at 40° C

The temperature shall be monitored once per month of each outfall. For the purpose of the sub-section the daily average is the total discharge by weight during calendar month divided by the number of days in month that the production or commercial facility was operating for the purpose of this sub-section, the daily maximum discharge means the total discharge by weight during any calendar day.

(b) The pH shall not be less than 5.5 or greater than 9.0 for outfalls. The samples are taken as monthly, grab samples.

3. Schedule of Compliance for effluent Limitation:- The applicant shall achieve compliance with the effluent limitation: specified above for discharge from outfalls in accordance with the following schedule

(i) Report of Progress : Tri - Monthly

(ii) Completion of final plans by .....

(iii) Award of contract of other commitment of financing .....

(iv) Commencement of construction by .....

(v) Report of construction progress .....

(vi) Completion of construction by .....

(vii) Attainment of operational level by .....

Please see on page no 11 to 15

(b) The applicant shall submit to the Consent issuing Authority the required report of progress or where a specific action is required in (a) above to be taken by a certain date a written notice of compliance or non-compliance with each of the above scheduled dates, post marked not later than 14 days following each elapsed date. Each notice of compliance shall include the following: -

(1) A short description of the non-compliance.

(2) A description of any action taken or proposed by the applicant to comply with the elapsed scheduled requirement without further delay.

(3) An estimate of any factor which tend to explain or mitigate the non-compliance, and

(4) An estimate of the date, the applicant will comply with the elapsed scheduled requirement and assessment of the possibility that the applicant will meet the next scheduled requirement time.

4. Compilation of monitoring Data

(a) Samples and measurements taken to meet the monitoring requirements specified above shall be representative of the volume and nature of monitored discharge.

(b) Following promulgation of guidelines establishing test procedures for the analysis of pollutants, all sampling and analytical methods used to meet monitoring requirements specified above shall conform to such guidelines. Unless otherwise specified sampling and analytical methods shall conform to the latest edition of the Indian Standard

specifications and where it is not specified the guidelines as per standard methods for the examination of Water & Waste Water 13th Edition of the American Public Health Association, New York U.S.A. shall be used.

(c) The applicant shall take samples and measurement to meet the monthly requirements specified above at the location indicated below:

POINT OF SAMPLING

(i) Outfalls of waste.
(ii) 100 meters from point of confluence, down stream to river or lake.

5. Recording of Monitoring activities and Results:

(a) The applicant shall make and maintain records of all information resulting from monitoring activities by this Consent.

(b) The applicant shall record for each measurement of sample taken pursuant to the requirements of this Consent the following information:

(1) The date, exact place and time of sampling.
(2) The dates on which analysis was performed.
(3) Who performed the analysis?
(4) The analytical techniques or methods used and
(5) The result of all required analysis.

(c) If applicant monitors any pollutant more frequently as is required by this Consent he shall include the results of such monitoring in the calculation and reporting of values required in the discharge monitoring reports, which may be prescribed by the Board, such increased frequency shall be indicated on the Discharge Monitoring Report form.

(d) The applicant shall retain for a minimum of 3 years all records of monitoring activities and result including all records of calibration and maintenance of instrumentation and original strip chart regarding continuous monitoring instrumentation. The period of retention shall be the extent during the course of any unresolved litigation regarding the discharge of pollutants by the applicant or when requested by the Central or State Board.

6. Reporting of Monitoring Results:

(a) Monitoring information required by this Consent shall be summarized and reported by submitting a Discharge Monitoring Report form duly filled in and signed, to the Board's office at the following address:

CHHATTISGARH ENVIRONMENT CONSERVATION BOARD
Commercial Complex, C.G. Housing Board Colony,
Kabir Nagar, Raipur (C.G.) 492 099

(b) Each submitted Discharge Monitoring Report shall be signed as follows:

(i) If submitted by Corporation by a Principal Executive Officer of at least the level of Vice-President or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge described in the discharge Monitoring Report originates,

(ii) If submitted by a partnership firm, by a general partner.

(iii) If submitted by a sole proprietor, the proprietor,

(iv) If submitted by a Municipal, State or Central Government or other public enterprises, by a Principal Executive Officer, ranking elected official commanding officer, or other duly authorized employee.

(c) All information submitted on the Discharge Monitoring From shall be based upon measurements and sampling carried out during the three previous calendar months. The first Discharge Monitoring Report shall be submitted for a period ending 60 days from issuance. Thereafter reporting period shall end on the last date of each month. The applicant shall submit a Discharge Monitoring Report post marked no later than 28th day of the month following each completed reporting period.

7. Limitation of Discharge of Oil Hazardous Substance in harmful quantities: The applicant shall not discharge oil in quantities defined as harmful in regulations. In addition the applicant shall not discharge hazardous substance into natural water course in quantities defined as harmful in regulations promulgated by the Board. Nothing in this Consent shall be deemed to preclude the institution of any legal action nor relieve the applicant from any

responsibilities, liabilities, or penalties to which the applicant is or may be subject to clauses.

8. Limitation of visible Floating Solids and Foam: During the period beginning date of issuance and lasting until the date of expiration of this Consent the applicant shall not discharge floating solids or visible foam.

9. Disposal of Collected Solids:

a) Intake Water Treatment: Solid Sludge's, dirt, silt or other pollutant separated from or resulting from treatment of intake or supply waters prior to use by the applicant shall be disposed off in such a manner as to prevent any pollutant from such materials from entering any such water Any live fish or other animals collected or trapped as a result of intake water screening or treatment may be returned to water.

b) Waste water Treatment. Solid sludge's, filter backwash or other pollutant removed from or resulting from treatment or control of waste waster shall be disposed of in such a manner as to prevent any pollutants from such materials from entering natural water.

10. Non-compliance with Effluent Limitations:

(a) If for any reason the applicant does not comply with or will be unable to comply with or will be unable to comply with any daily maximum effluent limitations specified in this Consent the applicant shall immediately notify the Consent issuing authority or his designee by telephone No. 0771-2443923/2443934 and provide the Consent issuing Authority with the following information in writing within 5 days of such notification:

i) Cause of non-compliance.
ii) A description of the non-complying discharge including its impact upon the receiving water.
iii) Anticipated time, of non compliance is expected to continue or if such condition has been corrected, the duration of non-compliance.
iv) Steps taken by the applicant to reduce and eliminate the non-complying discharge and;
v) Steps to be taken by the applicant to prevent recurrence of conditions of non compliance.

(b) The applicant shall take all responsible steps to minimize any adverse impact to natural waters resulting from non-

compliance with any effluent limitation specified in this Consent including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

(c) Nothing in this Consent shall be construed to relieve the applicant from civil or criminal penalties for non-compliance, whether or not such non-compliance is due to factors beyond his control such as equipment break down electric power failure, accident or natural disaster.

Limitation of Batch Discharge.

SPECIAL CONDITIONS

11. Provision for Electric Power Failure: The applicant shall either-

(a) No later than ..... certify in writing to the consent issuing authority that applicant has installed or provided for an alternative electric power source sufficient to operate all facilities utilized by the applicant to maintain compliance with the terms and conditions of the Consent or.

(b) No later than 30 days after the effective date of his Consent, certify in writing to the consent issuing authority that upon the reduction, loss, or failure of one or more of the primary sources of electric power to any facilities utilized by the applicant to maintain compliance with the terms and conditions of his consent, the applicant shall halt, reduce or otherwise Control production and/or all discharges in order to maintain compliance with the terms & conditions of this Consent.

12. Prohibition of By pass of Treatment Facilities: The diversion or by-pass of any discharge from facility utilized by the applicant to maintain compliance with the terms and conditions of this Consent is prohibited except:

(i) Where unavoidable to prevent loss of life severe property damage, or

(ii) Where excessive storm drainage or run off would damage any facilities necessary for compliance with the terms and conditions of this Consent. The applicant shall immediately notify the consent issuing authorities in writing of each such diversion or by-pass in accordance with the procedure specified above for reporting non-compliance.

13. Spill Prevention and Containment Plan: Within 90 days of the effective date of the Consent the applicant shall prepare and

submit to the consent issuing authority, a Spill Prevention, Containment and Countermeasure Plan for the facility covered by this Consent. Such plan shall include the following information and procedures relating to the prevention of spills and unauthorized discharges or oil and hazardous substances.

(a) A description of a reporting system to be used to notify immediately persons responsible for management of a facility and appropriate State and Central authorities;

(b) A description of equipment or facilities (including overall facility) for the prevention, containment of spills and unauthorized discharge.

(c) A list of all oil and hazardous materials used processed or stored at the facility including the normal quantity maintained on the premises for each listed material;

(d) A brief description of any spills or unauthorized discharge which occurred during the 36 months period preceding the effective date of this Consent and subsequent measures taken by the applicant or reduce the possibility of further spills or unauthorized discharges, and

(d) An implementation schedule for additional equipment or facilities which might be required for sub para (b) above but which are not yet operational.

SPECIAL CONDITIONS

1. The mining lease area shall not exceed 2113 hectares.

2. Industry shall ensure continuous, proper and efficient working of industrial and domestic effluent and shall ensure that the treated effluent quality meet the standards prescribed by Board published in Gazette Notification dated 25.03.88. Industry shall provide adequate facility for proper treatment of industrial [mine water including acid mine water (if any), heavy vehicle washing/workshop/ coal handling plant waste water etc.] and domestic effluent generated due to capacity enhancement also. The major parameters of treated effluent shall be kept within the limits as follows:-

S. No.	Parameters	Limits
1.	pH	5.5 - 9.0
2.	Suspended Solids	100 Milligram per Liter
3.	BOD	30 Milligram per Liter
4.	COD	250 Milligram per Liter
5.	Oil and Grease	10 Milligram per Liter

Chhattisgarh Environment Conservation Board may further stipulate stringent limit depending upon environmental conditions.

3. Industry shall provide suitable arrangement of drains/pipe networks to ensure adequate flow for utilization of treated effluent inside the mining lease area. Treated waste waters/effluent shall be recycled for mine operations. The mine discharge water/domestic effluent after proper treatment shall be utilized in plantation, dust suppression, sprinkling on roads or other useful purposes. Industry shall also provide adequate arrangement for supply of treated mine water as maximum as possible to nearby villages for use of different purposes such as irrigation/ agriculture/drinking etc. Industry shall use treated mine water as maximum as possible and the concept of zero discharge shall be adapted to a maximum possible extent. In case of discharge of treated mine water into nalla/river, industry shall ensure the nalla/river un-affected with respect to its water quality and its designated use. Industry shall provide adequate scientific arrangement for ground water re-charging by using treated mine water.

4. Industry shall provide water metering arrangement for the measurement of water utilized and effluent generated.

5. Industry shall use mined out coal for its captive consumption to the Lara Super Thermal Power Project (4000 MW) located at a distance of 60 km. In this regard industry shall establish transportation of coal through MGR system of rail network.

6. Industry shall provide adequate number of influent and effluent quality monitoring stations/points in consultation with Chhattisgarh

Environment Conservation Board. Regular monitoring shall be carried out for relevant parameters. Regular monitoring of surface and ground water quality shall be undertaken around mine area to ascertain the change in the water quality, if any, due to leaching of contaminants from dump area/mine area. Result and data collected shall be analyzed to ascertain the status of water quality and findings shall be submitted to Chhattisgarh Environment Conservation Board.

7. Industry shall ensure continuous running of separate electric metering arrangements with time totalizer for the running of pollution control devices. These arrangements shall be made in such a fashion that any non-functioning of pollution control devices shall immediately stop the electric/raw material supply to the production unit and shall remain tripped till the pollution control device/devices are made functional again.

8. Industry shall provide safe and scientific arrangement for handling, collection, storage, transportation and disposal of all solid wastes and over burden etc. Mining rock/boulders shall be used for road making and land filling. Industry shall obtain letter of authorization under Hazardous Wastes (Management and Handling) Rules, 1989 (as amended) from the Board (if required). Appropriate arrangement shall be provided as per law for collection/treatment/storage/ transportation / disposal of hazardous wastes.

9. All the slope of external dumps shall be maintained at a maximum of 28 degrees. Top soil shall be stacked properly in a dump with proper slope at earmarked site(s) with adequate measures and should be used for reclamation and rehabilitation of mined out area and for green belt development.

10. Backfilling of void (internal dump) shall be done and the mined out area shall be reclaimed to its original surface level. The monitoring of the safety of the internal backfill dump shall be done with the latest technologies and equipment as part of safety measures.

11. Industry shall take effective steps to check the soil erosion from over burden/waste material dumping areas etc. and causing silting problem in nearby nalla/river/pond during rainy season before onset of monsoon. Sufficient numbers of check dams of adequate capacity shall be constructed to prevent the same before onset of monsoon. Check dams and silting ponds of appropriate size shall be constructed to arrest silt and sediment flow from soil and coal/wastes/over burden dumps before onset of monsoon. The water/effluent so collected shall be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly de-silted and maintained. Garland drain of appropriate size shall be constructed before onset of monsoon to collect surface run-offs from

the mining area, topsoil dumps, waste dumps etc. Garland drain (size, gradient & length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material. Plantation shall be taken up for soil stabilization along the slopes of the dump. Sedimentation pits shall be constructed at the corners of the garland drains. The surface run-off shall be de-silted through a series of check dams and drains before final disposal/re-use. Dimension of the retaining wall at the toe of dumps and over burden benches within the mine to check run-off and siltation should be based on the rain fall data.

12. Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers at suitable locations at the proponent's cost in and around mine area. Regular monitoring of surface and ground water quality shall be carried out by establishing a network of stations at suitable locations in mine area/adjacent to mine area. The frequency of monitoring (quality and quantity) shall be four time a year - pre-monsoon (April/May), monsoon (August), post-monsoon (November) and winter (January) seasons. Data generated from groundwater regime monitoring will be submitted to Board on an annual basis.

13. Area brought under afforestation shall be not less than 1876.04 ha which includes, backfilled area (1848.38 ha), which includes area reclaimed after re-handling of temporary external OB dumps and topsoil dump, embankment (15 ha) along ML boundary, infrastructure area (5 ha), along roads, green belt (7.66 ha) and in undisturbed areas/safety zone and in colony outside the ML by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha.

14. Industry shall adopt rain water harvesting technique in the mine area and residential area for recharge of ground water before onset of monsoon. Industry shall develop rainwater harvesting structures to harvest the rain water for utilization in the lean season as well as to recharge the ground water table before onset of monsoon. The mine authorities should meet water requirement of nearby village(s) in case the village wells go dry due to de-watering of the mine.

15. Industry shall ensure transportation of fly ash for back filling / beneficial uses by covered vehicles to prevent emission during transportation.

16. Industry shall establish an environmental management cell to carryout function relating to environmental management under the supervision of senior executive who would directly report to the head of

organization. A full-fledged laboratory with qualified technical / scientific staffs to monitor the influent, effluent, ground water, surface water, soil and ambient air quality etc. shall be provided.

17. Necessary fund shall be provided for implementation of above conditions for environmental safeguards. The funds earmarked for environmental protection measures shall be kept in separate account and not diverted for any other purpose.

18. Industry shall obtain statutory clearances/licenses from concerned Central/State Government Departments, Boards, Bodies and Corporations etc. Industry shall follow direction issued by Central/State Government, Central Pollution Control Board/ Chhattisgarh Environment Conservation Board from time to time regarding control of water & air pollution and for environmental conservation.

19. The issuance of 'consent to operate' does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State or local laws or regulations.

20. Any change in product, production/mining capacity, process, raw materials used, project profile (mining technology and scope of working) etc. shall be intimated to the Board and prior permission of the Board shall be obtained for the same.

21. Board may amend/cancel any of the conditions and add new conditions to be incorporated in the permission to establish and consent to operate and further stringent the emission/effluent limit as and when deemed necessary in the interest of environmental protection, change in the project profile or non-satisfactory implementation of the stipulated conditions etc.

This consent and the authorization to discharge shall expire after twelve months starting from the first day of the month of commissioning of the plant. The applicant shall not discharge after the date of expiration. The applicant shall submit such information forms and fees as required by the Board not later than 180 days prior to the date of expiry.

For & on behalf of
Chhattisgarh Environment Conservation Board

Member Secretary
Chhattisgarh Environment Conservation Board
Raipur (C.G.)

A Maharatna Company

National Thermal Power Corporation Ltd.

(A Public Sector Undertaking)

TALAIPALLI COAL BLOCK

MAND-RAIGARH COAL FIELD
DISTRICT - RAIGARH, STATE - CHHATTISGARH

EXPERT REVIEW REPORT
ON
MINING PLAN
(INCLUDING MINE CLOSURE PLAN)
(1ST MODIFICATION)

MPPA Certificate No.: NABET/APA-MPPA/IA/015
Issued Date: 30th March, 2022

MECON LIMITED, RANCHI

MEC/11/16/Q7T5/ERA/R-0 **OCTOBER 2022**

EXPERT REVIEW REPORT

ON

MINING PLAN (INCLUDING MINE CLOSURE PLAN)

(1ST MODIFICATION) OF TALAIPALLI COAL BLOCK

MAND-RAIGARH COAL FIELD

DISTRICT- RAIGARH, STATE- CHHATTISGARH

SL. No.	Description	Clause No.	Remarks of MECON
1.	Cover Page		Along with Rated Capacity, Peak capacity also to be mentioned separately.
2.	Cover Page		MPPA Cert. No & Issuing Date to be mentioned.
3.	Index for List of Annexures		All Annexures to be checked as per Index. Followings are missing at present – Annexure 2: Certificate by QP/MPPA Annexure 3: Approval of the Company Board Annexure 6: Non-refundable Application fee
4.	Index for List of Plans/ Drawings		All Plans/Drawings to be checked as per Index. Followings are missing at present – Plate 2: Plan certified by QP/MPPA Plate 9: Tentative land use plan.
5.	All Plans / Drawings		All Legends to be updated in accordance with features shown in respective plans. The blank Rows in Legends table should be omitted. For Example, in Geological plan Coal outcrops to be shown in Legend, in Surface plan reserved forest & Protected Forests to be shown in legend. In Reclamation Plan Legends for Plantation area, Water body etc. to be incorporated.

SL. No.	Description	Clause No.	Remarks of MECON
6	List of Abbreviations	1.1.4	The following Abbreviations used in the Text to be included in the list of Abbreviations Table – 1. STPP (Clause 1.1.4) 2. CMDPA (Clause 1.3.5) 3. MGR (Clause 3.1.2) 4. OGL (Clause 3.1.2) 5. OBR (Clause 3.1.13) 6. RLS (Clause 5.4) 7. OHE (Clause 5.4) 8. CPCB (Clause 8.2) 9. TDS (Clause 8.2) 10. NAAQ (Clause 8.3)
7.	Charpter-1: Project Information	1.2.2	Road – Nearby road distance to be incorporated. Air link – Nearby Airport Name with distance to be given.
8.	Charpter-1: Project Information	1.2.4	Drainage Pattern – To be elaborated. Rainfall – Annual rainfall (avg.) along with max. and min. rainfall data to be incorporated in the report.
9.	Charpter-1: Project Information	1.3.2	Allotment/ Vesting order No. to be incorporated.
10.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.2	The coordinates provided does not match with the Block Boundary Coordinates in GR.
11.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.3	In GR, the total area of the Block has been mentioned as 20 Sq. Km. where as in Mining Plan it has been mentioned as 21.194 Sq. Km. The same has to be checked.

EXPERT REVIEW REPORT

ON

MINING PLAN (INCLUDING MINE CLOSURE PLAN)

(1ST MODIFICATION) OF TALAIPALLI COAL BLOCK

MAND-RAIGARH COAL FIELD

DISTRICT- RAIGARH, STATE- CHHATTISGARH

SL. No.	Description	Clause No.	Remarks of MECON
12.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.4	In GR, the total area of the Block has been mentioned as 20 Sq.Km. where as in Mining Plan it has been mentioned as 21.194 Sq.Km. The same has to be checked.
13.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.7	The clause may be corrected as per format Guideline provided by MoC for preparation of mining plan which states: "Cardinal Point Co-ordinates of the non-coal/lignite bearing area existing mining lease outside the allotted Geological Coal/Lignite Block"
14.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.8	Certificate to be produced as per the requirement.
15.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.9	The date of capture of satellite imagery to be provided.
16.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.1	It is mentioned as "It is situated between Ib-River Coalfield in the southeast and Korba Coalfield in the southwest with more or less similar stratigraphic and tectonic setting". Please review the location of Mand-Raigarh Coalfield with respect to Korba Coalfield and Ib-River Coalfield.
17.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.2	Coal Seam Sequence table should be updated as V Bottom, IV Middle & IV Bottom in Sl. No. 15, 17, 19.
18.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.3	In GR, the total area of the Block has been mentioned as 20 Sq.Km. where as in the Mining Plan it has been mentioned as 21.194 Sq.Km. This has to be checked.

SL. No.	Description	Clause No.	Remarks of MECON
19.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.17	Gross Geological Reserve figure mismatches with that of Clause No. 1.5.11
20.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.23	To be updated in line with the table of 2.2.14
21.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.24	To be updated in line with the table of 2.2.14
22.	Chapter-3: Mining	3.1.2	In the table showing the Geo-Mining Characteristics of the workable seams for OC, following seams have been considered as workable seams – XLB, IXL1, V TOP, V BOTTOM. However, in description it is mentioned that, the above mentioned seams are classified as poorly developed seams in the block. Hence, resources of these seams are not considered. It needs to be checked.
23.	Chapter-3: Mining	3.1.2	In the Pit Formulation Strategy, Quarry surface has been taken as 45-50 m from the Block boundary. It needs to be verified.
24.	Chapter-3: Mining	3.1.3	25 Mt shall be Rated capacity, instead of peak rated capacity.
25.	Chapter-3: Mining	3.1.4	Capacity spelling to be corrected.
26.	Chapter-5: Infrastructure Facilities	5.2	Power Supply & Illumination: In the first paragraph, workshop has been repeated twice. It needs to be corrected.

SL. No.	Description	Clause No.	Remarks of MECON
27.	Chapter-5: Infrastructure Facilities	5.4	CHP Mode of Despatch: Spelling of Talaipalli OCP to be corrected in the first point.
28.	Chapter-5: Infrastructure Facilities	5.4	Handling Arrangement: "Each silo shall facility of wagon loading" – This sentence shall be suitably corrected.
29.	Chapter-8: Progressive & Final Mine Closure Plan	8.10.1	In Abandonment cost table, Quantity & Unit cost are not given. Hence, Total amount calculation to be verified by NTPC.
30.	Chapter-8: Progressive & Final Mine Closure Plan	8.10.2	Balance Corpus for which provision is to be made – Please mention **(in Rs. Lakh)** Balance Life of Mine – Please mention **(in Years)**

Additional Annexure-17

COMPLIANCE TO OBSERVATIONS FROM SCRUTINY COMMITTEE FOR MINING PLAN AND MINE CLOSURE PLAN (1ST MODIFICATION) OF TALAIPALLI COAL BLOCK, M/S NTPC LTD.

Sl No.	Parameters	Observation	Compliance
6	a. Targeted capacity b.Peak rated capacity (150% of the rated capacity)	Peak capacity and rated capacity to be stated	Rated Capacity- 25.00 MTPA Peak Capacity- 37.50 MTPA (@150% of the rated capacity)
1.3.9	Cardinal Points coordinates of the Block boundary	Are the cardinal points coordinates of the block boundary used for preparation of mining plan part of the mine dossier?	No. The cardinal points coordinates of the block boundary used for preparation of this Revised Mining Plan is different from mine dossier. At the time of allotment of the Block in 2006, the Talaipalli Block boundary was not in WGS84 co-ordinate system. On request of NTPC, CMPDI carried out the DGPS survey in WGS84 coordinate system and finalized the block boundary. This has resulted in change of 6.4 Ha in block area on plan not on surface ground and change in Bounding coordinates. A corrigendum to the allotment order No. 103/31/2015/NA dated Sep 08, 2015 was issued by the Ministry of Coal vide order no. 103/31/2015/NA dated Nov 16, 2022 regarding this which is attached as Annexure-I.
1.5.20	OB in MM3	OB has reduced as compared to the previously approved mining plan. To be explained/corrected	In the previously approved Mining Plan, the pit was formulated considering Seam III as base seam for opencast mining and the entire dump was accommodated internally. On examination of the approved Mining Plan, it was found out that the Mining Plan is technically and operationally not feasible and so revision of the Mining plan was necessitated. This Revised Mining Plan has been formulated considering Seam IV Bot as base seam which is above Seam III. Seam IV Bot has been taken as the base seam for the pit since going upto Seam III which is only 4-4.5m thick and is 50-60m below seam IV Bot increases the OB handling to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~277 Mt of Coal. So, Opencast mining for the Talaipalli coal block has been proposed upto Seam IV Bot to maximize the recovery of coal by Opencast Mining. Therefore, OB has reduced as compared to the previously approved Mining Plan
1.5.10	Seams not considered for Mining with Reasons	Why seams IIIL, III, IIL3, II L1, II, IIL cannot be projectized at present? Why seam I not considered workable?	Opencast Mining is technically feasible upto base Seam IV Bot due to lack of dumping space and for maximization of coal recovery by Opencast Mining. As simultaneous working of UG and OC is not operationally safe, Seams below IV Bot will be planned for UG mining at the end of OC mine life as per the scientific study/latest technology options available at that time.

			Seam I is poorly developed in the block having non-mineable thickness and therefore its reserve is not assessed in the Geological Report.
1.5.21	SR M3/te	SR has reduced as compared to the previously approved mining plan. To be explained/corrected	The Previously approved Mining Plan has proposed Opencast Mining upto Seam III which is below Seam IV Bot. This is technically and operationally not feasible due to lack of dumping space. Therefore, this revised Mining Plan has proposed the Opencast Mining upto Seam IV Bot which is above Seam III. This has resulted in removal of less OB than the previously approved mining plan and hence the reduction of SR.
1.1.3	Base date of Mining Plan/ Mine Closure Plan	Base date cannot be later than the date of submission of mining plan.	Corrected
1.5.3	Lease area 'Ha'	Reasons for change in block area, geological reserve and extractable reserve may be informed.	At the time of allotment of the Block in 2006, the Talaipalli Block boundary was not in WGS84 co-ordinate system. On request of NTPC, CMPDI carried out the DGPS survey in WGS84 coordinate system and finalized the block boundary. This has resulted in change of 6.4 Ha in block area on **plan not on surface ground** and change in Bounding coordinates. A corrigendum to the allotment order No. 103/31/2015/NA dated Sep 06, 2015 was issued by the Ministry of Coal vide order no. 103/31/2015/NA dated Nov 15, 2022 regarding this which is attached as Annexure-I.

			The Net Geological Reserve of 1267.145 Mt mentioned in the Revised Mining Plan is as per the Geological Report prepared by MECL in September 2008.The Gross Geological Reserve is arrived at by considering 10% geological loss which is mentioned in the Geological Report. The extractable reserve has changed since the base seam for Opencast Mining has changed from Seam III in the previous approved Mining Plan to Seam IV in the proposed Revised Mining Plan due to lack of space for dumping. Also, some area for conveyor corridor for evacuation of coal and infrastructures has been excluded from mining since mine cannot run without these infrastructures.
1.3.7	Production Schedule as per opening permission (meeting provisions of CMDPA if any) / Allotment Agreement	Data to be given	The planned production schedule is given in 1.4.7
2.2.12	Seams not considered for Mining with Reasons.	Was it differently planned in the previously approved mining plan?	In the previously approved Mining Plan, the pit was formulated considering Seam III as base seam for opencast mining and the entire dump was accommodated internally. On examination of the previously approved Mining Plan, it was found out to be technically and operationally not feasible and so revision of the Mining plan was necessitated.

			This Revised Mining Plan has been formulated considering Seam IV Bot as base seam. Seam IV Bot has been taken as the base seam for the pit since going upto Seam III which is only 4-4.5m thick and is 50-60m below seam IV Bot increases the OB handling to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~277 Mt of Coal. So, Opencast mining for the Talaipalli coal block has been proposed upto Seam IV Bot to maximize the recovery of coal by Opencast Mining. As simultaneous working of UG and OC is not operationally safe. Seams below IV Bot will be planned for UG mining at the end of OC mine life as per the scientific study/latest technology options available at that time.
3.1.8	Rated Capacity "MTPA"	PRC of mine is being achieved in 2037-38. Reasons of same may be given.	It is because the mine will encounter upper seams (Seams IX, L2, X Bot etc.) in the later stage after 13-14 years. This will increase the cumulative thickness of coal and production can be increased to 25 MTPA.
3.1.7	Tentative Coal production Plan "MT"	Annual scheduled production till year 2027-28 is less in the proposed MP in comparision to previously approved MP. Same needs to be reviewed.	The basal seam of IV Bot is at a depth of 200m in the western side of the block. It will require time to reach that kind of depth and then only can production can be ramped up. The schedule of production given is optimized based on the geo-mining condition, temporary external dump requirement, lead etc.

6.2.3	Period for which Mining Lease has been granted/is to be renewed/ is to be applied for	life of mine to be quantified	Corrected. It is 31 years.
1.5.15	Extractable Reserves "Mt"	Extractable reserves have been reduced as compared to the previously approved mining plan. To be explained/corrected.	The extractable reserve has reduced since the base seam for Opencast Mining has changed from Seam III in the previous approved Mining Plan to Seam IV in the proposed Revised Mining Plan due to lack of space for dumping. Also, some area for conveyor corridor for evacuation of coal and infrastructures has been excluded from mining since mine cannot run without these infrastructures.
1.5.1	Block Area in "Ha"	Geological block area, geological block area projectized, lease area, project area have been changed as compared to the previously approved mining plan. To be explained/corrected.	At the time of allotment of the Block in 2006, the Talaipalli Block boundary was not in WGS84 co-ordinate system. On request of NTPC, CMPDI carried out the DGPS survey in WGS84 coordinate system and finalized the block boundary. This has resulted in change of 9.4 Ha in block area **on plan not on surface ground** and change in Bounding coordinates. A corrigendum to the allotment order No. 103/31/2015/NA dated Sep 06, 2015 was issued by the Ministry of Coal vide order no. 103/31/2015/NA dated Nov 15, 2022 regarding this which is attached as Annexure-I.
1.5.24	Handling of Rejects	1.5.25: Excavation area and safety zone area have been reduced while infrastructure area, green belt and undisturbed area have been increased as	In the earlier approved Mining Plan, no break-up of land use other than excavation area and safety zone was provided.

		compared to the previously approved mining plan. To be explained/corrected	In this proposed Mining Plan, detailed assessment of land use pattern has been done and provided accordingly.
1.5.11	Gross Geological Reserve "M"	Gross Geological reserves, blocked reserves, mineable reserves and extractable reserves have been changed as compared to the previously approved mining plan. To be explained/corrected.	The Net Geological Reserve of 1267.145 Mt mentioned in the Revised Mining Plan is as per the Geological Report prepared by MECL in September 2008 The Gross Geological Reserve is arrived at by considering 10% geological loss which is mentioned in the Geological Report. The blocked reserve, mineable reserve and extractable reserve has changed since the base seam for Opencast Mining has changed from Seam III in the previous approved Mining Plan to Seam IV in the proposed Revised Mining Plan due to lack of space for dumping. Also, some area for conveyor corridor for evacuation of coal and infrastructures has been excluded from mining since mine cannot run without these infrastructures.

Additional Annexure-18

COMPLIANCE TO OBSERVATIONS FROM MEETING OF THE INTERNAL COMMITTEE CONSTITUTED UNDER MMDR ACT 1957 FOR APPROVAL OF MINING PLAN AND MINE CLOSURE PLAN (1ST MODIFICATION) OF TALAIPALLI COAL BLOCK, M/S NTPC LTD HELD ON 07/02/2023 THROUGH VIDEO CONFERENCING

Sl No.	Observation	Compliance
1	Changes made in the mining plan as compared to the approved mining plan shall be furnished as an annexure. The production scheduled proposed shall be compared with the approved mining plan.	Furnished as Annexure-19
2	It has been stated that dump accommodation is not possible if opencast mine were to be operated with Seam III as base seam, as was proposed in the earlier approved mining plan. It shall be elaborated with relevant plan (s).	A Conceptual Report on Proposed Opencast Mining is furnished as Annexure-20 wherein it is clearly demonstrated that this is the best possible option to extract maximum reserves.
3	Seams, below Seam-IV has been proposed to be mined by underground mining method. However, no liquidation programme / mining details as per guidelines of MoC dated 29.05.2020 regarding mining plan has been given. To be furnished.	A Conceptual Report on UG Mining is attached as Annexure-21
4	No projectization of a part of coal bearing area in the south west part of the geological block has been done. To be corrected.	A Conceptual Report on Projectisation of South West Area is attached as Annexure-21
5	Annexure 3A1 Approval as per guidelines of MoC dated 29.05.2020 shall be given	Complied
6	Additional Annexure-16 Observations made during Expert Review has been given. However, compliance to the observations made by the project proponent and certification done by the agency carrying out the aforesaid review shall also be submitted.	Complied

Additional Annexure-19

CHANGES MADE IN THE PROPOSED REVISED MINING PLAN AS COMPARED TO THE APPROVED MINING PLAN

Sl. No.	Particulars	Approved Mining Plan	Proposed Revised Mining Plan	Remarks
1	Block Area in "Ha"	2113 Ha	2119.40 Ha	At the time of allotment of the Talaipalli coal Block in 2006, the block boundary was not in WGS84 co-ordinate system. On request of NTPC, CMPDI carried out the DGPS survey in WGS84 coordinate system and finalized the block boundary. This has resulted in change of 6.4 Ha in block area **on plan not on surface ground** and change in Bounding coordinates.
2	Lease area "Ha"	2113 Ha	2119.40 Ha	Same as above
3	Project Area "Ha"	2113 Ha	2119.40 Ha	Same as above
4	Base Seam for OC Mining	Seam III	Seam IV Bot	This Revised Mining Plan has been formulated considering Seam IV Bot as base seam which is above Seam III. Seam IV Bot has been taken as the base seam for the pit since going upto Seam III which is only 4-4.5m thick and is 50-60m below seam IV Bot increases the OB handling to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~277 Mt of Coal (Conceptual Report provided as Annexure 20). So, Opencast mining for the Talaipalli coal block has been proposed upto Seam IV Bot to maximize the recovery of coal by Opencast Mining.
5	Life of the Project "Yrs"	OC- 54 years UG- 34 years	OC-31 years UG- to be planned at the end of OC mine life	Since, Base Seam for OC mining has changed from Seam III to Seam IV Bot, Extractable reserve has also get changed and thus life of OC mine has also get changed
6	Production Target "MTPA"	OC-18 MTPA UG- 0.72 MTPA	OC- 25 MTPA UG- to be planned at the end of OC mine life	Considering strike length and cumulative thickness of coal, 25 MTPA is the optimum capacity of the Talaipalli Coal Mine

7	Seams not considered for Mining with Reasons	Seams II L3, II L and Seam I has not been considered for mining as they are poorly developed in the block and have non-mineable thickness.	Seam IIIL, II L3, II L2, II L1, II L and Seam I has not been considered due to non-mineable thickness and poor development of seams	Opencast Mining is technically feasible upto base Seam IV Bot due to lack of dumping space and for maximization of coal recovery by Opencast Mining. As simultaneous working of UG and OC is not operationally safe, Seams below IV Bot will be planned for UG mining at the end of OC mine life as per the scientific study/latest technology options available at that time. However, a Conceptual Plan for UG mining has been provided as Annexure 21.
8	Gross Geological Reserve "Mt"	1400.57 Mt	1407.94 Mt	The Net Geological Reserve of 1267.145 Mt mentioned in the Revised Mining Plan is as per the Geological Report prepared by MECL in September 2008.The Gross Geological Reserve of 1407.94 Mt is arrived at by considering 10% geological loss which is mentioned in the Geological Report.
9	Net Geological Reserve "Mt"	1260.52 Mt	1267.145 Mt (as per GR)	The Net Geological Reserve of 1267.145 Mt mentioned in the Revised Mining Plan is as per the Geological Report prepared by MECL in September 2008
10	Mineable Reserve "Mt"	OC-888.08 Mt UG-17.57 Mt	OC- 664.80 Mt UG- will be planned later	The mineable reserve has changed since the base seam for Opencast Mining has changed from Seam III in the approved Mining Plan to Seam IV Bot in the proposed Revised Mining Plan due to lack of space for OB dumping. Also, some area for conveyor corridor for evacuation of coal and infrastructures has been excluded from OC mining since mine cannot run without these infrastructures. The coal under infrastructures in south west part of the block shall be liquidated by OC & UG mining method at the end of OC mine life.

<table>
<tr><td>11</td><td>Extractable Reserves "Mt"</td><td>OC-843.68 Mt
UG- 17.57 Mt</td><td>OC- 631.56 Mt
UG- will be planned later</td><td>Same as above. Moreover, the extractable reserve of 843.68 Mt by OC in the approved Mining Plan is incorrect even if it is assumed to be technically feasible to mine up to base seam III. While reviewing the approved Mining Plan [Technical Feasibility Note on Talaipalli Coal Block attached as Annexure-22], the extractable reserve by OC was found to be 790.80 Mt, assuming there is no dumping space constraint.</td></tr>
<tr><td>12</td><td>OB in MM3</td><td>3777.07 Cum</td><td>2734.58 Cum</td><td>The approved Mining Plan has proposed Opencast Mining upto Seam III which is below Seam IV Bot. This is technically and operationally not feasible due to lack of dumping space. Therefore, in this revised Mining Plan, Opencast Mining is proposed with base seam of Seam IV Bot which is above Seam III. This has resulted in removal of less OB than the approved mining plan.</td></tr>
<tr><td>13</td><td>SR M3/te</td><td>4.48 cum/t</td><td>4.33 cum/t</td><td>Same as above</td></tr>
<tr><td>14</td><td>Production Schedule</td><td>
<table>
<tr><th>Year</th><th>Coal (Mt)</th></tr>
<tr><td>1</td><td>1.50</td></tr>
<tr><td>2</td><td>4.00</td></tr>
<tr><td>3</td><td>8.00</td></tr>
<tr><td>4</td><td>13.00</td></tr>
<tr><td>5</td><td>18.00</td></tr>
<tr><td>6</td><td>18.00</td></tr>
<tr><td>7</td><td>18.00</td></tr>
<tr><td>8 to 47</td><td>18.00/ yr</td></tr>
<tr><td>48</td><td>15.00</td></tr>
<tr><td>49</td><td>10.00</td></tr>
<tr><td>50</td><td>7.00</td></tr>
<tr><td>51</td><td>6.00</td></tr>
<tr><td>52</td><td>5.19</td></tr>
</table>
</td><td>
<table>
<tr><th>Year</th><th>Coal (Mt)</th></tr>
<tr><td>1</td><td>3.50</td></tr>
<tr><td>2</td><td>6.03</td></tr>
<tr><td>3</td><td>7.58</td></tr>
<tr><td>4</td><td>9.00</td></tr>
<tr><td>5</td><td>14.40</td></tr>
<tr><td>6</td><td>18.00</td></tr>
<tr><td>7</td><td>22.00</td></tr>
<tr><td>8 to 14</td><td>22.00/ yr</td></tr>
<tr><td>15 to 29</td><td>25.00/ yr</td></tr>
<tr><td>30</td><td>12.00</td></tr>
<tr><td>31</td><td>6.64</td></tr>
</table>
</td><td>The basal seam of Seam IV Bot is at a depth of200m in the western side of the block. It will require time to reach that kind of depth and then only can production can be ramped up. The schedule of production given is optimized based on the geo-mining condition, temporary external dump requirement, concurrent backfilling and total accommodation of OB, lead etc. The rated capacity of the mine has been increased to 25 MTPA from 18 MTPA.</td></tr>
</table>

Additional Annexure-20

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NTPC

CONCEPTUAL REPORT FOR OC MINING OF TALAIPALLI COAL BLOCK

JUNE 2022

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CHAPTER 1

BACKGROUND

1.1 INTRODUCTION

Talaipalli coal mining block in the state of Chhattisgarh was initially allotted to NTPC by Ministry of Coal (MoC), vide letter no.13016/29/2003-CA-1, dated 25.01.2006, for meeting coal requirement for the proposed 4000MW Lara Integrated Power Project which is approximately 60 kms away from the coal block.

Talaipalli Block lies in the eastern part of Mand-Raigarh Coalfield in the state of Chhattisgarh. At the time of allotment, the block was regionally explored by GSI by drilling 15 holes (6434.55m) and estimated coal reserves of 964.88 million tonnes of indicated category were assessed.

On receiving Letter of Award (LOA) from Ministry of Coal, NTPC Ltd issued Work order to MECL to carry out detailed exploration in the block. MECL drilled about 102 boreholes (39854.75 mtrs. of drilling) in approximately 20 sq. km. block area for which the Geological Report (GR) was submitted to NTPC on 29.09.08.

On receipt of GR, NTPC awarded the consultancy for preparation of Mining Plan and Feasibility Report for this block to Advance Coal Management & Marketing Pvt. Ltd. (ACMM), New Delhi. The Mining Plan was prepared by ACMM in 2009 for a rated capacity of 18.00 Mty based on the aforementioned GR which was later approved by the Ministry of Coal on 31.03.2010. Subsequently, all statutory clearances were obtained on the basis of the approved Mining Plan.

However, as a consequence to the Judgment of the Hon'ble Supreme Court in September 2014, the block allocation was cancelled which was later re-allotted to NTPC on 08.09.2015.

NTPC planned to develop and operate the mine through outsourcing by appointing a Mine Developer and Operator(MDO) with scope of works viz. overburden removal, extraction of coal, construction of CHP & other fixed mine infrastructures, compliance of statutory obligations and other associated activities.

Meanwhile, all requisite statutory clearances and permissions were obtained from the respective statutory bodies. The major statutory clearances out of the above are furnished below:

Table 1-1: Major Statutory Clearances with Obtaining Date

Activity	Date of Achievement
Env. Clearance	02.01.13/13.11.15 (Rev.)
Forest Clearance	St-I : 05.11.12; St-II: 29.01.14; 23.05.17(Rev)
Consent to Establish	06.01.15
Consent to Operate	17.03.16
Tripartite Escrow Agreement (Banker, CCO & NTPC)	15.05.14 & 04.09.17
DGMS Permission	19.01.18
Coal Controllers permission	31.01.18

1.2 NEED FOR THIS CONCEPTUAL REPORT

M/s TEMPL was appointed as MDO on 26.08.2020 by NTPC for development and operation of Talaipalli Coal Block. Post award of the contract, a dispute developed between M/s TEMPL and NTPC wherein TEMPL has claimed that as per their calculations 404.5 MT of coal can't be extracted at a stripping ratio of 4.30 cum/tonne as specified in the approved Mining Plan. In view of M/s TEMPL, the stripping ratio should be around 4.92 to 5.25 Cum/t. Along with this, the issue of accommodation of excess OB in the designated dump area including temporary external dump and unfeasibility of 100% backfilling by re-handling of temporary external dump as per approved mining plan has

also been raised by M/s TEMPL. There were a series of discussion/meetings held between NTPC and TEMPL to resolve the issue.

Subsequently, M/s TEMPL chose to rescind the contract through their Notice dated 04.05.2021 and filed a Commercial Civil Suit before Hon'ble Delhi High Court. Subsequent to few hearings and submissions made by both the Parties, the Hon'ble Delhi High Court directed both the parties for mutual discussions for amicable resolution of the issue which was complied by both the Parties by holding meetings wherein M/s TEMPL requested for appointment of Independent Expert for review of the mining plan of Talaipalli coal mining project.

Thereafter, M/s TEMPL and NTPC requested CMPDIL for review of the technical parameters of the Talaipalli coal mining project on urgent basis which was accepted by CMPDIL.

The Technical Feasibility Note on Talaipalli Coal Block was prepared by CMPDI and was submitted to NTPC and M/S TEMPL in September 2021. The approved Mining Plan was reviewed and it was found to be not feasible. CMPDI recommended revision of the Approved Mining Plan.

Against this backdrop, NTPC has awarded the consultancy service to CMPDI for Preparation of Conceptual Report, Mining Plan and feasibility Report for Talaipalli Coal Block to CMPDI.

1.3 SCOPE OF THE CONCEPTUAL REPORT

The Conceptual Technical Report will study the pit & dump options and finalize the base option along with mutually agreed project criteria that would form the basis of detailed study in the Mining plan and Feasibility Report.

The conceptual report has outlined the preliminary delineation of Open-pit boundary options and assessment of likely mineable reserves and waste quantities. It has also tentatively assessed the rated capacity, production buildup and mining strategy with respect to OB dumping.

1.4 BASE DOCUMENT

The Geological Report on Detailed Exploration for Coal: Talaipalli Coal Block (September 2008) prepared by MECL forms the base document for the above assignment.

CHAPTER 2

PROJECT SITE INFORMATION

2.1 LOCATION

Talaipalli coal block having an area of 2115.5 ha is bounded by latitude 22° 13' 35" & 22° 16' 08" N and longitude 83° 25' 49" & 83° 30' 22"E. It is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. Talaipalli block roughly forms a rectangle, the longer axis is NW-SE direction forming the length of the block, and the shorter axis NE-SW direction forming the width. The block boundary allocated to NTPC Ltd., was pillared by Boundary Pillers BP-1 to BP-65 . The Kelo river forms the eastern boundary of the block and the boundary line passes through Naya Rampur & Raikera village in the south of Sajepalli, west of Chotiguda forming the western boundary. Ajijgarh and Kudur-Mauha village forming the northern boundary.

Talaipalli block is covered by Survey of India top sheet No. 64N/7 &N/8 (RF 1:50000). The block is mostly covered by cultivated land while south-eastern part of the block has Reserve & protected forest cover. Talaipalli, Kudhur-Mauha, Ajijgarh, Chotiguda, Bichhinara, Naya Rampur, Raikera and Sajhepalli are numerous villages located within the block.

2.2 COMMUNICATION

Talaipalli block is about 55 km away from Raigarh township and is close to Tehsil Headquarters at Gharghoda which lies on Raigarh-Ambikapur State Highway. Talaipalli village is situated in the block & it is about 20 km NE from Gharghoda and is connected with Gharghoda partly by all-weather Gharghoda-Lelunga road. Gharghoda is about 35 km. North of Raigarh Railway Station which is on Howrah-Bombay Main Line of South Eastern Railway. A large part of the area of investigation is practically inaccessible during monsoon. The nearest railway station is Raigarh which is 55 km away from Talaipalli block lying on the Mumbai-Howrah main line of SE railways.

2.3 PHYSIOGRAPHY AND DRAINAGE

The topography of Talaipalli block is mostly covered by softer horizon and in general represents an undulating terrain bounded by Tolge Pahar in the north and Silot Pahar (580m) in the south. The general ground level elevation of the area varies between 280 m and 340m above MSL.

Kelo River is flowing through the south-eastern part of the present area, constitute the main drainage system. The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area. This subsidiary stream channel is fed by number of small tributaries rising from hills both from north and south.

2.4 CLIMATE

The area experiences a sub- tropical climate with very hot and dry summer. In the summer season from March to June, temperature rises to 45º C during the peak period. The monsoon period extends from mid-June to September with an average annual mean rainfall of 1620 mm. The winter season starts from November and continues upto February. During winter the temperature goes down to 18.6º C.

2.5 LAND USE, FLORA & FAUNA

Forest cover is found in the south eastern part of the block. Small land patches having forest cover are available in central part of the block. Remaining part of the area is mostly cultivated land. Cultivation and collection of forest products are the main occupation of the people of the area. The soil of the area is having fair to medium range of fertility. The main crop grown in this area is paddy. The commonly found flora in the area are Sal, Teak, Bija, Mango, Neem, Tendu etc. Wild animals found are elephants, wild dogs & bears etc.

2.6 VILLAGES AND HABITATION

Total eight number of village lies within the Talaipalli Block as per the Socio-Economic Survey report (2007) provided by NTPC. The details are as under;

Table 2-1: Particulars of the Village within Talaipalli Coal Block

S.No.	Name of the Villages	Proposed land to be Acquired (acre)
1.	Talaipali	762.31
2.	Bichinara	859.95
3.	Nayarampur	405.31
4.	Kudurmuha	299.76
5.	Raikera	1430.717
6.	Chotiguda	920.158
7.	Ajigarh	80.670
8.	Salehpali	388.96
Total		5147.381

The demographic pattern of the villages viz. Talaipalli , Bichinara, Nayarampur, Kudurmuha , Raikera, Chotiguda, Ajigarh & Salehpali as per Socio-Economic Survey (2007) provided by NTPCis detailed in Table 2-2 below:

Table 2-2: Demographic profile of the Villages

Name of villages	Males	Females	Total Population	SC	ST	Others
Talaipali	191 (49.5)	199 (50.5)	394	18 (4.6)	139 (35.5)	237 (60.2)
Bichinara	308 (68.7)	325 (31.3)	633	110 (17.4)	481 (76.0)	42 (6.6)
Nayarampur	177 (50.4)	174 (49.6)	351	26 (7.4)	325 (92.6)	-
Kudurmuha	78 (48.4)	83 (51.6)	161		159 (98.2)	3 (1.3)
Raikera	1033 (49.7)	1046 (50.3)	2081	42 (2.0)	1484 (71.3)	555 (25.7)
Chotiguda	598 (49.3)	616 (50.7)	1214	114 (9.4)	643 (53)	457 (37.6)
Ajigarh	100 (52.4)	91 (47.6)	191		148 (77.5)	43 (22.5)
Salehpali	333 (50.1)	330 (49.9)	663	57 (8.6)	378 (54.2)	246 (37.2)
Total	2822 (49.6)	2864 (50.4)	5686	387 (9.3)	3737 (68.7)	1602 (37.8)

*Figures in parentheses show percentage

CHAPTER 3

GEOLOGY AND EXPLORATION

3.1 EXPLORATION ACTIVITIES

The Ministry of coal allocated Talaipalli Block for exploitation to NTPC Ltd., after conducting the detailed exploration. As mentioned above the block was regionally explored by GSI and estimated 964.88 million tonnes of indicated category coal reserves based on only 15 boreholes data. NTPC Ltd. after receiving letter of award (LOA) from Ministry of Coal, decided that MECL shall carry out detailed exploration in the block by drilling boreholes at 400m x 400m grid interval, involving around 45,000m. drilling in 105 proposed boreholes with related geological work, so as to convert the indicated category of coal reserves to prove category.

MECL commenced the task of detailed exploration for coal in Talaipalli block on behalf of NTPC Ltd, on 11.08.2006 by deploying 3 rigs initially. Two projects were opened for the purpose of administrative control and for smooth functioning of drilling and related geological work. Progressively the rigs were increased in these projects to even 13 rigs (during April & May – 2007) to complete the task. Thus by 10.08.2007 a total of 33716.65 m. of drilling was done from 85 boreholes.

It was likely that the drilling target in Talaipalli block would have been completely achieved as per schedule, but due to the onset of monsoon and non-approachability to drill sites and also stoppage of work by the forest authorities, the exploration activities were temporarily suspended.

The drilling operation was resumed on 21/12/2007 after the completion of monsoon and harvesting. A total of 17 boreholes (MNRT-86 to MNRT-102) and two suspended boreholes MNRT-20 (Depth 187.50 – 429.20 = 241.70 m) and MNRT-74 (Depth 329.50 – 523.60 = 194.10 m.) were completed involving 6138.10 m. drilling. A total of 39854.75

m. drilling is done in 102 MNRT series boreholes in Talaipalli block by MECL. A grand total of 46289.30 m. drilling has been done by MECL & GSI in 117 boreholes (MNRT & RT series) in Talaipalli block.

The financial year wise break-up of drilling in Talaipalli block by MECL is given below :

Year 2006-07	:	22433.70 m.
Year 2007-08	:	16615.15 m.
Year 2008-09	:	805.90 m.
Total Drilling	:	**39854.75 m.**

A total of 20100.00 m in 48 BHs, out of 102 boreholes drilled in the block have been geophysical logged using multi parameter probes.

SAMPLING AND ANALYSIS

The carbonaceous horizons (coal, shaly coal and carbonaceous shale) of all correlatable coal seams as well as non-combustible bands of significant thickness from the boreholes drilled by MECL in this block were sent for band by band analysis to chemical laboratory, MECL, Nagpur. Before sending it to the laboratory, the samples prepared after crushing at (-) 72 mesh sizes, coning and quartering, packing etc. were done at project level only.

A total of 5965.41m of coal sampling in 102 boreholes have been carried out. All the samples have been sent for conducting band by band analysis.

After obtaining band by band analysis, the seam overall analysis at 60% RH & 40 ºC for all correlatable coal seams having thickness >0.50 m. were advised for BCS, I-30, I-100 thickness of seams. Some IP seam thickness was also analysed. Two seams were occasionally clubbed some time with above / below bands & result obtained for the combined thickness. Similarly, a few unworkable coal seams / bands were also subjected to overall analysis at 60% RH and 40OC. In addition to the seam overall analysis, special tests such as Ultimate analysis, GCV, AFT, Ash analysis, HGI, Sulphur Distribution, Total

Sulphur, Phosphorous content, Swelling Index and Coke Type have also been carried out as per the stipulated norms.

3.2 REGIONAL GEOLOGY

The extensive occurrences of Barakar and Supra-Barakar rocks amidst isolated Talchir outcrops spanned between latitudes 21°45' to 22°42' and longitudes 83°01' to 83°44', constitutes Mand-Raigarh Coalfield. It is situated between Ib-River Coalfield in the southeast and Korba Coalfield in the southwest with more or less similar stratigraphic and tectonic setting. The coal measures in the Mand-Raigarh basin are exposed in three well defined patches due to erosion of the overlying Kamthi rocks along the drainage of the prominent rivers.

Generalized stratigraphy of Mand-Raigarh Coalfield is given at Table 3-1.

Table 3-1: Generalized Stratigraphic Succession

Age	Formation	Thickness (m)	Lithology
1	2	3	4
Recent to subrecent			Aluvial soil pebbly to bouldary bed with silty clay band, laterite etc.
Cretaceous to Eocene	Deccan Traps		Basalt flows & dolerite dykes
Lower to Middle Triassic	Kamthi	2851	Poorly sorted, frequently ferruginous, coarse to very coarse grained, locally graded to pebbly, mega cross bedded sandstone containing, brownish grey to buff coloured clay clasts. A fossiliferous red claystone to siltstone bed occurs at the base.

Upper Permian to Lower Permian	Raniganj	180	Mostly fine to medium grained, grayish white, micaceous sandstone and siltstone with claystone, shale, minor coarse grained sandstone and two coal seams of inferior grade.
	Barren Measure	300	Dominantly grey claystone/grey shale with siltstone and iron stone bands; interbanded sequence of fine to medium grained sandstone and shale
	Barakar	425 - 800	Medium to coarse and very coarse grained even gritty, sandstone at the lower part followed upward by fine to medium grained assemblage with grey claystone/shale which become predominant towards the upper part, number of coal seams and carbonaceous shale.
	Karharbari(?)	23	Mottled at places carbonaceous sandstone, frequently associated with pebbles of quartzite granite etc. of various shapes and sizes
Upper Carboni-ferous to lowermost Permian	Talchir	150+	Very fine to fine grained sandstone with siltstone and shale, occasionally greenish in nature, at places with matrix based variegated polymictic conglomerate.

3.2.1 DESCRIPTION OF GEOLOGICAL FORMATIONS

The geological formations of Mand-Raigarh Coalfield are briefly described below:

- **Precambrian** :The Precambrian rocks comprising granite gneiss, mica schist, phyllites and quartzites along with quartz veins & pegmatites occur along the northern, northeastern periphery. The strike of the foliation varies from E-W to N70°W – S70°E with 50° to 70° dip towards west.

- **Talchir Formation** : The Talchir sequence begins with tillite at the base and overlie the basement unconformably. It occurs as a continuous strip along the northern periphery of the basin. Along the southern boundary, Talchirs crop out as narrow, elongated discontinuous strips disrupted by faults. The Mand-Raigarh basin shows widespread development of basal tillite pointing to advancement of ice from the surrounding Precambrian uplands.

- **Karharbari Formation** : Karharbari formation is developed in a limited area. It consists of mottled, at places carbonaceous sandstone, frequently associated with pebbles of quartzite, granite etc. of various shapes and sizes

- **Barakar Formation** : The Barakar formation conformably overlies the Talchir sediments over the major part of coalfield and covers a large tract within the coalfield. It is represented predominantly by multistoned cross-bedded feldspathic sandstone which are highly kaolinised and friable with subordinate shales, carbonaceous shales and coal seams. The sandstone are mostly medium to very coarse grained and milky white to greyish white in colour.

- **Barren Measure Formation** : Barren Measure formation overlies conformably over Barakar formation. This formation comprises of predominantly grey

claystone/grey shale with siltstone and iron stone bands and interbanded occurrence of fine to medium grained sandstone & shale.

- **Raniganj Formation** : Raniganj formation has been demarcated in south-eastern and south-western part, besides patchy occurrence in north-western part. It is represented by mostly fine to medium grained sandstone, siltstone with clay stone, shale, fine to coarse grained sandstone and coal seams / bands of inferior grade.

- **Kamthi Formation** : The rocks of Kamthi formation are well exposed at higher contours of the flat topped hills. It is represented dominantly by coarse, friable, porous, brownish to red cross bedded sandstone and argillaceous beds. The nature of the contact between Kamthis & Barakars is variable and is somewhat discordant and at places the Kamthi strata overlap the older units.

- **Intrusives/Deccan Trap** : A number of basic dykes, sills and flows have been observed in the Uprora-Porea area in the northern part of the coalfield. The basic rock comprise fine grained basalts to coarse grained gabbroid type. The flows at places have been altered to laterite.

3.2.2 COAL SEAMS

The regional exploration carried out in the western part of Mand-Raigarh coalfield along the eastern bank of Mand river in northern part of Dharamjaygarh-Khargaon, Ongana – Potia as well as Chhal area have revealed the presence of a number of coal seams in this coalfield. Exploration in the north-western and western part of the coalfield reveals number of coal seams and these have been numbered as I to XXII and so on in ascending order.

The coals of this coalfield are generally banded in nature and are not devolatilised. The coals in general, are low in rank, high in volatile and non-coking type.

3.2.3 REGIONAL STRUCTURE

The Mand-Raigarh Coalfield is an asymmetrical basin with an approximately NW-SE axis. It is a part of Ib-Mand-Korba master basin lying within the Mahanadi graben. It displays a typical half-graben configuration, with the southern boundary marked by a major NW-SE zone of faulting coinciding with the trend of the Mahanadi graben and the northern boundary not faulted over the major part. In the Mand Valley proper, the coal measures lying between Kharsia & Dharamjaygarh display a broad synclinal structure with its axis running just south of Sithra. The northern limb of the Mand river basin is exposed to the north of the Sithra-Dharamjaygarh area where the Barakar beds are found to strike broadly in NW-SE direction. The beds dip at low angle 50 – 70 towards south-west. In the southern limb, the strike is approximately NW-SE with minor variations and the beds dip towards north-east.

The other structural element in this basin belt comprises normal gravity faults. The available surface and sub-surface data indicate that the area lying on both sides of Mand river is traversed by number of sub-parallel faults of considerable linear extent, though the surface expressions of faults are very limited or entirely lacking. Two sets of faults trending WNW-ESE to NW-SE and N-S occur. The former generally has down throws against the dip i.e. towards north while the latter has easterly throw. The amount of throw varies from 10m. to 150m.

3.3 GEOLOGY OF TALAIPALLI BLOCK

Talaipalli Block is located in the eastern part of Mand-Raigarh Coalfield. The geology of the block is in conformity with the regional set up. Major part of Talaipalli block is covered by the rocks of Barakar formations. Barren measure occurs in the southern part of the block. However a small patch of Barren Measure is also noticed in the north western part of the block.

The geological succession evolved on the basis of exploration data generated in the block is given in the Table 3-2 below:

Table 3-2: Geological Succession in Talaipalli Block

Formation	Thickness (m)	Lithology
Recent	0.50 – 18.00	Soil, alluvium
Barren Measures	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakars	30 – 596	Fine, medium and coarse grained felspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir	1.00 – 54.30	Khakee,greenish shales & sandstone,occassional pebbly
Basement		Metamorphics

3.3.1 DESCRIPTION OF FORMATION

- **Metamorphics:** Precambrian metamorphic rock constitute the basement of the basin. These are composed of quartzite, mica-schist, granite gneiss and at places intruded by pegmatites or vein quartz. The metamorphics have been intersected in 7 boreholes (MNRT-53, 62, RT-6, 9, 12, 13 & 14). The thickness of metamorphics in boreholes varies from 1.00m (MNRT-62) to 9.90m (RT-9).

- **Talchir Formation** : The rocks of Talchir formation are not exposed within the block boundary. It is encountered in boreholes RT–5,6,9,10,12,13 &14. The thickness of Talchir as intersected in boreholes varies from 1.20m (RT-12) to 54.30m (RT-10). Talchir formation consists of greyish white to greenish grey sandstone and shale, occasionally khakee in colour. At places it is embedded with pebbles of quartzite, mica-schist, granite gneiss and of pegmatite.

- **Barakar Formation** : The major part of the block is covered with Barakar formation. Thickness of Barakar formation as intersected in borehole varies from 30 – 596 m. Barakar formation constitute fine to coarse grained, white to grey feldspathic, micaceous sandstone, shale and carbonaceous shale with economic coal horizons. A total of 27 coal seams have been encountered in this formation besides a few local seams / bands.

- **Barren Measure Formation** : This formation has occupied the southern part of the block. Besides a small patch of barren measure is preserved in the northern part of the block due to opposite dip of faults formation of graben. This formation is intersected in 15 boreholes with thickness varying from 18.80 m (MNRT-27) to 143.00 m (MNRT-24). Barren Measure Formation is represented by predominantly grey shale with minor sandstone and intercalation of sandstone and shale.

- **Igneous Intrusives** : The block is free from any igneous intrusives

- **Soil & Alluvium** : Major part of the block is covered by a layer of soil and alluvium. The weathering has affected all the strata below soil to a varying extent. The

thickness of soil ranges from 0.50m (MNRT-7, 8) to 18 m (MNRT-59). The depth of weathered zone varies from 6.00 m (MNRT-34) to 27.30 m (MNRT-5).

3.3.2 STRUCTURE OF THE BLOCK

The general strike of the bed is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from 4^0 to 8^0 towards South-west.

The Geological Plan of the Talaipalli Coal Block is given in Fig. 2-1 below:

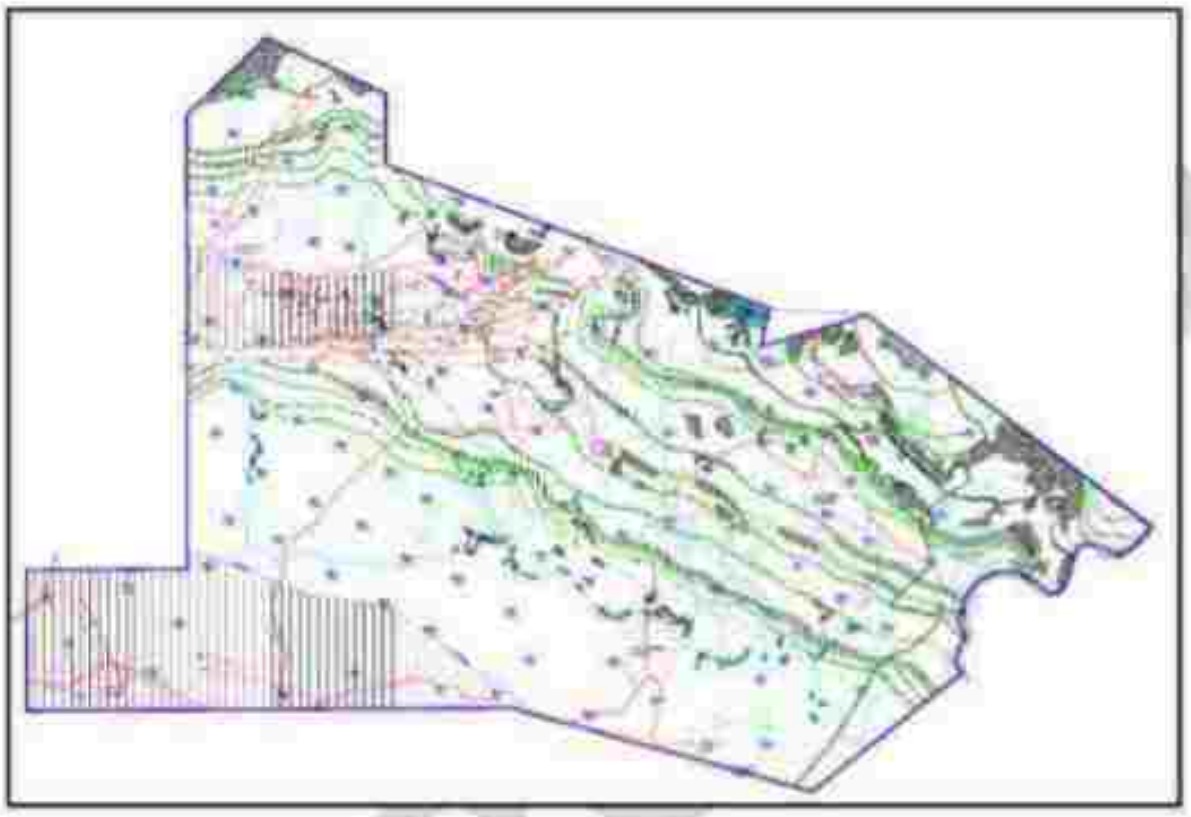

Figure 3-1 Geological Plan of Talaipalli Coal Block

The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data out of which three faults namely fault F1-F1,

F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. The faults details are furnished in Table 2-2 below:

Table 2-2: Details of Faults

Fault No.	Location	Trend	Nature of fault	Throw
F1-F1	Northern part passing near BH No. MNRT-24, 87, 22 & 35	East-West to ENE, NE-SW dipping northerly	Dip fault	20m – 85 m
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 – 10m.
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	30-35 m.
F4-F4	Northern part near BH MNRT-31, 24, 43 & 62	East-West dipping northerly	Dip fault	30 – 150 m
F5-F5	Northern western part through BH. MNRT-62	East-West	Strike fault	35 m
F6-F6	Northern part passing through MNRT-31	WNE-ESE dipping westerly	Oblique fault	15 – 25 m.
F7-F7	Northern part passing through MNRT-11	NW - SE	Oblique fault	20 m.
F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	60-105 m.
F9-F9	Northern part passing through MNRT-101 RT-4 & MNRT-11	East – West to curvilinear	Strike/Oblique Fault	25m
F10-F10	Northern part passing through RT-7	NE-SW	Oblique curvilinear	0 -10 m.
F11-F11	Southern part	NW-SE	Curvilinear	0 – 10 m.
F12-F12	Southern part	NW-SE	Oblique	25 m.

3.3.3 COAL SEAMS

Detailed exploration in Talaipalli Block has revealed the presence of coal bearing horizons belonging to Barakar Formations. These carbonaceous horizons could be distinctly demarcated as upper, middle and lower columns of Barakar formation. Altogether 26 workable coal seams are developed in the block. Besides these workable seams there are few non workable persistent bands occurring throughout the block. All the 26 seams are mainly composed of coal, shaly coal, carbonaceous shale and shale. The coal is dull in appearance high in moisture and is of non-coking type. The seams are not effected by any igneous intrusive.

Seam XLA is the top most seam in the block, developed persistently in the southern part of the block over a limited area. Seam-X has split into 4 major sections as X-LA, X-LB, X-Top and X Bottom. X Bottom seam underlies the X Top seam and is the thickest coal seam among X group of seam. Similarly seam-IX has 3 sections, (IX-L2, IX-L1 & IX) seam-VI has 3 sections, VI Top, VI Middle and VI Bottom, seam V has 3 splits as V Top, V Middle, V Bottom. Seam IV has 4 sections, IV Top, IV Middle, IV L & IV Bottom. Seam-III has two splits as seam III L and seam III. Whereas seam-II has 5 splits, sections as II L3, II L2, II L1, II and II L. Seam-I is poorly developed in the block and do not attain workable thickness.

The sequence of coal seams and parting is given Table 3-4 below:

Table 3-4: Sequence of Coal Seams & Parting

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.20	1.06			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	X LB	0.30	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
4	X Bot	1.6	8.1			3.5-6.0
	Parting			2.3	20.15	3.5-16.5
5	IX L2	1.2	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.65	11.87	6.0-8.0
7	IX	0.96	6.96			3.5-6.0
	Parting			6.30	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0
12	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.80	23.45	14.0-21.0
13	V Top	0.50	3.09			0.50-1.50
	Parting			9.09	18.94	11.5-18.5
14	V Mid	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bot	0.30	5.40			0.50-2.0
	Parting			15.16	30.14	17.0-23.0
16	IV Top	0.54	5.78			2.5-5.0
	Parting			5.30	20.13	6.0-10.0
17	IV Mid	0.99	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bot	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.10	3.25			0.50-1.5

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
	Parting			24.57	44.55	33.0-39.0
21	III	0.66	5.97			2.0-5.5
	Parting			31.1	55.99	33.0-51.0
22	II L3	0.50	3.09			<0.90
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			<0.90
	Parting			5.0	60.39	35.0
24	II L1	0.05	1.54			<0.90
	Parting			1.27	20.59	3.0-14.0
25	II	0.13	5.92			1.5-2.5
	Parting			0.37	3.89	0.50-2.0
26	II L	0.05	2.45			<0.90
	Parting			Around		
27	I	0.22	0.55			27

3.3.4 RESERVES

As per GR, a Net Geological Reserve of 1267.145 million tonnes of coal reserves including both opencast and underground reserves varying in grade from 'A' to 'G' have been established in the block. Out of this, 40.278 million tonnes of reserves fall in the indicated category and remaining 1226.867 million tonnes are proved reserves.

Depth-wise Net Geological Reserve and indicated reserve are provided in table 3-5 and 3-6 below

Table 5.6 Depth-wise net Geological Reserve (Proved+Indicated) in MT

SEAM	DEPTH												TOTAL
	0-50	50-100	100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600	
X LA	0.001	1.191	1.693	0.352	0	0	0	0	0	0	0	0	3.537
X LB	0.674	1.165	2.478	0.535	0	0	0	0	0	0	0	0	4.85
X TOP	3.461	4.291	4.159	1.974	0.21	0	0	0	0	0	0	0	14.126
X BOT	28.668	28.737	17.368	10.343	0.819	0	0	0	0	0	0	0	86.405
IX L2	7.705	9.807	5.932	5.596	0.516	0	0	0	0	0	0	0	29.554
IX L1	8.431	9.336	5.941	5.668	3.786	0.129	0	0	0	0	0	0	39.293
IX	28.686	31.227	20.701	17.421	12.039	0.555	0	0	0	0	0	0	102.331
VIII	16.463	36.979	29.613	22.83	21.315	2.261	0	0	0	0	0	0	129.251
VII	0	2.716	2.129	2.776	5.158	4.062	0	0	0	0	0	0	16.849
VI TOP	1.662	4.477	3.566	7.736	5.915	5.453	0.497	0.006	0	0	0	0	34.256
VI MID	16.955	26.353	46.913	37.848	25.493	24.153	3.053	0.115	0	0	0	0	180.514
VI BOT	0.173	1.078	1.488	1.428	3.333	2.804	0.528	0.043	0	0	0	0	10.934
V TOP	0.821	0.582	2.941	3.977	3.099	3.795	2.18	0.256	0	0	0	0	17.651
V MID	4.032	2.461	6.551	7.456	6.72	5.116	3.51	0.2	0	0	0	0	36.157
V BOT	4.324	5.367	9.220	9.442	9.592	5.344	4.093	0.951	0.063	0	0	0	48.351
IV TOP	4.744	11.157	11.37	20.788	16.653	14.659	9.085	3.108	0.32	0	0	0	93.922
IV MID	5.46	14.943	14.932	37.055	29.596	22.722	15.34	16.315	1.19	0.034	0	0	148.477
IVL	2.302	5.696	3.116	4.012	9.808	5.253	3.127	1.853	0.287	0.008	0	0	34.151
IV BOT	2.217	9.512	8.913	12.859	14.384	11.966	7.742	5.987	1.581	0.021	0	0	73.598
III L	0.589	5.31	5.267	4.233	9.712	5.739	4.335	2.071	0.799	0.13	0.085	0.017	93.043
III	0	1.773	7.244	7.379	11.377	17.831	12.788	10.875	8.021	2.796	0.253	0.103	80.045
II L2	0	0	2.109	3.603	1.915	5.186	3.061	1.102	0.362	1.57	1.313	0.047	17.859
II L2	0	0	0.126	5.008	0.027	0.165	1.471	1.048	0.671	1.475	3.196	0.22	8.814
II L1	0	0	0	0.141	0.762	0.549	0.561	0.736	1.053	1.026	0.96	0.244	6.973
II	0	0	0	0.447	1.787	4.491	5.038	7.901	6.594	5.253	4.755	3.645	42.791
II L	0	0	0	0	0.219	0.142	0	1.968	0.781	1.251	0.026	0.094	4.282
TOTAL	122.439	206.352	214.306	215.178	199.826	149.356	75.881	53.234	21.451	14.357	10.282	6.58	1267.145

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Table 5.6 Depth-wise net Indicated Geological Reserve in MT

SEAM	DEPTH												TOTAL
	0-50	50-100	100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600	
X LA	0.011	0.277	0.394	0.128	0	0	0	0	0	0	0	0	0.809
X LB	0	0.217	0.423	0.182	0	0	0	0	0	0	0	0	0.822
X TOP	0	0.113	0.217	0.466	0.239	0	0	0	0	0	0	0	1.035
X BOT	0	0.773	1.621	2.058	0.906	0	0	0	0	0	0	0	5.468
IX L2	0	0.17	0.529	0.944	0.543	0	0	0	0	0	0	0	2.186
IX L1	0	0	0.204	0.154	0.599	0.122	0	0	0	0	0	0	1.068
IX	0	0	0.637	1.398	1.674	0.606	0	0	0	0	0	0	4.315
VIII	0	0	0.262	1.2	1.846	1.049	0	0	0	0	0	0	4.157
VII	0	0	0	0.019	0	0	0	0	0	0	0	0	0.019
VI TOP	0	0	0	0.259	0.354	0.339	0.481	0.009	0	0	0	0	1.424
VI MID	0	0	0	0.376	1.391	1.982	2.431	0.115	0	0	0	0	5.519
VI BOT	0	0	0	0.003	0.147	0.199	0.404	0.042	0	0	0	0	0.795
V TOP	0	0	0	0	0.158	0.324	0.481	0.253	0	0	0	0	1.226
V MID	0	0	0	0	0.065	0.202	0.296	0.168	0	0	0	0	0.731
V BOT	0	0	0	0	0.032	0.203	0.407	0.567	0.063	0	0	0	1.272
IV TOP	0	0	0	0	0	0.394	0.411	0.779	0.316	0	0	0	1.899
IV MID	0	0	0	0	0	0.307	1.141	0.339	0.983	0.024	0	0	2.802
IVL	0	0	0	0	0	0.049	0.217	0.063	0.211	0.008	0	0	0.538
IV BOT	0	0	0	0	0	0.062	0.576	0.362	0.47	0.021	0	0	1.492
III L	0	0	0	0	0.071	0.002	0.156	0.03	0.035	0.129	0.084	0.017	0.555
III	0	0	0	0	0	0.201	0	0.405	0.117	0.332	0.247	0.095	1.437
II L2	0	0	0	0	0	0	0.026	0.303	0.043	0.015	0.075	0.038	0.305
II L2	0	0	0	0	0	0	0	0	0	0	0	0	0.000
II L1	0	0	0	0	0	0	0	0	0	0	0	0	0.000
II	0	0	0	0	0	0	0	3.109	0	0.141	0.026	0.321	0.593
II L	0	0	0	0	0	0	0	0.016	0	0.034	0.016	0.027	0.094
TOTAL	0.011	1.05	4.307	7.373	7.602	5.11	7.542	3.22	2.249	0.709	0.431	0.479	40.279

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CHAPTER 4

MINING: CONECPTUAL PLAN

Talaipalli Coal Block in Mand-Raigarh coalfield having an area of 21.15 sq. km. has been allotted to NTPC for meeting coal requirement for the proposed 4000MW Lara Integrated Power Project which is approximately 60 kms away from the coal block.

This Conceptual Report concerns with Opencast mining potential only and the UG potentiality shall be separately dealt with in the Mining Plan once the opencast pit and dump option is finalized.

The Conceptual Technical Report has studied the pit & dump options and finalize the base option. It has outlined the preliminary delineation of Open-pit boundary options and assessment of likely mineable reserves and waste quantities. It has also tentatively assessed the rated capacity, production buildup, mining strategy with respect to OB dumping and coal handling strategy.

4.1 ADJACENT BLOCKS

The Talaipalli Coal Block is surrounded by the following:

North: Beyond in-crop zone

South: Unexplored area and Dipside of Barod-Bijari Block

East: Pelma Block

West: Chimtapani Extension Block and Dipside of Barod-Bijari Block

4.2 CONSTRAINTS ON MINE DEVELOPMENT

The following constraints in opencast working of the deposit have been envisaged:

- The block area being surrounded by coal bearing blocks and hills in all sides, availability of any land for external dumping, outside the block area appears remote.
- Kelo river flowing along the north-eastern side of the block
- Presence of about 08 villages (fully or partly) within the proposed mining area.
- High initial Depth of base seam in the western side due to presence of several faults and high stripping ratio especially in the western side of the block requires huge amount of temporary external dump in the dip side which needs to be re-handled later.

4.3 PIT DELINEATION: MINE BOUNDARY OPTIONS

Different mine boundary options for opencast mining were studied. The objective of study was to come out with best possible option to maximize the recovery of coal with due consideration to space available within the block for internal and external dumping.

The mine boundary for different pit option has been delineated taking into consideration block boundary, surface features, strip ratio and external dump space required for continuity of mining.

As discussed with NTPC officials, the height of dump has been considered as 120m above ground level for all the options due to space constraints for dumping of waste.

Based on sequence of mining as per geo-mining parameters and existing constraints on mine development four options were worked out for Talaipalli Block. As discussed with NTPC officials, the height of internal and external dump has been considered as 120m above ground level for all the options due to space constraints for dumping of waste.

Option I: Base Seam III with full strike and External dump on the dip side of the block

This pit option has been formulated considering the base seam as Seam III. The entire block and the mandatory safety barriers with conveyor corridor along eastern, western and southern boundary has been considered for fixing the pit surface boundary keeping in mind the availability of dumping space.

The entry is envisaged to be made from both eastern and western side. The external dumping will be done in the dip side of the block. But due to high stripping ratio and lack of space for the internal as well as external dump, the pit shall be constrained to work only until the dumping space is available.

Considering the availability of dumping space (with RL +120 m from ground level), this option has ~277 Mt of mineable coal reserve. The tentative quantity of OBR is ~1358 Mcum with an average stripping ratio of 4.90 cum/t.

Figure 4-3: Option I Pit Plan

Option II: Base seam III leaving high strip ratio zone on the western side

This option has been formulated considering Seam III as base seam and also keeping in mind the limited availability of dumping space. Therefore, high strip ratio zone in the western side of the block has been excluded from open cast mining. The pit has been optimized to extract maximum coal. The western boundary of the pit is an arbitrary line considering low strip ratio zone and leaving sufficient external dump space in the western side. The external dump shall be done in the western part of the block and will be merged with internal dump. The infrastructural facilities will be in the south-west corner of the block.

This option has ~505 Mt of mineable coal reserve and ~2304 Mcum of OBR with an average stripping ratio of 4.56 cum/t.

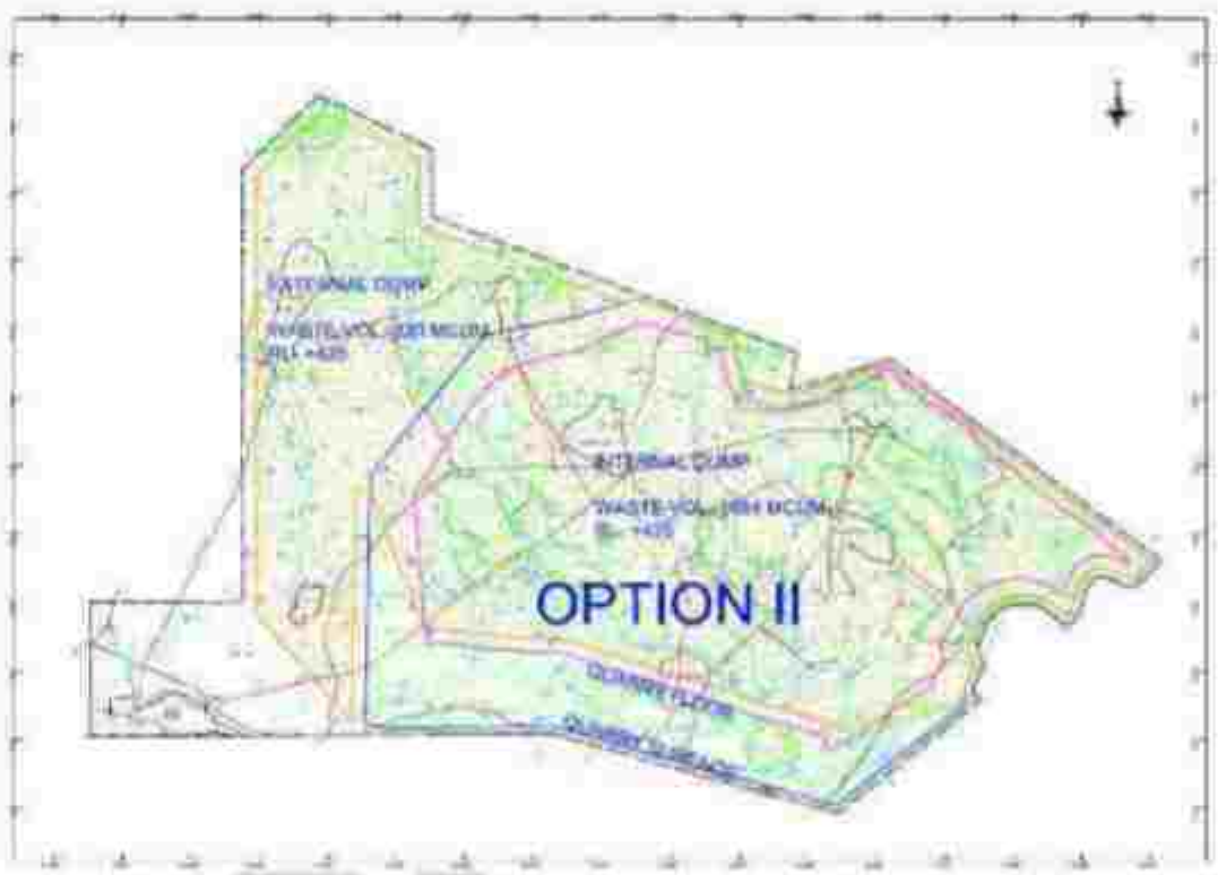


Figure 4-2: Option II Pit Plan

Option III: Base seam IV with full strike and temporary external dump on the dip side of the Block

This option has been formulated considering Seam IV as base seam. In this option, the pit boundary has been fixed leaving safety barrier, conveyor corridor along the eastern, southern and western boundary. The infrastructural facilities will be in the south-west corner of the block. The entry will be from both eastern and western side. A temporary dump will be created in the dip side of the block which will be re-handled from 12th-13th year of operation.

This option has ~631 Mt of mineable coal reserve and ~2735 Mcum of OBR with an average stripping ratio of 4.33 cum/t.

Figure 4.2: Option III Pit Plan

Option IV: Base seam IV leaving high strip ratio zone on the western side

This option has been formulated considering Seam IV as base seam. The high strip ratio zone in the western side has been excluded from open cast mining. The pit boundary on the western side has been delineated based on the dumping requirement, dump space availability and maximum extraction of coal. The external dump shall be done in the western part of the block and will be merged with internal dump. The infrastructural facilities will be in the south-west corner of the block.

This option has ~486 Mt of mineable coal reserve and ~2002 Mcum of OBR with an average stripping ratio of 4.12 cum/t.

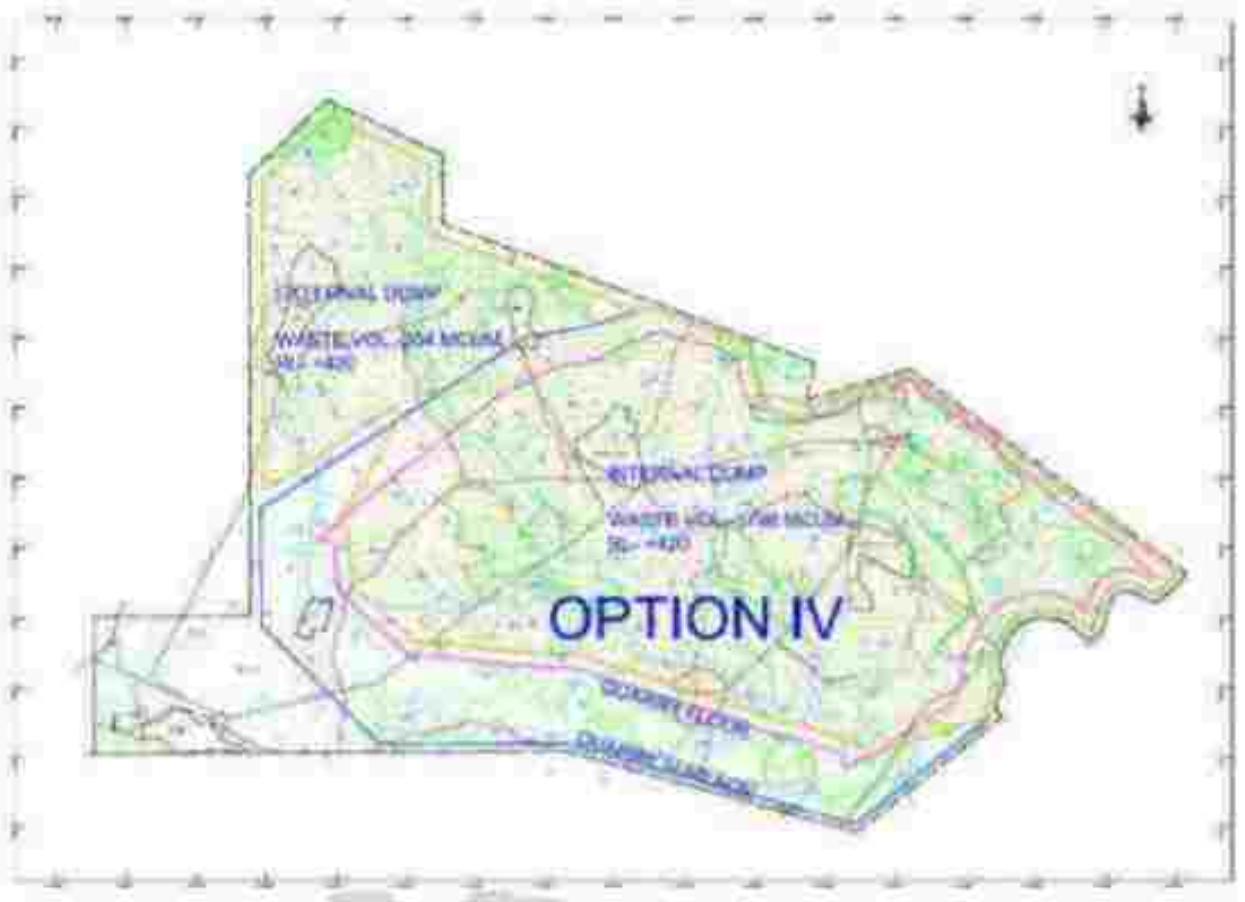


Figure 4-4: Option IV Pit Plan

The above options has been summarized below in table 4-1.

Table 4-1: Pit Delineation Options

Particulars	Pit Formulation	Extractable Reserves (Mt)	OBR (Mm3)	SR (m3/t)	Backfilling (Mm3)	External Dump (within the Block) (Mm3)	Temporary External Dump (Mm3)
Option I	Base Seam III with full strike and External dump on the dip side of the block.	277	1358	4.9	725	633	-
Option II	Base seam III leaving high strip ratio zone on the western side.	505	2304	4.56	1984	320	-
Option III	Base seam IV with full strike and temporary external dump on the dip side of the Block	631	2735	4.33	2735	-	490
Option IV	Base seam IV leaving high strip ratio zone on the western side	486	2002	4.12	1798	204	-

4.4 RECOMMENDED OPTION: DETAILS

Option III is proposed to be the recommended option for carrying out the detailing work for the mining plan.

This option proposes to mine ~631 Mt of mineable coal reserve and ~2735 Mcum of OBR with an average stripping ratio of 4.33 cum/t. Seam IV has been taken as the base seam for the pit since going upto Seam III which is only 4-4.5m thick and is 50-60m below seam IV increases the OB handling to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~277 Mt of Coal. As discussed above, the maximum coal extraction is possible in Option III and so with due regards to conservation of coal, Option III has been proposed to be the recommended option.

The Final Stage Quarry Plan for the recommended option i.e. Option III is shown below in Fig 4-5.

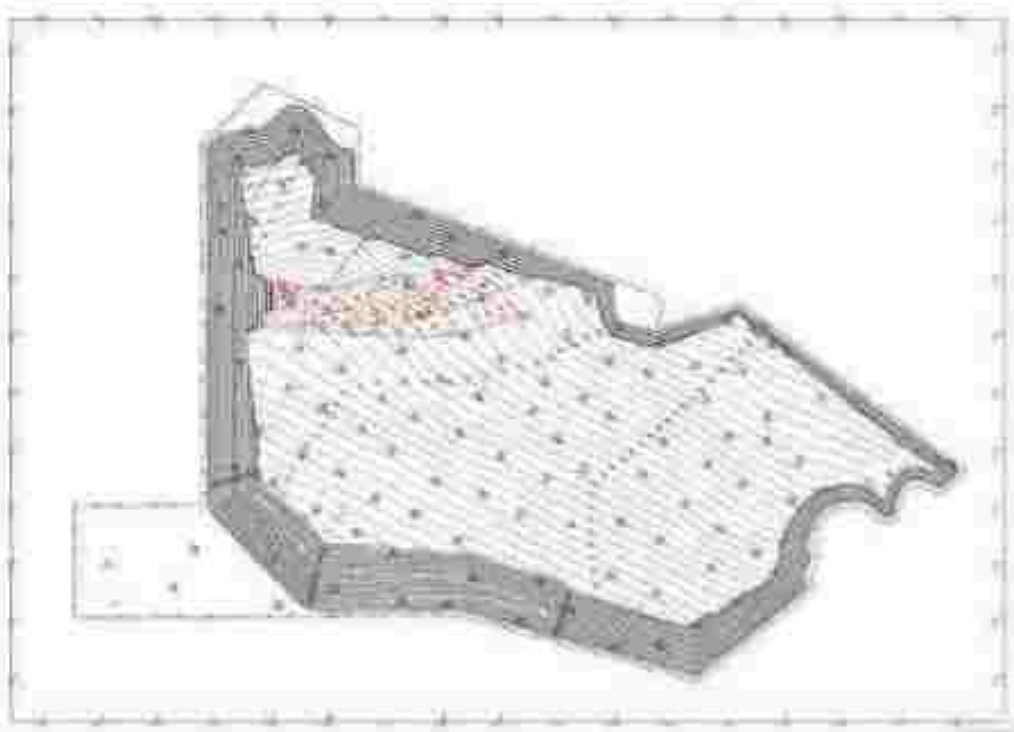


Figure 4-5: Final Stage Quarry Plan

4.4.1 GEO-MINING CHARACTERISTICS

The Geological & Mining characteristics of the quarriable block for the proposed Talaipalli OCP is given in table 4-2.

Table 4-2: Geo-Mining Characteristics of the Block

S. No.	Particulars	Unit			Usual/ Mean
			Minimum	Maximum	
I	Coal Seam Thickness				
	X LA	m.	0.20	1.04	0.50-0.95
	X LB	m.	0.30	1.28	0.50-0.90
	X Top	m.	0.40	1.60	1.00-1.15
	X Bot	m.	1.60	8.10	3.5-6.0
	IX L2	m.	1.20	2.55	1.2-2.0
	IX L1	m.	0.36	1.85	1.2-2.0
	IX	m.	0.96	6.56	3.5-6.0
	VIII	m.	2.06	6.54	4.0-6.5

S. No.	Particulars	Unit			Usual/ Mean
			Minimum	Maximum	
	VII	m.	0.10	3.90	0.50-1.0
	VI Top	m.	0.37	3.42	1.2-3.0
	VI Mid	m.	3.09	10.01	5.0-9.0
	VI Bot	m.	0.48	1.75	0.50-1.0
	V Top	m.	0.50	3.09	0.50-1.50
	V Mid	m.	0.15	3.73	0.50-2.50
	V Bot	m.	0.5	5.4	0.50-2.0
	IV Top	m.	0.54	5.78	2.5-5.0
	IV Mid	m.	1.02	7.22	3.5-7.0
	IV L	m.	0.24	4.97	0.50-2.0
	IV Bot	m.	0.55	5.67	1.5-3.5
II	**Thickness of Parting**				
	Parting XLA & XLB	m.	5.41	11.7	6.0-9.3
	Parting XLB & X TOP	m.	3.57	14.80	4.0-6.0
	Parting X TOP & X BOT	m.	0.80	2.98	1.0-2.0
	Parting X BOT & IX L2	m.	2.30	20.15	3.5-16.5
	Parting IX L2 & IX L1	m.	13.59	21.54	17.0-18.5
	Parting IX L1 & IX	m.	5.65	11.87	6.0-8.0
	Parting IX & VIII	m.	6.30	16.15	9.0-12.0
	Parting VIII & VII	m.	17.68	42.01	20.0-25.0
	Parting VIII & VI TOP	m.	1.08	17.44	4.0-14.0
	Parting VI TOP & VI MID	m.	0.56	3.25	0.5-1.5
	Pairting VI MID & VI BOT	m.	0.85	5.98	1.0-2.0
	Parting VI BOT & V TOP	m.	2.80	23.45	14.0-21.0
	Parting V TOP & V MID	m.	9.09	18.94	11.5-18.5
	Parting V MID & V BOT	m.	4.53	15.95	0.50-12.0
	Parting V BOT & IV TOP	m.	15.16	30.14	17.0-23.0
	Parting IV TOP & IV MID	m.	5.30	20.13	6.0-10.0
	Parting IV MID & IV L	m.	0.75	6.95	3.5-5.5
	Parting IV L & IV BOT	m.	0.70	4.55	0.50-2.0
	Parting IV BOT & III L	m.	8.05	23.54	14.0-17.0
	Parting III L & III	m.	24.57	44.55	33.0-39.0
III	**Seam Gradient**	degree			4°-8°
IV	**Maximum Depth**	m.			340
V	**Specific Gravity**	t/cum			
	- Coal				1.65
	- Overburden				2.4

4.4.2 BASIC PROJECT AND MINE PARAMETERS

The basic project parameters and mine parameters for the recommended option is presented below in table 4-3 and table 4-4.

Table 4-3: Basic Project parameters for recommended option

Sl. No.	Parameters	Unit	Value
1	Net Geological Reserve	Mt	1267.145
2	Extractable Reserve	Mt	631.56
3	OB Volume	Mcum	2734.90
4	Stripping ratio	Cum/t	4.33
5.	Target Capacity	Mt/year	25
6	Tentative Mine life	Years	31

Table 4-4: Mine parameters for recommended option

Sl. No.	Parameters	Unit	Value
1	Maximum depth	m	340
2	Usual strike length: along the Mine Floor along the Mine Surface	 m m	 4800 5300
4	Usual dip rise length: on the Mine Floor on the Mine Surface	 Km Km	 2500 3200
6	Area: On the Mine Floor On the Mine Surface	 ha ha	 1298.88 1839.85

4.4.3 EXTRACTABLE RESERVES

For furnishing account of reserves, Net Geological Reserve has been arrived by taking geological loss of 10 % from Gross Geological Reserve. Mining loss of 5 % has been taken to arrive at the open-castable mineable reserves.

The seam-wise reserve and OB/parting is presented below in table 4-5.

Table 4-5: Seam wise Extractible reserve

Sl No.	Seam	Coal (Mte)	Cumulative Coal (Mte)	OB (Mcum)	Cumulative OB (Mcum)
1	X-LA	0.10	0.10	594.09	594.09
2	X-LB	0.26	0.36	59.60	653.68
3	X-TOP	6.65	7.01	68.32	722.01
4	X-BOT	52.84	59.85	18.93	740.93
5	IX-L2	18.64	78.49	93.99	834.92
6	IX-L1	18.75	97.24	217.52	1052.44
7	IX	68.57	165.81	84.25	1136.69
8	VIII	82.28	248.09	127.96	1264.65
9	VII	3.37	251.46	312.69	1577.34
10	VI-TOP	18.60	270.06	105.25	1682.59
11	VI-MID	110.38	380.44	21.72	1704.31
12	VI-BOT	4.11	384.55	35.25	1739.56
13	V-TOP	7.05	391.60	240.63	1980.19
14	V-MID	17.64	409.24	199.78	2179.97
15	V-BOT	22.72	431.96	119.83	2299.80
16	IV-TOP	53.04	485.00	273.06	2572.86
17	IV-MID	82.09	567.09	116.83	2689.69
18	IV-L	18.81	585.90	25.21	2714.90
19	IV-BOT	45.66	**631.56**	20.00	**2734.90**
		631.56		**2734.90**	

4.4.4 CHOICE OF TECHNOLOGY

The operational factors include

- Multi-Seam operation involving 19 seams horizons.
- Effective seam thickness varying from 1.00 to 9.00 m with majority of seams having less effective thickness varying from 1.00 to 2.50m.
- Mild seam gradient.
- OB with varying parting thickness

Based on the above factors surface miner has been considered for extraction of coal as surface miner eliminates blasting in coal. Blasting in comparatively less thick coal seams leads to higher contamination of extracted coal.

As removal of overburden with varying parting thickness requires flexible operation, shovel-dumper combination with conventional system of mining i.e. inclined slicing has been considered for removal of overburden.

For a rated capacity of 25.0 Mty, it is proposed to deploy 10-12 cum Hydraulic Shovel/backhoe and 20-22 Cum Hydrualic shovel/backhoe with 100T and 190-200T Rear Dumper respectively for OB. For thin parting lower size equipment shall be deployed. For Coal, Surface Miner with Front End Loader and 100T Dumper shall be deployed.

The details of the fleet size will be presented in the Mining Plan.

4.4.5 MINING SEQUENCE, METHOD OF MINING AND MINING SYSTEM

The block has NW-SE strike of around 5 km. Opencast mining for the Talaipalli coal block has been proposed upto Seam IV as suggested above to maximize the recovery of coal. It has been proposed to mine maximum area in the block with due consideration to space required within the block for external dumping. The peak rated capacity for the block is proposed to be 25.00 Mty.

To ensure availability of adequate quantity of coal and early reaching of target capacity, a two-entry scenario has been envisaged: one on the north eastern side and the other on the western side. Seam IV will be accessed from both the side which will form the base of the quarry. Then working front of both the quarry will advance towards south and towards each other eventually merging into a single quarry with full strike length after about 9-10 years.

In the initial years, simultaneous working of mechanized opencast mine and the projected belowground mine may pose operational problems due to massive production from the opencast unit. As such, it is considered prudent to start underground mine work after exhaustion of opencast workings.

OB will be transported through flank roads to external OB dumps and internal OB dumps. Coal is proposed to be transported through ramps and flank roads. Coal from both pit in initial years and also after merger of the pit will be transported to mobile crushing arrangement at the surface in both eastern and western side and thereafter to Coal dispatch center by surface conveyors.

It is proposed to use conventional method of mining viz. inclined slicing with excavators/ loaders loading coal and waste into Dumpers for hauling.

Mining System

Elements of mining system have been determined in accordance with the parameters of excavation, transport equipment and parameters of drilling and blasting. However, the space constraint for dumping the OB has been the most important factor taken into consideration for designing the mining system, since the mining system plays an important role for determining the void created for internal dump.

With due consideration to geo-mining characteristics of the deposit and as envisaged in the Mining Plan, the mine is proposed to be worked by shovel-dumper combination as well as Surface Miner.

Design of mining system has been done considering safety guidelines of Directorate General of Mines Safety (DGMS). **However, during mine operations, the safety rules, regulations and various circulars issued by DGMS should be strictly followed and adhered to.**

The height of the shovel-benches in OB varies from inter-burden thickness to 10-15m. The width of the working benches has been considered as 40-45m and the width of non-working benches has been considered as 25m.

The slope of each bench is proposed as 70°. But the overall running slope in working faces will be around 18°. The ultimate pit slope is varies between 30 deg to 37 deg.

Persistent bands of thickness more than 1m present in coal seams are proposed to be mined separately.

Bench height of OB dumps formed by Shovel-Dumper system will be 30m and slope of individual dump benches will be 37° (equal to angle of natural repose of OB material). Width of berm between two adjacent benches will be 30 m.

Proposed System Parameters are tabulated and given below in table 4-6.

Table 4-6: System Parameters

Sl. No.	Particulars	Unit	Pit	Dump
1	Bench height	m	10-15/16 thickness	30
2	Working bench width	m	40-45	30
3	Nonworking bench width	m	25	30
4	Bench slope	Deg.	70	37

4.4.6 PRODUCTION BUILD-UP AND RATED CAPACITY

The mine has been planned for a peak capacity of 25 Mtpa of coal production. The mine will achieve a capacity of 22 Mt in 6th year and after encountering new seams, the mine will reach the target capacity of 25 Mt in 15th year only. The production build-up with likely OB quantities is given below in table 4-7.

Table 4-7: Tentative Production Build-up schedule

Year	Coal (Mt)		Natural OB (Mcum)		SR (cum/t)	
	Annual	Cumm.	Annual	Cumm.	Running	Cumm.
1	2.00	2.00	9.45	9.45	4.73	4.73
2	5.00	7.00	22.77	32.22	4.55	4.60
3	9.00	16.00	40.17	72.39	4.46	4.52
4	13.00	29.00	58.39	130.78	4.49	4.51
5	18.00	47.00	79.55	210.33	4.42	4.48
6	22.00	69.00	110.69	321.02	5.03	4.65
7	22.00	91.00	110.69	431.71	5.03	4.74
8	22.00	113.00	110.69	542.41	5.03	4.80
9	22.00	135.00	110.69	653.10	5.03	4.84
10	22.00	157.00	110.69	763.79	5.03	4.86
11	22.00	179.00	96.11	859.90	4.37	4.80
12	22.00	201.00	94.14	954.05	4.28	4.75
13	22.00	223.00	94.14	1048.19	4.28	4.70
14	22.00	245.00	94.14	1142.34	4.28	4.66
15	25.00	270.00	105.30	1247.64	4.21	4.62

4.4.7 WASTE DISPOSAL STRATEGY

It is envisaged that initially for 3-4 years, all the OB generated will be dumped externally from both the eastern and western pit. This temporary external dump is proposed to be located in the southern side of the block. Once sufficient void is created after 3-4 years of operation, internal dumping will start in eastern pit while in the Western pit, internal dumping can be started only from 6th year of operation once the base seam is reached.

The external dumping will continue till 11th year and thereafter from 13th year, this external dump will have to be re-handled back into the quarry void for smooth mine advancement.

Out of the total OB of ~2735 Mcum, it is estimated that ~490 Mcum (~18%) will be required to be dumped externally temporarily. This ~490 Mcum wil be re-handled back

into the quarry after sufficient space is available for accommodation of waste from 13th year.

The height of the temporary external dump is proposed to be around 120m above ground level upto an RL of +420m and final height of the internal dump is proposed to be 120m above ground level upto an RL of +420m. This will ensure optimization of the life of the mine to extract maximum mineable coal. However, a slope stability study will be imperative to determine final dump height and final dump slope as per **regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020.**

Shovel-dumper spoil dumps will be formed in benches of 30m and slope of individual dump bench will be 37° (equal to angle of natural repose of OB material). The width of berm between two adjacent benches will be 30 m. Overall slope of dump works out to be 23°- 24°. Top soil wherever available will be stacked separately which will be used up for spreading over the completed OB dumps. For the formation of dumps and leveling of dumps, dozers will be used.

During mining operation, OB dump stability, high-wall slope stability for OB bench parameters, and maximum OB dump height should be adopted and modified as per the scientific study and DGMS permission.

4.5 INFRASTRUCTURE AND FACILITIES

4.5.1 COAL HANDLING AND DISPATCH ARRANGEMENT

The mine is proposed to begin through two quarries: East Pit and West pit. Talaipalli mine is planned for maximum production of 25.0 Mty. These two quarries will join around 10 th year, however coal production will continue from both end. As proposed in Mining Plan, coal will be produced through surface miner (<100 mm size). Therefore, crushing of

coal will not be required for handling and despatch. Total coal produced from Talaipalli Project will be loaded into railway wagon at nearby proposed railway siding through silo and RLS for final despatch and transportation up to final destination. A dedicated MGR has already been planned and under construction in the south-western part of the block for coal loading and despatch.

Coal handling plant is proposed to cater entire production of coal from OCP and accordingly facilities of receiving of coal, required conveying system, storage bunker and reclamation of coal from bunker with conveying through belt conveyors to silo and loading into rail wagon through Rapid load out system.

Eastern quarry:

The proposed coal handling system includes receiving of ROM coal at surface produced through surface miner. ROM coal from eastern quarry will be transported at surface through dumpers/trucks which will be received in receiving hoppers for conveying of coal through belt conveyors.

Suitable receiving arrangement for coal produced through surface miner (-100 mm size) in Truck receiving station has been proposed for receiving of these coal at surface near the quarry mouth of the mine. These receiving arrangement for coal have been proposed near mine quarry mouth to minimize the truck/dumper movements. The receiving pit/ station along with the conveyor may be shifted as per the mine advancement and requirement during mine operation.

Initially, truck receiving hoppers are considered, however, suitable alternative receiving arrangement either through Reclaim feeder/ Chain feeder/Truck receiving station may also be considered at later stage according to mine condition and space availability at receiving pits.

The above proposed receiving station have been proposed for eastern quarry and at the southern side of the mine at a suitable location. It shall be shifted as per the mine

advancement of eastern quarry. The location plan shown for receiving stations and other system of coal handling are tentative and it may change as per requirement.

Coal from receiving station shall be conveyed through suitable capacity belt conveyors along the southern and eastern boundary of the eastern quarry at surface through series of conveyors. Further this coal will be conveyed and stored into a bunker of suitable capacity with the help of tripper. The storage bunker has been placed near proposed silo in the space provided for infrastructures to ease the wagon loading.

Western quarry:

Coal produced through surface miner (-100 mm) from western quarry shall be transported by truck/ dumpers at surface and received in a hopper. Suitable receiving arrangement for coal produced through surface miner (-100 mm size) in truck receiving station has been proposed for receiving of these coal at surface near the quarry mouth of the mine. These receiving arrangement for coal have been proposed near mine quarry mouth to minimize the truck/dumper movements. The receiving pit/ station along with the conveyor may be shifted as per the mine advancement and requirement during mine operation. Coal from receiving stations shall be conveyed through suitable capacity belt conveyors along the western boundary of the western quarry at surface through series of conveyors. Further this coal will be conveyed and stored into a bunker of suitable capacity with the help of tripper.

Loading & Despatch:

Coal from bunker will be reclaimed through suitable capacity feeders and fed to proposed silos through suitable capacity of belt conveyors. The coal will be loaded in to railway wagons through Rapid load out system having suitable capacity pre-weigh hoppers with loading Silo. Two nos. silo will be placed on two different rail lines of proposed railway siding for loading of coal into railway wagons. Both the silos are connected with the bridge conveyors for feeding of coal into silos to ensure flexibility in loading.

4.5.2 WORKSHOP

For maintenance and repair of equipment deployed at Talaipalli coal block, a workshop facility have been envisaged at the south-west corner of the block earmarked for infrastructural facilities. Daily maintenance, scheduled maintenance and repair are proposed to be carried out in the project workshop.

4.5.3 PUMPING

Adequate number of pumps will be provided to dewater the inflow of water due to precipitation falling within the active pit limit during the monsoon season to enable the mining activity to continue round the year.

4.5.4 POWER SUPPLY

A NTPC substation is already under operation at the site. Permanent Power shall be available from 132 KV / 33 KV NTPC Substation at Raikera village within the block in the south-west corner of the block which has been earmarked for infrastructure facilities.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 RECOMMENDATIONS

The Conceptual Report has been prepared for optimum extraction of coal under the present constraints and lack of space for waste disposal, keeping in view safety and other necessary conditions. The given figures are tentative and may get updated during detailed planning.

- The conceptual note presents various pit options for Talaipalli Coal Mine which is presented below:

Particulars	Pit Formulation	Extractable Reserves (Mt)	OBR (Mm3)	SR (m3/t)	Backfilling (Mm3)	External Dump (within the Block) (Mm3)	Temporary External Dump (Mm3)
Option I	Base Seam III with full strike and External dump on the dip side of the block.	277	1358	4.9	725	523	-
Option II	Base seam III leaving high strip ratio zone on the western side.	505	2304	4.56	1984	320	-
Option III	Base seam IV with full strike and temporary external dump on the dip side of the Block	633	2755	4.33	2735	-	490
Option IV	Base seam IV leaving high strip ratio zone on the western side	488	2002	4.12	1798	204	-

It is apparent from the above table that Option III gives maximum extractable coal at low strip ratio and therefore it is recommended as the base option. Other options are

not attractive due to constraints of dumping space availability and adverse stripping ratio.

- The mine will be designed with a rated capacity of 25Mtpa which is likely to be achieved in 15th year. However, the mine will reach a capacity of 22 Mtpa in 6th year of mine operation

- The mine life is tentatively estimated to be 31 years with an average stripping ratio of 4.33 cum/t.

- It is proposed to deploy 20-22 cum Hydraulic Shovel/backhoe and 10-12 cum hydraulic shovel/backhoe with 190T-200T dumper and 100T dumper respectively for a peak annual OB of ~110 Mcum. For Coal, Surface miner with FEL and 100T dumpers is proposed to be deployed.

- Coal produced through surface miner (-100 mm) from both side of the quarry (Eastern and western) shall be transported by truck/ dumpers at surface and received in a hopper. Suitable receiving arrangement for coal produced through surface miner (-100 mm size) in truck receiving station has been proposed for receiving of these coal at surface near the quarry mouth of the mine. It is proposed to have two separate truck receiving station and conveyor system at the eastern and western boundary of the mine to minimize the lead. The receiving pit/ station along with the conveyor may be shifted as per the mine advancement and requirement during mine operation. Coal from receiving stations shall be conveyed through suitable capacity belt conveyors at surface through series of conveyors. Further this coal will be conveyed and stored into a bunker of suitable capacity with the help of tripper. Coal from bunker will be reclaimed through suitable capacity feeders and fed to proposed silos through suitable capacity of belt conveyors. The coal will be loaded in to railway wagons through Rapid load out system having suitable capacity pre-weigh hoppers with loading Silo.

- The figures worked out in the conceptual report may undergo minor changes during the course of detailed planning for the Mining Plan.

- The key parameters proposed in the Conceptual Report is required to be finalized and confirmed by NTPC to start the work on Mining Plan/FR.

- Some additional inputs have to be provided by NTPC for preparation of Mining Plan. The list of inputs is attached as Annexure I. The requirement of other inputs for feasibility report preparation will be communicated separately.

PLATES

PLATE-I

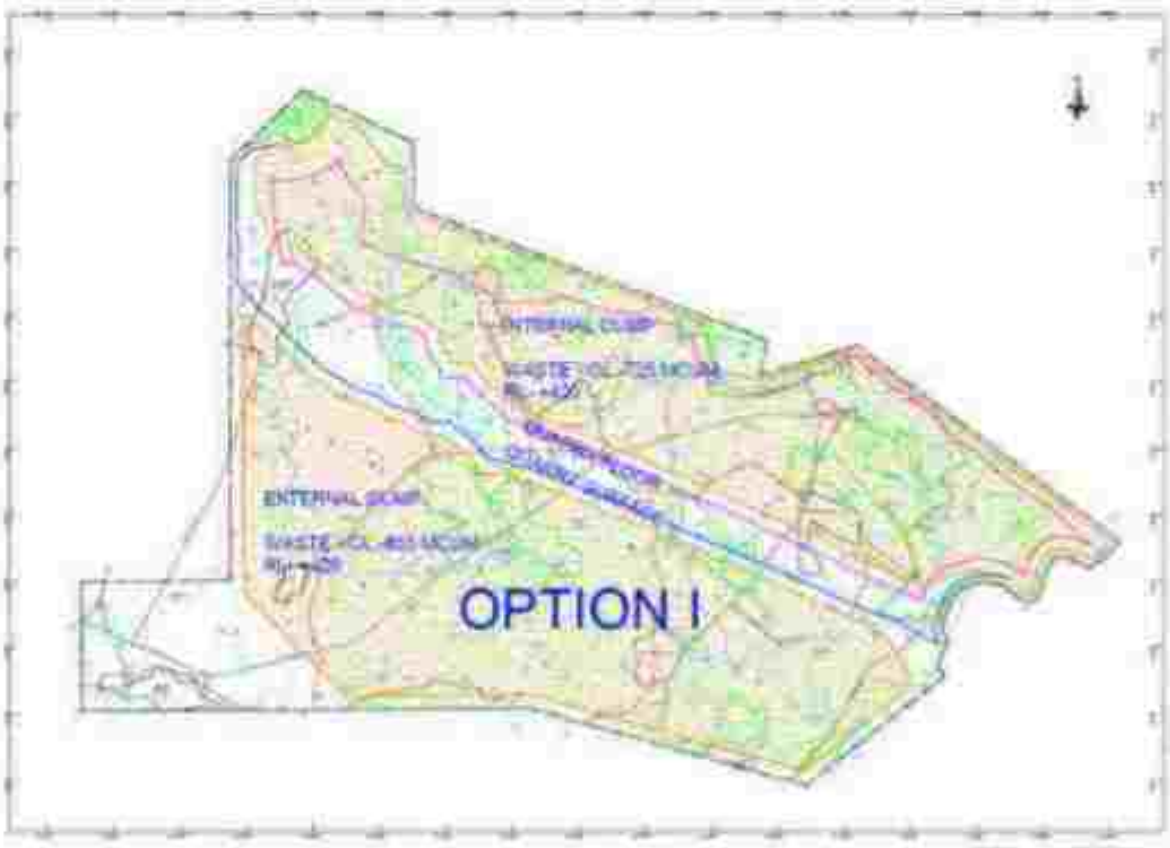
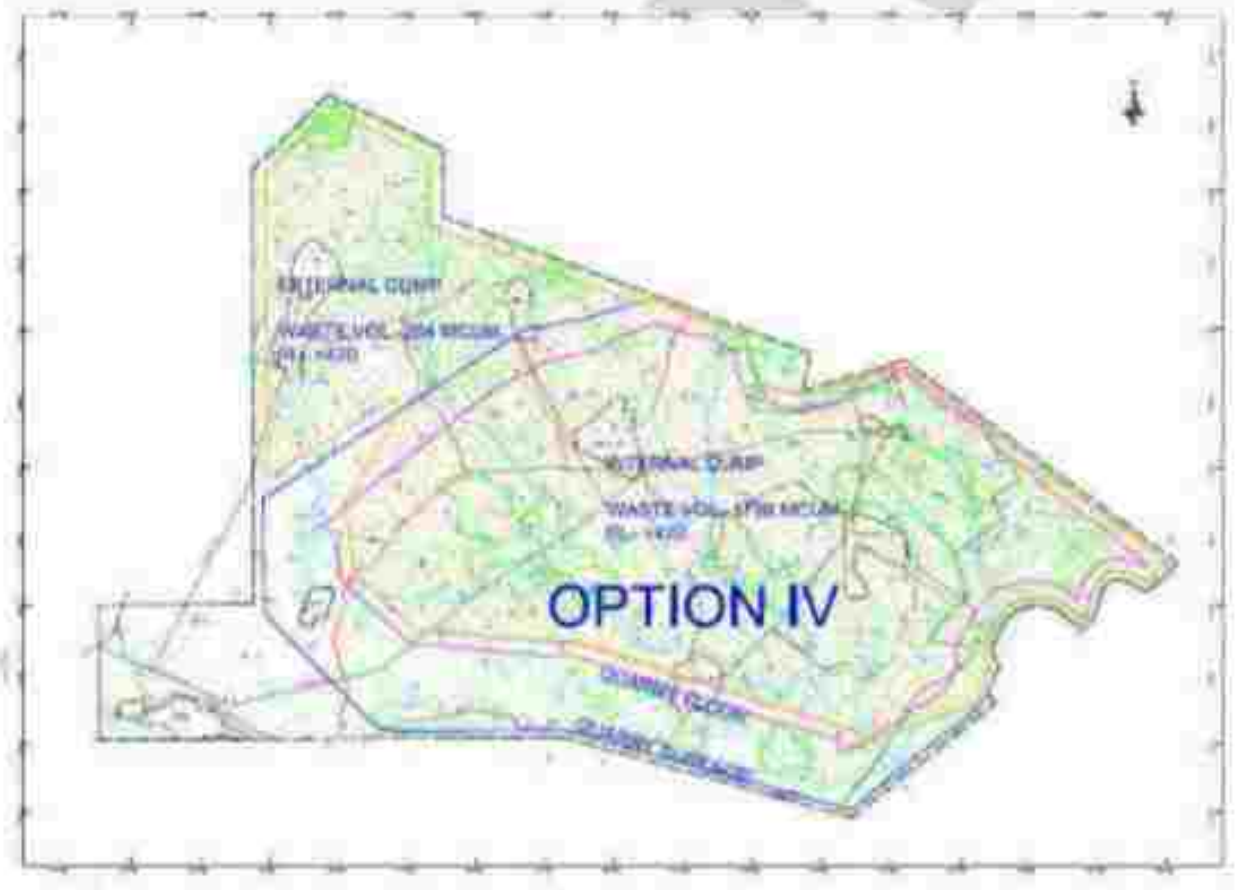


PLATE-II

PLATE-III

PLATE-IV



cmpdi
A Mini Ratna Company

CONCEPTUAL NOTE

FOR

ASSESSMENT OF UG MINING POTENTIALITY OF TALAIPALLI BLOCK & PROJECTIZATION OF SOUTH WEST AREA OF THE BLOCK

FEBRUARY 2023

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1.0 INTRODUCTION

Mining Plan and Mine Closure Plan (1st Modification) of Talaipalli Coal Block of M/s NTPC Ltd is has been prepared at CMPDI (HQ). The said Coal Block shows the existence of 27 coal horizons with their splits. Coal extraction by opencast has been proposed up to seam-IV Bot. Underground mining potentiality of left out coal Seam III and Seam II in whole of the block along with the small portion of the overlying Seams (Seams IV Mid, V Bot, VI Mid and VII) in the South West Corner (below the area considered for Surface infrastructures) has been assessed. Also, opencastable reserve upto VIII seam in the south west corner below the area considered for infrastructures has been estimated.

2.0 LOCATION

Talaipalli coal block having an area of 2115.5 ha is bounded by latitude 22° 13' 35" & 22° 16' 08" N and longitude 83° 25' 49" & 83° 30' 22"E. It is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. Talaipalli block roughly forms a rectangle, the longer axis is NW-SE direction forming the length of the block, and the shorter axis NE-SW direction forming the width. The block boundary allocated to NTPC Ltd., was pillared by Boundary Pillars BP-1 to BP-65. The Kelo River forms the eastern boundary of the block and the boundary line passes through Naya Rampur & Raikera village in the south, Salhepalli, west of Chotiguda forming the western boundary. Ajjgarh and Kudur-Mauha village forming the northern boundary.

Talaipalli block is covered by Survey of India top sheet No. 64N/7 &N/8 (RF 1:50000). The block is mostly covered by cultivated land while south-eastern part of the block has Reserve & protected forest cover. Villages such as Talaipalli, Kudhur-Mauha, Ajjgarh, Chotiguda, Bichhinara, Naya Rampur, Raikera and Salhepalli are located within the block.

3.0 DESCRIPTION OF THE BLOCK

The block extends over an area of about 21.19 Sq.km, in which forest cover is extended over an area of about 7.10 Sq.km. The limits of Block Boundary are defined as given below:

North:	Beyond in-crop zone
South:	Unexplored area and Dipside of Barod-Bijari Block
East:	Pelma Block
West:	Chimtapani Extension Block and Dipside of Barod-Bijari Block

4.0 GEOLOGICAL STRUCTURE

The general dip and strike of the seams within the geological coal block area as under:

i) Strike	Strike is approximately NW-SE with minor variations
ii) Dip	The beds dip at low angle 4^0 – 8^0 towards south-west

5.0 DETAILS OF SEAMS FOR UG MINING

5.1 SEAM SEQUENCE

The Seam Sequence is given below:

Sequence of Coal Seams & Partings

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.20	1.06			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	X LB	0.30	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0
4	X Bot	1.6	8.1			3.5-6.0
	Parting			2.3	20.15	3.5-16.5
5	IX L2	1.2	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX L1	0.38	1.85			1.2-2.0
	Parting			5.65	11.87	6.0-8.0
7	IX	0.96	6.96			3.5-6.0
	Parting			6.30	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0
12	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.80	23.45	14.0-21.0
13	V Top	0.50	3.09			0.50-1.50
	Parting			9.09	18.94	11.5-18.5
14	V Mid	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bot	0.30	5.40			0.50-2.0

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
	Parting			15.16	30.14	17.0-23.0
16	IV Top	0.54	5.78			2.5-5.0
	Parting			5.30	20.13	6.0-10.0
17	IV Mid	0.99	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bot	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.10	3.25			0.50-1.5
	Parting			24.57	44.55	33.0-39.0
21	III	0.66	5.97			2.0-5.5
	Parting			31.1	55.99	33.0-51.0
22	II L3	0.50	3.09			<0.90
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			<0.90
	Parting			5.0	60.39	35.0
24	II L1	0.05	1.54			<0.90
	Parting			1.27	20.59	3.0-14.0
25	II	0.13	5.92			1.5-2.5
	Parting			0.37	3.89	0.50-2.0
26	II L	0.05	2.45			<0.90
	Parting			Around 35.0 m		
27	I	0.22	0.55			-

5.2 SEAMS CONSIDERED FOR UG MINING

The Seam III and Seam II below Seam IV Bot (bottommost seam of the OC mine) have attained underground workable thickness over most of the block area consistently and have been considered to be mined after the completion of OC mining.

In addition to Seam II and Seam III, Seams IV Mid, V Bot, VI Mid and VII lying in a very small area on the south west corner of Talaipalli Block have been considered for UG mining. This area on the south west corner of the block has been earmarked for infrastructures required for OC mining. Only the above mentioned seams have achieved UG workable thickness in this area. All the other Seams above Seam III in this area have been found to be unworkable by UG methodology.

However, the top seams (Seam X-Top to VIII) in this area will be extracted by OC mining after relocation of infrastructure facilities after the end of OC mine life of 31 years.

5.3 DETAILS OF GEOLOGICAL RESERVE FOR UG MINING

Seams	Net Geological Reserve (Mt)	Area Considered
VII	5.34	South west area considered for Infrastructures
VI-MID	15.94	South west area considered for Infrastructures
V-BOT	2.84	South west area considered for Infrastructures
IV-MID	12.58	South west area considered for Infrastructures
III	80.05	Whole Block
II	42.78	Whole Block
Total	**159.52**	

6.0 STRATEGY FOR UG MINING

Mechanized opencast mining of various coal seams commencing from the topmost X seam to IV Bot seam has been planned. The various coal seams/ splits available below IV Bot seam and the partings between various such horizons have been examined.

It is evident that Seam IIIL below Seam IV Bot (the proposed quarry floor) has thickness varying from 0.12m to 3.25m although the seam has not acquired workable thickness in the mining area as the prevalent thickness in 83%of boreholes varies from 0.5m to 1.50m. The seam folio plan of Seam IIIL (Plate- 10B30) for Talaipalli Block can be referred for the purpose.

The seam below seam IIIL is Seam III which has acquired workable thickness in the mining area (the prevalent seam thickness is 2.0 to 5.50 m in 86% of boreholes). The seams upto Seam IV Bottom have been planned to be worked by Opencast. The OC workings are proposed to be filled with OB upto a height of 120m above the surface height in the final stage of the workings (Refer Final Stage Dump Plan, plate- 21E). The parting between Seam IV Bottom and Seam III vanes from 42m to 57m (Isoparting plan annexed). The thickness of Seam III in most of the mine area varies from 2m to 5m. The working of Seam III by underground, attracts the following provisions of Coal Mine Regulations (marked in italic).

*The Coal Mine Regulations and the circulars issued thereunder state that "no working which has approached within **60m** of any other working (not being a working which has been physically examined and found to be free from accumulation of water or other liquid matter or any material that is likely to flow when wet), whether in the same mine or in an adjoining mine , shall be extended further except with the prior permission in writing of the Chief Inspector and subject to such conditions as he may specify therein.*

For the purposes of this sub-regulation, the distance between the said workings shall mean the shortest distance between the workings of the same seam or between any two seams or sections, as the case may be, measured in any direction whether horizontal, vertical or inclined.

The mine surveyor in the mine is supposed to record in a bound paged book the full facts when working of the mine have approached to about 120m from the mine boundary or from disused or waterlogged workings. Every entry in such bound paged book is supposed to be signed and dated by the surveyor and countersigned and dated by the manager.

A void has been proposed to be left in the OC workings in the final stage of the Opencast operations (Refer plate-21E) and would normally be filled with water. Although, the pumping operation round the clock in OC mine is a practice, the OB dumps of the OC workings are watercharged during rainy season.

Therefore, for working Seam III, the DGMS will require scientific studies to be carried out for stability of the parting.

Also In Talaipalli block, there would be dead load of the 120m high dump above the Original Ground Level. Therefore, for working Seam III under the dead load of 120m, DGMS will stipulate a scientific study for the estimation of impacts of dead load of internal dump over the parting between roof of seam III and floor of seam IV Bot (i.e. floor of quarry). Depillaring of Seam III with caving may lead to danger of slope failure of dump due to subsidence. Also, simultaneous UG and OC workings statutorily require withdrawal of manpower from UG workings when blasting operations in OC workings are to be carried out. The movements due to HEMM in OC also have its safety implications in UG operations. Therefore, in this Mining Plan simultaneous UG and OC operations have not been considered. However, the construction period of the UG mine is proposed to begin 4 years before the completion of OC activities.

The parting between IV Bot and Seam III varies from around 42m to 57m i.e. less than 15t where t is the thickness of Seam III in certain areas within the block. Therefore, DGMS may not permit the depillaring of Seam III in many panels due to safety risk of overriding of pillars. However, extractable

reserves of Seam III have been assessed considering that permission for depillaring operations subject to certain conditions will be granted by DGMS.

Detailed study of the Geological Report has revealed that possibility of any belowground mining in Seam IIL1 and IIL does not exist due to poor development of the carbonaceous horizons. Seam II has developed working thickness in the block barring eastern side. Seam IIL2 & Seam IIL3 have attained workable thickness in North West and south west areas of the coal block in very small areas. The seam IIL2 and II L3 have workable area at a depth higher than 500m in the south western side. These seams have developed workable thickness in a very small area in the North Western side at a depth higher than 300m. Accessing these areas from Seam II would involve thin seam drivage or drivage of drifts. Hence, Seam IIL2 and Seam IIL3 are considered to be non economical as the workable reserves are meagre.

The Seam Folio plans of Seam II (Plate- 10B32) indicate that this seam has the very good potential to be mined by underground mining operation as it has developed workable thickness for UG mining in the mining area on from the central to western portion. The prevalent workable thickness of the II Seam varies from 1.5 to 5m. The depth of the workings vary from 230m to greater than 600m in the dipmost portion of the mining area.

The Surface Infrastructures (Merry-go-Round, Workshop, CHP, Silo etc) in this Mining Plan have been proposed in the south west corner of the Talaipalli block. The seams below this small area were examined for their mining potentiality. The seams from X Top to VIII are being proposed to be worked by OC method after relocation of the surface infrastructures at a suitable place within the block at the end of life of OC mine i.e. 31 years proposed in the Mining Plan.

The other seams below this area and above Seam III were examined for their workability by UG technology. The seams VII, VI Mid, V Bot and IV Mid have

been found to have developed workable thickness. It is proposed to drive 3 drifts from Seam III to VII for working these seams in this area.

7.0 UG MINING TECHNOLOGY

The Bord & Pillar method using SDL / LHD is the most prevalent underground mining method being used in the Indian mines. This is a semi mechanized technology and involves blasting operations. The work force is well versed with the various operations. The manpower deployment in the working districts being high and the production to the tune of 100 tons per day with SDL and 200 tons per day with LHD machine is being achieved in Indian mines. The reserves, the extent of mine and the high production requirements of the country call for deploying Mass Production Technology in Talaipalli Block.

The two prevalent methods for Mass production deployed in the Indian Mines are **Continuous Miner Technology and Longwall technology**.

Continuous Miner Technology on Bord & Pillar method is in operation in many mines of CIL. This technology is very flexible and the deploys coal cutting instead of blasting. This makes this technology less hazardous and more productive. The shuttle car used in the CM package is a coal hauling machine is tyre mounted like the LHDs being used in the CIL mines. The continuous Miner machine is available in wide cutting ranges. These days CM on hiring basis is being used in many mines of CIL and the production to the tune of 2000 tpd and more is being achieved in mines. In the hiring mode of CM technology, the district manpower is provided by the private party. The CM technology has been deployed in mines upto 400m depth in India.

Powered Support Longwall (PSLW) technology is generally suitable where comparatively large area free from faults and geological disturbances available for deployment. Long panels can be made for final extraction, as the method is highly inflexible. The property should not have large and abrupt variation in seam thickness. Besides, as the method involves cutting/shearing

(no blasting) and the rate of extraction is very high, it ensures better percentage of extraction, ease of management and is safer. Longwall panels operate on "straight line" extraction method.

A number of Longwall faces have been operated in the mines of CIL in collaboration with European Companies and even with Chinese collaboration. Till date the best results have been given by the Chinese packages. Longwall packages also require additional gate road drivage equipment.

The two seams which have achieved Underground workable thickness in most of the area are Seam II and Seam III. A small portion of the block on the south west corner has been proposed to be worked by Underground in the upper seams which have achieved workable thickness. The upper seam III has a restriction of less than 60m parting with the bottom most seam IV-Bot in the Opencast Quarry. For the purpose of Flexibilty in operations, the CM technology has been preferred in working the seam III. Most of the working area in this seam is at depths suitable for deployment of Continuous Miners.

The lower prominent workable seam is Seam II which has depths ranging from 200m to 550m. The Western side of this seam has not achieved workable thickness. Some large portions of the property are completely fault free. These thick fault free portions have been chosen for deployment of Longwall technology. The main dip development of Seam III has been proposed to be worked with CM technology.

The higher seams in the Southwest portion have been proposed to be worked with CM technology considering the flexibility and productivity of the technology.

8.0 TENTATIVE EXTRACTABLE UG RESERVE

Seams	Net Geological Reserve (Mt)	Extractable Reserve (Mt)	Area Considered
VII	5.34	2.22	South west area considered for Infrastructures
VI-MID	15.94	8.12	South west area considered for Infrastructures
V-BOT	2.84	0.77	South west area considered for Infrastructures
IV-MID	12.58	6.45	South west area considered for Infrastructures
III	80.05	53.71	Whole Block
II	42.78	28.25	Whole Block
Total	**159.52**	**99.52**	

9.0 MAIN MINE ENTRIES

Considering the availability of land as per the OC planning of higher seams, the only option suitable for the mine is working by two shafts. The usage of inclines is likely to block very large quantity of coal which can otherwise be extracted by Opencast. One of the shafts can shall be used as intake airshaft (for man winding and material winding) and the coal handling is proposed to be carried from the other shaft. The depth of the shafts has been considered to be 245 m.

Though it is ideal to locate such mine openings around middle of the area considered for belowground workings, yet disposition of seams for opencast mining operations does not permit to have such a choice.

10.0 MINE CAPACITY AND LIFE OF THE MINE

The seam II and Seam III would be connected with two shafts from surface till the end of Opencast mine life. The shaft sinking is proposed to be started 4 years prior to the end of OC mine life (31 years).

The total extractable reserves of all the workable seams above seam III in the area on the south west corner of the block being utilized for infrastucture comes to 17.5 Mt the details of which have been provided in table in 8.0. The total extractable reserves in seam III are to the tune of

53.71 Mt. Considering deployment of three CMs in the seams III and above, a life of around 40 Years is envisaged.

In Seam II, it is proposed to deploy one Longwall face alongwith two roadheaders. Considering average thickness of 3m for longwall face alongwith adequate gate/trunk transport is likely to produce on an average of about 1.7 MTPA. The two CM sets of standard height are proposed to be deployed in the Seam II and are likely to produce 1 Mt per annum. The total extractable reserves (Seam II) are to the tune of 28.25 MT. The total nos of CM deployment in the mine is five but considering the constraints of the drift drivages etc. at a time only four CM machines have been considered to be worked in the mine.

The peak production of the mine that can be achieved is around 3.7 Mty ((Longwalland roadheader 1.7 Mty) + (4 No of SHCCM 2.0)). However, the average production of the mine can be considered to be 2.5 Mty and the life of mine comes to around 40 Years. This capacity of the mine is being envisaged considering the constraints of OC workings above and the restriction of stipulations of DGMS prior to granting depillaring permission in every panel of seam III as the workings are within 60m of the of the IV Bottom workings which may be water charged during rainy season. The scientific study related to determining the hard cover between IV Bottom and Seam III and feasibility of safe depillaring of the panels in Seam III has to be carried out. The conditions imposed for depillaring are likely to reduce the productivity of CM and also it is envisaged that not all the panels in Seam III will get permission for depillaring. There are numerous faults on the North Western side of the property.

The conditions prevailing in the OC mine for a very long period cannot be projected in advance. **Likewise with the existing planning of the UG mine, a conceptual plan stipulating the method extraction of UG, the machinery deployment etc. has been provided. However, near the end of completion of OC mining, a detailed UG mine plan will have to be prepared for the purpose.**

11.0 MINE VENTILATION

The working belowground mines in Mand-Raigarh Coalfield are placed in Degree-I category of gassiness. It is, therefore, expected that the proposed underground mine workings at Talaipalli Coal block would also fall in same Degree-I of gassiness. However, a scientific study for the purpose is proposed to be carried out. Accordingly, ventilation provisions in this are based on Degree-I gassiness. These provisions may need to be altered if any change in degree of gassiness is found on actual determination as required by statute.

Exhaust ventilation system is considered for the proposed mine with one of the shafts provided with a main mechanical ventilator with suitably designed air lock arrangements & evasee. The ventilation simulation study in the mining plan are proposed to be carried out to establish the size of the motor and the type of the fan for the mine.

12.0 OC MINING IN THE SOUTH WEST PART AND TENTATIVE EXTRACTABLE RESERVE

In the Revised Mining Plan, surface infrastructures (CHP, Merry-go-Round, Silo, Workshops, and Sub-station etc) have been proposed in the south west part of the block. At the end of OC mine life of 31 years, the sterilized coal in this small part shall be taken out by both OC and UG method.

Given the shape of the block in South west part, OC mining can only be done upto Seam VIII, since going further deep will reduce the working area on the floor which will restrict machine deployment and operation. Rest of the Seams from Seam VII shall be mined by UG method subject to its workability by UG mining.

The tentative Seam-wise opencastable reserve, which can be extracted from the South west part of the block is given below:

Seams	Net Geological Reserve of Quarry upto Seam VIII (Mt)	Extractable reserve by OC upto Seam VIII (Mt)
X-LB		
X-TOP	0.21	0.20
X-BOT	4.05	3.85
IX-L2	1.32	1.25
IX-L1	1.08	1.02
IX	2.84	2.70
VIII	3.03	2.88
Total	**12.53**	**11.90**

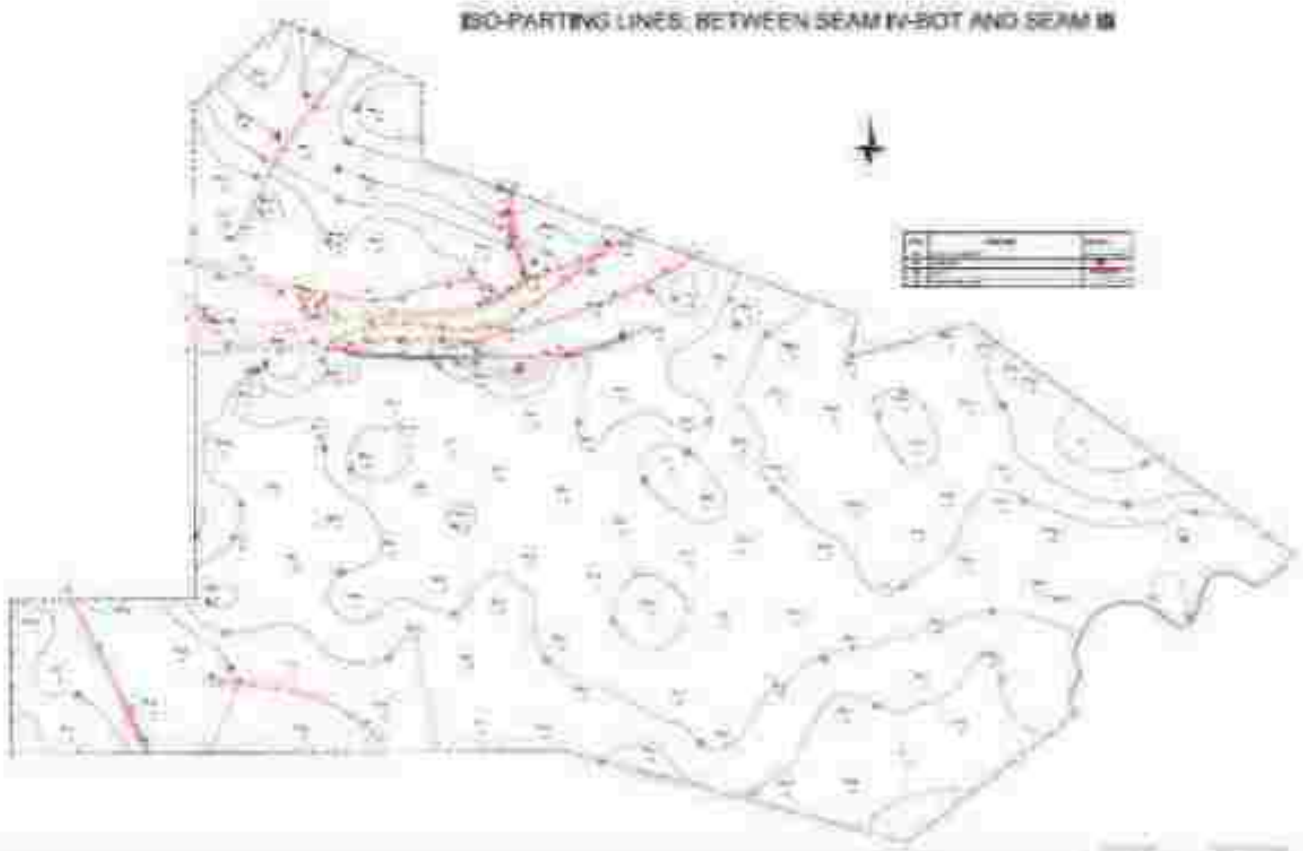
The total extractable Reserve by OC mining in South West part is tentatively estimated to be 11.90 Mt. The peak capacity of the mine that can be achieved in South West part is around 1.50 Mty with the mine life of around 8 years.

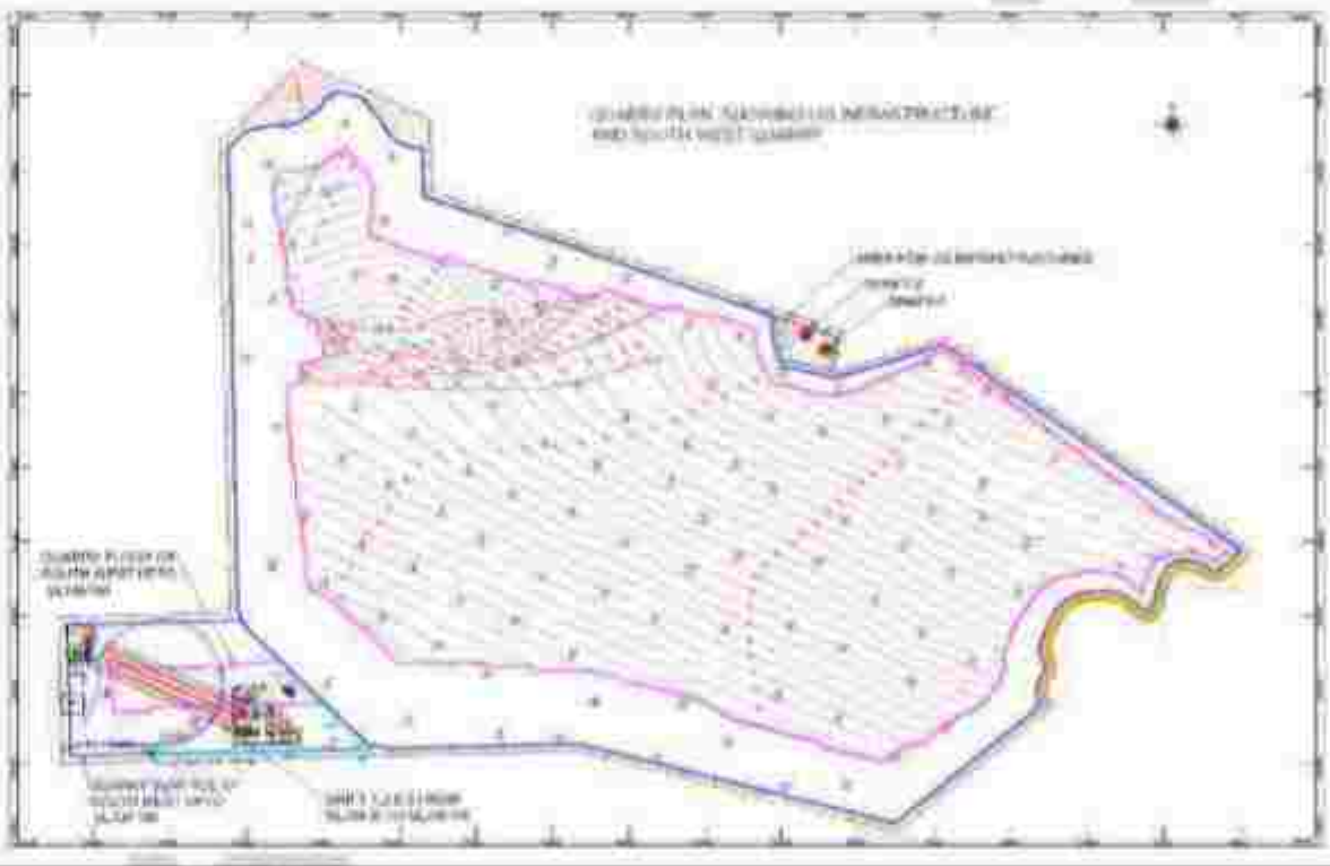
Therefore, total estimated reserve which can be extracted by both OC and UG after 31 years of proposed OC mine life is as follows:

Particulars	Extractable Reserve (Mt)	Mine Life (Years)
UG	99.52	40
OC	11.90	8
Total	111.42	-

The above figures may change while doing detailed planning.

A Revised Mining Plan needs to be prepared after 25 years for UG mining of Whole Block and OC mining upto Seam VIII in south western area where infrastructure for proposed Opencast mine is located.


ISO-PARTING LINES: BETWEEN SEAM IV-BOT AND SEAM III



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A Mini Ratna Company

TECHNICAL FEASIBILITY NOTE
TALAIPALLI COAL BLOCK

SEPTEMBER 2021

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DISCLAIMER

For the preparation of this Report, the MINEX Model, Approved Mining Plan and other Stage Plans/data for Talaipalli Coal block as provided by NTPC Ltd has been relied upon by CMPDI. CMPDI has not verified data provided by NTPC Ltd for accuracy and does not warrant the accuracy of, or make any other warranties or representations regarding this Report if there is any discrepancy in the data provided by NTPC Ltd. Further, this Technical review is a broad assessment and is subject to refinement in the detailed planning.

We have done our best to ensure that the alternate feasible option for Opencast Mining of Talaipalli coal block provided to the client is the most feasible option in the existing circumstances. We do not claim that this is the only and/or best option for this purpose.

No assurance is given that a position contrary/different to the opinions expressed herein will not be asserted by any person, entity, authority and/or sustained by an appellate authority or a court of law.

CHAPTER 1

BACKGROUND

1.1 INTRODUCTION

Talaipalli coal mining block in the state of Chhattisgarh was initially allotted to NTPC by Ministry of Coal (MoC), vide letter no.13016/29/2003-CA-1, dated 25.01.2006, for meeting coal requirement for the proposed 4000MW Lara Integrated Power Project which is approximately 60 kms away from the coal block.

Talaipalli Block lies in the eastern part of Mand-Raigarh Coalfield in the state of Chhattisgarh. At the time of allotment, the block was regionally explored by GSI by drilling 15 holes (6434.55m) and estimated coal reserves of 964.88 million tonnes of indicated category were assessed.

On receiving Letter of Award (LOA) from Ministry of Coal, NTPC Ltd issued Work order to MECL to carry out detailed exploration in the block. MECL drilled about 102 boreholes (39854.75 mtrs. of drilling) in approximately 20 sq. km. block area for which the Geological Report (GR) was submitted to NTPC on 29.09.08.

On receipt of GR, NTPC awarded the consultancy for preparation of Mining Plan and Feasibility Report for this block to Advance Coal Management & Marketing Pvt. Ltd. (ACMM), New Delhi. The Mining Plan was prepared by ACMM in 2009 for a rated capacity of 18.00 Mty based on the aforementioned GR which was later approved by the Ministry of Coal on 31.03.2010. Subsequently, all statutory clearances were obtained on the basis of the approved Mining Plan.

However, as a consequence to the Judgment of the Hon'ble Supreme Court in September 2014, the block allocation was cancelled which was later re-allotted to NTPC on 08.09.2015.

NTPC planned to develop and operate the mine through outsourcing by appointing a Mine Developer and Operator(MDO) with scope of works viz. overburden removal, extraction of coal, construction of CHP & other fixed mine infrastructures, compliance of statutory obligations and other associated activities.

Meanwhile, all requisite statutory clearances and permissions were obtained from the respective statutory bodies. The major statutory clearances out of the above are furnished below:

Table 3-1: Major Statutory Clearances with Obtaining Date

Activity	Date of Achievement
Env. Clearance	02.01.13/13.11.15 (Rev.)
Forest Clearance	St-I : 05.11.12; St-II: 29.01.14; 23.05.17(Rev)
Consent to Establish	06.01.15
Consent to Operate	17.03.16
Tripartite Escrow Agreement (Banker, CCO & NTPC)	15.05.14 & 04.09.17
DGMS Permission	19.01.18
Coal Controllers permission	31.01.18

NTPC floated the 1st NIT for appointment of MDO *(for 404.5 MMT of coal extraction with a stripping ratio of 4.3 Cum./t in a period of 25 years as per Approved Mine Plan)* on 31.12.2015. M/s. NCC-BGR Consortium was declared successful in the bid and was awarded the contract on 13.11.2017, but due to one FIR filed by CBI on corruption charges involving one of the Directors of BGR & NTPC, this contract was terminated on 04.07.2019.

Thereafter, Second NIT for appointment of MDO *(for 404.5 MMT of coal extraction with a stripping ratio of 4.3 Cum./t in a period of 25 years as per Approved Mine Plan)* was issued on 19.08.2019. M/s. Thriveni Earthmovers Pvt. Ltd. (TEMPL) emerged as the successful bidder and was appointed as MDO on 26.08.2020.

1.2 REASON FOR THIS TECHNICAL FEASIBILITY STUDY

M/s TEMPL was appointed as MDO on 26.08.2020 by NTPC for development and operation of Talaipalli Coal Block. Post award of the contract, a dispute developed between M/s TEMPL and NTPC wherein TEMPL has claimed that as per their calculations 404.5 MT of coal can't be extracted at a stripping ratio of 4.30 cum/tonne as specified in the approved Mining Plan. In view of M/s TEMPL, the stripping ratio should be around 4.92 to 5.25 Cum/t. Along with this, the issue of accommodation of excess OB in the designated dump area including temporary external dump and unfeasibility of 100% backfilling by re-handling of temporary external dump as per approved mining plan has also been raised by M/s TEMPL. There were a series of discussion/meetings held between NTPC and TEMPL to resolve the issue.

Subsequently, M/s TEMPL chose to rescind the contract through their Notice dated 04.05.2021 and filed a Commercial Civil Suit before Hon'ble Delhi High Court. Subsequent to few hearings and submissions made by both the Parties, the Hon'ble Delhi High Court directed both the parties for mutual discussions for amicable resolution of the issue which was complied by both the Parties by holding meetings wherein M/s TEMPL requested for appointment of Independent Expert for review of the mining plan of Talaipalli coal mining project.

M/s TEMPL vide letter dated 31.05.2021 (Annexure-II), submitted its consent to NTPC for appointment of CMPDIL as an Independent Consultant for review of the technical parameters of the Talaipalli coal mining project along with the consent to share the cost of the assignment/fees of CMPDIL equally with NTPC. Thereafter, NTPC requested CMPDIL vide letter NTPC/CM-HQ/TLCMP/2021/02 dated 01.06.2021 (Annexure- I) to take up this work on urgent basis which has been accepted by CMPDIL.

1.3 OBJECTIVE OF THE STUDY

The objective of the study is to ascertain the technical feasibility of the mining of the Talaipalli Coal Block and determine maximum coal that can be extracted from the block.

The report is aimed at holistically evaluating the feasibility of mining/dumping sequence as per the Approved Mining Plan and if found unworkable, provide an alternate technically feasible option to maximize the mineable coal.

1.4 SCOPE OF THE WORK

The agreed broad scope of the work is as below:

- ✓ Examination of two Entry scenario as per Approved Mining Plan with respect to Mineable Reserves, OB quantities, Average stripping ratio, Waste Disposal Planning and Average Lead.
- ✓ Generate a best possible scenario to maximize mineable coal from the block providing Mineable Reserves, OB quantities, Average stripping ratio, Waste Disposal Planning and Average Lead & Lift and identification of all major assumptions.
- ✓ Provide coal evacuation/handling arrangement up to railway siding with respect to proposed feasible option

The Schematic drawing and plates with respect to Stage Plans (5th year, 10th year, 15th year, 20th year, and 25th year) are included in the Report.

CHAPTER 2

TALAIPALLI COAL BLOCK: AN OVERVIEW

2.1 SITE INFORMATION

Talaipalli coal block is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. The Kelo river forms the eastern boundary of the block and the boundary line passes through Naya Rampur & Raikera village in the south of Sajepalli, west of Chotiguda forming the western boundary. Ajjgarh and Kudur-Mauha village forming the northern boundary. The block is mostly covered by cultivated land while south-eastern part of the block has Reserve & protected forest cover. Talaipalli, Kudhur-Mauha, Ajjgarh, Chotiguda, Bichhinara, Naya Rampur, Raikera and Sajhepalli are numerous villages located within the block.

The block is about 55 km away from Raigarh Township and is close to Tehsil Headquarters at Gharghoda which lies on Raigarh-Ambikapur State Highway. Talaipalli village is situated in the block & it is about 20 km NE from Gharghoda and is connected with Gharghoda partly by all-weather Gharghoda-Lelunga road. Gharghoda is about 35 km North of Raigarh Railway Station which is on Howrah-Bombay Main Line of South Eastern Railway.

2.2 GEOLOGY, EXPLORATION AND RESOURCES

Talaipalli Block is located in the eastern part of Mand-Raigarh Coalfield. The area of the block is about 20 sq. km. Major part of the block is covered by the rocks of Barakar formations. Barren measure occurs in the southern part of the block. However a small patch of Barren Measure is also noticed in the north western part of the block.

The geological succession evolved on the basis of exploration data generated in the block is given in the Table 2-1 below:

Table 2-1: Geological Succession in Talaipalli Block

Formation	Thickness (m)	Lithology
Recent	0.50 – 18.00	Soil, alluvium
Barren Measures	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakars	30 – 596	Fine, medium and coarse grained felspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir	1.00 – 54.30	Khakee,greenish shales & sandstone,occassional pebbly
Basement		Metamorphics

2.2.1 STRUCTURE OF THE BLOCK

The general strike of the bed is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from 4^0 to 8^0 towards South-west.

The Geological Plan of the Talaipalli Coal Block is given in Fig. 2-1 below:

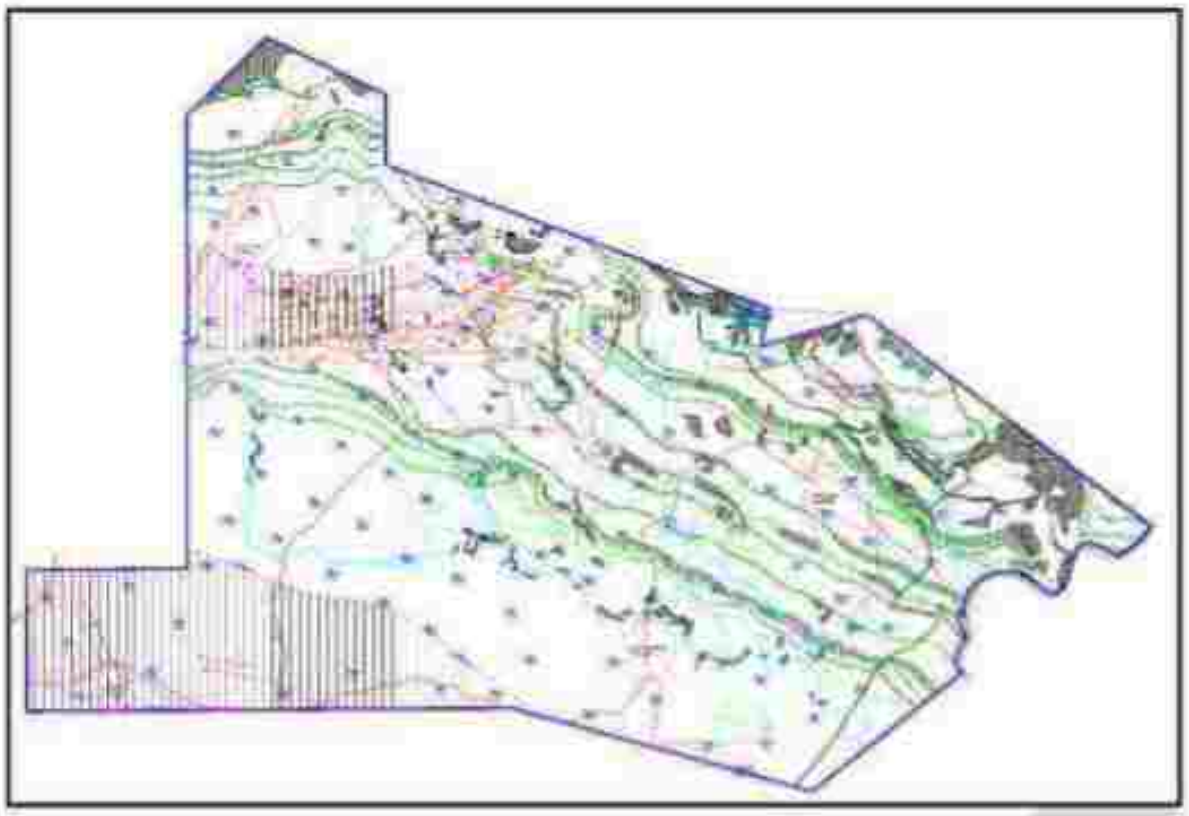

Figure 2-2: Geological Plan of Talaipalli Coal Block

The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data out of which three faults namely fault F1-F1, F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. The faults details are furnished in Table 2-2 below:

Table 2-2: Details of Faults

Fault No.	Location	Trend	Nature of fault	Throw
F1-F1	Northern part passing near BH No. MNRT-24, 87, 22 & 35	East-West to ENE, NE-SW dipping northerly	Dip fault	20m – 85 m
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 – 10m.
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	30-35 m.
F4-F4	Northern part near BH MNRT-31, 24, 43 & 62	East-West dipping northerly	Dip fault	30 – 150 m
F5-F5	Northern western part through BH. MNRT-62	East-West	Strike fault	35 m
F6-F6	Northern part passing through MNRT-31	WNE-ESE dipping westerly	Oblique fault	15 – 25 m.
F7-F7	Northern part passing through MNRT-11	NW - SE	Oblique fault	20 m.
F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	60-105 m.
F9-F9	Northern part passing through MNRT-101 RT-4 & MNRT-11	East – West to curvilinear	Strike/Oblique Fault	25m
F10-F10	Northern part passing through RT-7	NE-SW	Oblique curvilinear	0 -10 m.
F11-F11	Southern part	NW-SE	Curvilinear	0 – 10 m.
F12-F12	Southern part	NW-SE	Oblique	25 m.

2.2.2 COAL SEAMS

Detailed exploration in Talaipalli Block has revealed the presence of coal bearing horizons belonging to Barakar Formations. These carbonaceous horizons could be distinctly

demarcated as upper, middle and lower columns of Barakar formation. The coal is dull in appearance high in moisture and is of non-coking type.

There are 27 correlatable coal horizons, viz. seams XLA, XLB, X TOP, X BOT, IXL2, XL1, IX, VIII, VII, VI TOP, VI MID, VI BOT, V TOP, V MID, V BOT, IV TOP, IV MID, IV L, IV BOT, III L, III, IIL3, II L2, II L1, II, II L & I.

The sequence of coal seams and parting is given Table 2-3 below:

Table 2-3: Sequence of Coal Seams & Parting

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.20	1.06			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	X LB	0.30	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0
4	X Bot	1.6	8.1			3.5-6.0
	Parting			2.3	20.15	3.5-16.5
5	IX L2	1.2	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.65	11.87	6.0-8.0
7	IX	0.96	6.96			3.5-6.0
	Parting			6.30	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
12	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.80	23.45	14.0-21.0
13	V Top	0.50	3.09			0.50-1.50
	Parting			9.09	18.94	11.5-18.5
14	V Mid	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bot	0.30	5.40			0.50-2.0
	Parting			15.16	30.14	17.0-23.0
16	IV Top	0.54	5.78			2.5-5.0
	Parting			5.30	20.13	6.0-10.0
17	IV Mid	0.99	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bot	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.10	3.25			0.50-1.5
	Parting			24.57	44.55	33.0-39.0
21	III	0.66	5.97			2.0-5.5
	Parting			31.1	55.99	33.0-51.0
22	II L3	0.50	3.09			<0.90
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			<0.90
	Parting			5.0	60.39	35.0
24	II L1	0.05	1.54			<0.90
	Parting			1.27	20.59	3.0-14.0
25	II	0.13	5.92			1.5-2.5
	Parting			0.37	3.89	0.50-2.0
26	II L	0.05	2.45			<0.90
	Parting			Around		
27	I	0.22	0.55		-	27

2.2.3 RESERVES

As per GR, a Net Geological Reserve of 1267.145 million tonnes of coal reserves including both opencast and underground reserves varying in grade from 'A' to 'G' have been established in the block.

2.3 BRIEF OVERVIEW OF APPROVED MINING PLAN (OPENCAST MINING)

M/s ACMM prepared the Mining Plan for Talaipalli Coal Block in 2010 for a rated capacity of 18.00 Mty. As per Mining Plan, this coal block has gross geological reserves of 1400.58 MT. Opencast coal mining has been proposed upto the basal seam III for a total gross geological reserves of 1323.58 MT and the balance 77.13 MT are considered for by below ground method of mining. Salient Features of the Approved Mining Plan is given below:

Table 2-4: Salient Features of Approved Mining Plan

Sl.No	Particulars	
1.	Project Details	Location: Eastern part of Mand-Raigarh Coalfield, Dist- Raigarh, Chhattisgarh Area - 21.13 sq km
2.	Reserves (MT)	a) Gross Geological Reserves -1400.58 b) Net Geological Reserves- 1260.52 c) Mineable Reserves*/Extractable- - Opencast 843.68 - Under ground- 17.57 d) Reserves blocked in barrier & Batter 336.69 (* Mining Loss(@ 5%) 44.40
3.	Quarry Parameters (m)	Max. depth-404 Max. strike length-6690 Min. strike length-1370 Max. dip rise length-4760 Min. dip rise length-3060

Sl.No	Particulars					
4.	Annual Target Output (MT)	Opencast-18.0 Underground-0.72 (at 100%) & – 0.60 (at 85%)				
5.	Total Life (Years)	Opencast- Construction -2 Production -52 Underground- Construction - 4 Production - 26				
7.	Quality of Coal : Overall Grade - "F" Non-coking	U.H.V (K.Cal/Kg)		Ash %		Moisture %	
		Min	Max	Min	Max	Min	Max
		1310	5892	17.6	45.1	1.2	11
8.	Average Stripping Ratio Mm^3/te	4.48					
9.	Specific gravity of coal(Average)	1.65 te/cum					
10.	Method of Mining	Opencast –(Shovel-Dumper combination)/ Surface miner Underground- Continuous Miner & Shuttle car combination					

2.3.1 MINING STRATEGY

In the Mining plan, it is proposed to mine maximum area leaving a statutory barrier of 7.5m on surface from block boundary. It is also proposed to leave barrier of 60m from Kelo river on the eastern side of the block.

It is proposed to develop Infrastructure facility like MGR, Workshop, store, Sub-station, office etc. on the South-Western corner of the property. At the end of the mining operation, it is suggested to dismantle all infrastructure facility on the South-Western corner of the property to extract blocked coal below infrastructure facilities.

To ensure availability of adequate quantity of coal, it has been planned to commence mechanized mining operations by having two independent opencast mines at eastern & western extremities. Accordingly mining operation has been envisaged by driving two

access trenches, one on the east side of the North Eastern side and the other on the western side of the property as shown in Fig 2-2 & 2-3. Both the quarries would advance towards southwards as also towards each other to finally merge into one entity after about 20 years of mine operation.

Internal dump will start once sufficient void space gets available from 5th year of mine operation. This de-coaled area can be used for internal dumping. Initially overburden will be placed as temporary external dump within the mine property.

The lead of Coal and lead of OB/partings has been considered as 2.0-3.0 Km.

Figure 2-2: First year Stage Plan as per Mining Plan

Figure 2-3: Fifth year Stage Plan as per Mining Plan

Some major system parameters for both coal winning & OB removal are given below:-

a) For 35 M^3 Electric Rope shovel to be deployed for removal of overburden.

1) Height of the bench - 20 m
2) Width of the working bench - 50m
3) Width of the non-working bench - 30m
4) High wall angle of the bench -70° to the horizontal

b) For 20 M^3 Hydraulic shovel to be deployed for removal of overburden.

5) Height of the bench - 15m
6) Width of the working bench - 50m
7) Width of the non-working bench - 30m
8) High wall angle of the bench -70° to the horizontal

c) For 12 M^3 hydraulic shovel working in the thick seam and thick parting.

1) Height of the bench	-15m
2) Width of the working bench	-40m
3) Width of the non-working bench	-25m
4) High wall angle of the bench	- 70°

d) For 4.5 M^3 hydraulic shovel working in the thin seam and thin parting.

1) Height of the bench - equal to thickness of coal seam and thickness of parting	
2) Width of the working bench	-30m
3) Width of the non-working bench	-25m
4) High wall angle of the bench	-70°

The above parameters may be modified according to the actual working condition. The high wall angle for the soft OB bench will not be steeper than 45°.

The Final Stage Quarry Plan and Final Stage Dump Plan is shown below in fig. 2-4 and 2-5.

Figure 2-4: Final Stage Quarry Plan as per Mining Plan

Figure 2-5: Final Stage Dump Plan as per Mining Plan

2.3.2 CALENDAR PROGRAMME OF EXCAVATION

The summarized calendar programme of excavation is given in Table 2-5 which has been developed based on adopted sequence of open cast mine development at optimum condition of mining operation in the block.

Table 2-5: Calendar Programme of Excavation

Year	Coal	Cumm coal	Natural		Running	Avg	Adjusted		Running	Avg
			OB	Cumm OB	SR	SR	OB	Cumm OB	SR	SR
	Mt	MT	Mcum	Mcum	Cum/t	Cum/t	Mcum	Mcum	Cum/t	Cum/t
1	1.50	1.50	6.00	6.00	4.00	4.00	7.65	7.65	5.10	5.10
2	4.00	5.50	15.99	21.99	4.00	4.00	19.04	26.69	4.76	4.85
3	8.00	13.50	31.98	53.97	4.00	4.00	34.00	60.69	4.25	4.50
4	18.00	26.50	51.97	105.94	4.00	4.00	55.25	115.94	4.25	4.38
5	18.00	44.50	71.96	177.90	4.00	4.00	76.50	192.44	4.25	4.32
6	18.00	62.50	71.91	249.81	3.99	4.00	76.50	268.94	4.25	4.30
7	18.00	80.50	71.47	321.27	3.97	3.99	76.50	345.44	4.25	4.29
8	18.00	98.50	71.47	392.74	3.97	3.99	76.50	421.94	4.25	4.28
9	18.00	116.50	71.47	464.21	3.97	3.98	76.50	498.44	4.25	4.28

Year	Coal	Cumm coal	Natural		Running	Avg	Adjusted		Running	Avg
			OB	Cumm OB	SR	SR	OB	Cumm OB	SR	SR
	Mt	MT	Mcum	Mcum	Cum/t	Cum/t	Mcum	Mcum	Cum/t	Cum/t
10	18.00	134.50	71.47	535.67	3.97	3.98	76.50	574.84	4.25	4.27
11	18.00	152.50	70.05	605.72	3.89	3.97	76.50	651.44	4.25	4.27
12	18.00	170.50	69.86	675.58	3.88	3.96	76.50	727.94	4.25	4.27
13	18.00	188.50	69.86	745.44	3.88	3.95	76.50	804.44	4.25	4.27
14	18.00	206.50	69.86	815.30	3.88	3.95	76.50	880.94	4.25	4.27
15	18.00	224.50	69.86	885.16	3.88	3.94	76.50	957.44	4.25	4.26
16	18.00	242.50	69.86	955.02	3.88	3.94	76.50	1033.94	4.25	4.26
17	18.00	260.50	75.30	1030.32	4.18	3.96	78.30	1112.24	4.35	4.27
18	18.00	278.50	76.91	1107.24	4.27	3.98	78.30	1190.54	4.35	4.27
19	18.00	296.50	76.91	1184.15	4.27	3.99	78.30	1268.84	4.35	4.28
20	18.00	314.50	76.91	1261.06	4.27	4.01	78.30	1347.14	4.35	4.28
21	18.00	332.50	76.91	1337.98	4.27	4.02	78.30	1425.44	4.35	4.29
22	18.00	350.50	76.91	1414.89	4.27	4.04	78.30	1503.74	4.35	4.29
23	18.00	368.50	76.91	1491.80	4.27	4.05	78.30	1582.04	4.35	4.29
24	18.00	386.50	76.91	1568.72	4.27	4.06	78.30	1660.34	4.35	4.30
25	18.00	404.50	76.91	1645.63	4.27	4.07	78.30	1738.64	4.35	4.30
26	18.00	422.50	76.91	1722.54	4.27	4.08	78.30	1816.94	4.35	4.30
27	18.00	440.50	74.91	1797.45	4.16	4.08	80.10	1897.04	4.45	4.31
28	18.00	458.50	74.90	1872.36	4.16	4.08	80.10	1977.14	4.45	4.31
29	18.00	476.50	74.90	1947.26	4.16	4.09	80.10	2057.24	4.45	4.32
30	18.00	494.50	74.90	2022.16	4.16	4.09	80.10	2137.34	4.45	4.32
31	18.00	512.50	74.90	2097.06	4.16	4.09	80.10	2217.44	4.45	4.33
32	18.00	530.50	79.58	2176.65	4.42	4.10	80.10	2297.54	4.45	4.33
33	18.00	548.50	82.28	2258.92	4.57	4.12	80.10	2377.64	4.45	4.33
34	18.00	566.50	82.28	2341.20	4.57	4.13	80.10	2457.74	4.45	4.34
35	18.00	584.50	82.28	2423.48	4.57	4.15	80.10	2537.84	4.45	4.34
36	18.00	602.50	82.28	2505.75	4.57	4.16	80.10	2617.94	4.45	4.35
37	18.00	620.50	84.07	2589.83	4.67	4.17	80.10	2698.04	4.45	4.35
38	18.00	638.50	87.35	2677.18	4.85	4.19	87.84	2785.88	4.88	4.36
39	18.00	656.50	87.35	2764.52	4.85	4.21	87.84	2873.72	4.88	4.38
40	18.00	674.50	87.35	2851.87	4.85	4.23	87.84	2961.56	4.88	4.39
41	18.00	692.50	87.35	2939.22	4.85	4.24	87.84	3049.40	4.88	4.40
42	18.00	710.50	86.54	3025.76	4.81	4.26	87.84	3137.24	4.88	4.42
43	18.00	728.50	85.60	3111.37	4.76	4.27	87.84	3225.08	4.88	4.43
44	18.00	746.50	85.60	3196.97	4.76	4.28	87.84	3312.92	4.88	4.44
45	18.00	764.50	85.60	3282.57	4.76	4.29	87.84	3400.76	4.88	4.45
46	18.00	782.50	82.56	3365.13	4.59	4.30	87.84	3488.60	4.88	4.46
47	18.00	800.50	73.84	3438.97	4.10	4.30	87.84	3576.44	4.88	4.47
48	15.00	815.50	61.53	3500.50	4.10	4.29	73.20	3649.64	4.88	4.48
49	10.00	825.50	41.02	3541.52	4.10	4.29	48.00	3697.64	4.80	4.48
50	7.00	832.50	98.52	3688.04	13.79	4.87	32.41	3730.05	4.63	4.48
51	6.00	838.50	24.52	3712.56	12.42	4.48	25.98	3756.03	4.33	4.48
52	5.19	843.69	64.51	3777.07	12.42	4.48	21.04	3777.07	4.05	4.48
Total	**843.69**		**3777.07**				**3777.07**			

It is envisaged to make two quarry entry into the mine one on the east side of the North Eastern side and one on the western side of the property shown in the final stage quarry plan (fig. 2-4). Year wise coal extraction from east and west quarry for initial five year is summarized in table below:

Table 2-6: Coal extraction from east & west quarry for initial five years

YEAR	COAL(Mt)		OB(Mcum)		Total Coal	Total OB
	East	West	East	West	(Mt)	(Mcum)
1	0.45	1.05	2.45	5.20	1.50	7.65
2	1.03	2.97	5.18	13.86	4.00	19.04
3	1.68	6.32	7.06	26.94	8.00	34.00
4	2.13	10.87	8.93	46.32	13.00	55.25
5	5.48	12.52	23.04	53.46	18.00	76.50

The total mineable coal reserves have been estimated as 843.69 Mt at the corresponding OBR of 3777.07 Mm3 at an average SR of 4.48 m3/t.

The rated output of 18 Mty would be achieved in 5th year of quarry excavation (excluding construction period).

2.3.3 LIST OF MAJOR HEMM

The list of major mining machineries upto target year is given below in table 2-7.

Table 2-7: List of HEMM

Sl. No.	Equipment	Size	No	Year				
A	**Overburden**			1st	2nd	3rd	4th	5th
1	Electric Shovel	35 Cum	4				2	4
2	Electric Hydraulic Shovel	20 Cum	8	1	2	5	7	8
3	Electric Hydraulic Shovel	4.5 Cum	11	3	8	8	8	11
4	Rear Dumper	240T	41				21	41
5	Rear Dumper	190T	76	8	18	43	67	76
6	Rear Dumper	50 T	92	21	61	61	67	92
7	Electric Drill	311 mm	3				1	3
8	Elec. Drill	250 mm	13	2	4	8	11	13
9	Diesel Drill	160 mm	9	2	3	5	7	9
10	Dozer	450 hp	6	2	5	6	6	6
11	Dozer with ripper	850 hp	5	1	2	3	4	5
B	**Coal**							
1	Diesel Hydraulic Shovel	12 Cum	1			1	1	1
2	Diesel Hydraulic Shovel	4.5 Cum	3	1	2	2	3	3
3	Surface Miner	2200	4				1	4
4	Front end loader	4.5 cum	4				2	4
5	Rear Dumper	35 T	38				19	38
6	Rear Dumper	120T	10			10	10	10
7	Rear Dumper	50 T	26	8	16	18	26	26
8	Elec. Drill	250 mm	2			1	2	2
9	Diesel Drill	160 mm	3	1	2	3	3	3
10	Dozer	450 hp	3	1	1	2	3	3
11	Dozer with ripper	850 hp	3			1	3	3
C	**Common**							
1	Grador	280 hp	8	2	4	6	7	8
2	Hydraulic Shovel	6.5 Cum	2		1	2	2	2
3	Crane	100 T	4	1	2	3	3	4
4	Crane	30 T	4		1	2	2	4
5	Crane	8 T	6	1	2	2	4	6
6	Crane	5 T	4		1	2	3	4
7	Diesel B'hoe	1.0 Cum	6	2	3	4	5	6
8	FE Loader	5-6 Cum	3	1	2	2	3	3
Job No: 0210210049			19					

9	FE Loader	1-2 Cum	4	2	2	3	4	4
10	Diesel Drill	100 mm	4	1	1	2	4	4
11	Dozer	450 hp	4	1	2	3	3	4
12	Diesel bowser		8	3	4	5	7	8
13	Fire tender		3	1	2	3	3	3
14	Boom truck		3	0	1	3	3	3
15	Heavy duty toe truck		3	1	3	3	3	3
16	Fork lift truck	8 T	3	1	3	3	3	3
17	Line Truck		2	1	2	2	2	2
18	Tipping truck	8 T	6	2	4	6	6	6
19	Vibratory compactor		4	1	2	4	4	4
20	Tyre handler		4	1	3	3	4	4
21	Mobile maintenance Van		5	1	3	5	5	5
22	Water sprinkler	28kl	10	2	4	6	8	10
D	**Reclamation**							
1	Grader	280 hp	2					2
2	Dozer	410 hp	2					2
3	Water sprinkler	28kl	2					2
4	Farm Truck		2					2

2.3.4 DISPOSAL OF WASTE

In the initial years, when sufficient void to the floor of the basal seam fil is not created, the OB spoil generated will be temporarily accommodated within the block area to the dipside of the working area and then re-handled back in the void to the floor of the basal seam as internal dump.

Overall height of OB dump is 450 m from the deepest point of the mine floor, out of which only 60m is above quarry surface. Each tier of OB dump is of 30m height and berm width has been increased to 30m, with the result that the ultimate dump slope is 22 degrees.

Internal dump will start once sufficient void space gets available from 5th year of mine operation. This de-coaled area can be used for internal dumping. Initially overburden will

be placed at two external dump as shown in fig. 2-2 and fig. 2-3 earlier. For first four years of mine operation, OB will be accommodated in external dump only. In 5th year, majority of the OB will be dumped in external dump and only 12.29 Mcum will be accommodated in internal dump. From 9th year onward, no external dumping will be required. Hence, OBR will be accommodated in internal dump for rest of the mine life.

As there is no land available for external dump, it has been envisaged to re-handle external dump back to de-coaled area of the mine. Re-handling of overburden will start from 9th year of mine operation till 20th year of mine operation. About 264.52 Mcum of external dump will be required which has been planned to re-handle back to the de-coaled area of the mine.

Top soil is proposed to be removed separately and dumped outside the quarry in a manner so as not to lose its fertility. The top soil would be spread over the reclaimed land, afterward.

The dumping schedule is given in table 2-8 below:

Table 2-8: Dumping Schedule

	External dump (Mcum)		Internal dump (Mcum)		Rehandling		Total OB (Mcum)	
Year	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.
1	7.65	7.65	0.00	0.00		0.00	7.65	7.65
2	19.04	26.69	0.00	0.00		0.00	19.04	26.69
3	34.00	60.69	0.00	0.00		0.00	34.00	60.69
4	55.25	115.94	0.00	0.00		0.00	55.25	115.94
5	64.21	180.15	12.29	12.29		0.00	76.50	192.44
6	45.38	225.53	31.12	43.41		0.00	76.50	268.94
7	21.17	246.70	55.33	98.74		0.00	76.50	345.44
8	17.82	264.52	58.68	157.42		0.00	76.50	421.94
9	0.00	264.52	76.50	233.92	8.12	8.12	76.50	498.44
10	0.00	264.52	76.50	310.42	18.13	26.25	76.50	574.94
11	0.00	264.52	76.50	386.92	18.13	44.38	76.50	651.44
12	0.00	264.52	76.50	463.42	18.13	62.51	76.50	727.94
13	0.00	264.52	76.50	539.92	25.42	87.93	76.50	804.44
14	0.00	264.52	76.50	616.42	25.42	113.35	76.50	880.94
15	0.00	264.52	76.50	692.92	25.42	138.77	76.50	957.44
16	0.00	264.52	76.50	769.42	25.42	164.19	76.50	1033.94
17	0.00	264.52	78.30	847.72	25.42	189.61	78.30	1112.24

	External dump (Mcum)		Internal dump (Mcum)		Rehandling		Total OB (Mcum)	
Year	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.
18	0.00	264.52	78.30	926.02	35.42	215.03	78.30	1190.54
19	0.00	264.52	78.30	1004.32	35.42	240.45	78.30	1268.84
20	0.00	264.52	78.30	1082.62	24.07	264.52	78.30	1347.14
21	0.00	264.52	78.30	1160.92		264.52	78.30	1425.44
22	0.00	264.52	78.30	1239.22		264.52	78.30	1503.74
23	0.00	264.52	78.30	1317.52		264.52	78.30	1582.04
24	0.00	264.52	78.30	1395.82		264.52	78.30	1660.34
25	0.00	264.52	78.30	1474.12		264.52	78.30	1738.64
26	0.00	264.52	78.30	1552.42		264.52	78.30	1816.94
27	0.00	264.52	80.10	1632.52		264.52	80.10	1897.04
28	0.00	264.52	80.10	1712.62		264.52	80.10	1977.14
29	0.00	264.52	80.10	1792.72		264.52	80.10	2057.24
30	0.00	264.52	80.10	1872.82		264.52	80.10	2137.34
31	0.00	264.52	80.10	1952.92		264.52	80.10	2217.44
32	0.00	264.52	80.10	2033.02		264.52	80.10	2297.54
33	0.00	264.52	80.10	2113.12		264.52	80.10	2377.64
34	0.00	264.52	80.10	2193.22		264.52	80.10	2457.74
35	0.00	264.52	80.10	2273.32		264.52	80.10	2537.84
36	0.00	264.52	80.10	2353.42		264.52	80.10	2617.94
37	0.00	264.52	80.10	2433.52		264.52	80.10	2698.04
38	0.00	264.52	87.84	2521.36		264.52	87.84	2785.88
39	0.00	264.52	87.84	2609.20		264.52	87.84	2873.72
40	0.00	264.52	87.84	2697.04		264.52	87.84	2961.56
41	0.00	264.52	87.84	2784.88		264.52	87.84	3049.40
42	0.00	264.52	87.84	2872.72		264.52	87.84	3137.24
43	0.00	264.52	87.84	2960.56		264.52	87.84	3225.08
44	0.00	264.52	87.84	3048.40		264.52	87.84	3312.92
45	0.00	264.52	87.84	3136.24		264.52	87.84	3400.76
46	0.00	264.52	87.84	3224.08		264.52	87.84	3488.60
47	0.00	264.52	87.84	3311.92		264.52	87.84	3576.44
48	0.00	264.52	73.20	3385.12		264.52	73.20	3649.64
49		264.52	48.00	3433.12		264.52	48.00	3697.64
50		264.52	32.41	3465.53		264.52	32.41	3730.05
51		264.52	25.98	3491.51		264.52	25.98	3756.03
52		264.52	21.04	3512.55		264.52	21.04	3777.07
Total	**264.52**		**3512.55**		**264.52**		**3777.07**	

2.3.5 COAL HANDLING AND OFFTAKE

Coal from the quarry will be transported over the haul road provided in the quarry batters duly connected to various coal benches through temporary ramps. Coal dumpers would move up the access trench and on the surface up to the discharge hoppers of primary crushers. Coal will be sized to (-) 200 mm in primary crushers and subsequently to (-) 50 mm size in secondary crushers. Two independent belt conveying circuits on eastern and western side of the block have been envisaged for transporting the crushed coal to the ground bunker at coal dispatch center, planned to be constructed at the south western extremity of the coal block as shown in fig. 2-6.

Suitable arrangement will be provided to draw coal from the ground bunker in to two silos from where coal will be dispatched to the power house over dedicated "Merry Go Round" system of rail network.

Figure 2-6: Surface Plan showing conveyor route and Coal Dispatch Centre

CHAPTER 3

TECHNICAL FEASIBILITY STUDY

As mentioned earlier in the report, the need for this technical feasibility study for Talaipalli coal block arose due to the dispute between NTPC and its MDO M/s TEMPL regarding strip ratio in Approved Mining Plan, issue of accommodation of OB dump and unworkability of Talaipalli mine as per Approved Mining Plan.

As per the scope, the study has been done in two parts. Firstly, the opencast mining part of the approved mining plan has been reviewed with respect to Mineable Reserves, OB quantities, Average stripping ratio and Waste Disposal Planning. Secondly, an alternate feasible option for opencast mining of the Talaipalli Coal Block has been worked out to extract maximum open-castable reserves of coal from the bock. Also, the coal evacuation strategy has been reviewed in light of the alternate feasible option.

3.1 REVIEW OF MINING PLAN (OPENCAST MINING)

The Approved Mining Plan has been examined with respect to Stripping Ratio and waste disposal planning. The volumetric calculation is based on the MINEX model of Talaipalli Coal Block prepared by MECL. The MINEX model, Approved Mining Plan and different Stage Pits was provided by NTPC. The Review of Mining Plan has been done up to calendar year 25 since the MDO contract has been awarded for 25 years only. However, the strip ratio of the Final Stage Quarry (52nd year) provided in the Mining Plan has been determined to find out the variance in stripping ratio, if any.

As discussed earlier, the Mining plan has envisaged two entries for mining the Talaipalli Block: one on the east side of the North Eastern side and the other on the western side

of the property. It is mentioned in the Mining Plan that both the eastern and western quarry will advance independently and they will merge after about 20 years of mine operation. However, the Mining Plan contains only Final Stage Plans alongwith 1st to 5th year stage plans. The 25th year stage pit has not been provided in the Mining Plan for analysing the volumetric.

Therefore, the 25th year Pit has been provided by NTPC based on the identified sequence of operation and 25 year calendar schedule in approved Mining Plan, for like to like comparison of Reserves and Strip Ratio. The 25th year stage pit is shown below in fig. no. 3-1

Figure 3-1: 25th Year Stage Pit provided by NTPC

Job No: 0210210049	25

3.1.1 RESERVES, OB VOLUME AND STRIPPING RATIO

The Mineable Reserve, OB volume and Average Stripping Ratio for the Talaipalli Block has been determined for Year 5, Year 25 and Year 52 (life of the mine) based on the stage pit boundaries provided in the Mining Plan or Stage Pits provided by NTPC. The details are given in table 3-1 below:

Table 3-1: Comparison of Mineable Reserve, OB volume and Stripping Ratio

Year	As per Approved Mining Plan (AMP)			As per CMPDIL based on AMP design		
	Coal (Mte)	OB (Mcum)	Stripping Ratio (cum/te)	Coal (Mte)	OB (Mcum)	Stripping Ratio (cum/te)
5	44.50	192.44	**4.32**	36.08	165.07	**4.58**
25	404.5	1738.64	**4.30**	430.50	2169.66	**5.04***
52 (Final)	843.69	3777.07	**4.48**	790.81	4008.5	**5.07***

Not Workable according to design of Approved Mining Plan as discussed later

The average stripping ratio to produce ~404.5 Mte of coal in 25 years is ~4.30 cum/te as per Mining Plan whereas examination of the Pit boundaries and designs obtained from NTPC to deliver ~404.5 Mte of coal indicates that the average strip ratio is ~5 cum/te (five). The variance in strip ratio is around 16-17%.

According to the Mining Plan, the total Mineable Coal is 843.69 Mte and the total OB volume is 3777.07 Mcum with average strip ratio of 4.48 cum/te. However, analysis of the design of the final stage pit in the Mining Plan and volumetric calculation using MINEX model provided by NTPC suggest that the total mineable coal estimated in the final stage pit is 790.81 Mte and OB volume is estimated to be 4008.50 Mcum. This gives an average strip ratio of 5.07 cum/te which is ~13% more than what is indicated in the Mining Plan.

3.1.2 WASTE DISPOSAL PLANNING AND AVAILABILITY OF LAND

As per the Mining Plan, about 264.52 Mcum of OB is likely to be accommodated in the temporary external dump and has been planned to be re-handled back to the de-coaled area of the mine. The temporary external dump is 60m above the ground level with maximum RL of +360m. A particular area in the dip side within the block has been designated for temporary external dump.

Upon examining the design in Mining Plan, it is understood that the maximum OB that can be accommodated in the proposed temporary external dump is ~178 Mcum assuming the swell factor to be 1.2. Therefore, 264.52 Mcum of OB cannot be accommodated in the temporary external dump as envisaged in the Mining Plan.

Further, it has been envisaged in the Mining Plan that the internal dump will start in the 5th year of mine operation and from 9th year of mine operation sufficient void space will be created such that re-handling of temporary external dump along with yearly OB removed will be accommodated in the generated internal void. The temporary dump has been envisaged to be re-handled till 20th year of mine operation.

Upon perusal of the stage pit and sequence of mining in the Mining Plan, it is estimated that to deliver 44.50 Mte of coal in 5 years, total OB removed will be around ~204 Mcum rather than 192.44 Mcum given in the Mining Plan. The strip ratio works out to be ~4.58 cum/te rather than 4.32 cum/te in the Mining Plan. Further, it has been estimated that at the end of 5th year of mine operation, the total internal dump capacity created in the void is ~11 Mcum.

Table 3-2: Estimated OB generated and OB accommodation in designated dumps at the end of 5 year

Year	Estimated OB (Mcum)	Total OB accommodated (Mcum)			Remarks
		External	Internal	Total	
5	204	178	11	189	Shortage of space for ~15 Mcum of OB

Thus, the total OB accommodation in external and internal dump is estimated to be ~189 Mcum (178 Mcum+ 11 Mcum) at the end of 5th year while the total OB estimated to be generated is ~204 Mcum.

This suggest that if the mining sequence and dumping location for temporary external dump identified in the Mining Plan is strictly adhered to, it will effectuate cessation of the opencast mining operation in 5th year due to inadequate dumping space and mine will not be able to progress thereafter.

Even when the temporary external dump height is increased to 90m above the ground level upto a RL of +390m, the maximum OB accommodation in external dump would be ~251 Mcum. In 6th year stage, total OB generated would be ~286 Mcum and total OB accommodation in internal dump would be ~25 Mcum. So, the mine operation will stop in 6th year, even if the height of the dump is increased.

To ensure progression of the mine beyond 5th year, a scenario has been evaluated considering the entire land within the lease area is available for dumping and thus external dumping shall be done in the southern extremities of the block.

As per the Mining Sequence followed in the Mining Plan, it is estimated that at the end of 25th year, total OB volume generated would be ~2040 Mcum to deliver 404.5 Mte of coal. The total internal dumping space created would accommodate ~1175 Mcum (upto RL of +360m) of OB while the Mining Plan envisages backfill of total OB generated (1738.64 Mcum) till 25th year by re-handling the temporary external dump. Evidently, the accommodation of total OB internally is not feasible and so re-handling of OB is not

possible. As it happens, the total external dump space beyond the pit boundary of 25th year is ~ 175 Mcum upto an RL of +360m. Therefore, even after utilizing the entire land available for external dump, the total dump accommodation in 25th year would be 1350 Mcum (External+Internal) while the total OB generated would be ~2040 Mcum. It is clear that there is no space for dumping available for ~690 Mcum of OB.

Stage-wise generation of OB and availability of dumping space (upto RL of +360m), considering the entire land within the block is available for dumping, for 5th, 10th and 15th year has been determined. The details are given below in table 3-3.

Table 3-3: Stage wise estimated OB generated and space available for OB accommodation

Year	Coal (Mte)	Estimated OB (Mcum)	Total Dump accommodation upto RL of +360m (Mcum)			Remarks
			External	Internal	Total	
5	44.50	**204**	688	11	**689**	Dumping space adequate
10	134.50	**675**	544	209	**753**	Dumping space adequate
15	224.50	**1160**	403	507	**910**	Dumping space inadequate

It is evident from the above table that mining operation will come to a halt between 10th and 15th year due to non-availability of sufficient dumping space for OB. Even when the External Dump height is increased to 120m above ground level (4 deck) upto a RL of +390m, the total OB accommodation in external and internal dump will increase to only ~1070 Mcum, thus forcing the mine operation to discontinue in 14th year.

Therefore, the examination of the Mining Plan has led to the conclusion that overall, this Mining Plan does not seem to be practical and workable. Mineable coal and mining life given in mining plan is not feasible. Also dump accommodation as suggested in mining plan is not feasible. There is calculation error in stripping ratio as well.

3.2 ALTERNATE FEASIBLE OPTION

One of the scope of the work is to provide an alternate feasible option for opencast mining if the Mining Plan is found to be impractical. It is understood from the above that mine operation in accordance with the two entry scenario and mining sequence in Approved Mining Plan is not feasible in the Talaipalli Block since opencast mining cannot progress beyond 5th year. It is also apparent that even when the entire land within the block is made available for external dumping and height of external dump within the block is increased to 120m above ground level, mine operation cannot continue beyond 14th year.

Taking into consideration the dumping constraint due to inadequate dumping space, an alternate feasible opencast mining strategy has been designed to extract maximum coal from opencast mining. Also, the mining sequence has been determined to minimize the strip ratio. A tentative calendar programme, OB disposal schedule and lead for OB/Coal has also been worked out. Schematic stage plans at an interval of 5 year has been provided in the report. Additionally, due to change in pit design and mining sequence, an alternate coal evacuation/handling strategy has been suggested.

3.2.1 OPENCAST MINING STRATEGY

Opencast mining for the Talaipalli coal block has been proposed upto Seam III as suggested in the mining plan to maximize the recovery of coal. It has been proposed to mine maximum area in the block with due consideration to space required within the block for external dumping. The rated capacity for the block is proposed to be 18.00 Mty.

Similar to Approved Mining Plan, a two-entry scenario has been envisaged: one on the north eastern side and the other on the western side. However, due to lack of adequate dumping space, the western quarry is proposed to stop after 5th years of operation and

only eastern quarry will continue thereafter. This will optimize the mineable coal and increase the life of the mine thereby conserving coal.

3.2.1.1 MINE BOUNDARY

The mine boundary for the western and eastern quarry has been delineated taking into consideration block boundary, surface features, strip ratio and external dump space required for continuity of mining.

WEST PIT

The west pit has been proposed upto Seam VII and will operate for 5 year only. This is due to the fact that backfilling of western pit would be required after 5 years to create adequate dumping space for the subsequent year's OB to be dumped. Also, the pit is designed upto VII i.e. 110m depth as there is lack of space for the pit to go upto Seam III in 5 years which is at a depth of ~250m. The pit boundaries for the western pit is given below:

Northern Boundary : Foot of the hill in northwest and 7.5m from the block boundary

Southern Boundary : Extent of the pit upto 5 year of operation

Eastern Boundary : 7.5m from the block and extent of the pit upto 5 year of operation

Western Boundary : 7.5m from the block boundary

EAST PIT

The East pit has been proposed upto Seam III. The major considerations for delineation of Eastern Pit boundary are strip ratio minimization and requirement of external dump space within the block. The pit boundaries for the eastern pit is given below:

Northern Boundary : 7.5m from the block boundary

Southern Boundary : 100m from the block for conveyor corridor and magazine

Eastern Boundary : 60m from Kelo rover and 7.5m from block boundary

Western Boundary : Fault F1 and an arbitrary line considering low strip ratio zone and leaving sufficient external dump space in the western side

3.2.1.2 MINEABLE RESERVE

For furnishing account of reserves, Net Geological Reserve has been arrived by taking geological loss of 10 % from Gross Geological Reserve. Mining loss of 5 % has been taken to arrive at the open-castable mineable reserves.

Total open-castable mineable reserve has been estimated as 411.66 Mte at a strip ratio of 4.60 cum/te. Tentative Reserve assessment for opencast mining is given below in table 3-4:

Table 3-4: Mineable reserve assessment for Opencast Mining

Particulars	Value in Mte
Net Geological Reserve as per GR	1267.15
Open-castable Net Geological Reserve	575.78
Net Geological Reserve blocked in batter	142.45
Available Net Geological Reserve for Opencast Mining	**433.33**
Less: Mining Loss@ 5%	21.67
Mineable Reserve for Opencast Mining	**411.66**

Seam-wise mineable reserve for opencast mining is furnished below in table 3-5:

Table 3-5: Seam-wise Mineable Reserve

Seams	Net Geological Reserve (Mte)	Mineable Reserve (Mte)
X-LA	0.00	0.00
X-LB	0.20	0.19
X-TOP	2.73	2.59
X-BOT	23.95	22.75
IX-L2	7.95	7.55
IX-L1	10.09	9.59
IX	40.46	38.44
VIII	51.58	49.00
VII	2.17	2.06
VI-TOP	10.28	9.77
VI-MID	67.34	63.98
VI-BOT	1.42	1.35
V-TOP	3.39	3.22
V-MID	12.80	12.16
V-BOT	18.27	17.36
IV-TOP	38.35	36.44
IV-MID	57.85	54.96
IV-L	14.13	13.43
IV-BOT	32.11	30.51
III L	11.34	10.77
III	26.91	25.56
TOTAL	**433.33**	**411.66**

3.2.1.3 PRODUCTION TARGET AND LIFE OF PROJECT

Considering the Pit geometry and total thickness of coal in the block, the production target has been kept same as 18.00 Mty proposed in the Mining Plan.

For the rated capacity of 18.00 Mty and considering the mineable reserve of 411.66 Mte, the production life of Talaipalli mine is estimated to be 25 years.

3.2.1.4 MINING SEQUENCE AND SCHEDULE

The mining operation in Talaipalli block has been envisaged to be done through two entry. One entry will be in the north eastern side and other entry will be in the western side. As the physical possession of land is taken, equipment will be deployed to drive two access trench on either side to reach the bottommost seam and then this two pit viz. West Pit and East Pit will advance towards the dip side.

The west pit is proposed upto Seam VII and once the base seam is reached in 4th year of operation, it will advance towards the dip. The west pit is proposed only for 5 years since operating the west pit further beyond 5 years will lead to inadequate dumping space for external dump and thus it will become an impediment to continuity in coal production. The west pit will be utilized for backfilling OB from eastern pit after 5 years.

The east pit is proposed upto Seam III and is the main pit which will operate till end of the life. During 5th year of operation, coal production from both the pit will reach 18.00 Mty. After 5 years, the east pit will independently produce 18.00 Mty till 25th year of mine operation.

Internal dump will start once sufficient void is created in the pit. It has been proposed to start internal dumping in east pit from 6th year of mine operation. The external dump is

proposed to be done on the western side of the east pit and western external dump shall be merged with internal dump of the east pit after 10TH year.

The mine parameters for the east and west pit is given below in table3-6:

Table 3-6: Mine Parameters

Sl. No.	Parameters	Unit	Value	
			East Pit	West Pit
1	Maximum depth	M	350	110
2	Maximum strike length:			
	along the Mine Floor	Km	3.60	1.10
	along the Mine Surface	Km	4.20	1.40
3	Minimum strike length:			
	along the Mine Floor	Km	2.25	0.90
	along the Mine Surface	Km	2.90	1.05
4	Maximum dip rise length:			
	on the Mine Floor	Km	2.40	0.50
	on the Mine Surface	Km	3.20	0.95
5	Minimum dip rise length:			
	on the Mine Floor	Km	2.10	0.40
	on the Mine Surface	Km	3.10	0.83
6	Area:			
	On the Mine Floor	ha	775.70	43.43
	On the Mine Surface	ha	1171.45	111.93

The calendar plan of mining operations has been formulated based on the adopted sequence of opencast minefield development, optimum conditions of mining operations for the entire life of the planned opencast mine.

The target capacity of 18.00 Mtpa of ROM coal has been proposed to be achieved in the 5th year of mine opening . The peak volume of OB excavation is 91.08 Mcum per annum. The production schedule is given in table 3-7 below:

Table 3-7: Tentative Production Schedule

Year	Coal (Mte)			Cumm. Coal (Mte)	OB (Mcum)			Cumm. OB (Mcum)	Strip Ratio (Cum/te)	Cumm. SR (cum/te)
	East Pit	West Pit	Total		East Pit	West Pit	Total			
1	0.90	0.60	1.50	1.50	4.12	3.14	7.26	7.26	4.84	4.84
2	2.00	2.00	4.00	5.50	9.17	10.47	19.64	26.89	4.91	4.89
3	4.00	4.00	8.00	13.50	18.33	20.93	39.26	66.16	4.91	4.90
4	9.00	4.00	13.00	26.50	41.24	20.93	62.17	128.33	4.78	4.84
5	14.35	3.65	18.00	44.50	66.52	19.11	85.63	213.96	4.76	4.81
6	18.00		18.00	62.50	91.08		91.08	305.03	5.06	4.88
7	18.00		18.00	80.50	91.08		91.08	396.11	5.06	4.92
8	18.00		18.00	98.50	91.08		91.08	487.19	5.06	4.95
9	18.00		18.00	116.50	91.08		91.08	578.25	5.06	4.96
10	18.00		18.00	134.50	88.68		88.68	666.94	4.93	4.96
11	18.00		18.00	152.50	81.10		81.10	748.04	4.51	4.91
12	18.00		18.00	170.50	81.10		81.10	828.13	4.51	4.86
13	18.00		18.00	188.50	81.10		81.10	910.23	4.51	4.83
14	18.00		18.00	206.50	81.10		81.10	991.32	4.51	4.80
15	18.00		18.00	224.50	78.67		78.67	1070.00	4.37	4.77
16	18.00		18.00	242.50	77.00		77.00	1147.00	4.28	4.73
17	18.00		18.00	260.50	77.00		77.00	1224.01	4.28	4.70
18	18.00		18.00	278.50	77.00		77.00	1301.01	4.28	4.67
19	18.00		18.00	296.50	77.00		77.00	1378.02	4.28	4.65
20	18.00		18.00	314.50	80.24		80.24	1458.26	4.46	4.64
21	18.00		18.00	332.50	80.88		80.88	1539.14	4.49	4.63
22	18.00		18.00	350.50	80.88		80.88	1620.02	4.49	4.62
23	18.00		18.00	368.50	80.88		80.88	1700.90	4.49	4.62
24	18.00		18.00	386.50	80.88		80.88	1781.78	4.49	4.61
25	18.00		18.00	404.50	80.88		80.88	1862.66	4.49	4.60
26	7.16		7.16	**411.66**	32.19		32.19	**1894.85**	4.50	**4.60**
Total	397.41	14.25	411.66		1820.27	74.57	1894.85		4.60	

3.2.1.5 MINING SYSTEM AND SYSTEM PARAMETERS

Elements of mining system have been determined in accordance with the parameters of excavation, transport equipment and parameters of drilling and blasting. However, the space constraint for dumping the OB has been the most important factor taken into consideration for designing the mining system, since the mining system plays an important role for determining the void created for internal dump.

With due consideration to geo-mining characteristics of the deposit and as envisaged in the Mining Plan, the mine is proposed to be worked by shovel-dumper combination as well as Surface Miner.

Design of mining system has been done considering safety guidelines of Directorate General of Mines Safety (DGMS). **However, during mine operations, the safety rules, regulations and various circulars issued by DGMS should be strictly followed and adhered to.**

The height of the shovel-benches in OB varies from inter-burden thickness to 10-12m. The width of the working benches has been considered as 40m and the width of non-working benches has been considered as 25m. Considering the flat dip (4^0-8^0) of the seams, it is proposed to excavate the OB from advancing benches by inclined layers parallel to seam floor. This eliminates the need to cut new horizons from the side of seam roof and simplifies water drainage from the benches to central sump.

The slope of each bench is proposed as 70^0. But the overall running slope in working faces will be around 20^0. The ultimate pit slope is varies between 33 deg to 42 deg.

Persistent bands of thickness more than 1m present in coal seams are proposed to be mined separately.

Bench height of OB dumps formed by Shovel-Dumper system will be 30m and slope of individual dump benches will be 37° (equal to angle of natural repose of OB material). Width of berm between two adjacent benches will be 30 m.

Proposed System Parameters are tabulated and given below in table 3-8.

Table 3-8: System Parameters

Sl. No.	Particulars	Unit	Pit	Dump
1	Bench height	m	10-12	30
2	Working bench width	m	40	30
3	Nonworking bench width	m	25	30
4	Bench slope	Deg.	70	37

Above mentioned system parameters are indicative in nature. **Referring to Regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020**, it is imperative on part of the owner to carry out slope stability study to determine acceptable system parameters i.e. overall slopes of permanent dump and pit walls.

3.2.1.6 COAL AND OB TRANSPORTATION

OB will be transported through flank roads in both the pit to external OB dumps and Internal OB dumps.

Coal in both the pit is proposed to be transported through ramps and flank roads. Coal from east pit will be transported to mobile crushing arrangement at the surface and thereafter to Coal dispatch center by surface conveyors. Coal from west pit shall be directly transported to coal dispatch center through trucks since the pit is proposed to be operated only for 5 years and providing conveyor for surface transport will make it redundant after 5 years.

The lead for OB shall vary from about 3.00-7.25 km over the life of the mine. For West Pit, the average lead for external dumping vary from 3.25-3.75 km. For East Pit, the average lead for internal dumping vary from 3.00-3.50 km while the average lead for external dumping vary from 6.75-7.25 km in initial 10 years and thereafter it vary from 6.00-6.50 km for next 5 years. The lead for external dumping after 15th year will be same as lead for internal dumping.

The lead for coal vary from about 2.50 – 5.00 km over the life of the mine. For west Pit, the average lead for coal vary from 4.50-5.00 km. For East Pit, the average lead for coal vary from 2.50-4.00 km.

The lead estimation is tentative and may be estimated each year in the yearly operation plan.

3.2.2 WASTE DISPOSAL STRATEGY

It is envisaged that initially for 5 years, all the OB generated will be dumped externally. The external dump is proposed to be located in the western side of the east pit leaving 100m distance from east pit boundary. Once sufficient void is created after 5 years of operation, internal dumping will start and some OB will be dumped in the de-coaled area.

Initially the OB from both the east and west pit will be dumped externally as shown in the 5th year stage plan. However, after 5 years, the west pit will cease to operate and thereafter it will be backfilled with the OB generated by the east pit. This is necessary to create adequate dumping space for continuity of mine operation.

The external dumping will continue till 15th year and thereafter only tiny amount of OB of around ~1 Mcum per year will be dumped externally in the region between external dump toe and east pit boundary.

The Approved Mining Plan has proposed re-handling of OB back into the void but there is no space within the pit for re-handling and so re-handling has not been envisaged.

Out of the total OB of 1894.85 Mcum, it is estimated that 510.05 Mcum (~27%) will be required to be dumped externally and rest 1384.80 Mcum (~73%) will be dumped internally. The final height of the external dump is proposed to be around 120m above ground level upto an RL of +410m and final height of the internal dump is around 90m above ground level upto an RL of +375m. This will ensure optimization of the life of the mine to extract maximum mineable coal. However, a slope stability study will be imperative to determine final dump height and final dump slope as per **regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020.**

Shovel-dumper spoil dumps will be formed in benches of 30m and slope of individual dump bench will be 37° (equal to angle of natural repose of OB material). The width of berm between two adjacent benches will be 30 m. Overall slope of dump works out to be 22^0- 24^0. Top soil wherever available will be stacked separately which will be used up for spreading over the completed OB dumps. For the formation of dumps and leveling of dumps, dozers will be used.

During mining operation, OB dump stability, high-wall slope stability for OB bench parameters, and maximum OB dump height should be adopted and modified as per the scientific study and DGMS permission.

Final stage dump plan, as well as stage plans also show the location of external/internal dumps showing RL as well as volume of dump.

The year-wise dumping schedule is provided in table 3-9 below:

Table 3-9: Terminal Dump Schedule

Year	External Dump		Internal Dump		Total OB	
	Annual	Cummulative	Annual	Cummulative	Annual	Cummulative
1	7.26	7.26		0.00	7.26	7.26
2	19.63	26.89		0.00	19.63	26.89
3	39.26	66.16		0.00	39.26	66.16
4	62.17	128.33		0.00	62.17	128.33
5	85.63	213.96		0.00	85.63	213.96
6	34.21	248.17	56.87	56.87	91.08	305.03

Year	External Dump		Internal Dump		Total OB	
	Annual	Cummulative	Annual	Cummulative	Annual	Cummulative
7	34.21	282.38	56.87	113.73	91.08	396.11
8	34.21	316.59	56.87	170.60	91.08	487.19
9	34.21	350.80	56.87	227.46	91.08	578.26
10	34.21	385.01	54.47	281.93	88.68	666.94
11	22.40	407.41	58.70	340.63	81.10	748.04
12	22.40	429.81	58.70	399.33	81.10	829.13
13	22.40	452.21	58.70	458.02	81.10	910.23
14	22.40	474.61	58.70	516.72	81.10	991.32
15	22.40	497.01	56.27	572.99	78.67	1070.00
16	1.60	498.61	75.40	648.39	77.00	1147.00
17	1.60	500.21	75.40	723.80	77.00	1224.01
18	1.60	501.81	75.40	799.20	77.00	1301.01
19	1.60	503.41	75.40	874.61	77.00	1378.02
20	1.60	505.01	78.64	953.25	80.24	1458.26
21	0.84	505.85	80.04	1033.29	80.88	1539.14
22	0.84	506.69	80.04	1113.33	80.88	1620.02
23	0.84	507.53	80.04	1193.37	80.88	1700.90
24	0.84	508.37	80.04	1273.41	80.88	1781.78
25	0.84	509.21	80.04	1353.45	80.88	1862.66
26	0.84	**510.05**	31.35	**1384.80**	32.19	**1894.85**

3.3 COAL HANDLING AND DISPATCH ARRANGEMENT

The mine is proposed to work through two quarries: East Pit and West pit. Talaipalli mine is planned for the production of 18.0 Mty of ROM coal from mine. As proposed in the Approved Mining Plan, coal will be produced through shovel dumper and surface miner (-100 mm size). Therefore, crushing of coal will also be required for handling and despatch. Total coal produced from Talaipalli Project will be loaded into railway wagon at nearby new proposed railway siding through silo and RLS for final despatch. A railway siding has been proposed in the south-western part of the block for coal loading and despatch.

Coal handling plant is proposed to cater entire production of coal from OCP and accordingly facilities of receiving, required crushing system, conveying, reclamation of coal from stockpile with conveying through belt conveyors to silo and loading into rail wagon through Rapid load out system.

Eastern quarry:

The proposed coal handling system includes receiving of ROM coal at surface. ROM coal from eastern quarry will be transported at surface through dumpers/trucks which will be received in receiving hoppers for conveying of coal through belt conveyors.

Suitable receiving arrangement for coal produced through shovel dumper /surface miner (-100 mm size) in Truck receiving station has been proposed for receiving of these coal at surface near the quarry mouth of the mine. These receiving arrangement for coal have been proposed near mine quarry mouth to minimize the truck/dumper movements. The receiving pit/ station may be shifted as per the mine advancement and requirement during mine operation.

At this stage, truck receiving hoppers are considered, however, suitable alternative receiving arrangement either through Reclaim feeder/ Chain feeder/Truck receiving station may also be considered at later stage according to mine condition and space availability at receiving pits.

ROM blasted coal produced and transported through dumper shall also be received at surface in receiving hopper of crusher. These coal will be crushed up to (-) 100 mm size with suitable capacity of crushers/ sizers and it will also be fed to conveyors for further transportation through belt conveyors.

The above proposed receiving and crushing station have been proposed for eastern quarry and at the southern side of the mine at a suitable location. It shall be shifted as per the mine advancement of eastern quarry. The location plan shown for receiving/

crushing stations and other system of coal handling in Stage Plans are tentative and it may change as per requirement.

Coal from receiving station and crushers shall be conveyed through suitable capacity belt conveyors at surface through series of conveyors. Further this coal will be conveyed and stored into stockpile through stacker conveyors. The stockpile may be placed near proposed silo in the space provided for infrastructures.

Western quarry:

Coal produced from western quarry shall be transported by truck/ dumpers at surface and received in a hopper of crusher for crushing coal up to (-)100 mm size. This crushing station for coal will be placed at a suitable location near proposed stockpile for Silo loading arrangement. This crushed coal shall also be reclaimed into suitable capacity belt conveyor and fed to proposed stockpile. The life of this quarry is about five years only as such coal crushing and handling/ conveying set up may be provided accordingly.

Loading & Despatch:

Coal from stockpile will be reclaimed through suitable capacity feeders/reclaimers and fed to proposed silos through suitable capacity of belt conveyors. The coal will be loaded in to railway wagons through Rapid load out system having suitable capacity pre-weigh hoppers with loading Silo. Two nos. silo will be placed on two different rail lines of proposed railway siding for loading of coal into railway wagons. Both the silos are connected with the bridge conveyors for feeding of coal into silos to ensure flexibility in loading.

CHAPTER 4

CONCLUSION AND RECOMMENDATIONS

4.1 KEY FINDINGS AND RECOMMENDATIONS

In light of the review of the Approved Mining Plan and technical feasibility study done in the earlier chapter, some of the key finding are summarised below:

- The mine operation as per Approved Mining Plan is not feasible and if executed, will cease to operate in 5th year and beyond. This is because of the fact that designated dumping space in the Mining Plan for temporary external dump is not adequate and there would be no space left for dumping OB in 5th year of operation.

- It is also evident that even if the entire land within the lease area is made available for dumping and external dump height is increased to 120m above ground level as opposed to 60m in the Mining Plan, the mine will still not able to operate beyond 14th year when the mining sequence of the Approved Mining Plan is followed.

- The mineable reserve for opencast mining as per Approved Mining Plan is 843.69 Mte at an average strip ratio of 4.48 cum/te for a life of 52 years. This mine cannot operate for 52 years attributable to the lack of land available within the block for accommodating OB. Also, while examining the pit design of the Mining Plan, it was found that the total mineable coal with opencast mining would be ~790.80 Mte at an average strip ratio of ~5.07 cum/te assuming there is no dumping space constraint and the mine operation is feasible for the entire projectized area in the Mining Plan.

- The Approved Mining Plan envisages total coal production of 404.50 Mte of coal at an average strip ratio of 4.30 cum/te for first 25 years, which is the contract period of MDO appointed by NTPC. Although mining till 25th year as per design of Mining Plan is impractical, the average strip ratio to deliver 404.50 Mte of coal in accordance with the sequence of the Mining Plan would be around ~5.04 cum/te assuming there is no dumping space constraint and mine operation is feasible till 25th year.

- A feasible option has been prepared after detailed analysis of the geo-mining parameters of the block and it has been ascertained that the total mineable coal from opencast mining would be around ~411.66 Mte at an average strip ratio of 4.60 cum/te as opposed to 843.69 Mte at an average strip ratio of 4.48 cum/te given in the Mining Plan. This is due to inadequate space available within the block for accommodation of OB. Additionally, the life of the mine would be around 26 years as opposed to 52 years in the Mining Plan.

- Pit boundary, mining sequence, external dump location and final height of the external dump is proposed to be changed to ensure continuity of mine operation and to extract maximum coal from opencast mining.

- Mine system parameters is proposed to be modified to ensure optimization of dump generation and creation of void. The change in bench parameters would necessitate review of equipment configuration proposed in the Approved Mining Plan.

- Two pit operation has been envisaged for 5 years and thereafter only east pit can continue since continuance of west pit will become a hindrance to coal production in subsequent years due to inadequate dumping space.

- Re-handling of OB has not been envisaged as there is no space within the pit for accommodating re-handled external dump.

- Since the west pit will operate only for 5 years, it is prudent to use conveyor transport only for east pit and coal from west pit (~14.25 Mte) shall be directly transported to the coal dispatch centre through trucks for 5 years.

- The lead for OB shall vary from about 3.00-7.25 km and the lead for coal vary from about 2.50 – 5.00 km over the life of the mine. The lead may be estimated each year in the year-wise operation plan.

In view of the above findings, it is evident that the current Mining Plan appears to be impractical. Therefore it is imminent to modify the Mining Plan and get the competent approval considering the proposed alternate feasible option since all the crucial parameters viz. opencast able mineable reserves, strip ratio, opencast mine boundary, calendar programme of excavation, opencast mine life, dumping location and dump schedule, lead distance, system parameters etc. would significantly change from the Approved Mining Plan.

ANNEXURES

ANNEXURE-I: *Letter from NTPC requesting CMPDI to be Independent Consultant*

Ref No: NTPC/CMI-HQ/TL/CMP/2021/02 01.06.2021

To
Sh. A K Rana,
Director (Technical),
Planning & Design,
CMPDIL,
Kanke Road,
Ranchi.

Sub: Consultancy for review of Mining Plan of Talaipalli Coal Block as Independent Consultant

Dear Sir,

Talaipalli coal block, located in Mand-Raigarh coalfield, Chhattisgarh, was initially allocated by Ministry of Coal on 25.01.2006. At the time of allotment, the block was regionally explored. NTPC engaged M/s. MECL for detailed exploration and preparation of Geological Report (GR) on 14.07.2006. Upon completion of about 102 boreholes (39654.75 mtrs. of drilling) in about 20 sq.km. block area, GR was received on 29.06.2009.

After receipt of the GR, NTPC appointed Advanced Coal Management & Marketing Pvt. Ltd (ACMM) as consultant for preparation of Mining Plan on 24.08.2009. Mining Plan prepared by ACMM was approved by Ministry of Coal for a rated capacity of 18 MMTPA, on 31.03.2010. Subsequently, all statutory clearances were obtained on the basis of the approved Mining Plan.

Key features of Approved Mining Plan as given in table:

Sl.	Minable Reserves (MMT)	Overburden (M.Cum.)	Stripping Ratio (Cum./t)	Life of the Mine (Yrs)
1	643.00	3777.07	4.48	50
2	404.50	1728.04	4.30	25

Subsequent to the cancellation of allocation of Talaipalli coal block (as a part of total 204 blocks) by Hon'ble Supreme Court of India in Sep '14, this block was re-allotted to NTPC on 06.09.2015.

NTPC appointed M/s. Thriveni Earthmovers Private Limited (TEMPL) as Mine Developer-cum-Operator (MDO) on 26.08.2020 for development and operation of Talaipalli Coal Block. During the contract period TEMPL has to extract 404.50 Million tonnes of coal at an average indicative Stripping Ratio of 4.30 Cum./t for 25 years including re-handling of 2% M.Cum. of OB dumped in temporary external dump.

TEMPL, after the award of contract, through various correspondences and in meetings, claimed that as per their calculations 404 MMT of coal can't be extracted at a stripping ratio of 4.30 Cum/tonne as specified in the approved Mining Plan. As per their estimation by various pit designs, stripping ratio is varying between 4.92 to 5.25 Cum./t. Further, TEMPL claims that excess OB generated cannot be accommodated in the designated dump as per the approved Mining Plan and 100% of backfilling of OB is also not possible. TEMPL also stated that two pit operations is not feasible at this stripping ratio and mine operations would become standstill after 6 years of operations if they follow the approved Mining Plan.

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NTPC had a series of discussions with TEMPL for the past 5 months and every time, it was communicated to them to start the mining operations as per the approved Mining Plan. It was also apprised to them that Mining Plan may be revised after 5 years of operations, after obtaining sufficient additional information.

In the meantime, when discussions with TEMPL were under progress for finding feasible solution, in contrary, M/s TEMPL chose to rescind the Project Agreement through their notice dated 04.05.2021 and filed a Commercial Civil Suit before Hon'ble Delhi Court. When the matter came for hearing on 10.05.2021 before Hon'ble Delhi Court, counsel of TEMPL brought the information of NTPC's earlier approach to CMPDIL into the notice of Hon'ble Delhi High Court. Accordingly, Hon'ble Delhi High Court in order dated 01.05.20201 has made the following observation:

> *"6. Mr. Mukul Rohatgi, learned senior counsel for the plaintiff submits that the plaintiff's complaint has been referred to Central Mine Planning and Design Institute Limited (CMPDIL) and the report of the said authority would be relevant for settlement talks. Mr. Tushar Mehta, learned Solicitor General submits that he shall verify the averments made by the plaintiff and communicate the same to the defendant."*

Subsequently, as per the direction of Delhi High Court, mutual discussions for amicable resolution of the issue were held between NTPC and TEMPL on 14.05.2021 and 21.05.2021 and where in TEMPL requested for appointment of Independent Expert for review of the Mining plan of Talaipalli coal mining project.

In the meantime, NTPC, in a meeting with Secretary, Ministry of Coal held on 10.05.2021 and with the Nominated Authority & Addl. Secretary, Ministry of Coal held on 13.05.2021 apprised about this issue cropped up regarding approved Mining Plan of Talaipalli mine.

M/s TEMPL, vide letter dated 31.05.2021, submitted its consent to NTPC for appointment of CMPDIL as an **Independent Consultant** for resolution of the above disputes related to the approved Mining Plan and also consented for sharing of the cost of the assignment/fees of CMPDIL, equally with NTPC.

Since, CMPDIL is the premier Government organization in the field of mining plan & design in India, and also as per the observation made by Hon'ble Delhi Court, we, on behalf of both NTPC Ltd. and Thulwani Earthmovers Private Ltd., hereby request you to take up this consultancy assignment as an Independent Consultant for detailed study and for amicable resolution of the issues. Cost of the assignment/fees of CMPDIL, in this regard, shall be equally shared by NTPC and TEMPL.

In this regard, a brief scope of work is placed below:

i) Review of the Mining Plan of Talaipalli coal mining project for both 25 years and the life of mine (52 years) with emphasis on calendar plan of excavation (Coal & OB, stripping ratio), dumping schedule (in-pit, external and re-handling), feasibility of two pit option, etc.

ii) Review of submissions / workings / variances being indicated by M/s TEMPL.

iii) Yearly stage plans for the first 25 years clearly showing positions of the pit, external dump, and in-pit backfill dump.

iv) If any deviation/discrepancy in approved mining plan, in that case alternate feasible solution may be provided along with the design parameters used and assumptions made therein.

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vi. A detailed report to be submitted indicating the findings of the review work covering all the points above.

You are requested to kindly take up this consultancy assignment on urgent basis. Cost of the assignment/fees of CMPDI, shall be taken care of parallelly. In this regard, we would also like to intimate you that the next date of hearing in the Delhi High Court is scheduled to be held on 27.07.2021.

Thanking you.

Yours faithfully,

(Partha Mazumder)
Executive Director (Coal Mining)
e-Mail : p.partha@cmpdi.co.in
Mobile : 9650986304

ANNEXURE-II: *Consent from TEMPL to engage CMPDI to review the Mining Plan*

THRIVENI EARTHMOVERS PRIVATE LIMITED

A World Class Mine Developer Operator

CIN: U60221TZ1999PTC008678

Ref: TEMPL/TL/Contracts/2021-22/

May 31, 2021

To,
The Head of Project,
Talaipalli CMP,
NTPC Ltd.
Lailunga Road, Gharghoda,
District Raigarh 496111,
Chhattisgarh.

Ref: (1) Order dated 10.05.2021 by Hon'ble Delhi High Court in C.S. (COMM) No. 219/2021, *Thriveni Earthmovers Private Limited v. NTPC Ltd.*
(2) Meetings between representatives of NTPC and TEMPL on 14.05.2021 and 21.05.2021.
(3) NTPC's email dated 30.05.2021,2:51PM

Sub: Engagement of the Central Mine Planning and Design Institute Limited (CMPDIL) to review technical parameters pertaining to the Talaipalli Coal Mining Project.

Dear Sir,

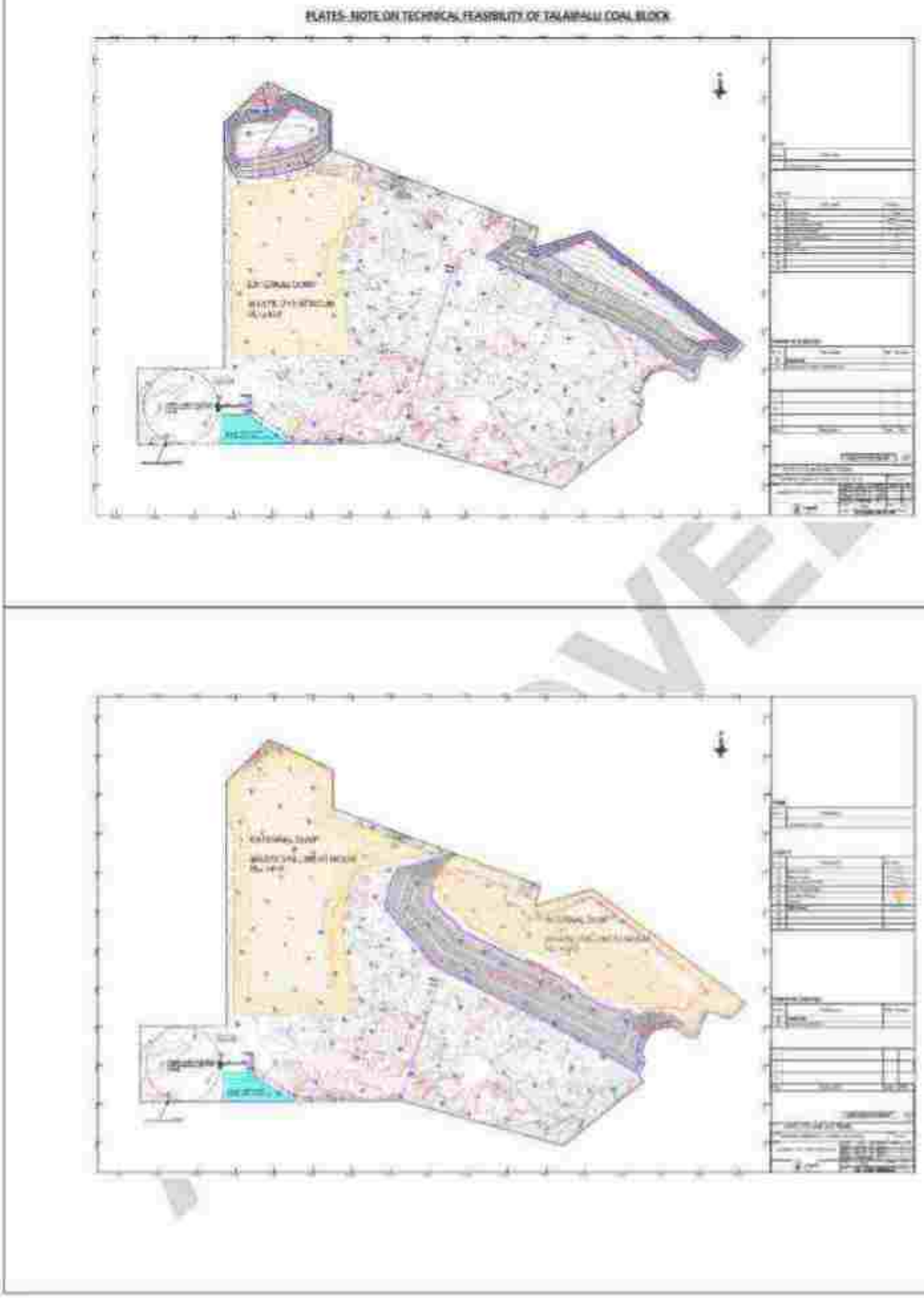
Pursuant to the Hon'ble Delhi High Court's order dated 10.05.2021, NTPC and TEMPL representatives had participated in meetings on 14.05.2021 and 21.05.2021 to resolve outstanding issues and bring an amicable solution.
TEMPL submitted NTPC to approach CMPDIL, jointly sharing all data's in each other's possession, including assumptions, to review the technical issues pertaining to the development and 25-year operation of the Talaipalli Coal Mining Project. TEMPL agrees to a joint mandate to CMPDIL as an Independent Consultant/agency, and would bear half the costs of CMPDIL with NTPC for this engagement. The scope of work (draft), as drafted by us is annexed in Annexure -I.
You are requested to take necessary action to approach CMPDIL at the earliest. We stand by and await your instructions/advise to engage jointly with CMPDIL as required.

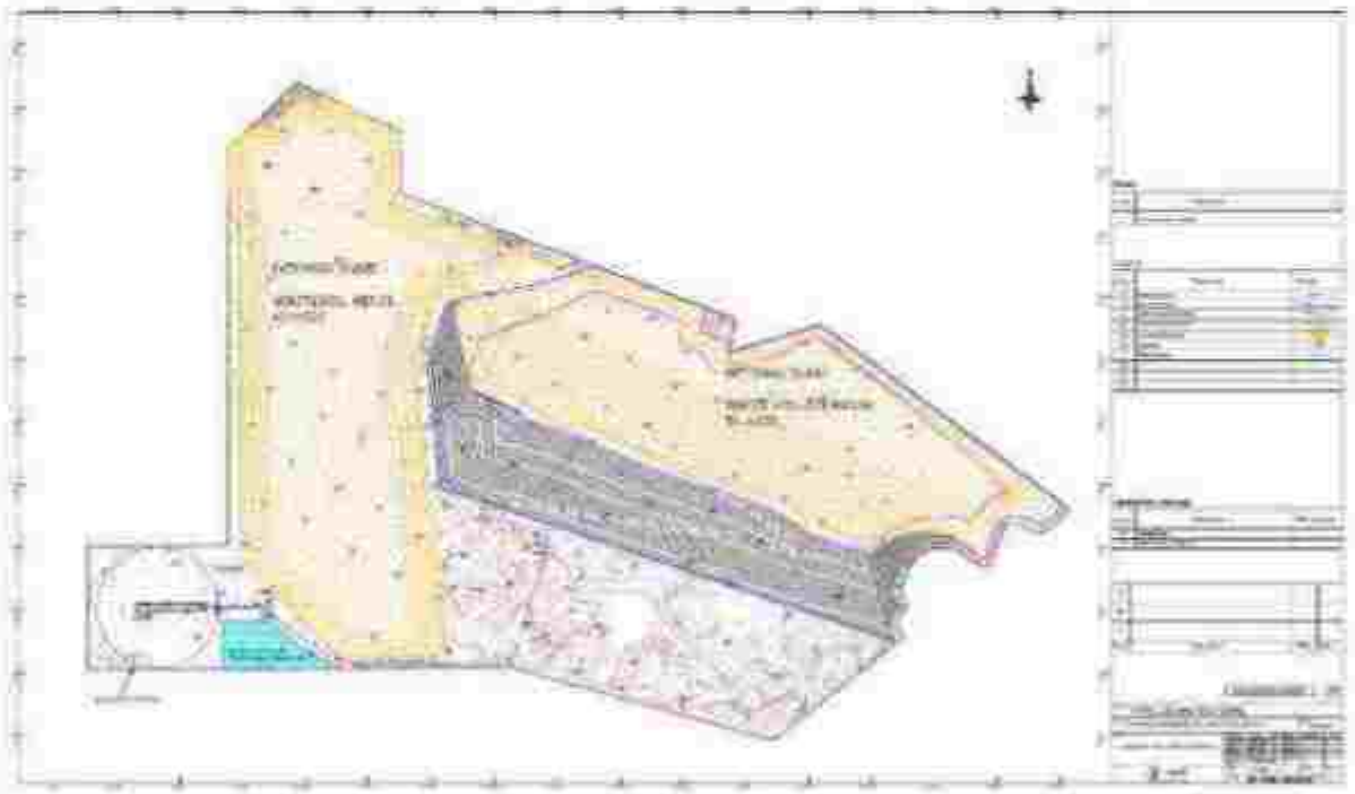
Thanking You,

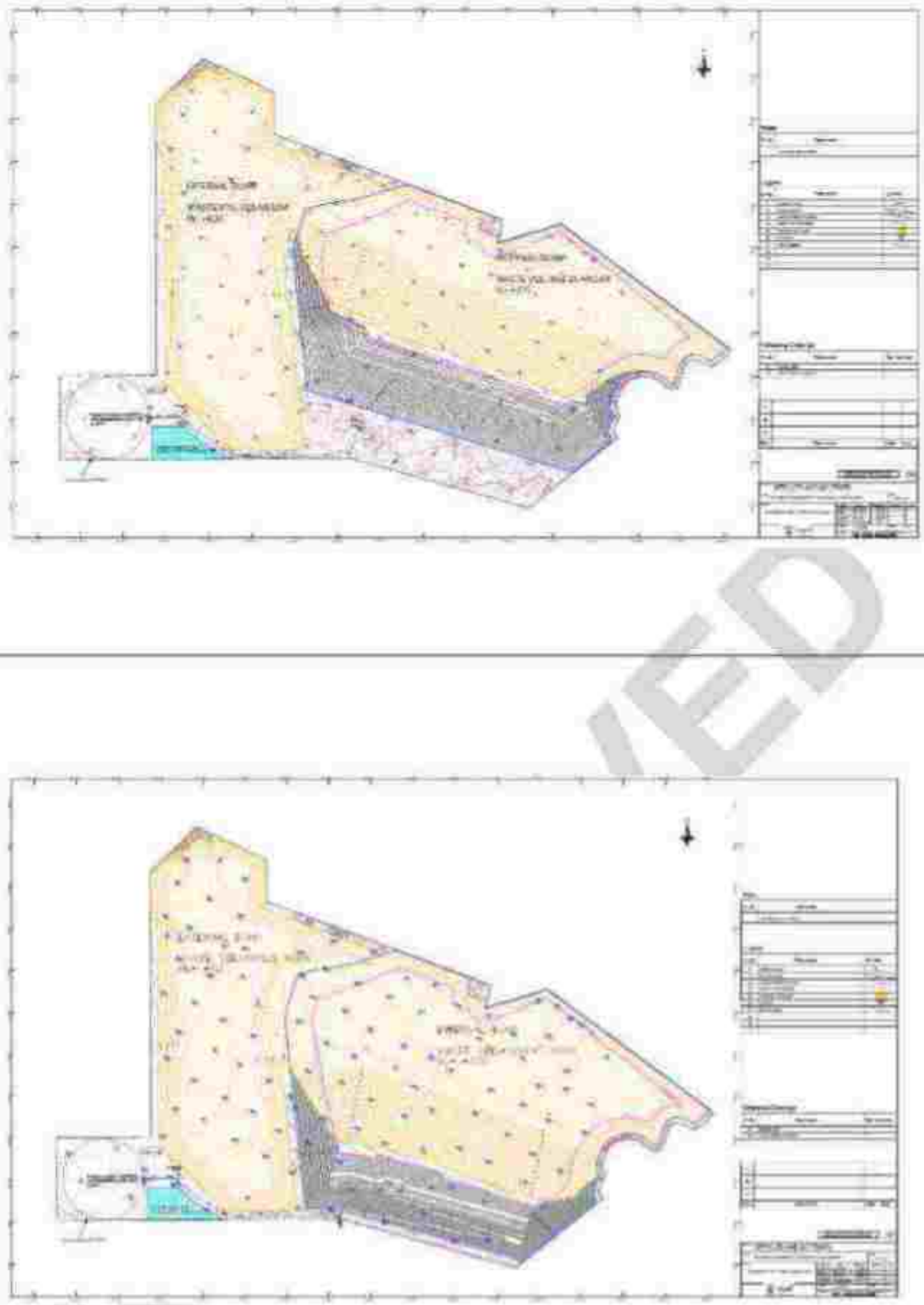
Yours faithfully,
For **Thriveni Earthmovers Private Limited**

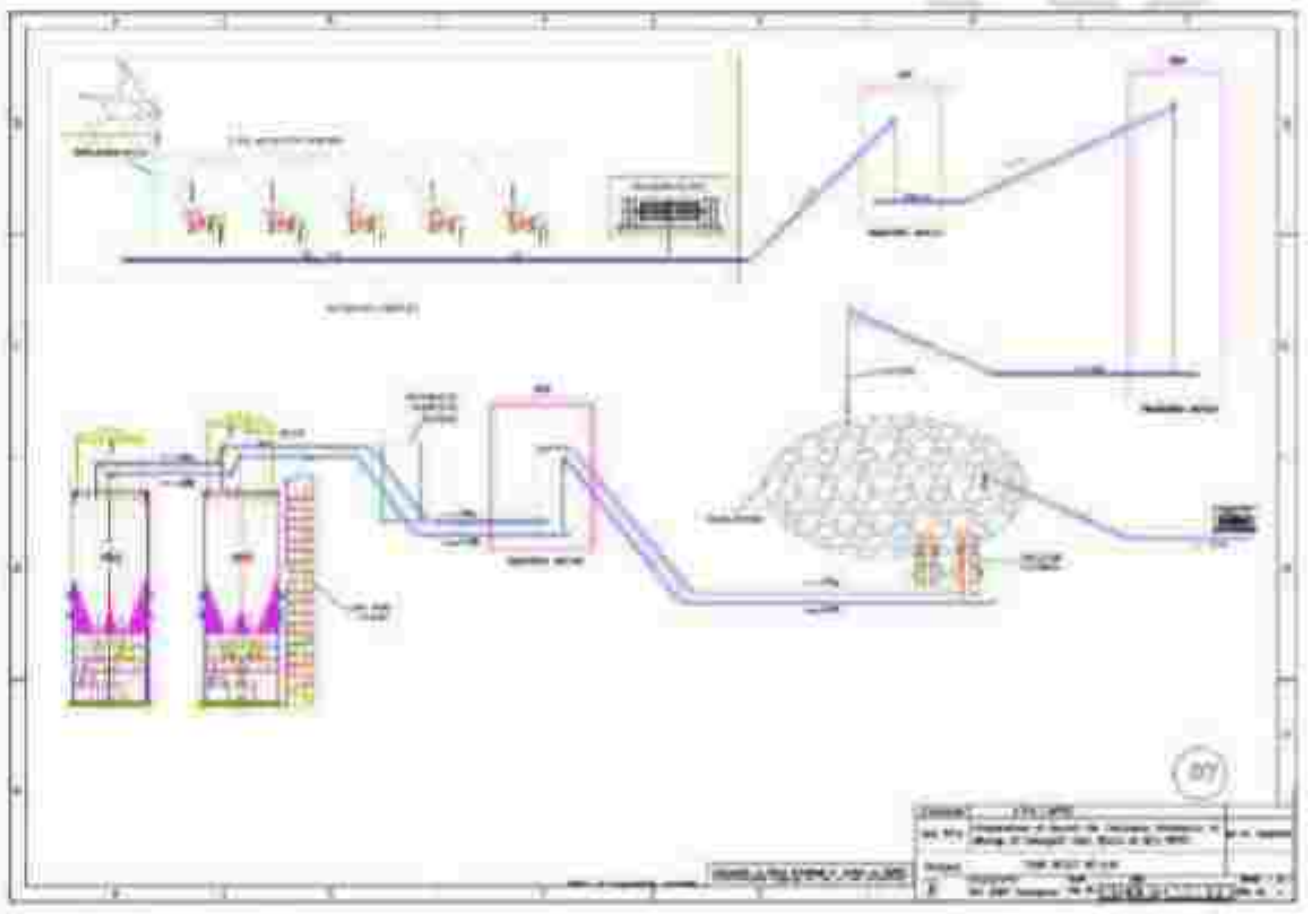
Authorised Signatory

Additional Annexure-23









Expert Advice and Technical Vetting of Technical Feasibility Note of Talaipalli Coal Block prepared by CMPDIL

December 2021

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List of Abbreviations

Mt	Million metric tons
Mbcm	Million bank cubic meter
AMP	Approved Mining Plan
MECL	Mineral Exploration Corporation Limited
CMPDIL	Central Mine Planning and Design Institute Limited
RoM	Run of Mine
TEMPL	Thriveni Earth Movers Private Limited
Mty	Million metric tons per year

DISCLAIMER

Given the mandate and the timeline of the work, this report is a high-level review of Approved Mining Plan of Talaipalli Coal Mine (AMP), TEMPL's findings of the AMP, and the Technical Feasibility Note of Talaipalli Coal Block prepared by CMPDIL.

All the data and plans provided with the CMPDIL's technical note has been relied upon and interpreted for the technical suggestions and the vetting of the report or developing any new insights about the mining strategy and sustainability of the operation.

IIT-ISM has not reviewed the MINEX Resource Model of Tallaipalli coal mine for any volume calculations. However, validations of overburden volumes have been performed on the mine stage plans (AutoCad drawings) provided by NTPC as part of the Technical Feasibility Note of CMPDIL. The level of accuracy of volume calculation would be in the range of +/- 10%.

Further, this report is for the NTPC's own use and not for the use of any third party.

CHAPTER 1

Background

1.1. Introduction

IIT-ISM has been approached by NTPC for an Expert Advice and Technical Vetting of Technical Feasibility Note of Talaipalli Coal Block prepared by CMPDIL.

Talaipalli coal block is located in the eastern part of Mand-Raigarh Coalfield in the state of Chhattisgarh. The coal block has been allotted to NTPC by Ministry of Coal (MoC), vide letter no.13016/29/2003-CA-1, dated 25.01.2006, for meeting coal requirement of proposed 4000MW Lara Integrated Power Project, approximately 60 km. away from the coal block.

Mining plan of Talaipalli coal block was prepared by Advanced Coal Management & Marketing Pvt. Ltd (ACMM), New Delhi on behalf of NTPC in 2009 and got approved by Ministry of Coal for a rated capacity of 18 MMTPA, on 31.03.2010. Subsequently, the various statutory clearances were obtained on the basis of this approved Mining Plan to develop and operate the mine (Table 1.1).

Table 1.1. List of Statutory Clearances.

Description	Date of Clearance
Approval of mining plan	31.03.2010
Environment Clearance (EC)	02.01.13/13.11.15 (Rev.)
Forest Clearance (FC)	Stage I: 05.11.12; Stage II: 29.01.14; 23.05.17(Rev.)
Consent to Establish (CTE)	06.01.15
Consent to Operate (CTO)	17.03.16
Tripartite Escrow Agreement (Banker, CCO & NTPC)	15.05.14 & 04.09.17
DGMS Permission	19.01.18
Coal Controllers Permission	31.01.18

Based on the approved mine plan and the subsequent approvals (Table 1.1), NTPC appointed M/s. Thriveni Earthmovers Private Limited (TEMPL or the Contractor) as MDO on 26.08.2020 for

development and operation of Talaipalli coal mine. TEMPL disputed the technical viability of the mining plan and filed a Commercial Civil Suit before Hon'ble Delhi High Court. Later on, at the direction of the Hon'ble Delhi High Court, NTPC and TEMPLE agreed to engage CMPDIL as the Independent Consultant for reviewing the approved Mining Plan and the workings of TEMPL and to suggest a feasible solution for working of the mine. CMPDIL took up this assignment and submitted its Technical Feasibility Note on 07.09.2021.

NTPC has approached IIT-ISM for the expert advice and technical vetting of CMPDIL's Technical Feasibility Report (hereinafter referred as CMPDIL Report or Report) along with a high level review of the approved mine plan (AMP) and the findings of TEMPL, and has engaged IIT-ISM for the said services vide purchase order no. 5500039397-108-1074, dated, 19.11.2021.

1.2. Scope of Work

The scope of as proposed by IIT-ISM through its proposal dated, 14.11.2021, has agreed for the following scope of work:

- Technical review of Technical Feasibility Note prepared by CMPDIL,
- Technical review of Approved Mining Plan and Fundings of TEMPL, and
- Suggestions Expert advice for modification for sustainable mine

1.3. Exclusions

The Scope of Work for this work does not include the followings,

- Review, development and / or modification of Minex resource model.
- Modification of the quarry plan. Any modification in the mine plan suggested / recommended by IIT-ISM shall be undertaken by NTPC. Should NTPC require any alteration in the mining plan, IIT-ISM would be able to do it under a separate agreement beyond the scope of work of this proposal.
- Any environment impact assessment study. Should NTPC require any assistance in completing the environment impact assessment study, IIT-ISM would be able to do under a separate agreement beyond the scope of work of this proposal.

CHAPTER 2

Review of Approved Mining Plan

2.1. Geological Parameters of the coal mine

Talaipalli Coal Block ("Coal Block") is located in the eastern part of Mand-Raigarh Coalfield. The area of the block is approximately 20 sq. km. Major part of the block is covered by Barakar rock formations. As per the geological plan provided by NTPC, the barren measure rocks occur in the southern part of the block. A small patch of Barren Measure rock is also noticed in the north western part of the block (Figure 2.1). Geological succession of rocks is shown in Table 2.1.

Fig. 2.1. Geological Plan of Talaipalli Coal Block

Table 2.1. Geological Succession of Lithologies

Formation	Thickness (m)	Lithology
Recent	0.50 – 18.00	Soil, alluvium
Barren Measures	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakar Rocks	30 – 596	Fine, medium and coarse grained felspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir Rocks	1.00 – 54.30	Khakee, greenish shale & sandstone, occasional pebbly
Basement		Metamorphic rock

2.1.1. Structure of the coal formation

As shown in the geological plan (Figure 2.1), the general strike direction of coal seams in the coal block is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. As reported from the approved mine plans, the dip of the coal seams varied from 4^0 to 8^0 towards south-west (Figure 2.1).

A total of 12 numbers of faults have been reported in the coal block as per the approved mine plan. The details are provided in Table 2.2

Table 2.2. Details of Faults

Fault no.	Location	Trend	Fault Type	Throw
F1-F1	Northern part passing near BH No. MNRT-24, 87, 22 & 35	East-West to ENE, NE-SW dipping northerly	Dip fault	**20 – 85m**
F2-F2	Northern part passing through MNRT-30	Essentially east- west dipping northerly	Dip fault	**0 – 10m**
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	**30 – 35m**
F4-F4	Northern part near BH MNRT-31, 24, 43 & 62	East-West dipping northerly	Dip fault	**30 – 150m**
F5-F5	Northern western part through BH MNRT-62	East-West	Strike fault	**35m**
F6-F6	Northern part passing through MNRT-31	WNE-ESE dipping westerly	Oblique fault	**15 – 25m**
F7-F7	Northern part passing through MNRT-11	NW - SE	Oblique fault	**20m**
F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	**60-105m.**
F9-F9	Northern part passing through MNRT-101 RT-4 & MNRT-11	East – West to curvilinear	Strike / Oblique Fault	**25m**
F10-F10	Northern part passing through RT-7	NE-SW	Oblique / Curvilinear	**0 -10m**
F11-F11	Southern part	NW-SE	Curvilinear	**0 – 10m**
F12-F12	**Southern part**	**NW-SE**	**Oblique**	**25 m**

Most of the faults are restricted to the northern part of the block. Faults: F1, F4 and F8 are major faults with larger throw.

2.1.2. Coal Seams

There are 27 coal seams / horizons in the coal block namely, XLA, XLB, X TOP, X BOT, IXL2, XL1, IX, VIII, VII, VI TOP, VI MID, VI BOT, V TOP, V MID, V BOT, IV TOP, IV MID, IV L, IV BOT, III L, III, III.3, II L2, II L1, II, II L & I. The sequence of coal seams along with inter-burdens are shown in Table 2.3

Table 2.3. Sequence of Coal Seams & Inter-burdens / Partings

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.20	1.06			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	X LB	0.30	1.28			0.50-0.90
	Parting			3.57	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0
4	X Bot	1.6	8.1			3.5-6.0
	Parting			2.3	20.15	3_5-16.5
5	IX L2	1.2	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.65	11.87	6.0-8.0
7	IX	0.96	6.96			3.5-6.0
	Parting			6.30	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0

12	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.80	23.45	14.0-21.0
13	V Top	0.50	3.09			0.50-1.50
	Parting			9.09	18.94	11.5-18.5
14	V Mid	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bot	0.30	5.40			0.50-2.0
	Parting			15.16	30.14	17.0-23.0
16	IV Top	0.54	5.78			2.5-5.0
	Parting			5.30	20.13	6.0-10.0
17	IV Mid	0.99	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bot	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.10	3.25			0.50-1.5
	Parting			24.57	44.55	33.0-39.0
21	III	0.66	5.97			2.0-5.5
	Parting			31.1	55.99	33.0-51.0
22	II L3	0.50	3.09			<0.90
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			<0.90
	Parting			5.0	60.39	35.0
24	II L1	0.05	1.54			<0.90
	Parting			1.27	20.59	3.0-14.0
25	II	0.13	5.92			1.5-2.5
	Parting			0.37	3.89	0.50-2.0
26	II L	0.05	2.45			<0.90
	Parting			Around		
27	**I**	**0.22**	**0.55**		-	27

2.2. Mining parameters

As per the approved mining plan, the proposed mining method is open cast mining with shovel-dumper-surface mine equipment systems. Open cast mining is proposed up to the floor coal seam III. Final stage quarry plan and quarry parameters are shown in Figure 2.2 and Table 2.4.

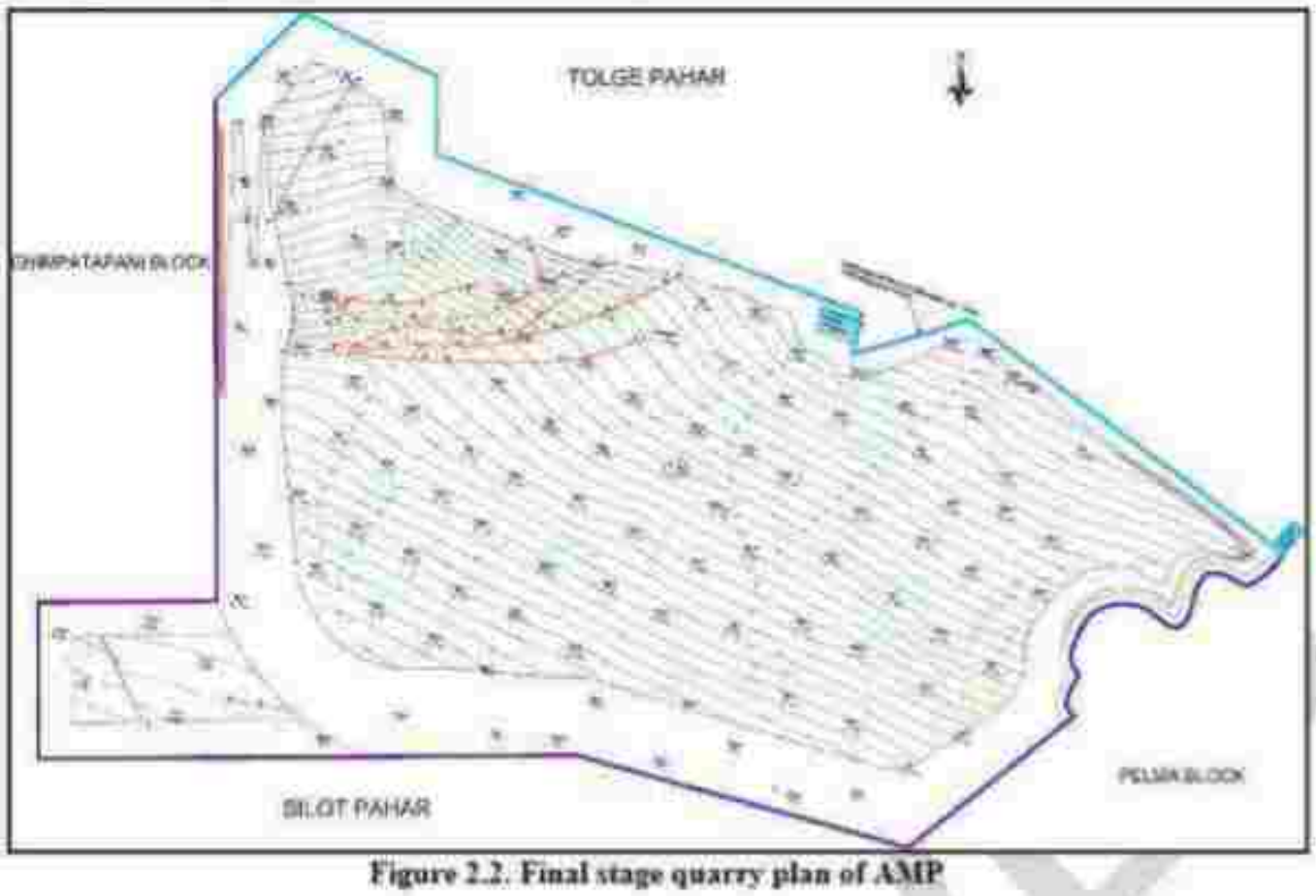

Figure 2.2. Final stage quarry plan of AMP

Table 2.4. Mining parameters

Sl. No.	Description of Mining Parameters	Values	
1	Project Details	Area - 21.13 km^2	
2	Reserves (MT)	Gross Geological Reserves (MT):	1400.58
		Net Geological Reserves (MT):	1260.52
		Mineable Reserves* Extractable-	
		OC 843.68	
		UG 17.57	
		Coal blocked in barrier & batters:	336.69
		Mining Losses Considered (@ 5%):	44.40
3	Pit Parameters (m)	Max. depth of OC mine: 404	

		Strike lengths (m):	
		Max.	6690
		Min.	1370
		Dip- rise lengths (m):	
		Max.	4760
		Min.	3060
4	Annual Coal Target Output (MT)	OC:	18.0
		UG:	0.72
5	Life of the Mine (LOM) (Years) (*: Mine construction period)	OC:	2* + 52 = 54
		UG:	4* + 26 = 30
6	Average Specific gravity of coal	1.65	
7	Equipment Systems Proposed for Mining	OC: Shovel – Dumper for Overburden, and a combination of Shovel / Loader – Dumper and Surface Miner for Coal.	
		UG: Continuous Miner & Shuttle Car Combination	
8	Average lead for Coal and Overburden (km)	2-3	
9	Overall coal quality:	**U.H.V (K.Cal. /Kg.)**	
	Grade - "F" Non-coking	Min. – 1310	Max. 5892
		Ash %	
		Min.17.50	Max. 45.10
		Moisture %	
		Min.1.20	Max. 11.00

*: Construction period

2.3. Mine development strategy:

Mine development strategy envisaged in approved mine plan has left a barrier of 7.5m on the surface from the adjoining coal block boundaries and 60m barrier from Kelo river on the eastern side of the Talaipalli coal block. Infrastructure facilities of the project such as MGR, workshop, store, sub-station, office etc. are proposed in the S-W corner of the property. These infrastructure facilities have blocked the coal which have been proposed to be extracted towards the end of the mine life when these infrastructures would be dismantled completely.

Given a large annual capacity (18.0 MTPA) of the mine and a high stripping ratio (4.30), high-capacity mining equipment have been proposed for coal extraction, overburden removal and the auxiliary

operations of the mine. Approved mining plan envisaged two pit mining operations at eastern & western extremities respectively of the coal block with respective east and west pit external dumps for overburden dumping in the initial years (Figure 2.3).

Figure 2.3. Two-pit mining operation at the end of 1st year operation of AMP

2.3.1. Calendar program of excavation and dumping schedule:

Both east and west pit advance towards the dip directions and finally merge to become a single pit at the end of 20 years of mining operation. Internal dumping / backfilling is envisaged to begin in the 5th year of mining operation once sufficient void is created within the pit. In the absence of land available for external dumping beyond the leasehold boundary / coal bearing area, initial overburden produced up to 4th year of quarry operation (115.94 million m^3) is to be put entirely as an external dump on the lease hold (herein after referred as "External" or "On – Pit Dump") (Figure 2.3.) on the dip side. In the 5th year of mining operation, the

majority of the OB is dumped externally, only 12.29 million m^3 is accommodated internally (Table 2.7).

Year wise coal extraction and overburden removal program of east and west pits for initial five year are shown in Table 2.5.

Table 2.5. Coal production and overburden removal program of east and west pit

Years	Coal (Mt)		OB (Mbcm)		Total Coal	Total OB
	East	West	East	West	(Mt)	(M.cum)
1	0.45	1.05	2.45	5.2	1.5	7.65
2	1.03	2.97	5.18	13.86	4	19.04
3	1.68	6.32	7.06	26.94	8	34
4	2.13	10.87	8.93	46.32	13	55.25
5	5.48	12.52	23.04	53.46	18	76.5

Note: Calendar program of excavation for east and west pit after 5th year till the merger of the pit is not provided.

From 5th year to 8th year, due to the lack of space available for internal dumping, the total overburden quantity of 306 million m^3 is split into external dump (148.58 million m^3) to be placed on the on-pit dump and internal dump (157.42 million m^3). From 9th year onward, no external dumping is proposed as the entire overburden quantity is accommodated in the internal dump for the balance period of the mine life. The entire external dump (total quantity - 264.52 million m^3) is re-handled back to within the quarry from 9th year until 20th year. The two quarries will finally merge in the 20th year of mining operation. 25 years calendar program of excavation and dumping are shown in Table 2.6 and 2.7 respectively.

Overall height of OB dump is 450 m from the deepest point of the mine floor, out of which only 60m is above the general quarry surface up to an RL value of +360m. Each tier of OB dump bench is of 30m height and berm width 30m, resulting into an ultimate dump slope is 22 degrees.

Table 2.6 Calendar Program of coal production and overburden removal

Year	Coal	Cumm. coal	Volume of overburden (Natural)				Volume of Overburden (Adjusted)			
			Current OB	Cumm. OB	Current SR	Average SR	Current OB	Cumm. OB	Current SR	Average SR
	Mt	MT	M.cum	M.cum	Cum/t	Cum/t	M.cum	M.cum	Cum/t	Cum/t
1	1.50	1.50	6.00	6.00	4.00	4.00	7.65	7.65	5.10	5.10
2	4.00	5.50	15.99	21.99	4.00	4.00	19.04	26.69	4.76	4.85
3	6.00	13.50	31.98	53.97	4.00	4.00	34.00	60.69	4.25	4.50
4	13.00	26.50	51.97	105.94	4.00	4.00	55.25	115.94	4.25	4.38
5	18.00	44.50	71.96	177.90	4.00	4.00	76.50	192.44	4.25	4.32
6	18.00	62.50	71.91	249.81	4.00	4.00	76.50	268.94	4.25	4.30
7	18.00	80.50	71.47	321.27	3.97	3.99	76.50	345.44	4.25	4.29
8	18.00	98.50	71.47	392.74	3.97	3.99	76.50	421.94	4.25	4.28
9	18.00	116.50	71.47	464.21	3.97	3.98	76.50	498.44	4.25	4.28
10	18.00	134.50	71.47	535.67	3.97	3.98	76.50	574.94	4.25	4.27
11	18.00	152.50	70.05	605.72	3.89	3.97	76.50	651.44	4.25	4.27
12	18.00	170.50	69.86	675.58	3.88	3.96	76.50	727.94	4.25	4.27
13	18.00	188.50	69.86	745.44	3.88	3.95	76.50	804.44	4.25	4.27
14	18.00	206.50	69.86	815.30	3.88	3.95	76.50	880.94	4.25	4.27
15	18.00	224.50	69.86	885.16	3.88	3.94	76.50	957.44	4.25	4.26
16	18.00	242.50	69.86	955.02	3.88	3.94	76.50	1033.94	4.25	4.26
17	18.00	260.50	75.30	1030.32	4.18	3.96	78.30	1112.24	4.35	4.27

18	18.00	278.50	76.91	1107.24	4.27	3.98	78.30	1190.54	4.35	4.27
19	18.00	296.50	76.91	1184.15	4.27	3.99	78.30	1268.84	4.35	4.28
20	18.00	314.50	76.91	1261.06	4.27	4.01	78.30	1347.14	4.35	4.28
21	18.00	332.50	76.91	1337.98	4.27	4.02	78.30	1425.44	4.35	4.29
22	18.00	350.50	76.91	1414.89	4.27	4.04	78.30	1503.74	4.35	4.29
23	18.00	368.50	76.91	1491.80	4.27	4.05	78.30	1582.04	4.35	4.29
24	18.00	386.50	76.91	1568.72	4.27	4.06	78.30	1660.34	4.35	4.30
25	18.00	404.50	76.91	1645.63	4.27	4.07	78.30	1738.64	4.35	4.30
26	18.00	422.50	76.91	1722.54	4.27	4.08	78.30	1816.94	4.35	4.30
27	18.00	440.50	74.91	1797.45	4.16	4.08	80.10	1897.04	4.45	4.31
28	18.00	458.50	74.90	1872.36	4.16	4.08	80.10	1977.14	4.45	4.31
29	18.00	476.50	74.90	1947.26	4.16	4.09	80.10	2057.24	4.45	4.32
30	18.00	494.50	74.90	2022.16	4.16	4.09	80.10	2137.34	4.45	4.32
31	18.00	512.50	74.90	2097.06	4.16	4.09	80.10	2217.44	4.45	4.33
32	18.00	530.50	79.58	2176.65	4.42	4.10	80.10	2297.54	4.45	4.33
33	18.00	548.50	82.28	2258.92	4.57	4.12	80.10	2377.64	4.45	4.33
34	18.00	566.50	82.28	2341.20	4.57	4.13	80.10	2457.74	4.45	4.34
35	18.00	584.50	82.28	2423.48	4.57	4.15	80.10	2537.84	4.45	4.34
36	18.00	602.50	82.28	2505.75	4.57	4.16	80.10	2617.94	4.45	4.35
37	18.00	620.50	84.07	2589.83	4.67	4.17	80.10	2698.04	4.45	4.35
38	18.00	638.50	87.35	2677.18	4.85	4.19	87.84	2785.88	4.88	4.36
39	18.00	656.50	87.35	2764.52	4.85	4.21	87.84	2873.72	4.88	4.38
40	18.00	674.50	87.35	2851.87	4.85	4.23	87.84	2961.56	4.88	4.39

41	18.00	692.50	87.35	3938.22	4.85	4.24	87.84	3649.40	4.88	4.40
42	18.00	710.50	86.34	3025.76	4.81	4.26	87.84	3137.24	4.88	4.42
43	18.00	728.50	85.60	3111.37	4.76	4.27	87.84	3225.08	4.88	4.43
44	18.00	746.50	85.60	3196.97	4.76	4.28	87.84	3312.92	4.88	4.44
45	18.00	764.50	85.60	3282.57	4.76	4.29	87.84	3400.76	4.88	4.45
46	18.00	782.50	82.96	3365.13	4.39	4.30	87.84	3488.60	4.88	4.46
47	18.00	800.50	73.84	3438.97	4.10	4.30	87.84	3576.44	4.88	4.47
48	15.00	815.50	61.55	3500.50	4.10	4.29	73.20	3649.64	4.88	4.48
49	10.00	825.50	41.02	3541.52	4.10	4.29	48.80	3697.84	4.80	4.48
50	7.00	832.50	96.53	3638.04	13.79	4.37	92.41	3750.05	4.63	4.48
51	6.00	838.50	74.52	3712.56	12.42	4.43	25.98	3756.03	4.33	4.48
52	5.19	843.69	64.51	3777.07	12.43	4.48	21.04	3777.07	4.05	4.48
Total	**843.69**		**3777.07**				**3777.07**			

Table 2.7: Overburden dumping schedule up to 25th year of operation

Year	External Dump		Internal Dump		Rehandling		Total OB (Mcum)	
	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.
1	7.65	7.65	0	0		0	7.65	7.65
2	19.04	26.69	0	0		0	19.04	26.69
3	34	60.69	0	0		0	34	60.69
4	55.25	115.94	0	0		0	55.25	115.94
5	64.21	180.15	12.29	12.29		0	76.5	192.44
6	45.38	225.53	31.12	43.41		0	76.5	268.94
7	21.17	246.7	51.33	98.74		0	76.5	345.44
8	17.82	264.52	58.68	157.42		0	76.5	421.94
9	0	264.52	76.5	233.92	8.12	8.12	76.5	498.44
10	0	264.52	76.5	310.42	18.13	26.25	76.5	574.94
11	0	264.52	76.5	386.92	18.13	44.38	76.5	651.44
12	0	264.52	76.5	463.42	18.13	62.51	76.5	727.94
13	0	264.52	76.5	539.92	25.42	87.93	76.5	804.44
14	0	264.52	76.5	616.42	25.42	113.35	76.5	880.94
15	0	264.52	76.5	692.92	25.42	138.77	76.5	957.44
16	0	264.52	76.5	769.42	25.42	164.19	76.5	1033.94
17	0	264.52	78.5	847.72	25.42	189.61	78.5	1112.24

18	0	264.52	78.3	926.02	25.42	215.05	78.3	1190.54
19	0	264.52	78.3	1004.32	25.42	240.45	78.3	1268.84
20	0	264.52	78.3	1082.63	24.07	264.52	78.3	1347.14
21	0	264.52	78.3	1160.92		264.52	78.3	1425.44
22	0	264.52	78.3	1239.22		264.52	78.3	1503.74
23	0	264.52	78.3	1317.52		264.52	78.3	1582.04
24	0	264.52	78.3	1395.82		264.52	78.3	1660.34
25	0	264.52	78.3	1474.12		264.52	78.3	1738.64

2.3.2. Equipment Configurations and deployment Schedule

Following equipment configurations for overburden removal, coal extraction and various auxiliary operations of the mine have been proposed in the approved mine plan (Table 2.8.)

Table 2.8. Equipment Configuration and Phasing

Sl. No.	Equipment	Size	Nos.	Year of Operation				
				1	2	3	4	5
	A. Overburden Removal							
1	Electric Shovel	35 Cum	4				2	4
2	Electric Hydraulic Shovel	20 Cum	8	1	2	5	7	8
3	Electric Hydraulic Shovel	4.5 Cum	11	3	8	8	8	11
4	Rear Dumper	240T	41				21	41
5	Rear Dumper	190T	76	8	18	43	67	76
6	Rear Dumper	50 T	92	21	61	61	67	92
7	Electric Drill	311 mm	3				1	3
8	Elec. Drill	250 mm	13	2	4	8	11	13
9	Diesel Drill	160 mm	9	2	3	5	7	9
10	Dozer	450 HP	6	2	5	6	6	6
11	Dozer with ripper	850 HP	5	1	2	3	4	5
	B. Coal Extraction							
1	Diesel Hydraulic Shovel	12 Cum	1			1	1	1
2	Diesel Hydraulic Shovel	4.5 Cum	3	1	2	2	3	3
3	Surface Miner	2200	4				1	4
4	Front end loader	4.5 cum	4				2	4
5	Rear Dumper	35 T	38				19	38
6	Rear Dumper	120T	10			10	10	10
7	Rear Dumper	50 T	26	8	16	18	26	26
8	Elec. Drill	250 mm	2			1	2	2
9	Diesel Drill	160 mm	3	1	2	3	3	3
10	Dozer	450 HP	3	1	1	2	3	3
11	Dozer with ripper	850 HP	3			1	3	3
	C. Common (Auxiliary Operations)							

1	Grader	280 HP	8	2	4	6	7	8
2	Hydraulic Shovel	6.5 Cum	2		1	2	2	2
3	Crane	100 T	4	1	2	3	3	4
4	Crane	30 T	4		1	2	2	4
5	Crane	8 T	6	1	2	2	4	6
6	Crane	5 T	4		1	2	3	4
7	Diesel Backhoe	1.0 Cum	6	2	3	4	5	6
8	FE Loader	5-6 Cum	3	1	2	2	3	3

The top overburden is proposed to be mined by 35.0 m^3 Rope Shovel and 240 T Rear Dump (RD) Truck combinations, thick intervening partings / inter-burdens are proposed to be mined by 20.0 m^3 Rope Shovel and 190 T RD Truck combinations, and the thin partings / inter-burdens are proposed to be mined by 4.5 m^3 hydraulic shovels and 35 – 50 T RD Trucks.

For coal extraction, 12.0 m^3 hydraulic shovels and RD 120 T trucks are proposed for thick coal seams, 4.5 m^3 hydraulic back-hoes and 35 – 50 T RD Trucks for thin seams. In addition, Surface Miner in combination with 4.30 m3 Front End Loaders (FELs) and 35 T RD Trucks have been proposed to extract up to 40% of the coal.

IIT-ISM is of the view that it is difficult comment on the fleet size and the deployment schedule of various equipment configurations proposed for overburden / inter-burdens removal and coal productions in the mining plan., as the calendar program of excavation in the approved mining plan does not provide the year wise break-ups of Top OB, Thick Partings / Inter-burdens and Thin Partings / Inter-burdens, and also the seam wise production details. The details of estimation of productivities for various equipment configurations are also not provided in the mining plan.

While detailed production planning is not within the scope of the present work, IIT – ISM is happy to provide the estimate of productivities of various equipment systems proposed for Tallaipalli coal mine (Table 2.9 to 2.13). These estimates can be used by NTPC for estimating the fleet sizes of various equipment systems to be deployed in the mine.

Table 2.9. Estimation of Productivity and Fleet of 35.0 cum. Shovel – RD 240 T Dumpers

	Particulars	Value	Unit.
Assumptions	Swell Factor	0.74	#
	Bucket Fill factor of Shovel	90%	#
	Bucket Capacity of Shovel	35	cum.
	Volumetric Capacity of Dumper (Struck Capacity)	130	cum.
	Bucket Cycle Time	0.6	min*
	Spotting time of dumper	0.6	min.*
	Factors Allowed for Travelling, Positioning etc.	0.85	#
	Annual working hours of shovel	6000	hrs.
	Av. Speed of Dumper	30	kmph*
	Lead	2.5	km*
	Dumper Spotting, Unloading & Waiting Time	2	min.*
	Working Dumper Availability	80%	#
1	Average standard hourly output of 35.0 m^3 shovel	1864.8	cum.
2	Annual output of 35.0 m^3 Shovel	9510480	cum.
3	240 T dumpers fleet size for one shovel	6	#
4	Annual output of 240 T RD Trucks	1585080	cum.
5	Average hourly output of RD Trucks	310.8	cum.

Table 2.10. Estimation of Productivity and Fleet of 20.0 cum. Shovel – RD 190 T Dumpers

	Particulars	Value	Unit.
Assumptions	Swell Factor	0.74	#
	Bucket Fill factor of Shovel	90%	#
	Bucket Capacity of Shovel	20	cum.
	Volumetric Capacity of 190 T Dumpers	101	cum.
	Bucket Cycle Time	0.6	min*
	Spotting time of dumper	0.6	min.*
	Factors Allowed for Travelling, Positioning etc.	0.85	#
	Annual working hours of shovel	6000	hrs.

	Av. Speed of Dumper	30	kmph*
	Lead	2.5	km*
	Dumper Spotting, Unloading & Waiting Time	2	min.*
	Working Dumper Availability	80%	#
1	Average standard hourly output of 20.0 m^3 shovel	1141.714286	cum.
2	Annual output of 20.0 m^3 Shovel	5822742.857	cum.
3	190 T dumpers fleet size for one shovel	5	#
4	Annual output of 190 T RD Trucks	1164548.571	cum.
5	Average hourly output of 190 T RD Trucks	228.3428571	cum.

Table 2.11. Estimation of Productivity and Fleet of 12.0 cum. Hyd. Shovel – RD 120 T Dumpers

	Particulars	Value	Unit.
Assumptions	Swell Factor	0.74	#
	Bucket Fill factor of Shovel	90%	#
	Bucket Capacity of Shovel	12	cum.
	Volumetric Capacity of 120 T Dumpers	70	cum.
	Bucket Cycle Time	0.45	min*
	Spotting time of dumper	0.6	min.*
	Factors Allowed for Travelling, Positioning etc.	0.85	#
	Annual working hours of shovel	6000	hrs.
	Av. Speed of Dumper	30	kmph*
	Lead	2.5	km*
	Dumper Spotting, Unloading & Waiting Time	2	min.*
	Working Dumper Availability	80%	#
1	Average standard hourly output of 12.0 m^3 shovel	871.85	cum.
2	Annual output of 12.0 m^3 Shovel	4446458.18	cum.
3	120 T dumpers fleet size for one shovel	6	#
4	Annual output of 120 T RD Trucks	741076.36	cum.
5	Average hourly output of 120 T RD Trucks	145.31	cum.

Table 2.12. Estimation of Productivity and Fleet of 4.5 cum. Hyd. Backhoe – RD 35 T Dumpers

	Particulars	Value	Unit.
Assumptions	Swell Factor	0.74	#
	Bucket Fill factor of Shovel	80%	#
	Bucket Capacity of Shovel	4.5	cum.
	Volumetric Capacity of 190 T Dumpers	16	cum.
	Bucket Cycle Time	0.4	min*
	Spotting time of dumper	0.4	min.*
	Factors Allowed for Travelling, Positioning etc.	0.85	#
	Annual working hours of shovel	6000	hrs.
	Av. Speed of Dumper	25	kmph*
	Lead	2.5	km*
	Dumper Spotting, Unloading & Waiting Time	1.5	min.*
	Working Dumper Availability	80%	#
1	Average standard hourly output of 4.5 m^3 shovel	319.68	cum.
2	Annual output of 4.5 m^3 Shovel	1630368	cum.
3	35 T dumpers fleet size for one shovel	10	#
4	Annual output of 35 T RD Trucks	163036.8	cum.
5	Average hourly output of 35 T RD Trucks	31.97	cum.

Table 2.13 (a). Estimation of Productivity of Surface Miner (SM 2200)

Particulars	Value	Units
Sp. Gravity (Coal)*	1.5	#
B (Cutting Width) *	2.2	meter
T (Cutting Depth) *	0.2	meter
V (SM Speed) *	20	meter / minutes
Q (B*T*V*60) (Productivity)	528	cum / hour
Factor for manoeuvring etc.*	75%	%

Hourly productivity	396	cum/ hour
	594	tons/hour
Working hours	5000	hours
Annual productivity	2970000	tons
	1980000	cum

*: Assumptions

Table 2.13 (b). Estimation of FEL-Truck Fleet for each Surface Miner.

	Particulars	Value	Unit.
Assumptions	Swell Factor	0.74	#
	Bucket Fill factor of FEL	80%	#
	Bucket Capacity of FEL	4.5	cum.
	Volumetric Capacity of 35 T Truck	16	cum.
	Bucket Cycle Time	1	min*
	Truck Spotting Time	0.5	min.*
	Factors for Travelling, Positioning etc. of FEL	85%	#
	Annual working hours of FEL	6000	hrs.
	Av. Speed of Truck	20	kmph*
	Lead	2.5	km*
	Truck Spotting, Unloading & Waiting Time at Delivery	1.5	min.*
	Working Trucks Availability	75%	#
1	Average standard hourly output of 4.5 m^3 shovel	142.08	cum.
2	Annual output of 4.5 m^3 Shovel	724608	cum.
3	35 T dumpers fleet size for one shovel	6	#
4	Annual output of 35 T RD Trucks	120768	cum.
5	Average hourly output of 35 T RD Trucks	23.68	cum.
6	Number of FEL per Surface Miner	3	#
7	Number of Trucks per Surface Miner	18	#

2.3.3. Mining Benches

Benches are the most distinguishing feature of a surface mine and one of the busiest areas of operation. Benches are crucial for surface mining operations as they have to accommodate all the major mining activities such as blasting, excavation, loading, hauling etc. Mining operations take place in multiple benches. To access the different benches a road or ramp are created. The width and steepness of the road and ramp depends upon the type and size of the equipment to be accommodated. Depending upon the operating requirements and the push back design, the mining benches can be classified into working benches and non-working (inactive) benches.

Stable slopes to the benches are extremely important for safe mining operations. At the same time slope angle is an important geometric consideration which has significant economic impacts. Normally bench should be as steep as possible within the reasonable factor of safety to ensure better economic returns. A typical initial design value of 70^0 bench slope angle may be considered. A thorough bench slope stability analysis may be essential to maximize the economic gain and strike a balance between safety and economy of operation. IIT – ISM recommends the following bench geometries for safe and efficient operations of various equipment systems / configuration of Talaipalli coal mine:

Table 2.14. Mining benches geometry

Sl. No.	Equipment Configuration	Bench Height (m)	Bench Width (m)		Length of Bench (m)	Bench Slope (^{0})
			Working Bench	Non-working Bench		
1	35.0 cum. Shovel – 240 T Dumpers	20.00	50.00	30.00	300 - 400	65 - 70^0
2	20.0 cum. Shovel – 190 T Dumpers	15.00	50.00	30.00	300 - 400	65 - 70^0
3	12.0 cum. Shovel – 120 T Dumpers	15.00	40.00	25.00	300 - 400	65 - 70^0
4	4.5 cum. Shovel – 35 T Dumpers	5.0 - 6.0	30.00	25.00	200 - 300	65 - 70^0
5	Surface Miners – FEL – 35 T	4.5 cum.	100 - 150	-	500	60 - 65^0

Above mentioned system parameters are indicative in nature based on equipment configuration, working efficiency and safety requirements of mining operations. However, the requirements

according to the DGMS **Regulation no. 106, CMR 2017, and Circular no. 3, 2020** must be carried out for slope stability study to determine acceptable system parameters i.e. overall slopes of permanent dump and pit walls.

CHAPTER 3

Review of Findings of TEMPL

M/s TEMPL, the appointed MDO of Tallapalli coal mine by NTPC, has disputed the approved mining plan strategy on four potential grounds - i) TEMPL observed that 404.5 MT of coal can't be extracted at a stripping ratio of 4.30 cum/ton by 25th year of mine operation as specified in the approved Mining Plan (AMP), ii) there would be an excess OB quantity than envisaged in the AMP which would not be able to be accommodated in the designated internal and external dump areas, iii) 100% backfilling by re-handling of temporary external dump / on pit dump as envisaged in the AMP is not feasible, iv) TEMPL observed that production will stop after 10 year if the two pit approach as proposed in the AMP is followed, and v) TEMPL claimed that the average lead overburden transportation will be 2 to 3 kms more than the average lead indicated in the AMP.

3.1. TEMPL's observations about excess overburden quantity till 25th year mining operation

M/S TEMPL has prepared its own estimate of mineable coal reserve and stripping ratio (Table 3.1) based on the approved 25th year mine plan (Figure 3.1.)

Table 3.1. TEMPL Reserve Statement on the basis of 25th year approved mine plan.

Description	UoM	Values (TEMPL)	Value (AMP*)	Variations
Coal Reserve (by open cast mining method)	Million Tons	409.70	404.50	+ 5.30
Waste Adjusted	Million BCM	2143.00	1738.64	+ 404.36
Strip Ratio	BCM / Ton	5.23	4.30	+ 0.93

Figure 3.1. 25th year approved mining plan.

TEMPL estimated the total coal quantity of 409.70 Mt. against the AMP estimated quantity of 404.50 Mt up to 25th years. Likewise, total overburden quantity has been estimated as 2143.00 million bcm against the approved mine plan overburden quantity of 1738.64 (adjusted) and 1645.63 million bcm (natural) up to 25th year. This resulted into a revised stripping ratio of 5.23 as against the AMP stripping ratio of 4.30 (adjusted) and 4.07 (natural).

The above observations of TEMPL provides a significant deviation in the overburden quantity of the mine having a huge commercial impact during the life of the contract. However, TEMPL's claim is not substantiated by the detailed engineering drawing and the calculation sheets.

Further, TEMPL modified the mining sequence to arrive at a revised mining plan of 25th years (Figure 3.2), which provided a superior outcome than the approved mining plan from mining point of view (Table 3.2.).

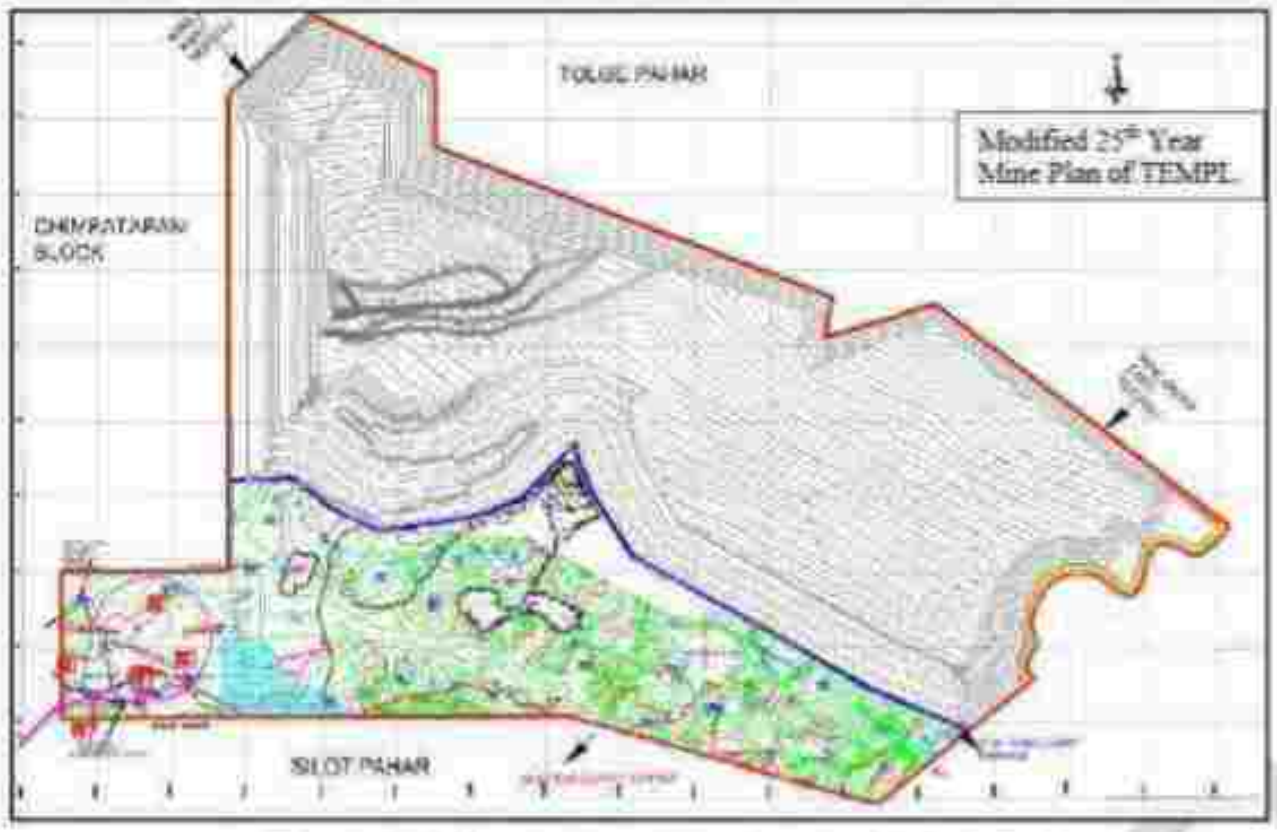

Figure 3.2. 25th year pit operation plan modified by TEML.

Table 3.2. TEMPL optimized Reserve Statement of 25 years operation.

Details	UoM	Values	Value (AMP*)	Variations
Coal Reserve (by opn cast mining method)	Million Tons	405.00	404.50	- 0.50
Waste Adjusted	Million BCM	1992.00	1738.64	- 253.56
Strip Ratio	BCM / Ton	4.92	4.30	- 0.60

Disclaimer by M/S. TEMPL: The above designs are based on information provided and assumptions made. TEMPL is not responsible for the accuracy or veracity of its sources.

In the modified 25th year mining plan of TEMPL, the estimated coal quantity was reduced to 404.50 (a minor reduction of 0.50 Mt), the estimated total overburden quantity got reduced to 1992.00 (still carrying a variation of over 14.50 % from approved mining plan), and the stripping ratio was also reduced to 4.92 (a variation of over 13.90% from the approved mine plan). However, the findings of TEMPL is based on high-level assumptions and does not claim the accuracy of the results.

However, IIT-ISM is of the view that the revised mining plan does carry the merit, a much more detailed engineering plan may be sought from TEMPL or an expert agency may be engaged to look into details of the mining plan to improve accuracy and engineering aspects of the mining plan from implementation point of view.

3.2. M/S. TEMPL claims that there is less dumping space at the designated dumping area and there won't be the feasibility of 100% backfilling by re-handling of temporary external dump as per approved mining plan

M/S TEMPL's claim, based on the study of the approved mining plan, shows a shortfall of dumping space by as high as 943 million bcm up to 25th year of mining operation (Table 3.3.)

Table 3.3. Assessment of dumping space by TEMPL

Details	UoM	TEMPL Estimate	AMP Estimate
Waste mined up to 25th years	Million bcm	2143.00	1738.60
In-pit dump capacity	Million bcm	1200.00	NA
No space for dumping	Million bcm	943.00	NA

However, after modification of the mining plan which brings an improvement (Figure 3.3), the short fall in the dumping space is reduced to 542 million bcm (Table 3.4.)

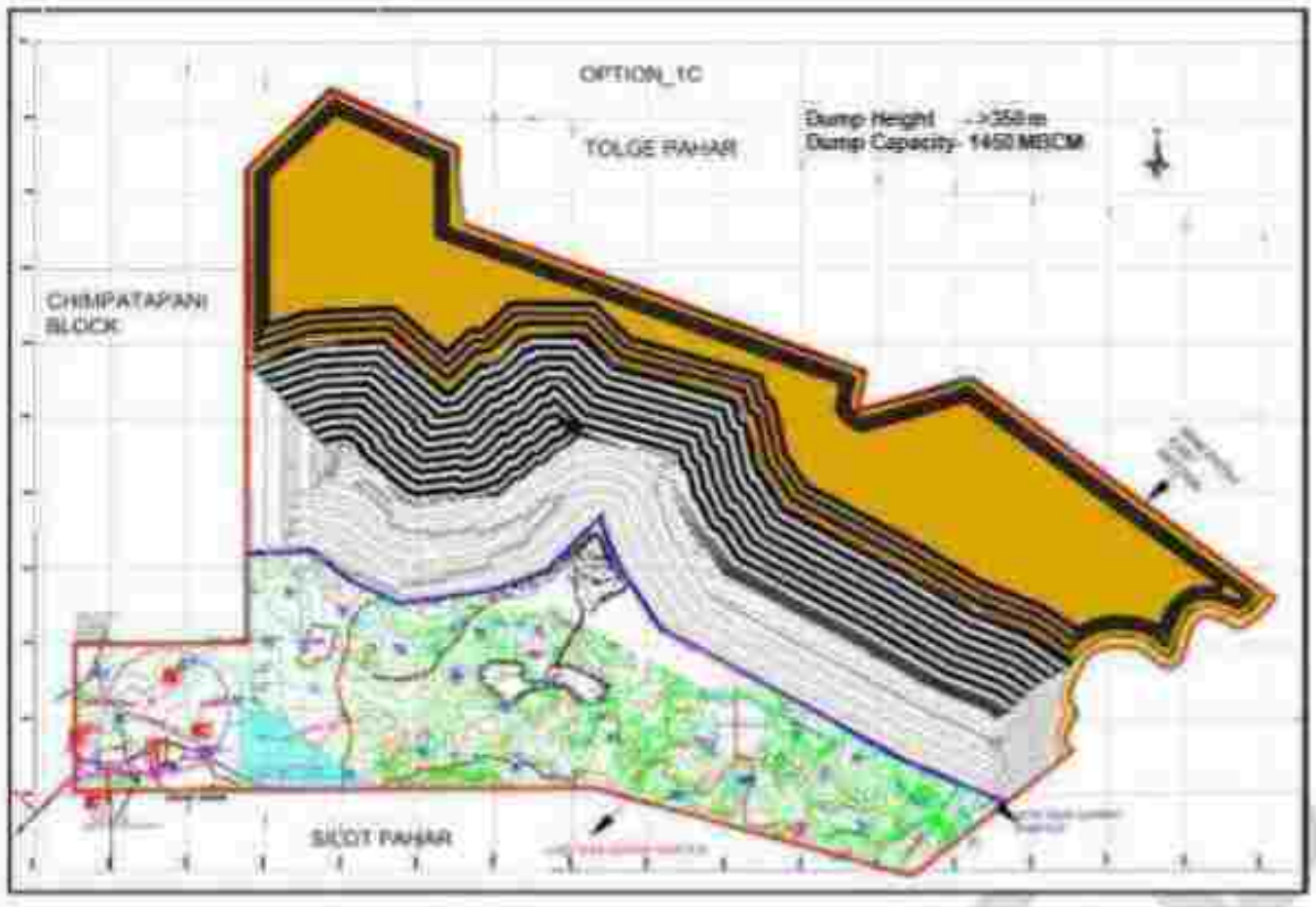

Figure 3.3. 25th year mine plan showing OB dumps.

Table 3.4. TEMPL Dumping Scenarios as per optimized 25th Year Mine Plan. .

Details	UoM	Modified Mining Plan Estimate	AMP Estimate
Waste Mine (25th Year)	Million bcm	1992.00	1738.60
In-pit dump capacity	Million bcm	1450.00	NA
No space for dumping (Swell Factor – 23%)	Million bcm	542.00	NA

Though, the TEMPL's claim is on the basis of a high-level indicative diagram (Figure 3.3) which certainly carry a merit, but in absence of a detailed engineering (drawings and calculations), IIT-ISM is not in position ascertain the accuracy of TEMPL's claim. An expert agency may be engaged to look into detailed engineering aspects of the mining plan to ascertain the accuracy and implementability of

the mining plan. No justification is provided for swell factor calculations which has been assumed as 23%. IIT-ISM does not take cognizance of SRK mine plan as it is not as key stakeholder in this case.

3.3. TEMPL claim that production will stop after 10 years if Double Pit approach is followed. Whereas, with Single Pit approach the production continues till the 25th year.

Approved mining plan envisages two pit operations at eastern & western extremities respectively of the coal block. Two access trenches and box cuts have been opened (Figure 2.2). Both east and west pit advance towards the dip directions and finally merge at the end of 20 years of mining operation. Internal dump will begin once sufficient void is created within the pit in the 5th year of mining operation. In absence of land outside the leasehold, all the overburden generated up to 4th year and thereafter part overburden up to 9th year of quarry operation is proposed outside the quarry operation on the dip side within the lease hold area to be re-handled back from 10th year of operation.

TEMPL has disputed this mining strategy saying that with two pit operation strategy, the coal production from the mine will stop in the 10th years as both pit operations would be bound by the on pit / external dump (Figure 3.4 and Table 3.5).

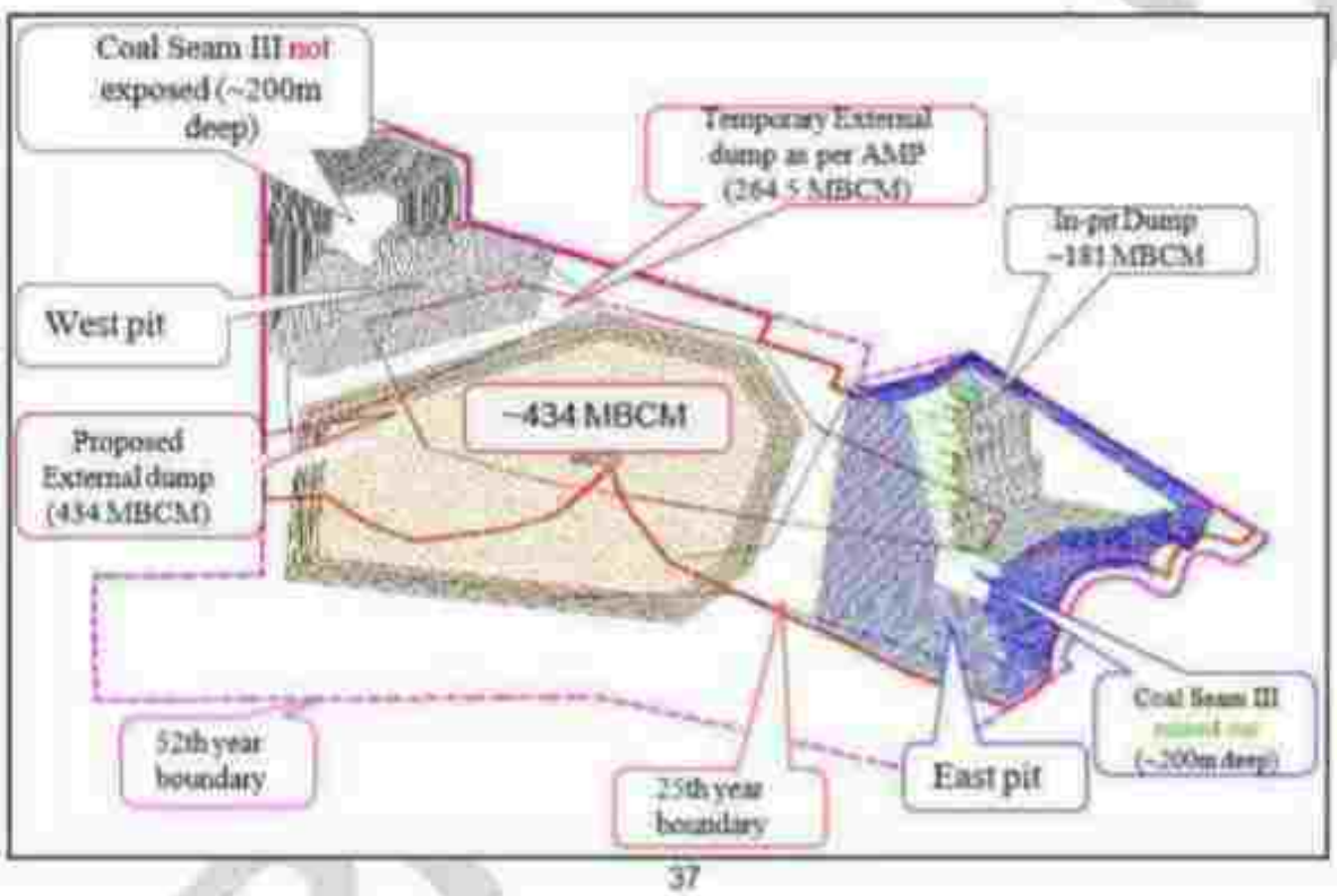

Figure 3.4. Two pit operation at the end of 10 years.

Table 3.5. Coal and Overburden Quantities in 10th Year of Operation

Details	UoM	Values
Coal extracted	Million tons	132.00
Waste generated	Million bcm	562.00
In-pit dumping	Million bcm	181.00

However, the single pit operation strategy starting with East pit proposed by TEMPL can continue the production till 25th year (Figure 3.6).

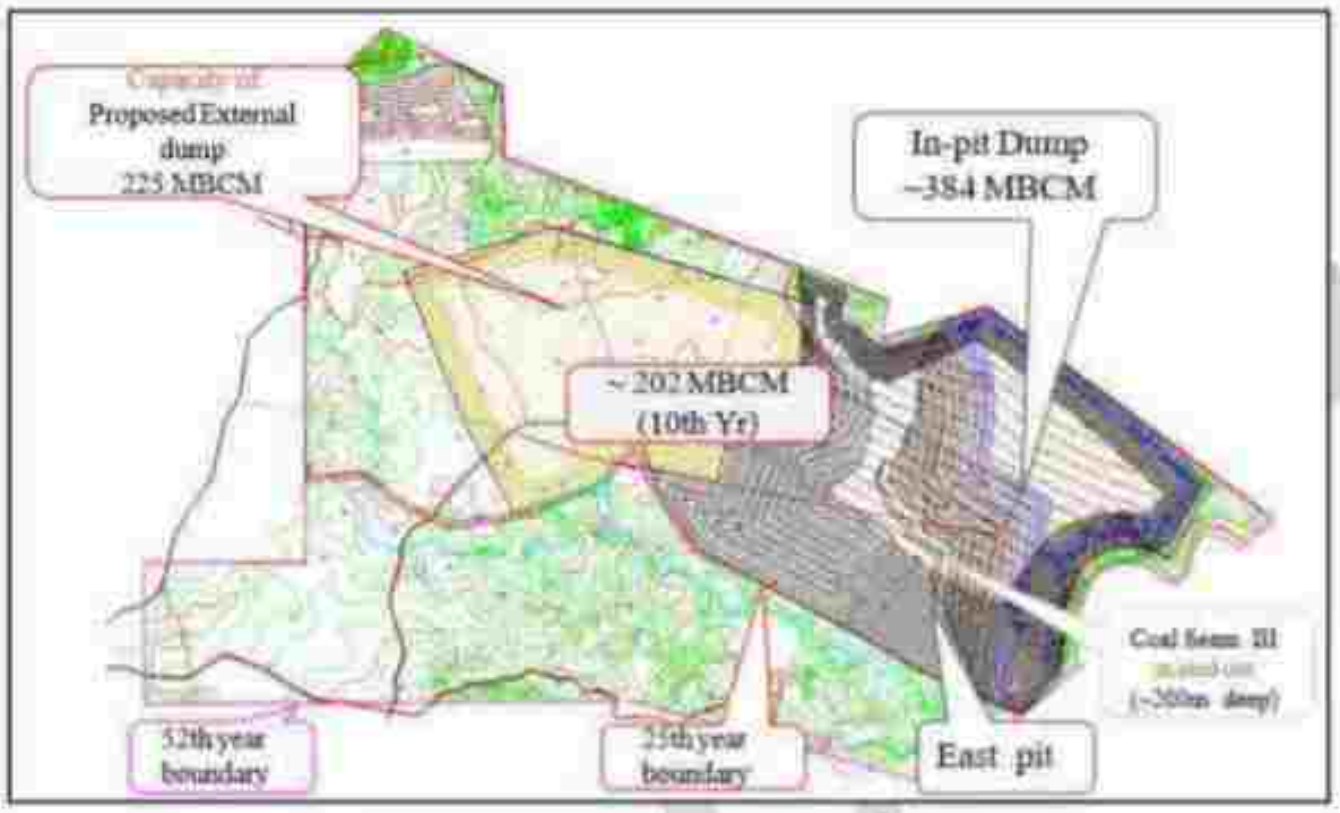

Figure 3.5. Single pit operation in 10th year.

Table 3.6. TEMPL Reserve Statement of Single Pit Operation in 10th Year.

Details	UoM	Values
Coal extracted	Million tons	132.00
Waste generated	Million bcm	587.00

In-pit dumping	Million bcm	384.00

IIT-ISM does not completely agree with the observations of TEMPL. IIT-ISM is of the view that TEMPL has not provided enough information in terms of engineering drawings (year-wise operating plans), estimation of internal and external dump quantities (year-wise) and calendar program of excavation showing the coal and overburden quantities (year-wise) from East and West respectively from 5th to 10th years of mining operations. In absence of these information, it is not possible to substantiate the TEMPL's claim that two pit operations would not be feasible after 10th year of operations. Rather, in a single pit operation, there is a high risk of the mining operation to be bound by the external dump which can stop the mining operation.

Prima-facie from Figure 3.4, it still seems possible to accommodate extra quantities of overburden in the external dump by increasing its height the dump due to the availability of space and thus continuing the two-pit operation in the 10th year. From 10th to 20th year of mining operation, a detailed study in terms of developing engineering plans and designs to ascertain that the operation does not stop as the intensity of operation increase due to re-handling of external dump.

3.4. M/S. TEMPL claimed that the lead distance will be increased by 2 to 3 kms compared to the average lead indicated in the approved mining plan.

IIT – ISM is of the view that there is a need to calculate average lead distance for overburden dumping at least at 5 years intervals to ascertain the claim. In absence this data TEMPL's claim does not exist.

CHAPTER 4

Review of Technical Feasibility Note of Talaipalli Coal Block prepared by CMPDIL

CMPDIL technical Note of Talaipalli Coal Block broadly contained two parts: i) Review of opencast mining strategy of AMP with reference to mineable reserves, overburden quantities, average stripping ratio and waste disposal schedule, and ii) an alternate mining plan strategy of Talaipalli Coal Block to optimize coal extraction and the coal evacuation strategy, if the AMP is not found to be workable.

Approved Mining Plan (AMP) was examined by CMPDIL with volumetric calculations of coal and overburden quantities using MINEX ROM model prepared by MECL. AMP contained only the 1st to 5th years, and 25th years and Final stage (52nd mining plans. 10th year, 15th year and 20th year mining plan was missing). Therefore, CMPDIL reviewed these mining plans as per the mining sequence proposed in the AMP for the reserves and overburden quantities (Table 4.1 and 4.2).

Table 4.1. Comparison of Mineable Reserve, OB volume and Stripping Ratio

Year	As per Approved Mining Plan (AMP)			As per CMPDIL based on AMP Design		
	Coal (Mt.)	OB (Mbcm)	Stripping Ratio (cum/t)	Coal (Mt.)	OB (Mbcm)	Stripping Ratio (cum/te)
5	44.5	192.44	**4.32**	**36.08**	165.07	4.58
25	404.5	1738.64	**4.3**	**430.5**	2169.66	5.04
52 (Final)	843.69	3777.07	**4.48**	**790.81**	4008.5	5.07

*Not Workable according to design of Approved Mining Plan as discussed later

Table 4.2. Variations of Reserve, OB volume and Stripping Ratio

Year	Variations (%)		
	OB (Mbcm)	Coal (Mt.)	Stripping Ratio (cum/te)
5	-14%	-19%	6%
25	25%	6%	17%
52 (Final)	6%	-6%	13%

Till the 5th year mine plan of AMP, while there was a decrease in the coal reserve as per CMPDIL estimates by 19% (from 44.50 Mt in the AMP to 36.08 Mt in the CMPDIL estimate), the decrease in overburden quantity is also 14% (from 192.44 Mbcm to 165.07 Mbcm) leading to a net increase in the stripping ratio by 6%. IIT-ISM is of the view that theses variations are well within the expected accuracy level of the

In the 25th year mine plan, there is a marginal increase in the coal reserve of CMPDIL estimates by 6% (from 404.50 Mt to 430.5 Mt), the increase in overburden quantity is quite high at 25% (from 1738.64 Mbcm to 2169 Mbcm) leading to an increase in the stripping ratio by 17%. In the final year (52nd year) mining plan there has been a decrease in the coal reserve of CMPDIL estimates by 6% (from 843.69 Mt to 790.81.5 Mt), and an increase in overburden quantity is by 6% (from 3777.07 Mbcm to 4000.8 Mbcm) leading to an increase in the stripping ratio by 13%.

It is pertinent to note that a similar study carried out by TEMPL till the 25th year mining plan showed a variation of 5.30 Mt in coal (from 404.50 Mt to 409.70 Mt) and + 404.36 Mbcm in overburden (from 1738.64 Mbcm to 2143.00 Mbcm) leading to a net increase in stripping ratio from 4.30 to 5.30 (Table 3.1). However, TEMPL workings were not based on detailed engineering as CMPDIL's. Therefore, IIT-ISM considers the CMPDIL's study more authentic and accepts the outcomes.

4.1. Waste Disposal and Overburden Dumping Plan

AMP has proposed to dump 264.52 Mbcm overburden (from 1st year to 9th Year) in the external dump and re-handle the same back to the internal dump from 10th year to 20th year in a systematic manner as the two pit operations advanced and finally merge together in the 20th year. The temporary external dump is 60m above the ground level with maximum RL of +360m. A particular area in the dip side within the block has been designated for temporary external dump (Figure 3.4).

CMPDIL reviewed the dump plan and concluded that the maximum OB that can be accommodated in the proposed temporary external dump area is ~178 Mbcm at a swell factor of 1.2 (The "swell factor" is defined as the ratio of the bank to lose weight densities of excavating material). Therefore, 264.52 Mbcm of OB cannot be accommodated in the temporary external dump as envisaged in the AMP. IIT-ISM is of the view is that this is a serious bottle neck to carry out the mining operation beyond 10th year.

Further, CMPDIL has estimated that to deliver 44.50 Mt. of coal till the 5th year of operation, total overburden to be removed will be approximately ~204 Mbcm instead of 192.44 Mbcm as proposed in the AMP, an additional ~11 Mbcm with a variation in the excavation area (CMPDIL estimated only 36.08 Mt coal and 165.07 Mbcm of overburden from the same excavation area proposed until 5th year of the AMP) (Table 4.1.). Further, it has been estimated that at the end of 5th year of mining operation, the total internal dump capacity created in the mine void is 11.00 Mbcm as against 12.29 Mbcm estimated in the AMP (a variation of approximately 11.7%) (Table 4.3). There will be shortage of space to accommodate approximately 15.0 Mbcm of overburden which is ~7% variation together in external and internal dumps. IIT-ISM is of the view that a variation of ~7% is well within the acceptable limits and there would not be a problem in continuing with the operation until the 5th year as per the AMP.

Table 4.3. Estimation of OB produced and its accommodation in the designated dump at the end of 5 year

Year	Estimated OB (Mbcm)	Total OB accommodated (Mbcm)			Remarks
		External	Internal	Total	
5	204	178	11	189	**Shortage of space for ~15 Mbcm of OB**

Prima-facie from Figure 3.4, it still seems possible to accommodate extra quantities of overburden in the external dump by increasing its height the dump due to the availability of space and thus continuing the two-pit operation in the 10th year. From 10th to 20th year of mining operation, a detailed analysis with proper engineering design and the plans was required to ascertain that the operation does not stop as the intensity of operation increase due to re-handling of external dump.

Accordingly, CMPDIL carried out this exercise by increasing the height of temporary external dump to 90m above the ground level up-to a RL of +390m, the maximum overburden quantity in the revised external dump would increase to ~251 Mbcm from 178 Mbcm in the dump up to +360m level. Thus following the natural excavation plan (249 Mbcm - un-adjusted), the mining operation is going to be feasible till 6th year. However, if the advance stripping is continued till the 6th year stage, total OB generated would be ~268 Mbcm and total OB accommodation in internal dump would be short by ~25

Mbcm. So, the mine operation will stop in 6th year, even if the height of the dump is increased. Further, to ensure progression of the mine beyond 5th year, CMPDIL evaluated the dumping options considering the entire land within the lease area is available for dumping and thus external dumping was to be done in the southern extremities of the block.

CMPDIL estimated that to deliver 404.50 Mt of coal till 25th year of mining operation, a total of ~ 2040 Mbcm of overburden will be generated following the mining sequence proposed in the AMP. CMPDI has analyzed the availability of space for internal and external dumping for 5th, 10th and 15th years of mining operation up to the RL of +360m as shown in Table 4.4.

Table 4.4. Stage-Wise Estimation of OB generated and Dumping Space

Year of Operation	Coal (Mt.)	Estimated OB (Mbcm)	Total Dump accommodation up-to RL of + 360m (Mbcm)			Remarks
			External	Internal	Total	
5	44.50	204	688	11	689	Dumping space adequate
10	134.60	675	544	209	753	Dumping space adequate
15	224.50	1160	403	507	910	Dumping space inadequate

Further, CMPDIL estimated that up to 25th year of mining operation, the total internal dumping space created would be ~1175 Mbcm (up-to RL of +360m) of OB while the Mining Plan envisaged to re-handle and backfill the entire OB (1738.64 Mbcm) generated as per the AMP till 25th year of mining operation. Evidently, the accommodation of total OB internally would not be feasible and hence the mining operation would not happen till 25th year of operation.

CMPDIL further explored the possibilities to accommodate more overburden dumps by increasing the dump heigh level to +390m (4 decks of 30m each). CMPDIL estimated that even with an increase in the final dump height to +390m, total designed space for overburden dump would be ~1070 Mbcm, thus making the mining operation not feasible beyond 14th year.

In the 25th year of mining operation, CMPDIL estimated the total external dump space beyond 25th

year pit boundary is ~ 175 Mbcm up-to an RL of +360m. Therefore, even after utilizing the entire land available for external dump, the total dump accommodation in 25th year would be 1350 Mbcm (External + Internal) while the total OB generated would be ~2040 Mbcm. It is clear that there is no space for dumping available for ~690 Mbcm of OB.

Therefore, the examination of the Mining Plan has led to the conclusion that overall, this Mining Plan does not seem to be practical and workable for 25 years as a lot of errors are there in the estimation of internal and external dump quantities. Mineable coal and mining life given in mining plan is not feasible. Also dump accommodation as suggested in mining plan is not feasible. There is calculation error in stripping ratio as well.

IIT-ISM agrees with the estimation of overburden dumps within the lease hold areas at different years of mining operations and endorses the view of CMPDIL that it would be difficult to carry out the mining operation beyond 15th years due to serious issues associated with excavation and dumping schedule.

4.3. Alternative Mine Plan Option of CMPDIL

In the light of the above findings of the AMP, CMPDIL thoroughly reviewed the mining strategy of Tallaipalli coal mine. CMPDIL suggested an alternative mining strategy based on the maximization of coal extraction, optimize overburden removal and dumping schedule, still meeting the coal production requirements of 18.0 Mt.

The alternative mining plan maximized the coal extraction with less surface area up to Seam III so that more overburden can be accommodated in external and internal dump. The alternative mining plan still followed two – pit operation - one on the north eastern side and the other on the western side. However, due to lack of adequate dumping space, the western quarry is terminated 5th year of mining operation after mining coal up to seam VI to a maximum depth of 110m (Figure 4.1), so that the void and the space thus created could be utilized for additional quantities of overburden generated from eastern pit in the subsequent years.

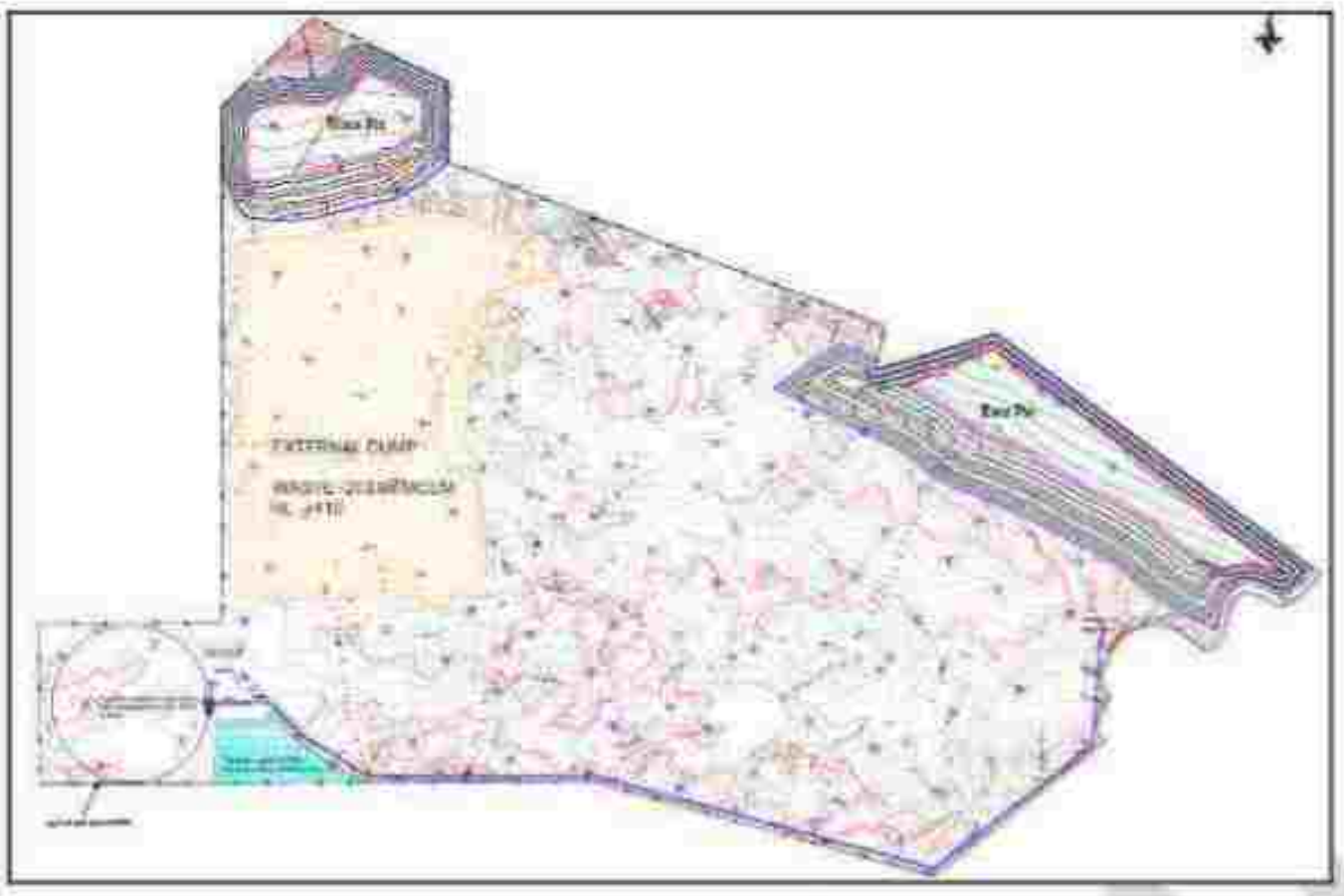

Figure 4.1. Mining plan at the end of 5th year of operation

A tentative calendar programme of excavation and OB disposal schedule of the alternative mining plan is shown in Table 4.5.

Table 4.5. Calendar Program of Excavation of Alternative / Modified Mining Plan

Year	Coal (Mt)			Cumm. Coal (Mt)	OB (Mbcm)			Cumm. OB (Mbcm)	Strip Ratio (Cum/t)	Cumm. SR (cum/t)
1	0.9	0.6	1.5	1.5	4.12	3.14	7.26	7.26	4.84	4.84
2	2	2	4	5.5	9.17	10.47	19.63	26.89	4.91	4.89
3	4	4	8	13.5	18.33	20.93	39.26	66.16	4.91	4.9
4	9	4	13	26.5	41.24	20.93	62.17	128.33	4.78	4.84
5	14.35	3.65	18	44.5	66.52	19.11	85.63	213.96	4.76	4.81
6	18		18	62.5	91.08		91.08	305.03	5.06	4.88
7	18		18	80.5	91.08		91.08	396.11	5.06	4.92
8	18		18	98.5	91.08		91.08	487.19	5.06	4.95
9	18		18	116.5	91.08		91.08	578.26	5.06	4.96
10	18		18	134.5	88.68		88.68	666.94	4.93	4.96
11	18		18	152.5	81.1		81.1	748.04	4.51	4.91
12	18		18	170.5	81.1		81.1	829.13	4.51	4.86
13	18		18	188.5	81.1		81.1	910.23	4.51	4.83
14	18		18	206.5	81.1		81.1	991.32	4.51	4.8
15	18		18	224.5	78.67		78.67	1070	4.37	4.77
16	18		18	242.5	??		??	1147	4.28	4.73
17	18		18	260.5	??		??	1224.01	4.28	4.7
18	18		18	278.5	??		??	1301.01	4.28	4.67
19	18		18	296.5	??		??	1378.02	4.28	4.65
20	18		18	314.5	80.24		80.24	1458.26	4.46	4.64
21	18		18	332.5	80.88		80.88	1539.14	4.49	4.63
22	18		18	350.5	80.88		80.88	1620.02	4.49	4.62
23	18		18	368.5	80.88		80.88	1700.9	4.49	4.62
24	18		18	386.5	80.88		80.88	1781.78	4.49	4.61
25	18		18	404.5	80.88		80.88	1862.66	4.49	4.6
26	7.16		7.16	411.66	32.19		32.19	1894.85	4.5	4.6
Total	397.41	14.25	411.66		1820.27	74.57	1894.85			4.60

Mining plans of 10th year, 15th year and 20th year developed by CMPDIL are shown in Annexure 1.

4.3.1. Mine Boundary

The mine boundary for the western and eastern quarry was fixed taking into consideration block boundary, surface features, strip ratio and external dump space required for continuity of mining.

West Pit: The west pit was designed up-to Seam VII at a maximum depth of 110m to be operated in the initial 5 years. This was required in order to create more space for dumping of overburden needed in the subsequent years for the overburden of the East Pit (Table 4.4). The coal extraction was limited to seam VI because it was not possible to reach seam III (at a depth of 250m in 5th year) in the constrained geological conditions considering the dumping requirements. The West pit boundary is determined by the following conditions:

Northern Boundary : Foot of the hill in northwest and 7.5m from the block boundary
Southern Boundary : Extent of the pit up-to 5th year of operation
Eastern Boundary : 7.5m from the block and extent of the pit upto 5 year of operation
Western Boundary : 7.5m from the block boundary

East Pit: The East pit is proposed up-to Seam III. The major considerations for the fixing of Eastern Pit boundary were the requirements of space for external dumping within the block boundary and minimization of overburden quantity still meeting the coal production requirements. The East pit boundaries was determined by the following conditions:

Northern Boundary : 7.5m from the block boundary
Southern Boundary : 100m from the block for conveyor corridor and magazine
Eastern Boundary : 60m from Kelo rover and 7.5m from block boundary
Western Boundary : Fault F1 and an arbitrary line considering low strip ratio zone and leaving sufficient external dump space in the western side

The East pit will operate till end of the life. Till 5th year of operation, coal production from both the pit will reach 18.00 Mty. Internal dump will start once sufficient void is created in the pit. After 5 years, the east pit will independently produce 18.00 Mty till 25th year of mine operation by open cast mining (Table 4.4). It has been proposed to start internal dumping in east pit from 6th year of

mining operation when the sufficient void is created within the pit. At the same time the backfilling will also be done in the West pit from 6th year. By 10th year of mining operation (Figure 4.2), the West pit will be completely filled and merged with the external dump, and the external dump will also begin merging with the internal dump of East pit.

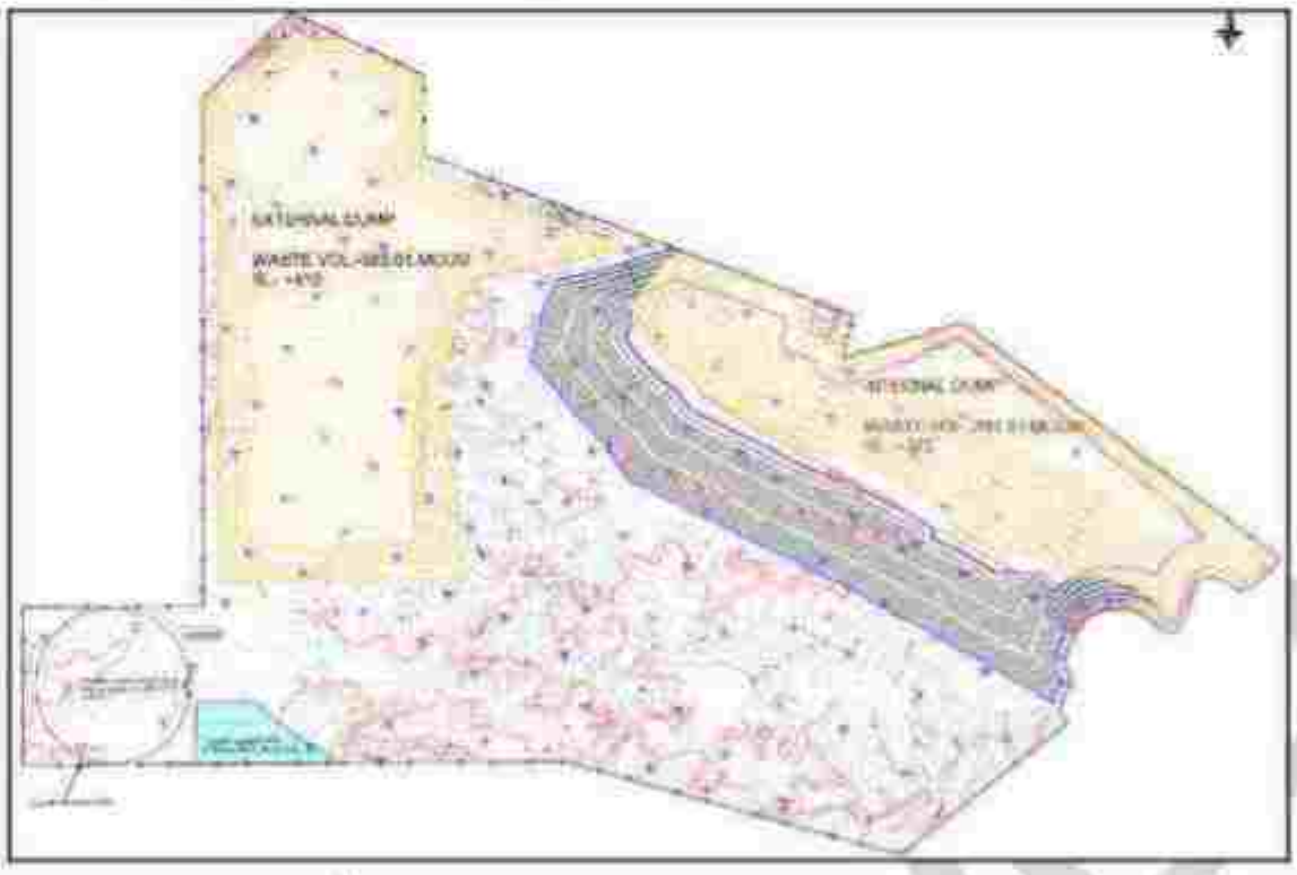

Figure 4.2. 10th year mining operation showing external and internal dumps.

Overburden removal from East pit peaks in the 6th year of operation at 91.08 Mbcm and continues till the 9th year before it tapers down to 88.68m in the 10th year and 81.10 Mbcm from 11th to 14th year.

4.3.2. Reserve Statement

Statement of reserve as per the revised pit design is shown in Table 4.6

Table 4.6. Resource and Reserve Statement of Alternative Mining Plan

Particulars	Value in Mt
Net Geological Reserve as per GR	1267.15

Net Geological Reserve by Open Cast Mining Method	575.78
Net Geological Reserve blocked in batter	142.45
Available Net Geological Reserve for Opencast Mining	433.33
Less: Mining Loss@ 5%	21.67
Mineable Reserve for Opencast Mining	411.66

Net Geological Reserve is arrived considering a geological loss of 10 % from Gross Geological Reserve (Resource) and mining loss of 5 % leading to a final total reserve of 411.66 Mt at a stripping ratio of 4.60 cum/t. Seam-wise resource (geological reserve) and reserve (mineable reserve) statements are shown in Table 4.7.

Table 4.7. Seam-Wise Resource and Reserve Statement

Seams	Net Geological Reserve (Mt)	Mineable Reserve (Mt)
X-LA	0.00	0.00
X-LB	0.20	0.19
X-TOP	2.73	2.59
X-BOT	23.95	22.75
IX-L2	7.95	7.55
IX-L1	10.09	9.59
IX	40.46	38.44
VIII	51.58	49.00
VII	2.17	2.06
VI-TOP	10.28	9.77
VI-MID	67.34	63.98
VI-BOT	1.42	1.35
V-TOP	3.39	3.22
V-MID	12.80	12.16
V-BOT	18.27	17.36
IV-TOP	38.35	36.44
IV-MID	57.85	54.96

IV-L	14.13	**13.43**
IV-BOT	32.11	**30.51**
III L	11.34	**10.77**
III	26.91	**25.56**
TOTAL	**433.33**	**411.66**

Table 4.8. Final pit design parameters

Sl. No.	Parameters	Unit	Value	
			East Pit	West Pit
1	Maximum depth	Meter	350	110
2	Maximum strike length:	Km		
	Mine Floor		3.60	1.10
	Mine Surface		4.20	1.40
3	Minimum strike length:	Km		
	Mine Floor		2.25	0.90
	Mine Surface		2.90	1.05
4	Maximum dip-rise length:	Km		
	Mine Floor		2.40	0.50
	Mine Surface		3.20	0.95
5	Minimum dip-rise length:	Km	2.10	0.40
	Mine Floor		3.10	0.83
	Mine Surface			
6	Area:			
	Mine Floor	Hectare	775.70	43.43
	Mine Surface		1171.45	111.93

4.4. Overburden dumping strategy

Alternative mining plan envisaged that in the initial 5 years, all the OB generated from east and west pit will be dumped externally (Figure 4.1). The external dump will be located in the western side of the east pit leaving 100m distance from east pit boundary. Once sufficient void is created after 5 years of operation, internal dumping will start in the east pit in the de-coaled area. However, after 5 years, the west pit will cease to exist and the void of the west pit will be utilized to place the overburden generated in the west pit. 666.96 (74+590). By 10th year the west pit will be completely filled and merged with the external dump carrying – 666.96 Mbcm of overburden generated from mining operation (Table 4.8). The external dumping will be continuing till 15th year and thereafter only tiny amount of OB of around –13.04 Mbcm will be dumped till 26th year of operation. No re-handling of external dump back to the east pit is proposed, thus saving huge amount of money for the project. However, based on the environmental impact assessment study, the final void may be left to serve as the water storage for ground water recharging or may be completely reclaimed by flushing external and internal dumps, followed by development of an environment friendly land use for the neighboring society.

Out of the total overburden of 1894.85 Mbcm, ~510.05 Mbcm (~27%) will be dumped externally and the balance 1384.80 Mbcm (~73%) will be dumped internally. The final height of the external dump is will be be ~120m above ground level up-to an RL of +410m. The final height of the internal dump will be around 90m above ground level up-to an RL of +375m. The dumps will be formed in benches with individual bench heights of 30m each and a bench width of 30m. To ensure the safety of dump, scientific slope stability study will be required for the final dump design under the **regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020 to ensure the safety of operation.** The year-wise dumping schedule is provided in Table 4.9 below.

Table 4.9. Tentative Dumping Schedule

Year	External Dump		Internal Dump		Total OB	
	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative
1	7.26	7.26		0.00	7.26	7.26
2	19.63	26.89		0.00	19.63	26.89
3	39.26	66.16		0.00	39.26	66.16
4	62.17	128.33		0.00	62.17	128.33

5	85.63	213.96		0.00	85.63	213.96
6	34.21	248.17	56.87	56.87	91.08	305.03
7	34.21	282.38	56.87	113.73	91.08	396.11
8	34.21	316.59	56.87	170.60	91.08	487.19
9	34.21	350.80	56.87	227.46	91.08	578.26
10	34.21	385.01	54.47	281.93	88.68	666.94
11	22.40	407.41	58.70	340.63	81.10	748.04
12	22.40	429.81	58.70	399.33	81.10	829.13
13	22.40	452.21	58.70	458.02	81.10	910.23
14	22.40	474.61	58.70	516.72	81.10	991.32
15	22.40	497.01	56.27	572.99	78.67	1070.00
16	1.60	498.61	75.40	648.39	77.00	1147.00
17	1.60	500.21	75.40	723.80	77.00	1224.01
18	1.60	501.81	75.40	799.20	77.00	1301.01
19	1.60	503.41	75.40	874.61	77.00	1378.02
20	1.60	505.01	78.64	953.25	80.24	1458.26
21	0.84	505.85	80.04	1033.29	80.88	1539.14
22	0.84	506.69	80.04	1113.33	80.88	1620.02
23	0.84	507.53	80.04	1193.37	80.88	1700.90
24	0.84	508.37	80.04	1273.41	80.88	1781.78
25	0.84	509.21	80.04	1353.45	80.88	1862.66
26	0.84	510.05	31.35	1384.80	32.19	1894.85

CMPDIL has estimated the lead overburden varying from about 3.00-7.25 km over the life of the mine. For west pit, the average lead for external dumping is estimated to vary from 3.25-3.75 km. For east pit, the average lead of internal dumping is estimated to vary from 3.00-3.50 km. The average lead for external dumping from east pit is estimated to vary from 6.75-7.25 km in initial 10 years and thereafter from 6.00-6.50 km for next 5 years. The lead for external dumping after 15th year is estimated to be 3.0 – 3.50 km. IIT-ISM is of the view that there is an opportunity to optimize haulage network of overburden transport on a year-to-year basis on the basis of annual operating plan which has the potential to reduce the lead distance of overburden transport.

4.5. Coal handling and dispatch arrangements

Coal from both the pit is proposed to be transported to surface by the trucks which would then be fed into a mobile crushing arrangement and thereafter to coal dispatch center by surface conveyors. Coal from west pit shall be directly transported to coal dispatch center, as the pit will be operational only for 5 years, therefore, any capital investment for conveyor system would not be a viable option.

As per the Approved Mining Plan, coal will be produced through a shovel dumper and surface miner equipment systems. Surface miner equipment system is expected to produce ~40% of the coal, i.e., ~7.2 Mty (-100 mm size). Therefore, crushing of coal will also be required for handling and dispatch. The entire coal produced from Talaipalli Project (18.0 Mty) will be transported / dispatched through railways. Loading into the rail wagon at the railway siding will be through Silos and Rapid Loading System (RLS). Therefore, a railway siding is proposed in the south-western part of the block for coal loading and dispatch.

As the coal handling plant (CHP) is proposed to cater entire production of coal, accordingly facilities of receiving station, crushing & conveying system up to the silo will be established for RLS into the railway wagons. The lead for coal varies from about 2.50 – 5.00 km over the life of the mine. For west Pit, the average lead for coal varies from 4.50-5.00 km.

4.5.1. Coal handling system of East Pit:

East quarry will have a separate receiving station for ROM coal at the mine mouth before it is crushed and conveyed to the central dispatch arrangement. The proposed coal handling system includes receiving of ROM coal at surface. The receiving pit / station and the mobile crusher unit will be shifted as the mine advances during the operation. The proposed receiving and crushing stations are proposed at the southern side of the mine at a suitable location.

For East Pit, the average lead for coal varies from 2.50-4.00 km. The lead estimation is tentative and may be estimated each year in the yearly operation plan.

4.5.2. Coal handling systems for west pit:

Coal produced from western quarry shall be transported by truck/ dumpers at surface and received in a

hopper of crusher for crushing coal up to (-)100 mm size. This crushing station for coal will be placed at a suitable location near proposed stockpile for Silo loading arrangement. The coal up to the crushing station shall be transported from the mine via trucks.

4.5.3. Loading & Dispatch Arrangements

The coal will be loaded in to railway wagons through Rapid load out system having suitable capacity pre-weigh hoppers with loading Silo. Two nos. od silos area proposed with two different rail lines of at the railway siding for loading of coal into railway wagons. Both the silos will be connected with the bridge conveyors for feeding of coal into silos to ensure flexibility in loading

CHAPTER 5

Technical Vetting of CMPDIL Report and Suggestions to Improve Sustainability of Tallaipalli Coal Mine

IIT-ISM examined the approved mine plan (AMP) of Tallaipalli coal block, findings of TEMPL, and technical report of Tallaipalli coal mine prepared by CMPDIL with the following observations.

While prima-facie the overall mining strategy of NTPC's approved mining plan looked sound, the variations in year wise estimated quantities of coal and overburden, estimated quantity of internal and external dump to accommodate overburden volume produced as per the AMP was questioned by both Thrivemi Earthmovers Private Limited (TEMPL) and the CMPDIL report. TEMPL raised four potential problems in the AMP – i) TEMPL observed that 404.5 MT of coal can't be extracted at a stripping ratio of 4.30 cum/ton by 25th year of mine operation as specified in the approved Mining Plan (AMP), ii) there would be an excess OB quantity than envisaged in the AMP which would not be able to be accommodated in the designated internal and external dump areas, iii) 100% backfilling by re-handling of temporary external dump / on pit dump as envisaged in the AMP is not feasible, iv) TEMPL observed that production will stop after 10 year if the two pit approach as proposed in the AMP is followed, and v) TEMPL claimed that the average lead overburden transportation will be 2 to 3 kms more than the average lead indicated in the AMP.

CMPDIL examined the AMP to validate the volumetric calculations of coal and overburden quantities. CMPDIL used MINEX ROM model prepared by MECL for volume calculations. As the AMP contained only the 1st to 5th years, 25th years and Final stage (52nd year) mining plans (10th year, 15th year and 20th year mining plan was missing), CMPDIL reviewed these mining plans as per the mining sequence of AMP for estimation of reserves, overburden quantities and dumping strategy. The key findings of CMPDIL and IIT-ISM's comments are as below;

- Till the 5th year mine plan of AMP, while there is a decrease in the coal reserve as per CMPDIL estimates by 19% (from 44.50 Mt in the AMP to 36.08 Mt in the CMPDIL estimate), the decrease in overburden quantity is also 14% (from 192.44 Mbcm to 165.07 Mbcm) leading to a net increase in the stripping ratio by 6%. As the validation of ROM model was not in the scope of IIT-ISM's

work, therefore, these figures were accepted / relied upon by IIT-ISM. The variations in the stripping ratios are well within the expected level of accuracy +/- 10% of the report. IIT-ISM sees a possibility of errors in estimation of coal reserve and overburden quantity in the approved mining plan.

- Further, CMPDIL estimated that to deliver 44.50 Mt. of coal till the 5th year of operation, total overburden to be removed will be approximately ~204 Mbcm instead of 192.44 Mbcm as proposed in the AMP, an additional ~11 Mbcm with a variation in the area of excavation (CMPDIL estimated only 36.08 Mt coal and 165.07 Mbcm of overburden in the same excavation area proposed until 5th year by the AMP). Further, it has been estimated that at the end of 5th year of mining operation, the total internal dump capacity created in the mine void is 11.00 Mbcm as against 12.29 Mbcm estimated in the AMP (a variation of approximately 1.29 Mbcm). There will be shortage of space to accommodate approximately 15.0 Mbcm of overburden which is ~7% variation together in external and internal dumps. IIT-ISM is of the view that there is a possibility to accommodate this extra volume with a minor modification in the year wise operational plan. Therefore, there should not be a problem in continuing with the operation until the 5th year as per the AMP.
- CMPDI analyzed the availability of space for internal and external dumping for 5th, 10th and 15th years of mining operation up to the RL of +360m, it was observed that the mining operation would stop before the year 15 as there will be a shortfall for dumping space to accommodate ~200 Mbcm extra overburden generated during the operation.

CMPDIL further explored the possibilities to accommodate more overburden dumps by increasing the dump heigh level to +390m. CMPDIL estimated that even with an increase in the final dump height to +390m, total designed space for overburden dump would be ~1070 Mbcm as against the total dumping requirements of 1160 Mbcm in the 15th year. IIT-ISM does not quite agree with CMPDIL's observation that the mine will not be able to move beyond 14th year, the shortfall in the quantity is less than 10% and there would be a possibility to further increase the height at least 5 – 10m which can accommodate the shortfall in the quantity of dumping space in the 15th year.

CMPDIL has not provided any estimate of overburden removal and space for dumping beyond 15th years and up to 24th year. Therefore, to conclude that the mine will not progress beyond 15th year may be pre-mature. In absence of detailed drawings and data submitted by CMPDIL in support their calculations, IIT-ISM has only relied on CMPDIL's estimations and tried to extrapolate few

estimations based on its professional experience and subject matter expertise. CMPDIL has also not provided the estimates for 20th year so that IIT-ISM could review the scenarios between 15th and 20th year.

In the 25th year mine plan, there is a marginal increase in the coal reserve of CMPDIL estimates, by 6% (from 404.50 Mt to 430.5 Mt), the increase in overburden quantity is quite high at 25% (from 1738.64 Mbcm to 2169 Mbcm) leading to an increase in the stripping ratio by 17%. It was pertinent to note that a similar study carried out by TEMPL till the 25th year mining plan showed a variation of 5.30 Mt in coal (from 404.50 Mt to 409.70 Mt) and + 404.36 Mbcm in overburden (from 1738.64 Mbcm to 2143.00 Mbcm) leading to a net increase in stripping ratio from 4.30 to 5.30 (Table 3.1). However, TEMPL workings were not based on detailed engineering as CMPDIL's. Since the review of MINEX ROM model was not in the scope of IIT-ISM's work, IIT-ISM considers the CMPDIL's analysis and accepted these outcomes.

- According to the CMPDIL's calculations, to deliver 404.50 Mt of coal till 25th year of mining operation of the AMP, a total of ~ 2040 Mbcm of overburden will be generated following the mining sequences proposed in the AMP. In the 25th year of mining operation, CMPDIL estimated the total external dump space beyond 25th year pit boundary is ~ 175 Mbcm up-to an RL of +360m. Therefore, even after utilizing the entire space for dumping, the total accommodation of dump in the 25th year would be 1350 Mbcm (External + Internal) while the total OB generated would be ~2040 Mbcm. It is clear that there is no space for dumping available for ~690 Mbcm of OB. CMPDIL has not estimated nor provided the detailed drawings and information in support of its calculation for 25th year of mining operations of the approved mining plan. CMPDIL has also not estimated the dumping space beyond +360m level as it has done so in the alternative mining plan.
- The examination of the AMP by CMPDIL has, thus led to the conclusion that overall AMP's mining plan strategies are not workable unless it is further modified / optimized from excavation and dumping point of view. The errors have been found in the estimation of coal and overburden quantities, internal and external dump quantities etc. which can make the implementation of AMP un-feasible. IIT-ISM agrees with the findings of CMPDIL report that there will be a bottleneck in implementing the AMP unless the AMP is modified to address the above issues (Figure i and v of Annexure I).

Accordingly, CMPDIL suggested modifications in the mining plan in order to improve excavation and the dumping strategy of Talaipalli coal mine. IIT-ISM has reviewed the modified mining plan

proposed by CMPDIL with following observations:

- CMPDIL analyzed the geo-mining conditions / parameters of Talaipalli coal block to ascertain mining of coal takes place for at least for a minimum period of 25 years. In the alternate / modified mining plan, CMPDIL has estimated total mineable coal by opencast mining method to be ~411.66 Mt at an average strip ratio of 4.60 cum/t for a period of 26 years at an annual production rate of 18Mty from 5th year of mining operation. Beyond this limit, open cat mining method is not proposed because of the dumping space bottleneck as the operation becomes bound by the external dump. The modified mining plan still follows the two pit operations as proposed in the AMP - one on the north eastern (East Pit) side and the other on the western side (West Pit). However, due to lack of adequate dumping space, the western quarry is terminated in the 5th year of mining operation after mining coal up to seam VI up-to a maximum depth of 110m, so that the mine void and the space thus created could be utilized for additional quantities of overburden generated from eastern pit in the subsequent years. The East pit will operate till end of the life up to seam III, and up to a maximum depth of ~350m. There is a scope to increase the internal dump height with proper dump slope study by 20 – 30m thus increasing the capacity of internal dump and reducing the external dump quantity, thus de-bottle necking the mining operation beyond 26 years. An expert professional agency may be engaged to carry this study.
- Till 5th year of operation, coal production from both the pit will reach 18.00 Mty. Internal dump will start once sufficient void is created in the pit. After 5 years, the east pit will independently produce 18.00 Mty till 25th year of mining operation. It has been proposed to start internal dumping in east pit from 6th year of mining operation when the sufficient void is created within the pit. At the same time the complete backfilling will also be done of the West pit from 6th year. By 10th year of operation, the West pit will be completely filled and merged with the external dump, and the external dump will also begin merging with the internal dump of keeping a barrier of 100m between the excavation of the east pit and the dumping area. IIT-ISM does not find any bottleneck in continuing the operation till 10th year (Figure vi and vii of Annexure I).
- IIT-ISM has also analyzed the dumping scenario in the 15th and 20th year (Figure ix and figure x of Annexure I) and finds a scope of increasing the total dump quantity by 3 to 5% in the existing dump plan.
- Out of the total overburden of 1894.85 Mbcm, ~510.05 Mbcm (~27%) is proposed to be dumped externally and the balance 1384.80 Mbcm (~73%) internally. The final height of the external dump

is will be ~120m above ground level up-to an RL of +410m. The final height of the internal dump will be around 90m above ground level up-to an RL of +375m. IIT-ISM reviewed the available dumping space (Internal + External + West Pit Void) and finds an scope to increase the overburden dump quantity by 3 – 5%, up to 2000 Mcum (Figure x). Further, the dumps will be formed in benches with individual bench heights of 30m each and a bench width of 30m. IIT-ISM is of the view that there exists a scope to increase the height internal dump by another tier of 20-30m thus de-bottle necking and continuing the operation beyond 26th years and making available additional coal reserve.

- IIT-ISM has carried out a high-level study of the average overburden transportation lead in the 5th, 10th, 15th, 20th and 25th year of operation (Table 5.1).

Table 5.1. Approximate Average Lead for Overburden Transportation

Years of Operation	Average Lead (km)	
	Internal Dump	External Dump
5th Year	-	4.50
10th Year	4.2	5.10
15th Year	4.8	-
20th Year	4.8	-
25th Year	4.5	-

- As the life of the west pit is only 5 years, a truck transport is proposed for coal transportation up to the railway siding instead of a conveyor transport which could eventually have a larger environmental foot print than the truck transport considering its installation and dis-mantling in a 5 years timeframe, in addition to its economic viability. For the east pit, conveyor transport is proposed from the mouth of the pit until the railway siding.
- CMPDIL has estimated the lead overburden varying from about 3.00-7.25 km over the life of the mine. For west pit, the average lead for external dumping is estimated to vary from 3.25-3.75 km. For east pit, the average lead of internal dumping is estimated to vary from 3.00-3.50 km. The average lead for external dumping from east pit is estimated to vary from 6.75-7.25 km in initial 10 years and thereafter from 6.00-6.50 km for next 5 years. The lead for external dumping after 15th year is estimated to be 3.0 – 3.50 km.
- The entire coal produced from Talaipalli Project (18.0 Mt) will be transported / dispatched through railways. Loading into the rail wagon at the railway siding will be through Silos and Rapid Loading System (RLS).

- The lead for coal varies from about 2.50 – 5.00 km over the life of the mine. For west Pit, the average lead for coal will vary from 4.50-5.00 km.

Following suggestions of IIT-ISM may be considered which may have the bearing on the sustainability and viability of the alternative / modified mining plan of CMPDIL.

- As proposed by CMPDIL, the dumps (both internal and external) will be formed in benches with individual bench heights of 30m each and a bench width 30m. However, while reviewing the 25th years plan, it is found the individual bench width is 40m instead of 30m as suggested in the text. This could have a significant impact on the quantities of internal dump and consequently de-limiting the mining operation at 26th year as proposed by CMPDIL. A representative cross section extracted from 25th year mining plan is shown in (Figure x, Annexure I).
- Alternative / modified mining plan sterilizes large quantity of coal to be mine by open cast mining method. The new mining plan extracts only ~ 411.66 Mt of coal for a period of 26 years as against the total mineable coal reserve of 843.69 Mt for a period of 52 years because no re-handling of external dump is proposed. This aspect may be looked into with detailed mine planning with an objective to further optimize the mining sequence.
- As per the alternative / modified mining plan, open cast mining seizes in the 26th year (becomes bound by the external dump). In case this alternative mining plan of CMPDIL is adopted, NTPC should explore possibilities of High Wall Mining on the final high wall faces of the open cast mine to maximize the extraction of coal.
- IIT-ISM suggests flushing of internal and external dump for the reclamation of final void of the east pit to develop a land form for a better land use and minimize environmental impacts of mining. While doing so IIT-ISM proposes to take into confidence the community around for sustainable land usage post mining.
- Both the AMP and CMPDIL report suggest application of Surface Miners in the windrowing options to mine ~40%, i.e., ~7.2 Mt of coal. IIT-ISM is of the view that as the mine has the provisions of crushing and conveying the entire coal produced from the Tallaipalli coal mine, and there is no requirement of selective coal mining, a cost benefit analysis of surface miner equipment system (Surface Miner + FEL + Trucks) vis-a-vis the shovel dumper equipment system (Shovel + Truck + Blasting) should be performed.
- IIT-ISM is of the view that there is an opportunity to optimize haulage network of overburden

transport on a year-to-year basis on the basis of annual operating plan which has the potential to reduce the lead distance of overburden transport

Annexure I

Figure i. 5th year modified mining plan of CMPDIL

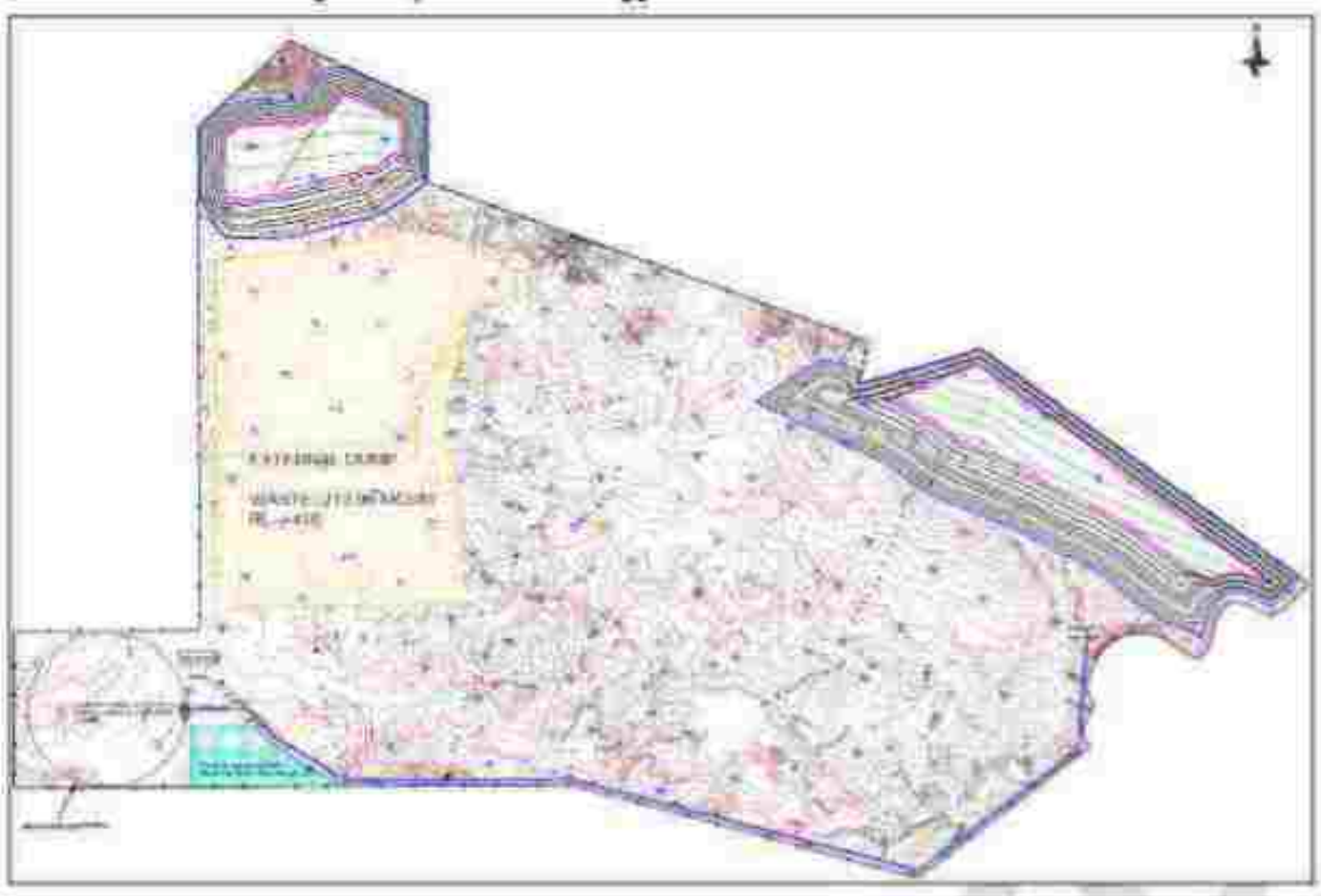

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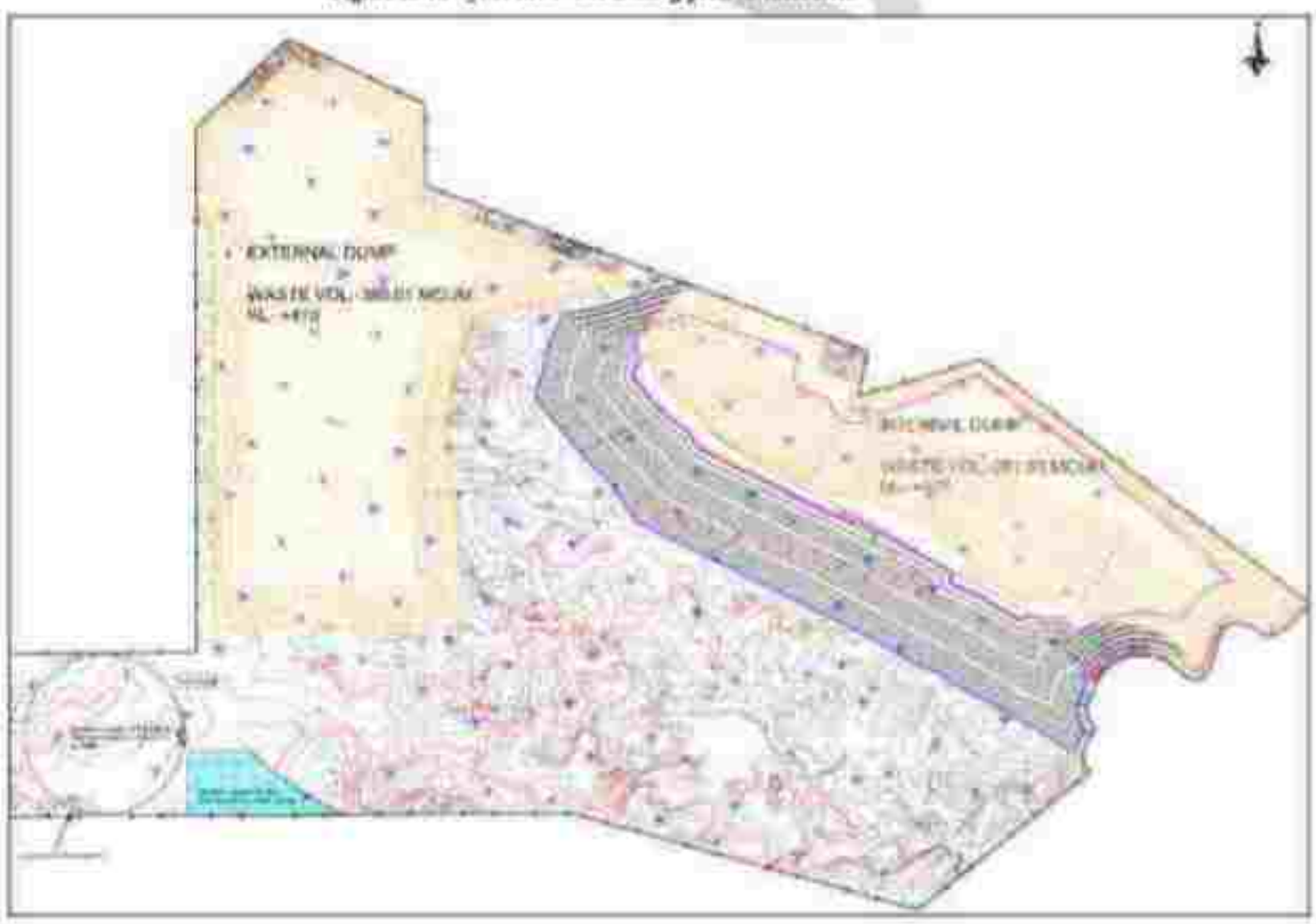
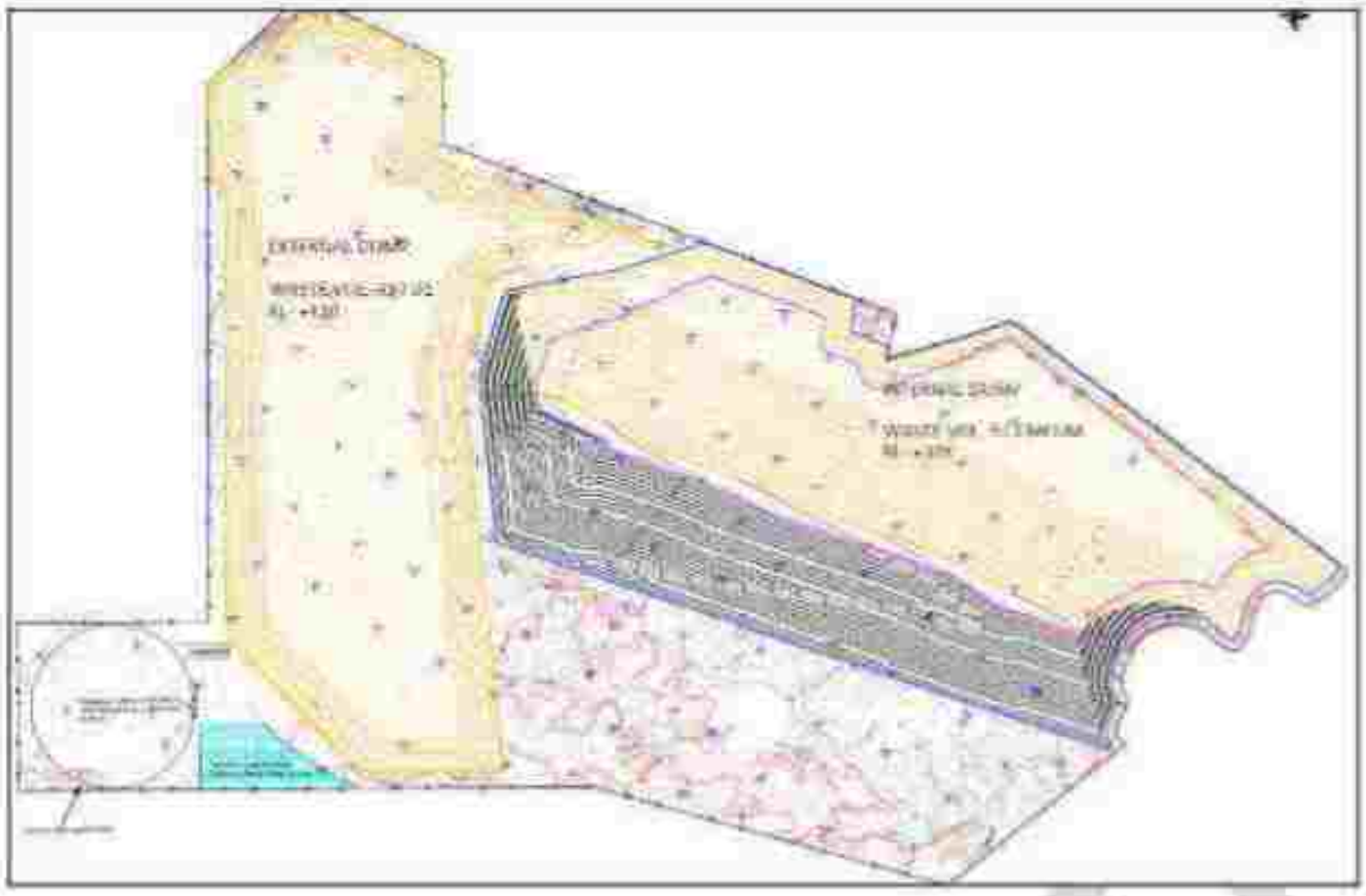
Figure ii. 10th year modified mining plan of CMPDIL



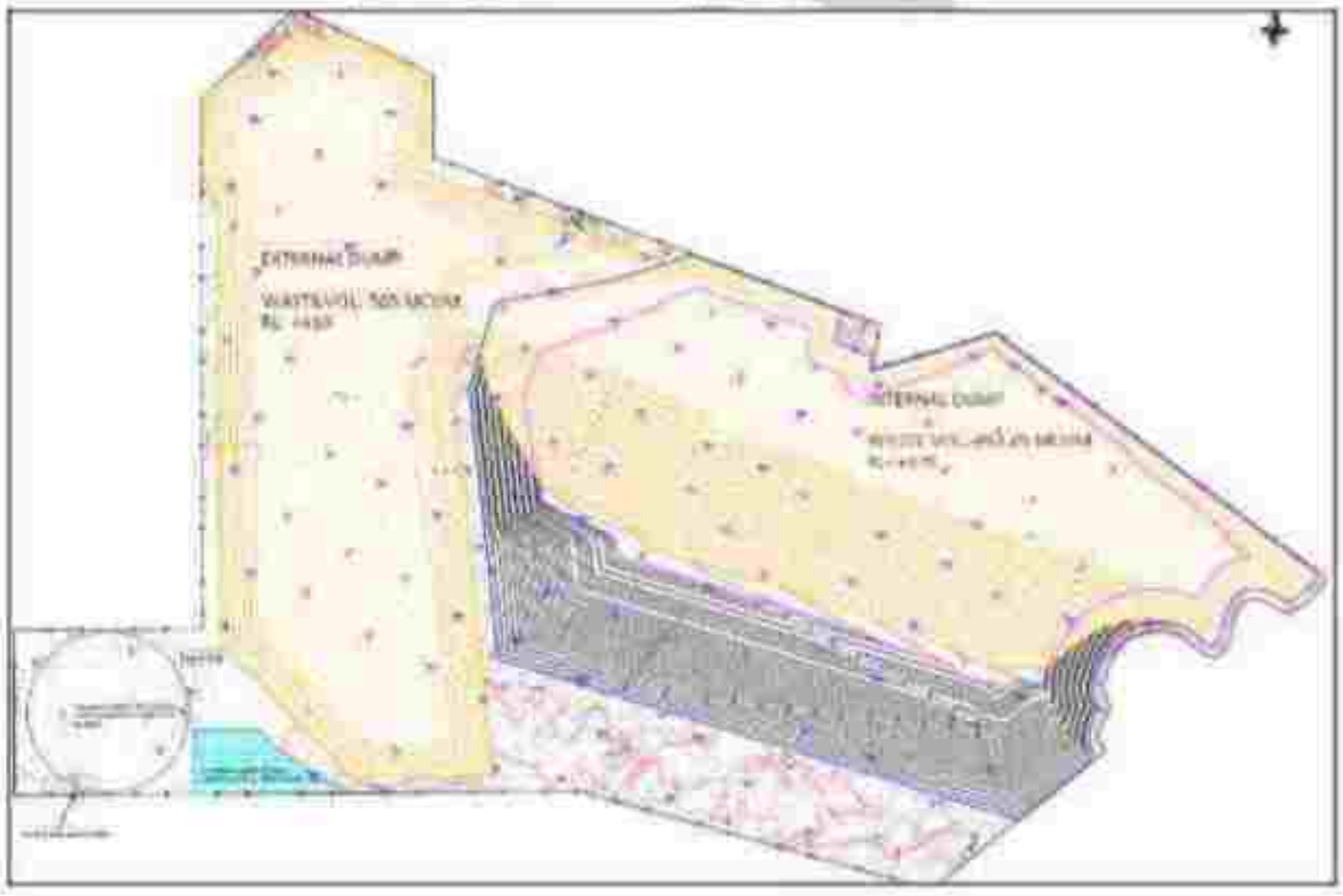
63

Figure iii. 15th year modified mining plan of CMPDIL.



64

Figure iv. 20th year modified mining plan of CMPDIL.

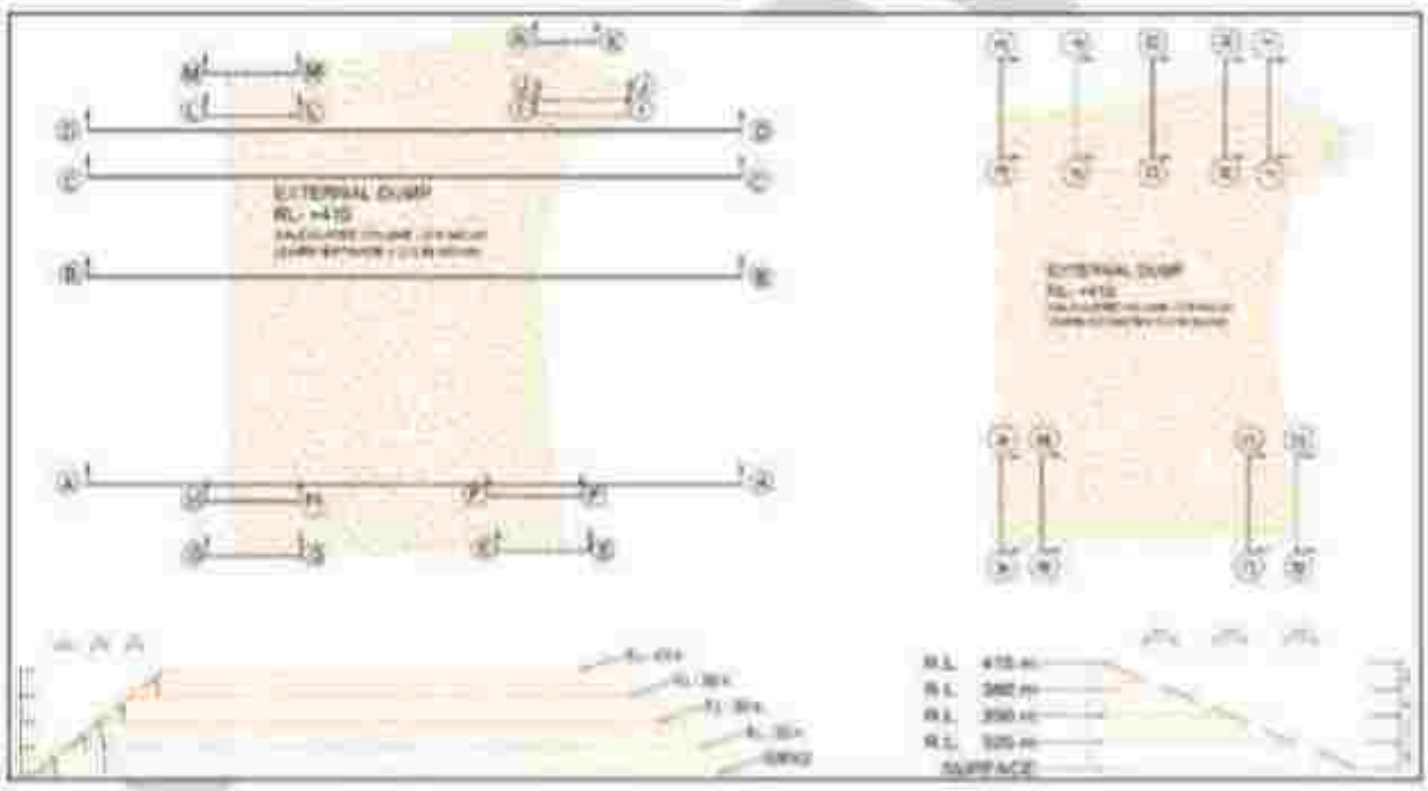


65

Figure v. 25th year modified mining plan of CMPDIL

66

Figure vi. Estimated Dump Quantities in the 5th Year of Mining Operation



Estimated Dump Quantities 5th Year (Mcum)

External Dump	Internal Dump	Total
~216	Nil	~216

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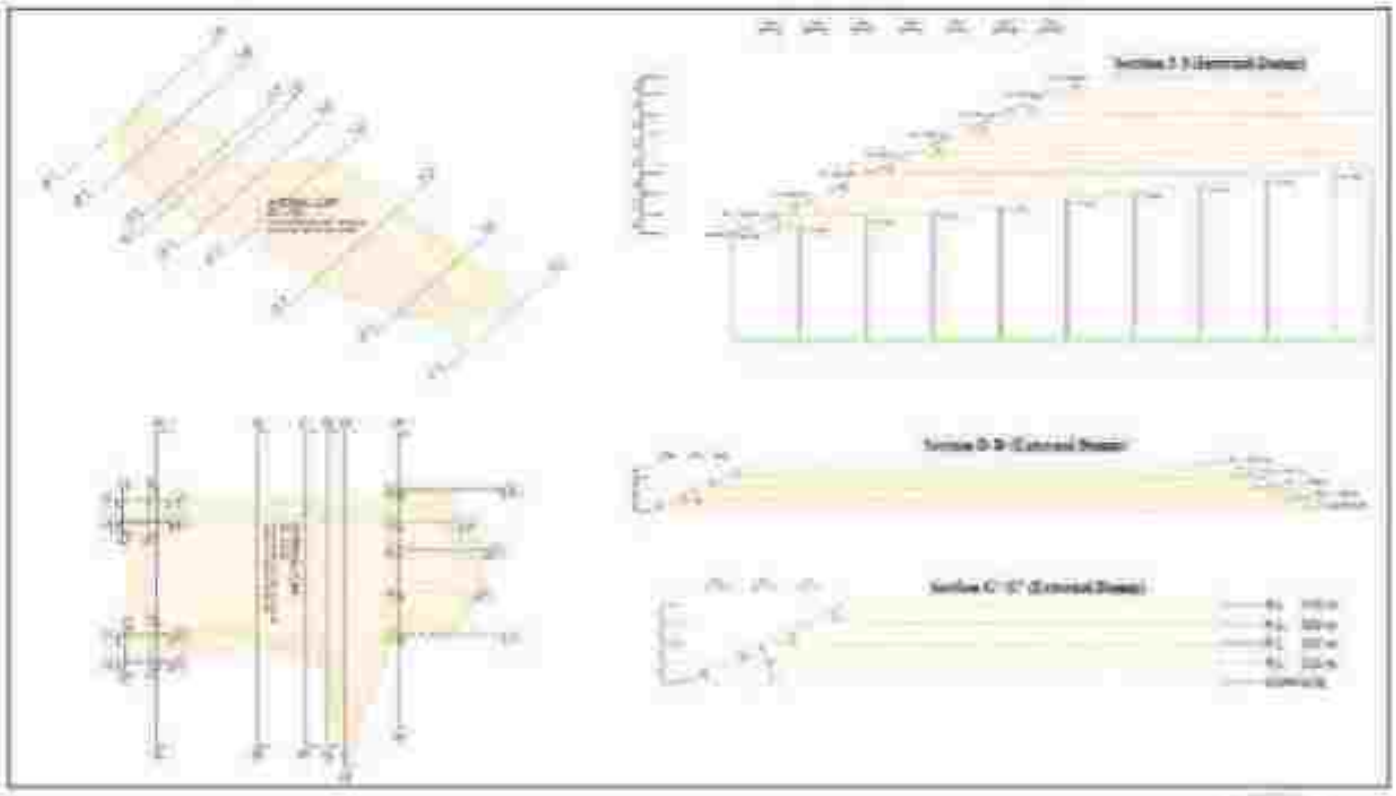
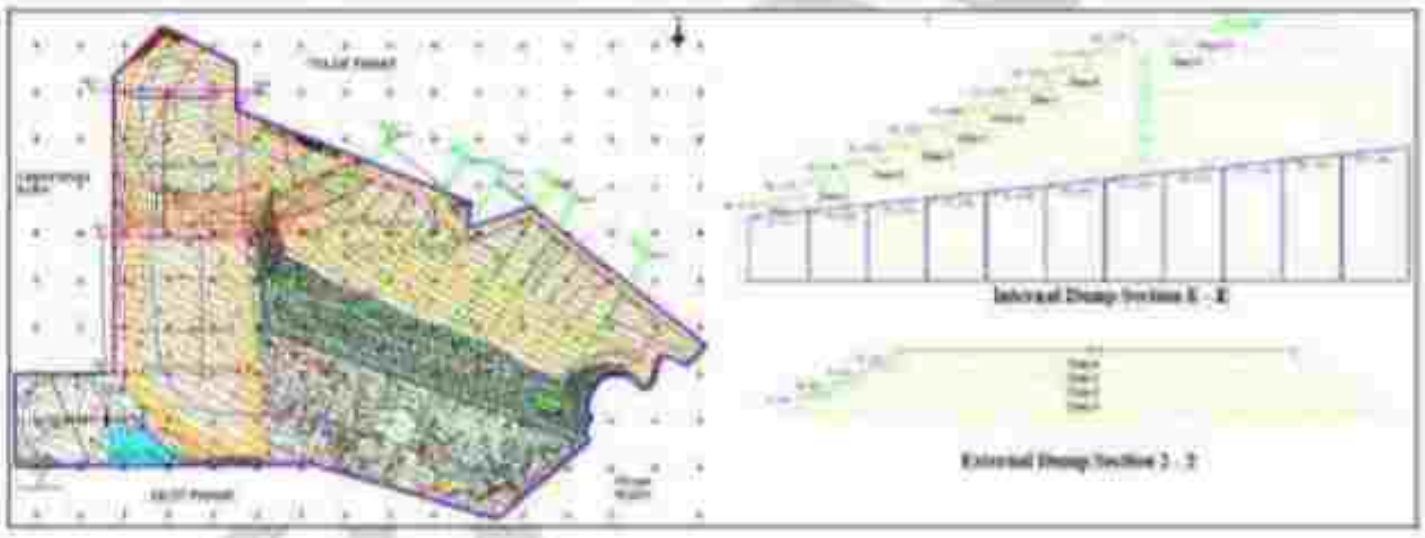
Figure vii: Estimated Dump Quantities in the 10th Year of Mining Operation.



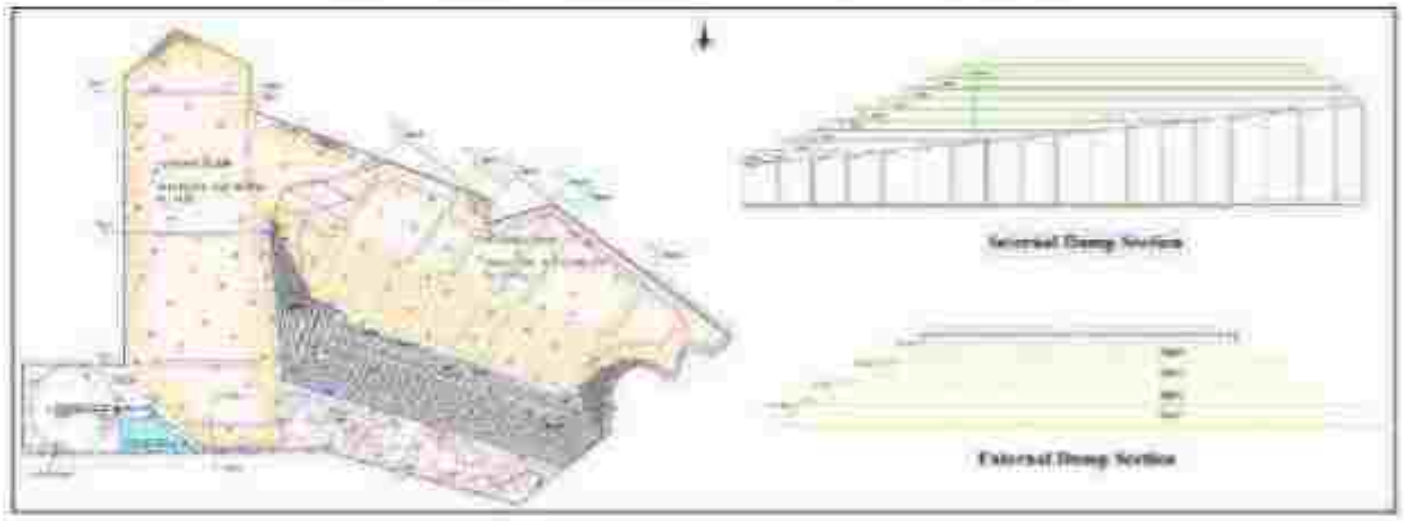
Estimated Dump Quantities of 10th Year (Mcum)			
External Dump	Internal Dump		Total
~370	East Pit	West Pit	~ 750
	~290	~70	

Figure viii. Estimated Dump Quantities in the 15th Year of Mining Operation.



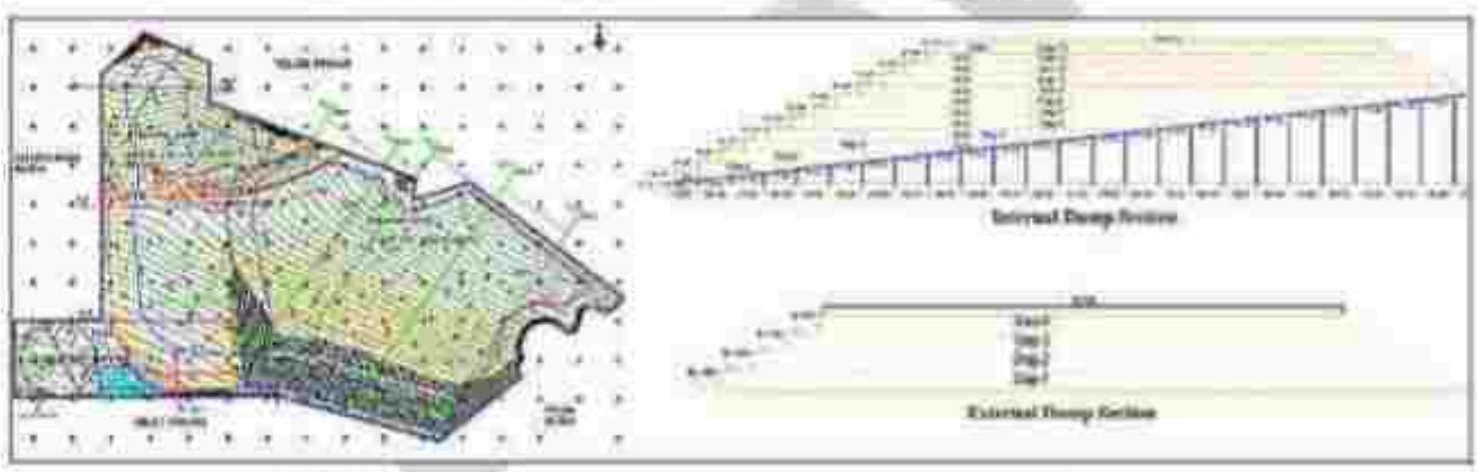
Estimated Dump Quantities of 15th Year (Mcum)			
External Dump	Internal Dump		Total
~475	East Pit	West Pit	~ 1085
	~540	~70	

Figure ix. Estimated Dump Quantities in the 20th Year of Mining Operation.



Estimated Dump Quantities of 20th Year (Mcum)			
External Dump	Internal Dump		Total
~520	East Pit	West Pit	~1450
	~860	~70	

Figure x. Estimated Dump Quantities in the 25th Year of Mining Operation.



Estimated Dump Quantities of 25th Year (Mcum)			
External Dump	Internal Dump		Total
~490	East Pit	West Pit	~2000
	~1440	~70	

Additional Annexure-25

PERSONNEL ASSOCIATED WITH PREPARATION OF MINING PLAN AND MINE CLOSURE PLAN (1ST MODIFICATION) OF TALAIPALLI COAL BLOCK, M/S NTPC LTD.

Sl. No	Name of Expert	Particulars
1	Rakesh Chandra Dutta	Project Coordinator
2	Rajesh Dhingra	Project Coordinator (for UG only)
3	Vats Priyesh	Technical Area Expert
4	Murari Prasad	Technical Area Expert
5	Ashish Agrawal	Technical Area Expert
6	Amritanshu	Technical Area Expert
7	Sagar Das	Technical Area Expert
8	Farah Nawaz	Technical Area Expert
9	Navin Kumar	Technical Area Expert
10	Vinod Kumar Pandey	Technical Area Expert

ANNEXURE 26

TO WHOM IT MAY CONCERN

The Mining Plan & Mine Closure Plan (1st modification) of Talaipally Coal Mine of NTPC Limited formulated by CMPDIL, Ranchi (Certificate No: NABET/APA-MPPA/IA/010) was sent for Expert Review to Mining Plan preparing Agency–MECON Limited (Certificate No: NABET/APA-MPPA/IA/015).

The Mine Plan & Mine Closure Plan of Talaipally Coal Mine has been reviewed from Technical & Administrative angle and observations were forwarded to the project proponent for further compliance at their end. Subsequently, the project proponent has submitted the compliance report incorporating all our observations on Draft Mining Plan & Mine Closure Plan (1st modification) of Talaipally Coal Mine. The Compliance Report has been reviewed & found in line with the Guidelines for Preparation, Formulation, Submission, Processing, Scrutiny, Approval and Revision of Mining Plan circulated vide Office Memorandum dated 29th May 2020.

Henceforth, the subject Mining Plan is recommended for consideration of the Approving Authority for Approval.

Sincerely,

For MECON Limited, Ranchi

Digital Signature
Name of the Authorizing Officer: S. R. VIRSEN
Date: 17.03.2023

Additional Annexure-27

COMPLIANCE TO OBSERVATIONS FROM MEETING OF THE INTERNAL COMMITTEE CONSTITUTED UNDER MMDR ACT 1957 FOR APPROVAL OF MINING PLAN AND MINE CLOSURE PLAN (1ST MODIFICATION) OF TALAIPALLI COAL BLOCK, M/S NTPC LTD HELD ON 23/03/2023 THROUGH VIDEO CONFERENCING

Sl No.	Observation	Compliance
1	A part of area in the north west part of the geological block has not been proposed to be liquidated. This shall be justified/corrected.	There is a steep hill in the north west part of the block with elevation difference of 70 m. The top width of the drain to take care of the surface runoff in that region will be close to 150 m in order to achieve the required bed level. The excavation of such drain will be huge and hence a minimum safe distance of 60 m is proposed between the drain and the opencast mine to prevent danger of inundation of the mine during rainy season. In order to keep the drain inside block boundary and for the safe operation of the mine, the pit boundary delineation along the foothill is proposed in the Revised Mining Plan.
2	Point 14, Additional Annexure-19 The proposed production schedule for few years is inferior to that given in the approved mining plan. To be justified/ corrected.	The production schedule as given in the proposed Revised Mining Plan is the most optimized one based on the geo-mining condition, temporary external dump requirement, concurrent backfilling and total accommodation of OB, etc. The approved Mining Plan is incorrect and operationally not feasible which is apparent from Technical Feasibility Note of Talaipalli Coal Block (Annexure-22, 23 and 24). As the depth of the base seam i.e. Seam III in the western side is around 250m according to the approved Mining Plan, the production schedule for initial years and peak production capacity of 18 MTPA is not possible to achieve in the given span of 5 years as per the approved mining plan. However, the cumulative coal production for the first 7 years in both the approved Mining Plan and the proposed Revised Mining Plan is 80.50 Mt. From 7th year onwards, the production in the Revised Mining Plan is 22 MTPA as against the production of 18 MTPA in the approved Mining Plan. The peak production in the Revised Mining Plan is increased to 25 MTPA which will be achieved in the 15th year and will continue till 29th year. Hence, taking into consideration the above factors, the overall production schedule as per the Revised Mining Plan is better than the approved Mining Plan.
3	Features, land boundaries etc. outside the project area and not a part of the mining plan shall be removed (refer Plate 4, 9 etc.)	Complied.
4	As the extractable reserves were reduced considerably compared to the approved MP, Pit Optimisation exercise shall be undertaken for maximum recovery of reserves.	Pit optimization exercise has been done for maximization of coal recovery through opencast mining as given in Conceptual Report (Annexure-29). The approved Mining Plan, which envisaged OC mining upto Seam III, is incorrect and operationally not feasible. Mining upto Seam III will result in less extraction of Coal due to dump space constraint as given in Conceptual Report. Different Pit options has been envisaged to maximize the recovery of coal and the proposed pit option in the Revised Mining Plan is found to be the most optimized for maximum recovery of Coal.

COMPLIANCE TO OBSERVATIONS FROM MEETING OF THE INTERNAL COMMITTEE CONSTITUTED UNDER MMDR ACT 1957 FOR APPROVAL OF MINING PLAN AND MINE CLOSURE PLAN (1ST MODIFICATION) OF TALAIPALLI COAL BLOCK, M/S NTPC LTD HELD ON 17/04/2023 THROUGH VIDEO CONFERENCING

Query: 1 - Para 1.5.26 of mining plan- A Commercial Civil suit has been stated to be filed regarding the mining plan. (a) Is the matter subjudice(b) Relevant documents to be furnished in support of the declaration in (a).

Reply of NTPC:

a. *The matter is not sub-judice*
b. *The referred commercial suit has been dismissed as withdrawn. The relevant order of Hon'ble High Court of Delhi is enclosed as Annexure-29 for kind information of Internal Committee constituted under MMDR Act 1957 for approval of Mining Plan*

S-33

* **IN THE HIGH COURT OF DELHI AT NEW DELHI**

\+ CS(COMM) 219/2021, I.As. 6177/2021, 6180/2021, 6181/2021, 3914/2022, 4551/2022 & 10541/2022

THRIVENI EARTHMOVERS PVT. LTD

..... Plaintiff

Through: Mr. Parag P. Tripathi, Sr. Adv. with Mr. Abhimanyu Bhandari, Mr. Anand Varma, Mr. Anirudh Bakhru, Mr. Apoorva Pandey, Mr. Anirudh Dusaj, Mr. Adyasha Nanda, Mr. Apoorv Tripathi and Ms. Riya Kalra, Advs.

versus

NTPC LTD

..... Defendant

Through: Mr. Chetan Sharma, ASG with Mr. Puneet Taneja, Mr. R. Dubey, Mr. Amit Gupta, Mr. Saurabh Tripathi and Mr. Manmohan Singh Narula, Advs.

CORAM:
HON'BLE MR. JUSTICE V. KAMESWAR RAO

ORDER

% **07.09.2022**

I.A. 10541/2022

1. This is an application filed by the plaintiff with the following prayers:

"It is therefore humbly prayed that this Hon'ble Court be pleased to:
(i) Allow the present application and refer the present dispute for conciliation by the CCIE in accordance with the procedure set forth in the OM issued by the Hon'ble Ministry of Power and New and Renewable Energy dated 29.12.2021;
(ii) Pass any other order as this Hon'ble Court may deem fit in the interests of justice."

2. A reply to the application has been filed by the defendant wherein it is stated, as per the procedure provided in the OM dated December 29, 2021, the dispute can be referred to the conciliation committee with the consent of the parties and the party withdrawing the case. It is stated that the condition precedent for referring the dispute to CCIE is that the plaintiff needs to withdraw the case. It is also stated that keeping in view the procedure specifically provided in OM dated December 29, 2021 for reference of dispute to the Conciliation Committee in case dispute is pending before Court of Law, defendant vide its letter dated August 18, 2022 has informed the plaintiff that they are ready for referring the dispute provided, plaintiff complies with the procedure for reference in a matter pending before a Court of Law, which requires withdrawing the case before making reference.

3. I have heard Mr. Parag P. Tripathi, learned Senior Counsel appearing for the plaintiff and Mr. Chetan Sharma, learned Additional Solicitor General appearing for the defendant on this application, yesterday. During the course of hearing, Mr. Tripathi would submit that the plaintiff is inclined to go for conciliation with the defendant by withdrawing the suit provided that in the eventuality the conciliation proceedings fail or any grievance subsist, the plaintiff should be granted liberty to revive the present suit and such a prayer, should not be objected to by the defendant.

4. Mr. Sharma had taken time to take instructions from the defendant. Mr. Sharma has taken instructions. According to him, the OM dated December 29, 2021 on which reliance has been placed by Mr. Tripathi is very clear, inasmuch as if the conciliation fails, the plaintiff shall be at liberty to approach this Court for revival of the suit to which the defendant shall have no objection.

5. In view of the submission made by Mr. Sharma, the present suit and connected applications are dismissed as withdrawn. The defendant to refer the dispute to conciliation.

6. It is made clear that if the conciliation fails or any grievance subsist relating to the suit filed by the plaintiff, the plaintiff is at liberty to approach this Court for revival of the suit. If such a prayer is made, as stated by Mr. Sharma, the defendant shall not object to the same. It is made clear, all the rights and contentions of the parties are left open.

7. The application is disposed of.

V. KAMESWAR RAO, J

SEPTEMBER 7, 2022/*aky*

Additional Annexure-30

COMPLIANCE TO OBSERVATIONS FROM MEETING OF THE INTERNAL COMMITTEE CONSTITUTED UNDER MMDR ACT 1957 FOR APPROVAL OF MINING PLAN AND MINE CLOSURE PLAN OF TALAIPALLI COAL BLOCK, M/S NTPC LTD HELD ON 14/07/2023 THROUGH VIDEO CONFERENCING

Query: Extractable reserves have decreased considerably as compared to the earlier approved mining plan. The decrease of extractable reserves (seam-wise, area-wise) as compared to the earlier mining plan with explanation shall be tabulated.

Compliance: The seam-wise variation of extractable reserves with respect to approved Mining Plan is tabulated below:

TABLE-1: SEAMWISE EXTRACTABLE RESERVES IN EARLIER APPROVED MINING PLAN VIS-À-VIS PROPOSED REVISED MINING PLAN:

Seams	Extractable Reserve in Earlier Approved MP (Mt)			Extractable Reserve in Proposed Revised MP (Mt)	Difference w.r.t. Approved MP (Mt)	Reason for Difference in Proposed Revised MP w.r.t to Approved MP			
	OC	UG	Total	OC		Decrease due to Re-assessment* (Mt)	Due to conveyor corridor, garland drain, roads etc** (Mt)	Infrastructure area in South-West part** (Mt)	Seams proposed to be mined later by UG***
X-UA	0.96		0.96	0.10	0.87	0.06	0.81		
X-LB	1.47		1.47	0.26	1.21	0.09	1.11		
X-TOP	9.17		9.17	6.65	2.52	0.57	1.74	0.20	
X-BOT	75.19		75.19	52.64	22.55	4.72	13.79	3.05	
IX-L2	25.18		25.18	18.44	6.54	1.58	3.71	1.25	
IX-L1	23.07		23.07	18.75	4.32	1.45	1.85	1.02	
IX	82.52		82.52	68.57	13.94	5.17	6.07	1.70	
VIII	150.58		100.58	83.28	16.30	6.30	8.12	2.88	

Seams	Extractable Reserve in Earlier Approved MP (Mt)			Extractable Reserve in Proposed Revised MP (Mt)	Difference w.r.t Approved MP (Mt)	Reason for Difference in Proposed Revised MP w.r.t to Approved MP			
	OC	UG	Total	OC		Decrease due to Re-assessment* (Mt)	Due to conveyor corridor, garland drain, roads etc** (Mt)	Infrastructure area in South-West part** (Mt)	Seams proposed to be mined later by UG***
VII	4.75		4.75	3.37	1.38	0.30	1.09		
VI-TOP	22.61		22.61	15.60	8.01	1.42	2.59		
VI-MID	132.89		102.89	110.88	22.59	8.33	14.22		
VI-BOT	5.46		5.46	4.11	1.35	0.34	1.01		
V-TOP	9.52		9.52	7.05	2.47	0.60	1.87		
V-MID	23.13		23.13	17.64	5.49	1.45	3.04		
V-BOT	28.72		28.72	22.72	6.00	1.80	4.20		
IV-TOP	68.90		68.90	53.04	15.91	4.33	11.58		
IV-MID	93.20		93.20	82.09	11.12	5.84	5.28		
IV-L	21.55		21.55	18.81	2.73	1.35	1.38		
IV-BOT	51.00		51.00	45.68	5.44	3.20	2.23		
NE	16.87		16.87		16.87	1.06			15.81
III	86.75		86.75		86.75	2.93			83.82
III-3		8.25	8.25		8.25				8.25
III-2		1.85	1.85		1.85				1.85
III-1			0.00		0.00				0.00
II		11.47	11.47		11.47				11.47

Seams	Extractable Reserve in Earlier Approved MP (Mt)			Extractable Reserve in Proposed Revised MP (Mt)	Difference w.r.t Approved MP (Mt)	Reason for Difference in Proposed Revised MP w.r.t to Approved MP			
	OC	UG	Total	OC		Decrease due to Re-assessment* (Mt)	Due to conveyor corridor, garland drain, roads etc** (Mt)	Infrastructure area in South-West part** (Mt)	Seams proposed to be mined later by UG***
XC			0.00		0.00				3.00
Total	**841.68**	**17.57**	**861.25**	**631.56**	**229.69**	**52.88**	**87.30**	**11.90**	**77.20**

* The earlier approved Mining Plan is not correct (Refer Annexure 22- Note on Technical Feasibility of Talaipalli Coal Block). Further, assuming no dumping space constraint and the mining operation to be feasible for the entire projected area as per the earlier approved Mining Plan, on re-assessment the total extractable reserves by OC mining would be 790.00 Mt and not 841.68 Mt as given in the earlier approved Mining Plan (Refer Pg. 44 of Annexure-22).

**In earlier approved Mining Plan, barring only 7.5m statutory barrier and 60m from kalo river, the whole of remaining area i.e. 2079.56 Ha is shown to be extracted by OC method. No area for conveyor corridor, garland drain, roads, lighting arrangement, etc has been provided without which mining is not feasible. This has been corrected in the proposed Revised Mining Plan. A 45-50m width of area has been left around the block for conveyor corridor, roads, garland drain, lighting arrangements, etc. Also 158 Ha of land is left in the South West part of the block for required infrastructures like MSP, Workshop, Substation etc. and is proposed to be mined later (Refer Annexure 21) due to which the total excavation area in the Revised MP is 1838.85 Ha.

*** Seams below IV-BOT is proposed to be mined by UG method as it is not feasible to mine by OC method due to dump space constraint. Tentative extractable reserve for OC mining of South West part and UG mining as given in Annexure-21 (CONCEPTUAL NOTE FOR ASSESSMENT OF UG MINING POTENTIALITY OF TALAIPALLI BLOCK & PROJECTISATION OF SOUTH WEST AREA OF THE BLOCK). A Revised Mining Plan needs to be prepared after 25 years for UG mining of Whole Block and OC mining upto Seam VII in south western area where infrastructure for proposed Opencast mine is located.

TABLE-2: SEAMWISE EXTRACTABLE RESERVES IN EARLIER APPROVED MINING PLAN VIS-À-VIS PROPOSED REVISED MINING PLAN INCLUDING TENTATIVE EXTRACTABLE RESERVE BY UG MINING AND BY OC MINING IN SOUTH WEST PART ASSESSED IN CONCEPTUAL NOTE (ANEXXURE 21)

Seams	Extractable Reserve in Earlier Approved MP (Mt)			Extractable Reserve in Proposed Revised MP (Mt)				Difference w.r.t approved Mining Plan	Reason for Difference
	OC	UG	Total	OC	OC-SOUTH WEST*	UG*	Total		
X-LA	0.96		0.96	0.10			0.10	0.87	The earlier approved Mining Plan is not correct (Refer Annexure 22- Note on Technical Feasibility of Talaipalli Coal Block). Further, assuming no dumping space constraint and the mining operation to be feasible for the entire projected area as per the earlier approved Mining Plan, the total extractable reserves by OC mining would be 790.00 Mt **and not 841.68 Mt** as given in the earlier approved Mining Plan (Refer Pg. 44 of Annexure-22). In earlier approved Mining Plan, barring only 7.5m statutory barrier and 60m from kalo river, the whole of remaining area i.e. 2079.56 Ha is shown to be extracted by OC method. No area for conveyor corridor, garland drain, roads, lighting arrangement, etc has been provided without which mining is not feasible. This has been corrected in the proposed Revised Mining Plan. A 45-50m width of area has been left around the block for conveyor corridor, roads, garland drain, lighting
X-LB	1.47		1.47	0.26			0.26	1.21	
X-TOP	9.17		9.17	6.85	0.2		6.85	2.32	
X-BOT	75.19		75.19	52.64	3.85		56.69	18.50	
IX-L2	23.18		23.18	18.64	1.25		19.89	3.29	
IX-L1	23.07		23.07	18.75	1.02		19.77	3.30	
IX	82.52		82.52	68.97	2.7		71.27	11.25	
VIII	100.58		100.58	82.28	2.89		85.16	15.42	
VII	4.75		4.75	3.37		2.22	5.59	-0.84	
VI-TOP	22.61		22.61	18.60			18.60	4.01	
VI-MID	132.93		132.93	110.88		9.12	118.50	14.43	
VI-BOT	5.46		5.46	4.11			4.11	1.35	
V-TOP	9.52		9.52	7.65			7.65	1.87	

Seams	Extractable Reserve in Earlier Approved MP (Mt)			Extractable Reserve in Proposed Revised MP (Mt)				Difference w.r.t approved Mining Plan	Reason for Difference
	OC	UG	Total	OC	OC-SOUTH WEST*	UG*	Total		
V-MID	29.13		29.13	17.64			17.64	5.29	arrangements, etc due to which the total excavation area in the Revised MP is 1839.85 Ha. Considering the infrastructure area in the south west part which will be mined by OC method upto Seam VIII as per the Conceptual Note for UG and South West OC mining (Refer Annexure 21),the total excavation area will increase to 1878.55 Ha . So in the proposed Revised MP, 100Ha of less area than the earlier Mining Plan is proposed to be excavated for seam X-1A to IV-BOT. Hence the difference.
V-BOT	28.72		28.72	22.72		0.77	23.49	5.23	
IV-TOP	68.95		68.95	53.04			53.04	15.91	
IV-MID	93.10		93.10	82.09		6.45	88.54	4.57	
IV-L	21.55		21.55	18.81			18.81	2.73	
IV-BOT	51.09		51.09	45.66			45.66	5.43	
III	16.87		16.87				0.00	16.87	In the Proposed Revised MP, seam III is not proposed to be excavated by OC mining as it is not feasible due to dump space constraint. Also, the seam has not acquired workable thickness in the mining area as the prevalent thickness in 83%of boreholes varies from 0.5m to 1.50m and so it cannot be mined through UG mining (Refer Annexure 21- Conceptual Note on UG mining and South West part).

Seams	Extractable Reserve in Earlier Approved MP (Mt)			Extractable Reserve in Proposed Revised MP (Mt)				Difference w.r.t approved Mining Plan	Reason for Difference
	OC	UG	Total	OC	OC-SOUTH WEST*	UG*	Total		
III	46.75		46.75			53.71	53.71	-6.96	In the Proposed Revised MP, seam III is not proposed to be excavated by OC mining as it is not feasible due to dump space constraint. The seam will be mined by UG method (Refer Annexure 21-Conceptual Note on UG mining and South West part)
III L3		4.25	4.25				0.00	4.25	Seam III.2 & Seam III.3 have attained workable thickness in North West and south west part of the coal block in very small areas. The seam III.2 and III.3 have workable area at a depth higher than 300m in the south western side. These seams have developed workable thickness in a very small area in the North Western side at a depth higher than 300m. Accessing these areas from Seam II would involve thin seam drivage or drivage of drifts. Hence, Seam III.2 and Seam III.3 are considered to be non-economical (Refer Annexure 21- Conceptual Note on UG mining and South West part).
III L2		1.85	1.85				0.00	1.85	
II L1			0.00				0.00	0.00	Not Mineable due to poor development of the carbonaceous horizons
II		11.47	11.47			28.25	28.25	-16.78	Seam II will be mined through UG mining (Refer Annexure 21- Conceptual Note on UG mining and South West part).

Seams	Extractable Reserve in Earlier Approved MP (Mt)			Extractable Reserve in Proposed Revised MP (Mt)				Difference w.r.t approved Mining Plan	Reason for Difference
	OC	UG	Total	OC	OC-SOUTH WEST*	UG*	Total		
IIL			0.00				0.00	0.00	Not Minable due to poor development of the carbonaceous horizons
Total	843.68	17.57	861.25	631.56	11.90	99.52	742.98	118.27	

Note:

* Tentative extractable reserve for OC mining of South West part and UG mining as given in Annexure-21 (CONCEPTUAL NOTE FOR ASSESSMENT OF UG MINING POTENTIALITY OF TALAIPALLI BLOCK & PROJECTIZATION OF SOUTH WEST AREA OF THE BLOCK). A Revised Mining Plan needs to be prepared after 25 years for UG mining of Whole Block and OC mining upto Seam VI/ in south western area where infrastructure for proposed Opencast mine is located.

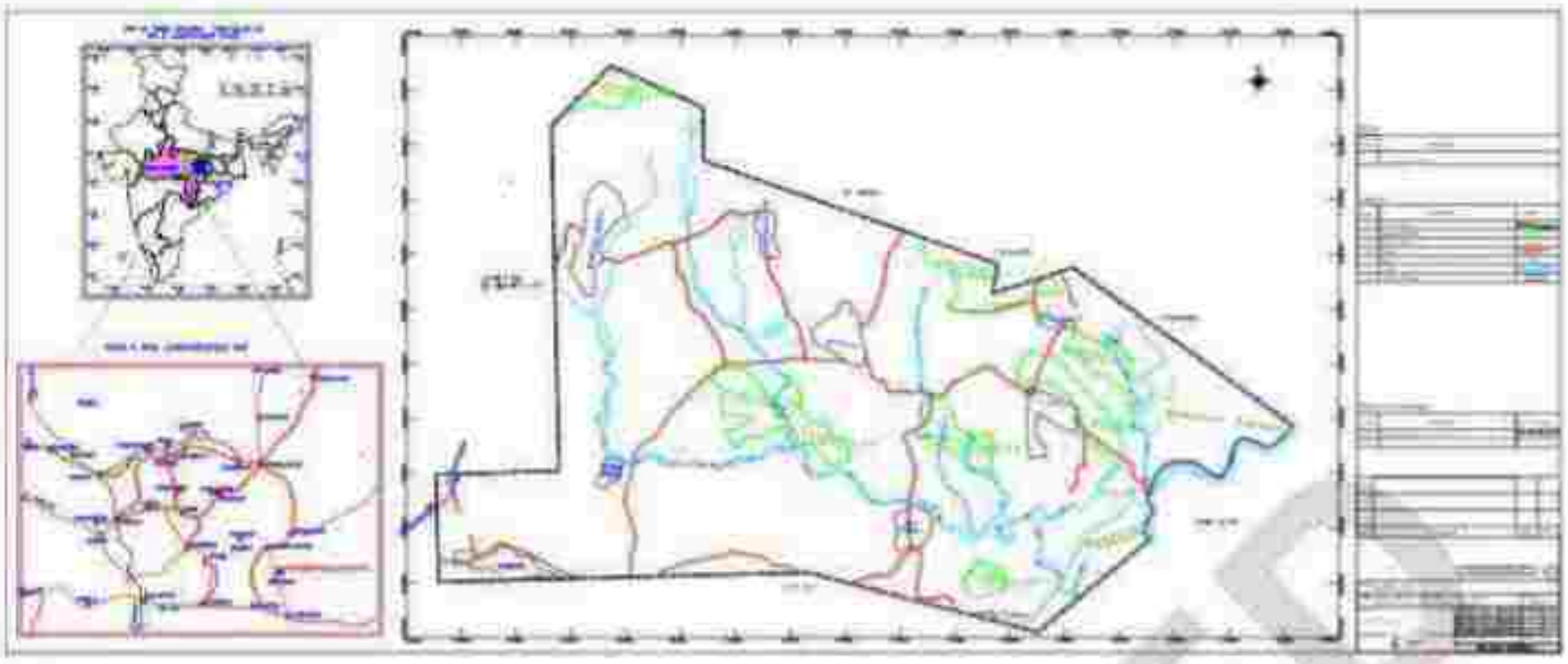
TABLE-II: SUMMARY OF EXTRACTABLE RESERVE (INCLUDING TENTATIVE RESERVE BY UG MINING AND OC MINING IN SOUTH WEST)

Sl. No	Particulars	Extractable Reserve in Earlier Approved MP (Mt)	Extractable Reserve in Proposed Revised MP (Mt)	Remarks
1	Seams from X-LR to IV-BOT	760.06	861.01*	Difference with respect to earlier approved Mining Plan is 119.24 Mt. This difference is on account of following - Calculation error in earlier approved Mining Plan (Refer Pg. 44 of Annexure-22)- ~68.99 Mt - Due to area provided for conveyor corridor, garland drain, roads, lighting arrangement, etc. around the block which was not provided in earlier approved Mining Plan and without which mining operation is not feasible - ~70.25 Mt
2	Seam IV-L to Seam IV	81.19	81.96	No loss in Extractable reserve below Seam IV-Bot with respect to earlier approved Mining Plan
Total		861.25	742.98	

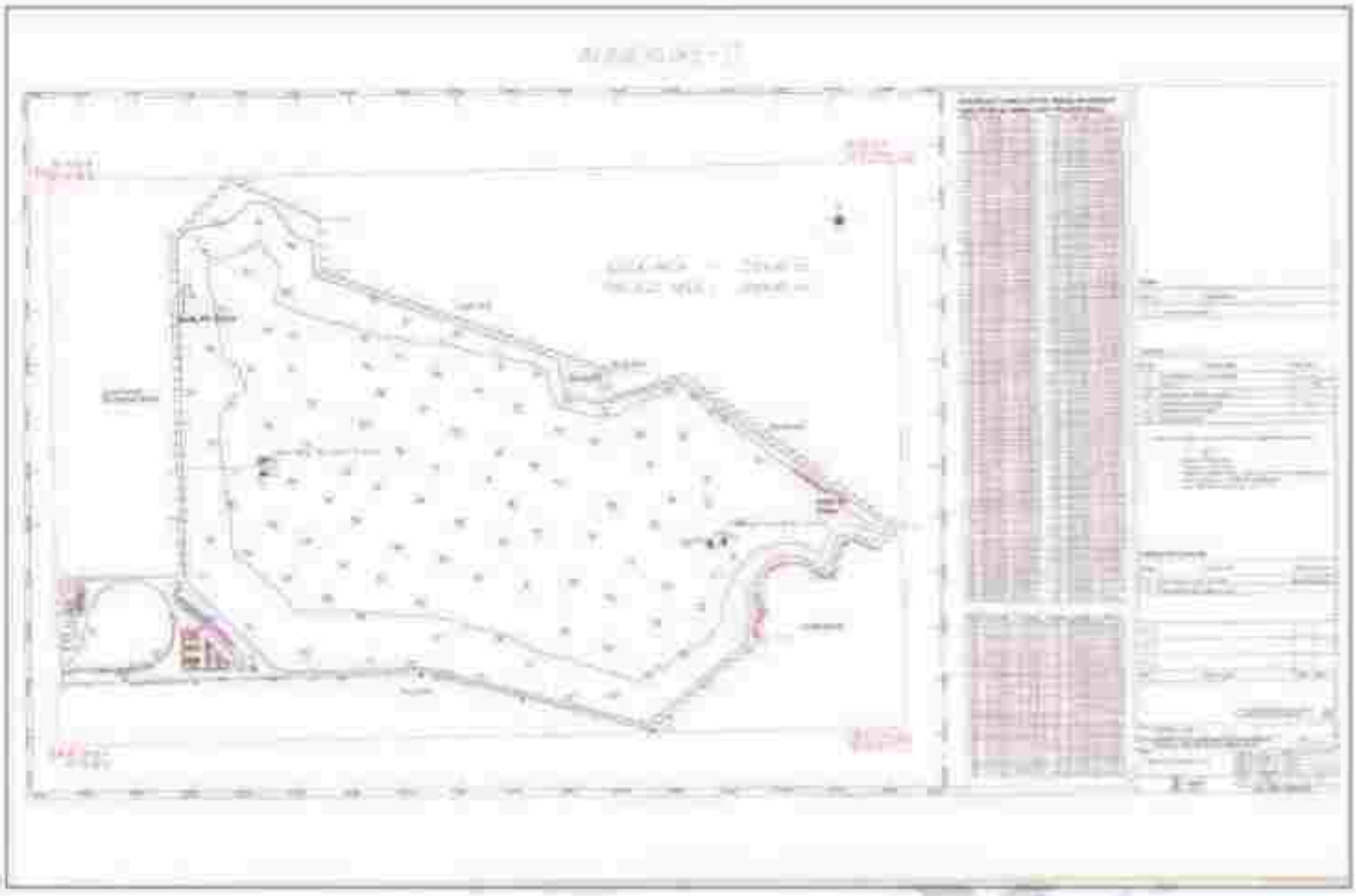
* 861.01 Mt. of Extractable Reserve includes 631.56 Mt of reserve as given in proposed Revised MP & 11.90 Mt of tentative OC reserve and 17.56 Mt of tentative UG reserve of Seams above IV-BOT as given in Annexure-21 (CONCEPTUAL NOTE FOR ASSESSMENT OF UG MINING POTENTIALITY OF TALAIPALLI BLOCK & PROJECTIZATION OF SOUTH WEST AREA OF THE BLOCK)

Plan/Plates

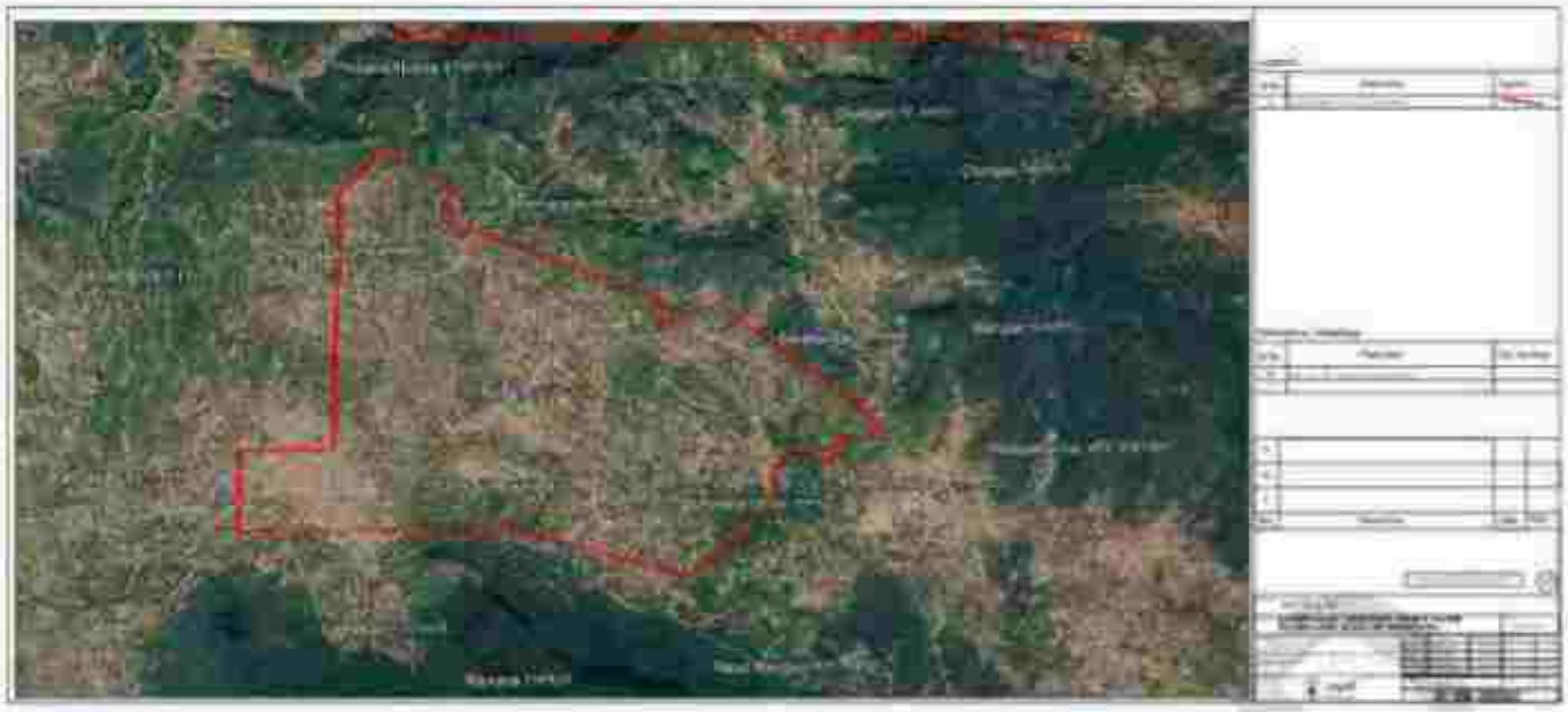
Plate 1



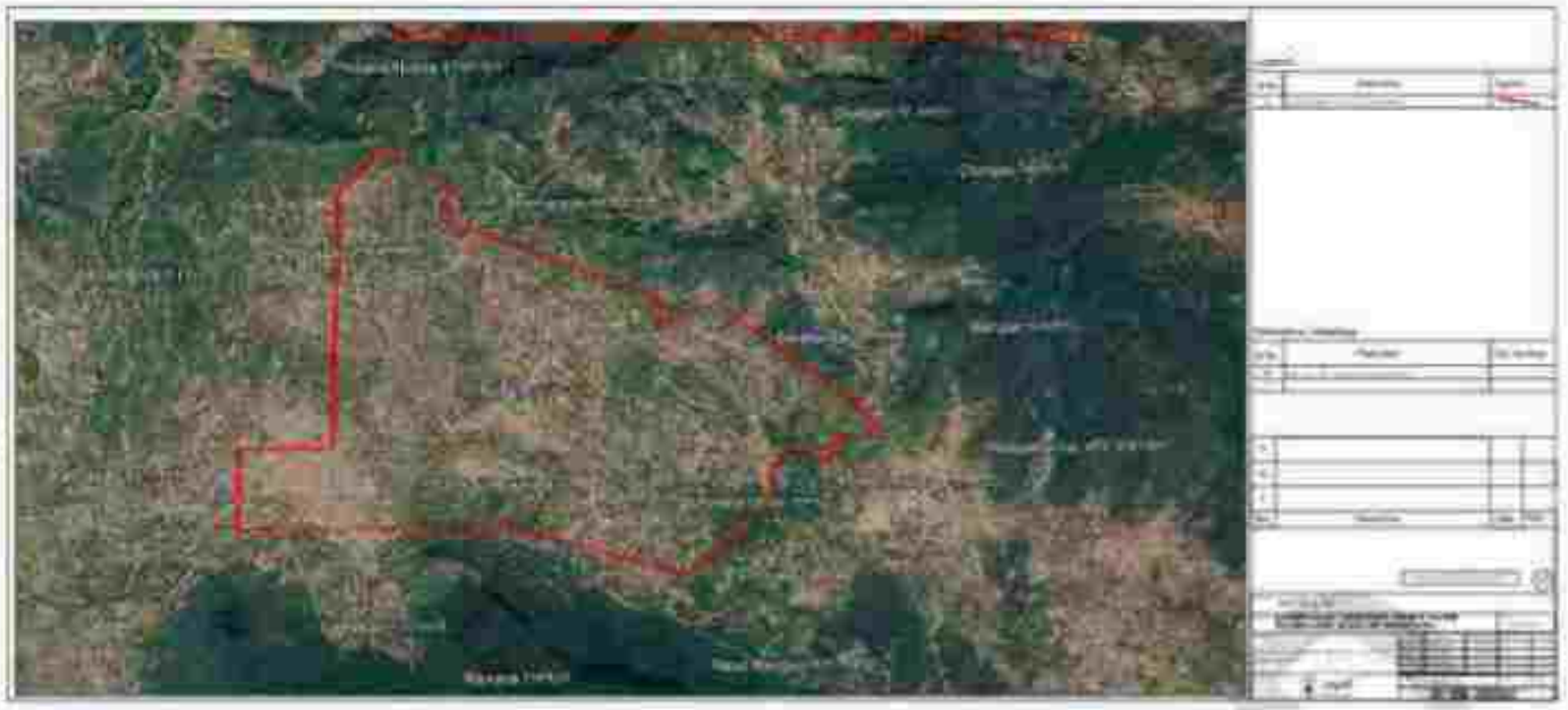
Plan / Plate 2A



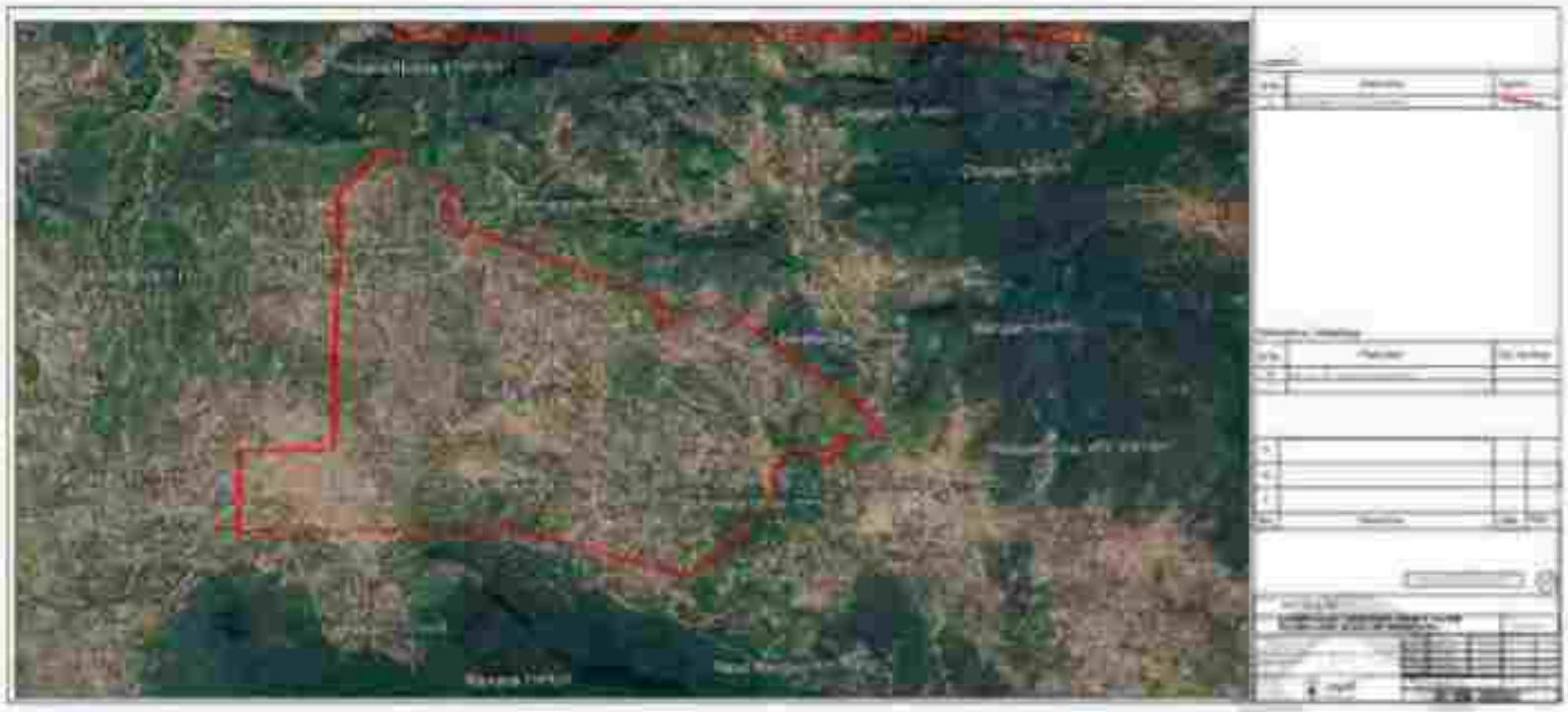
Plan / Plate 3A (Lease Area)



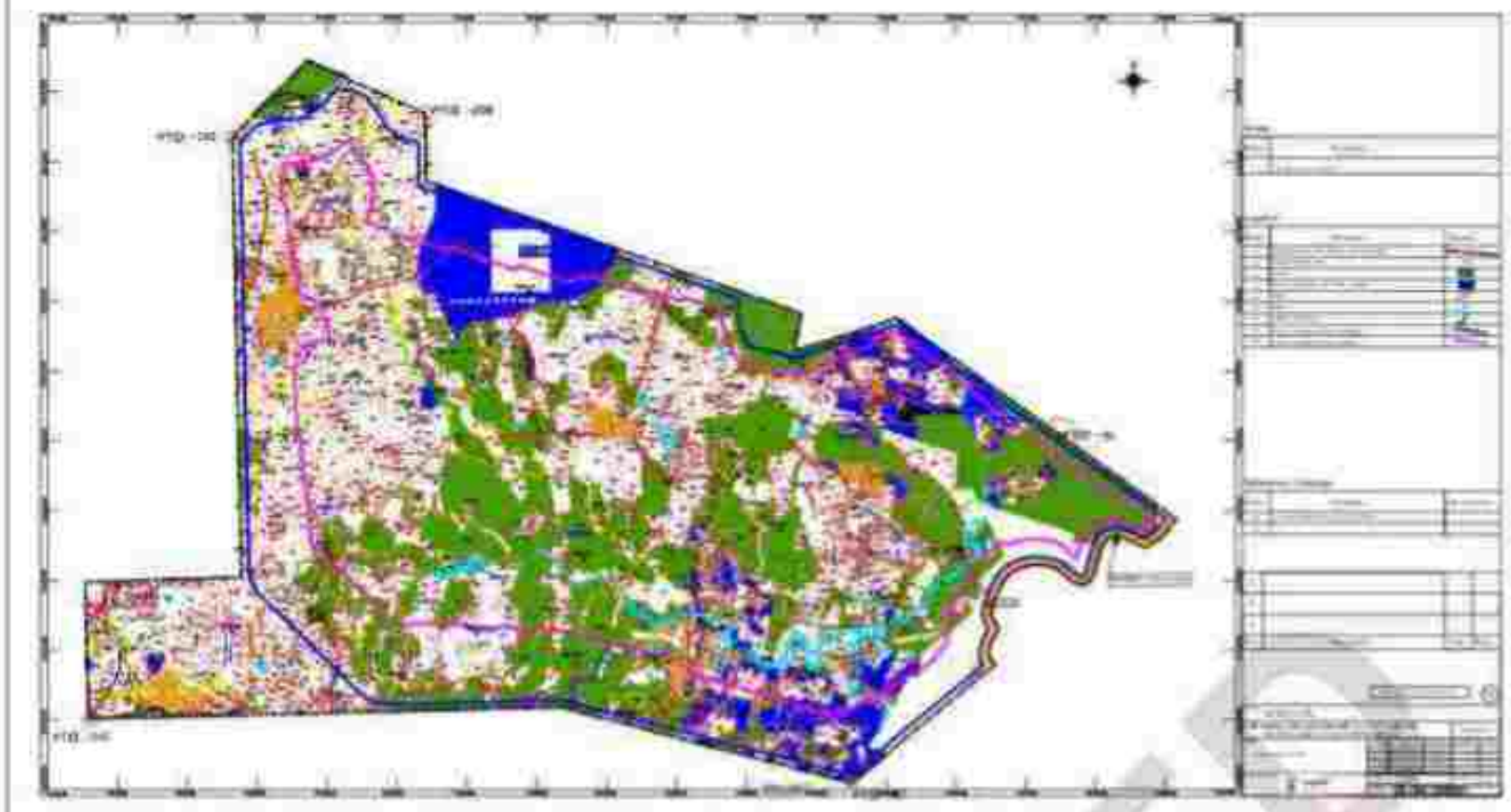
Plan / Plate 3B (Project Area))



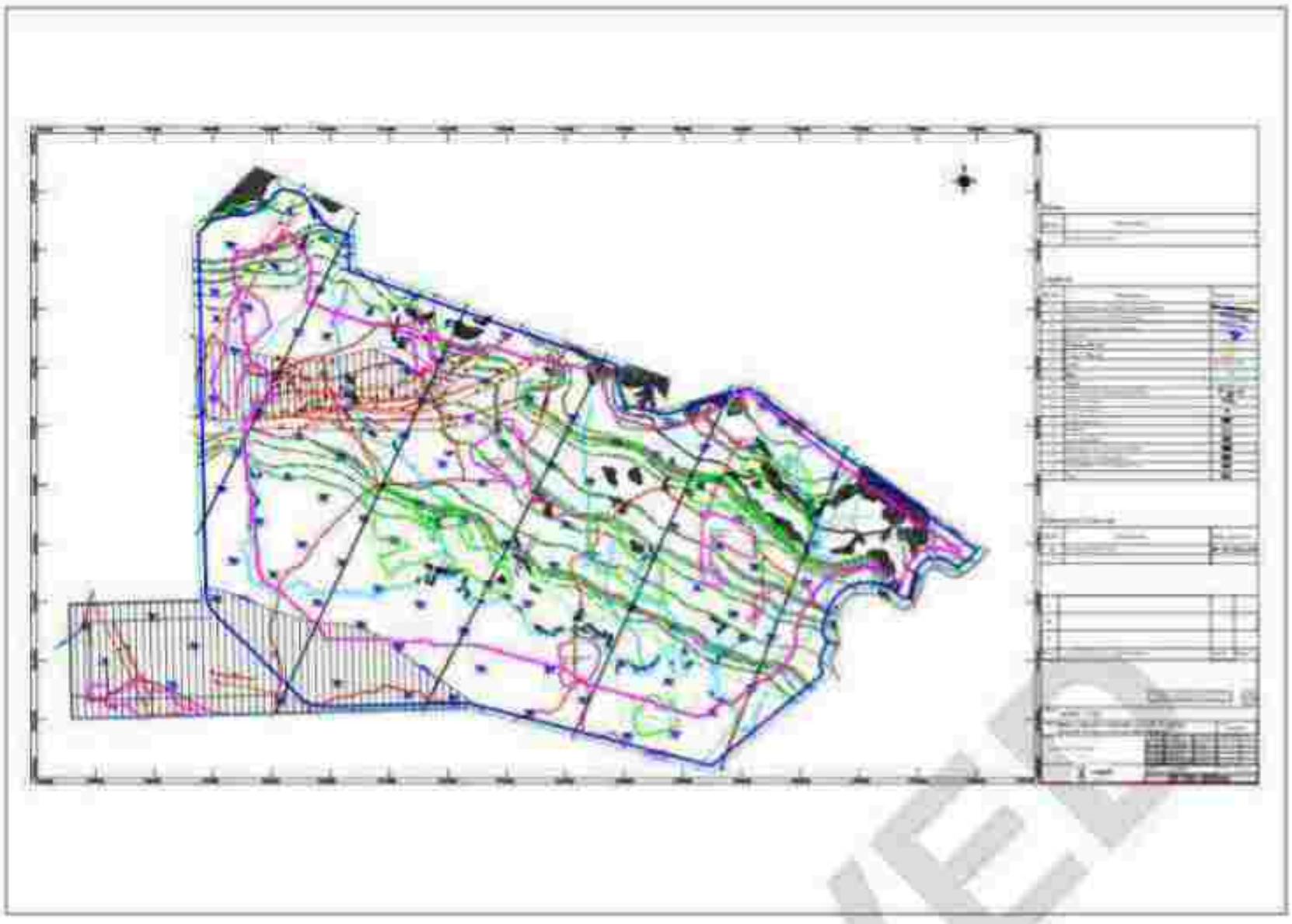
Plan / Plate 3C (Geological Block))



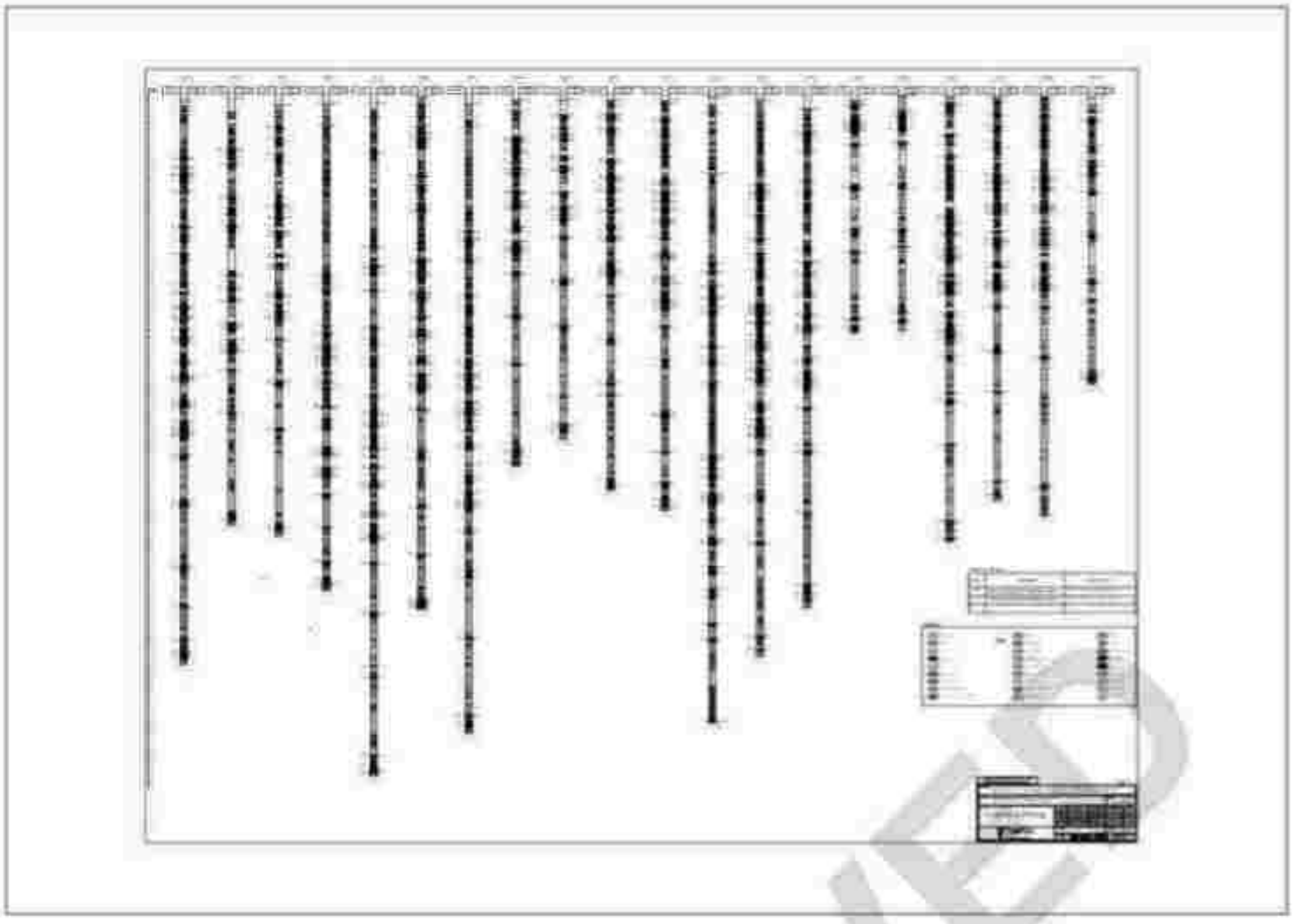
Plan / Plate 4



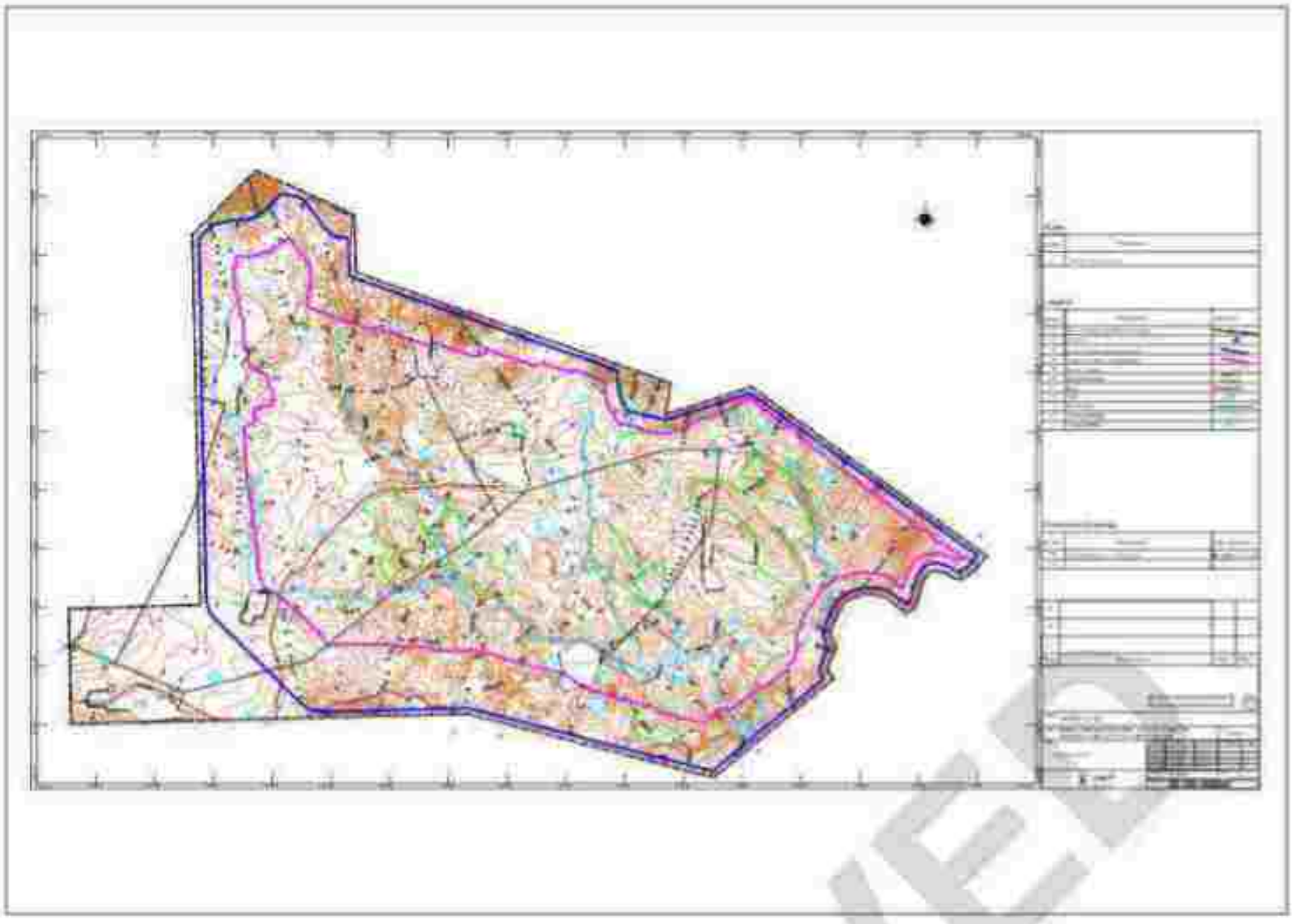
Plan / Plate 5A1



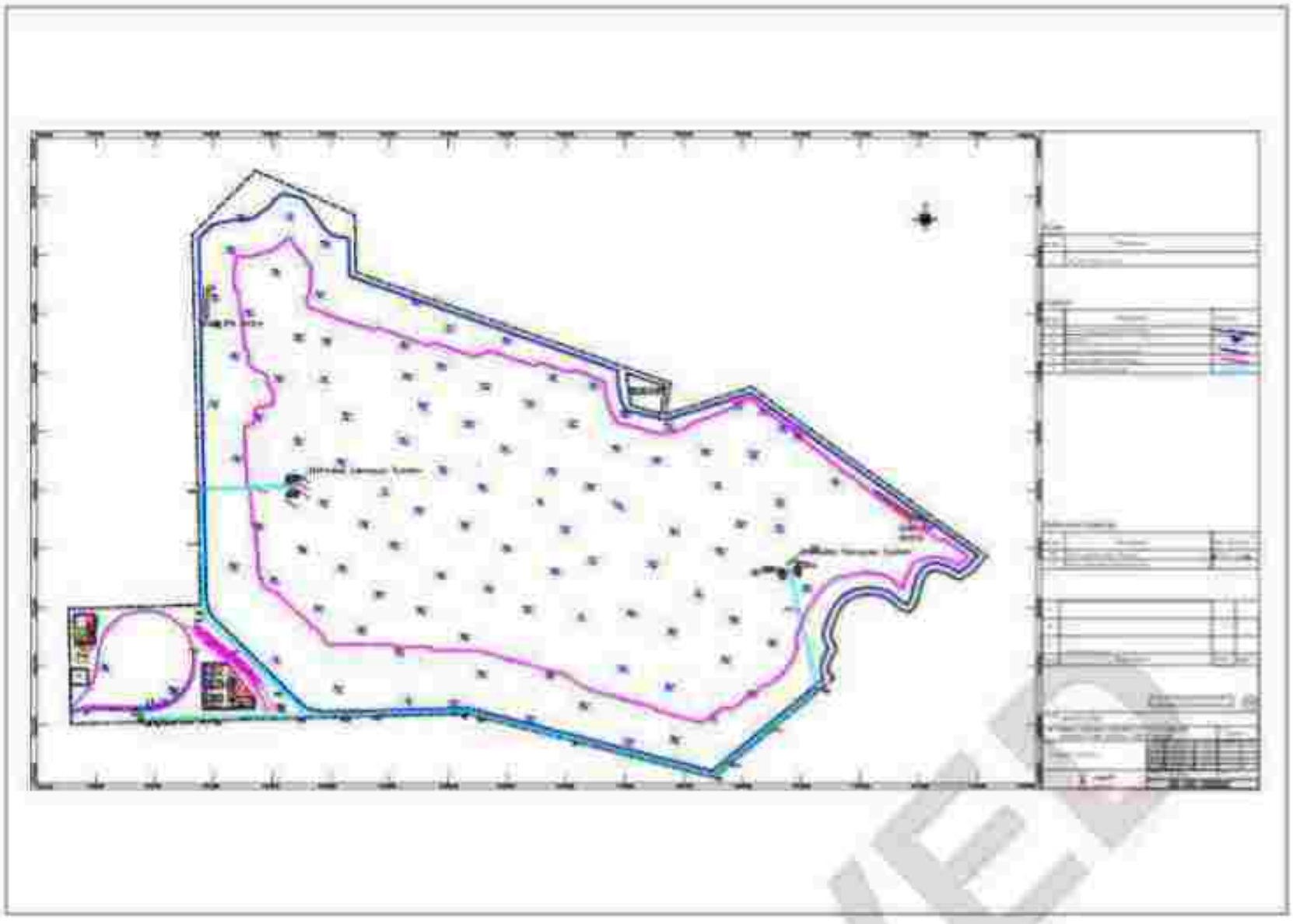
Plan / Plate 6A1



Plan / Plate 7

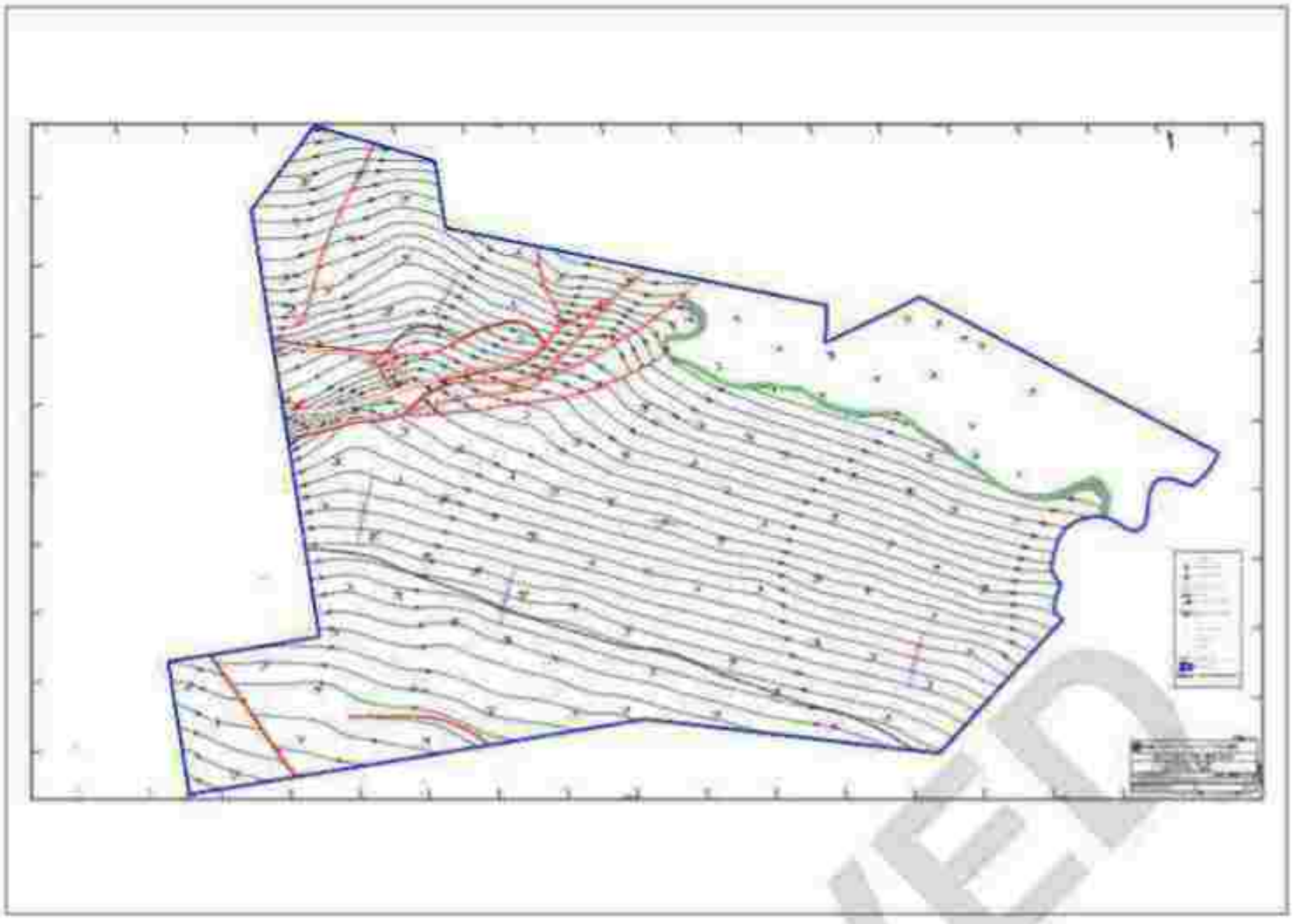


Plan / Plate 8

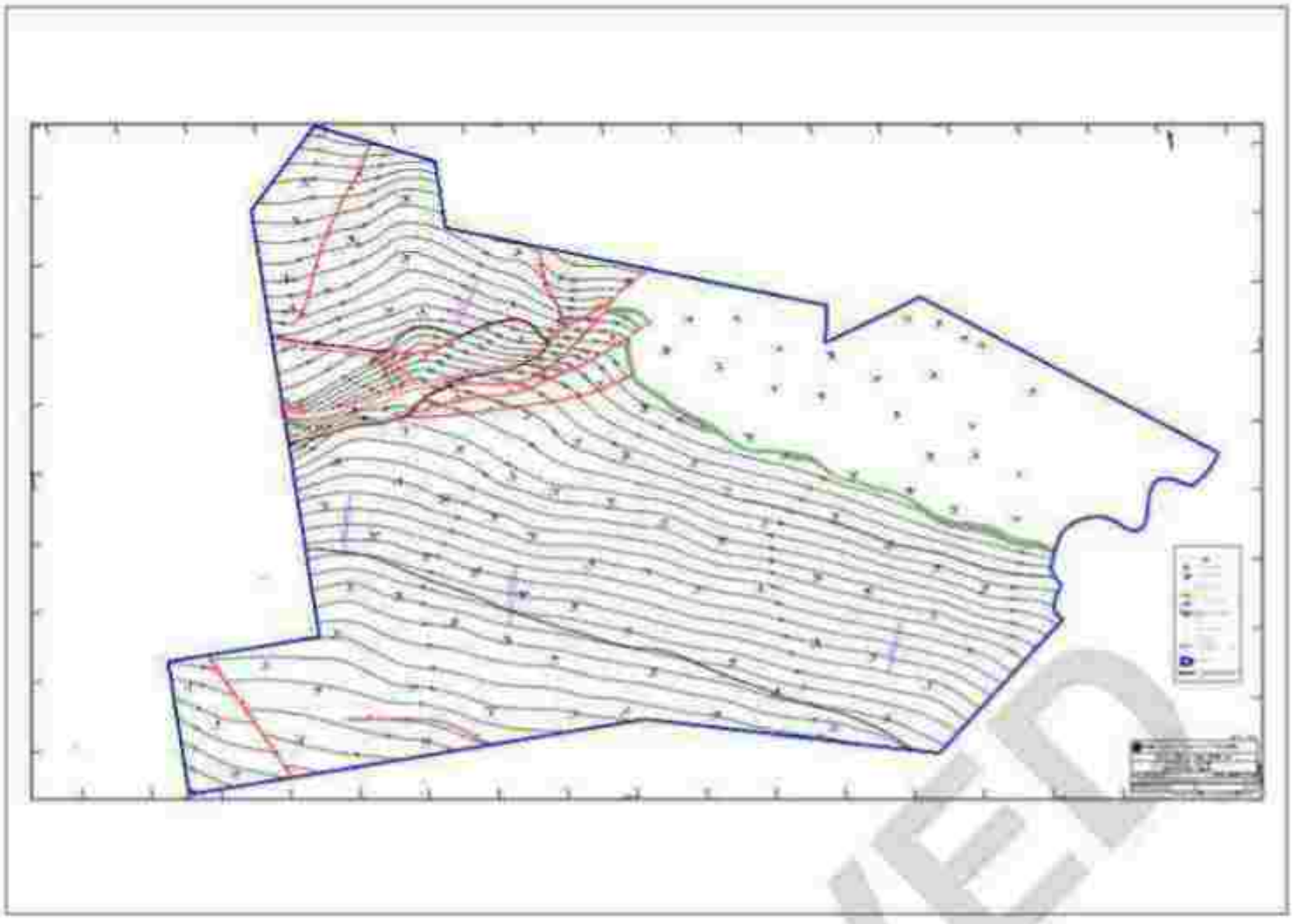


Plan / Plate 9

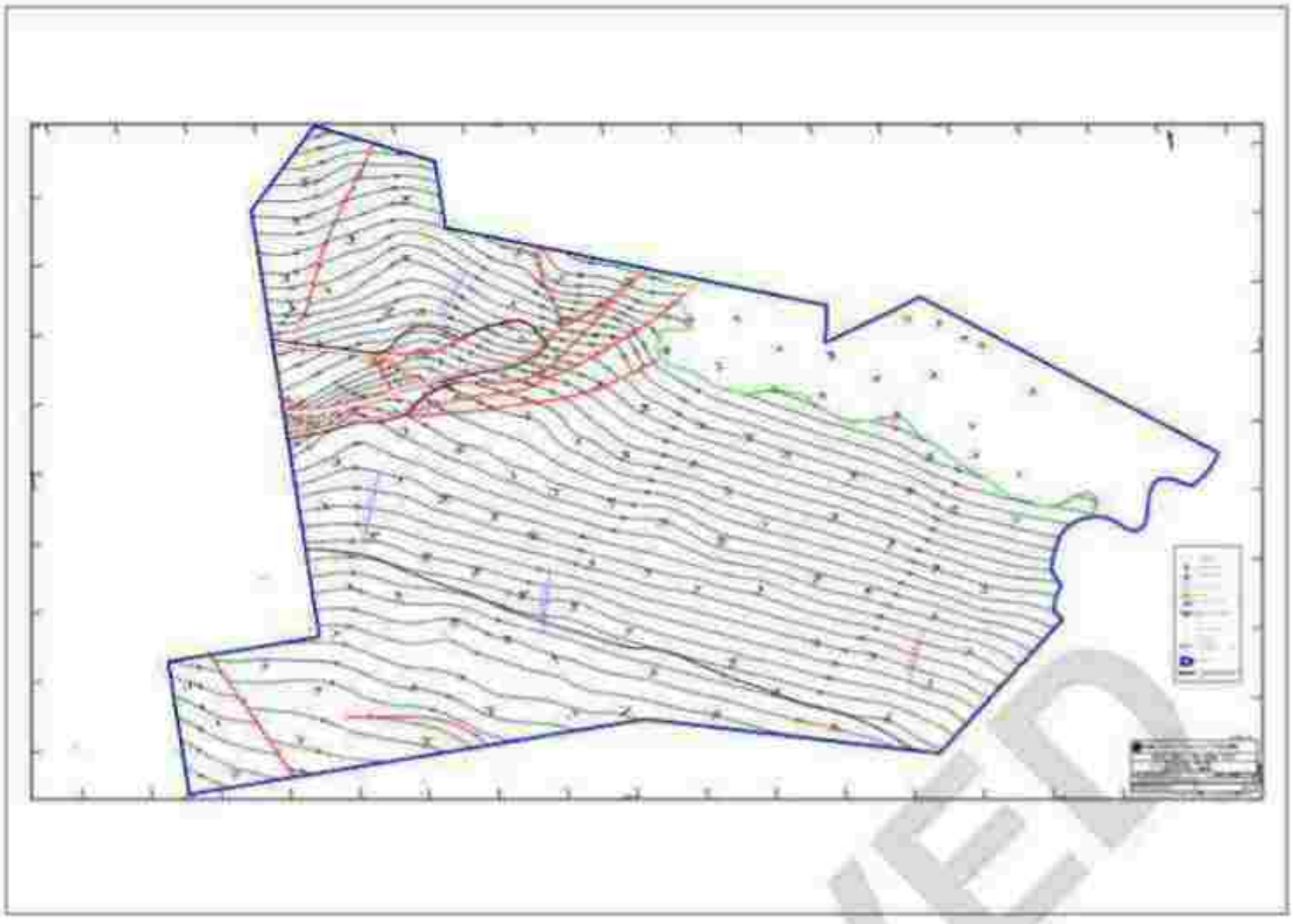
Plan / Plate 10A1



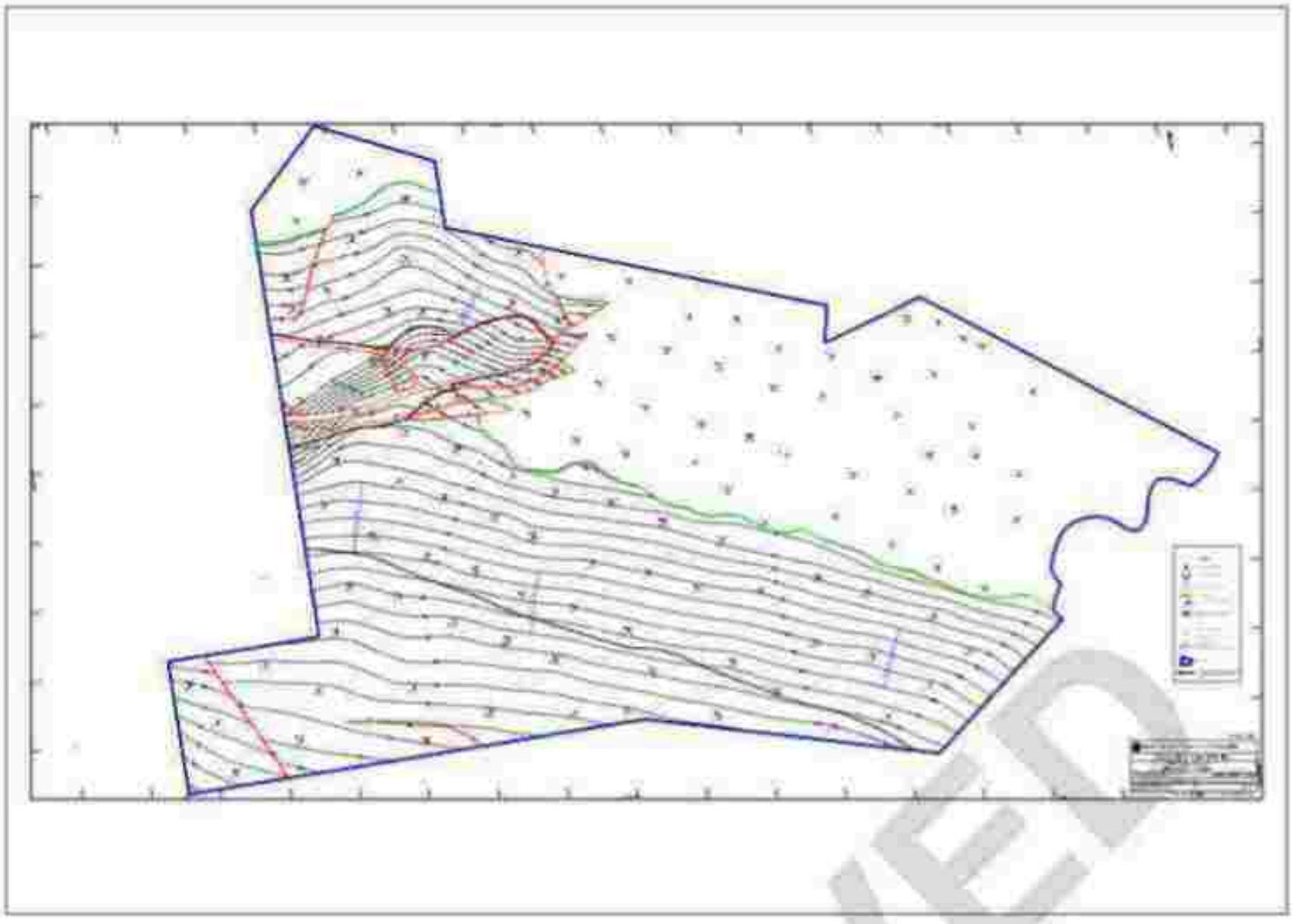
Plan / Plate 10A2



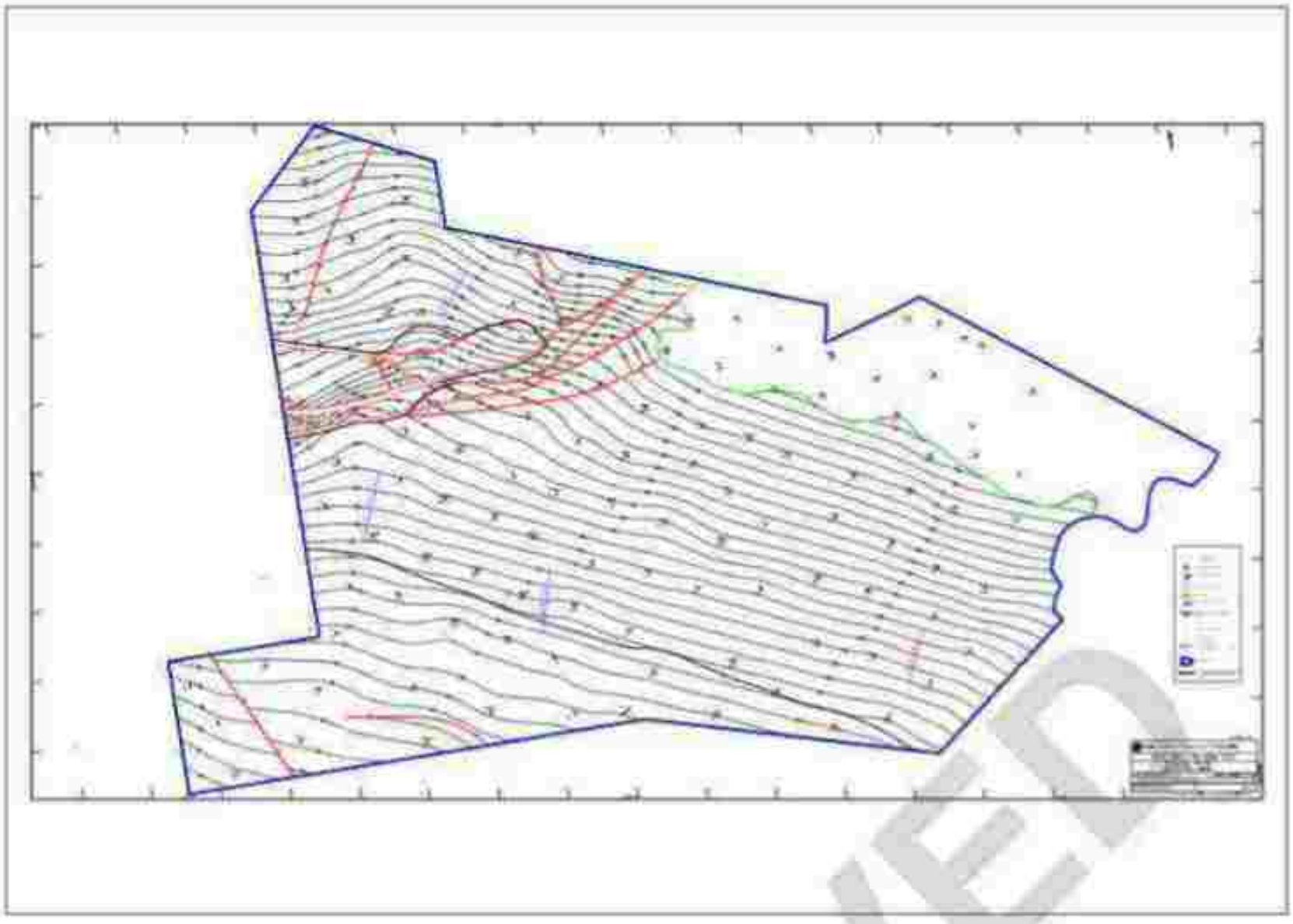
Plan / Plate 10A3



Plan / Plate 10A4



Plan / Plate 10A5



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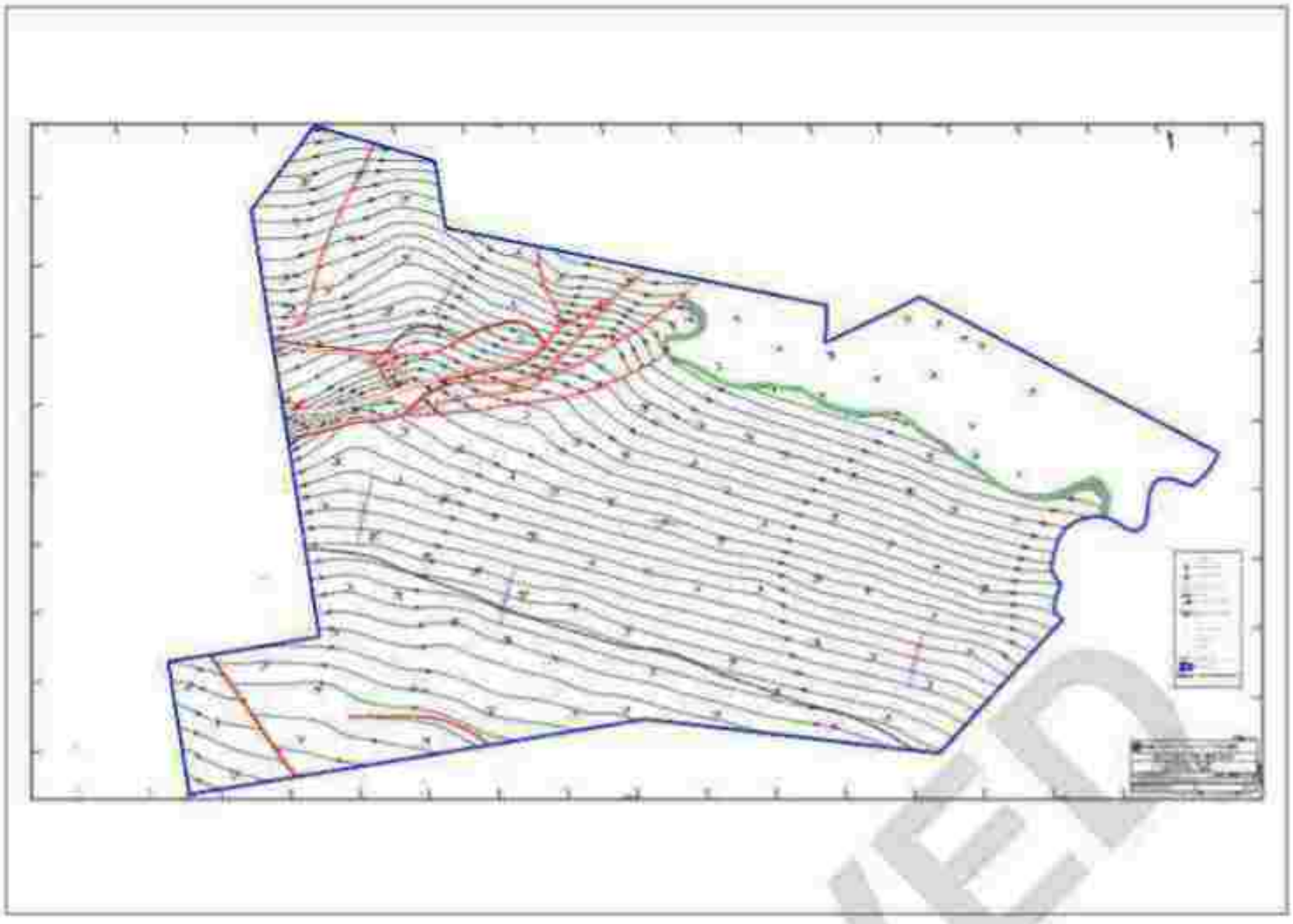
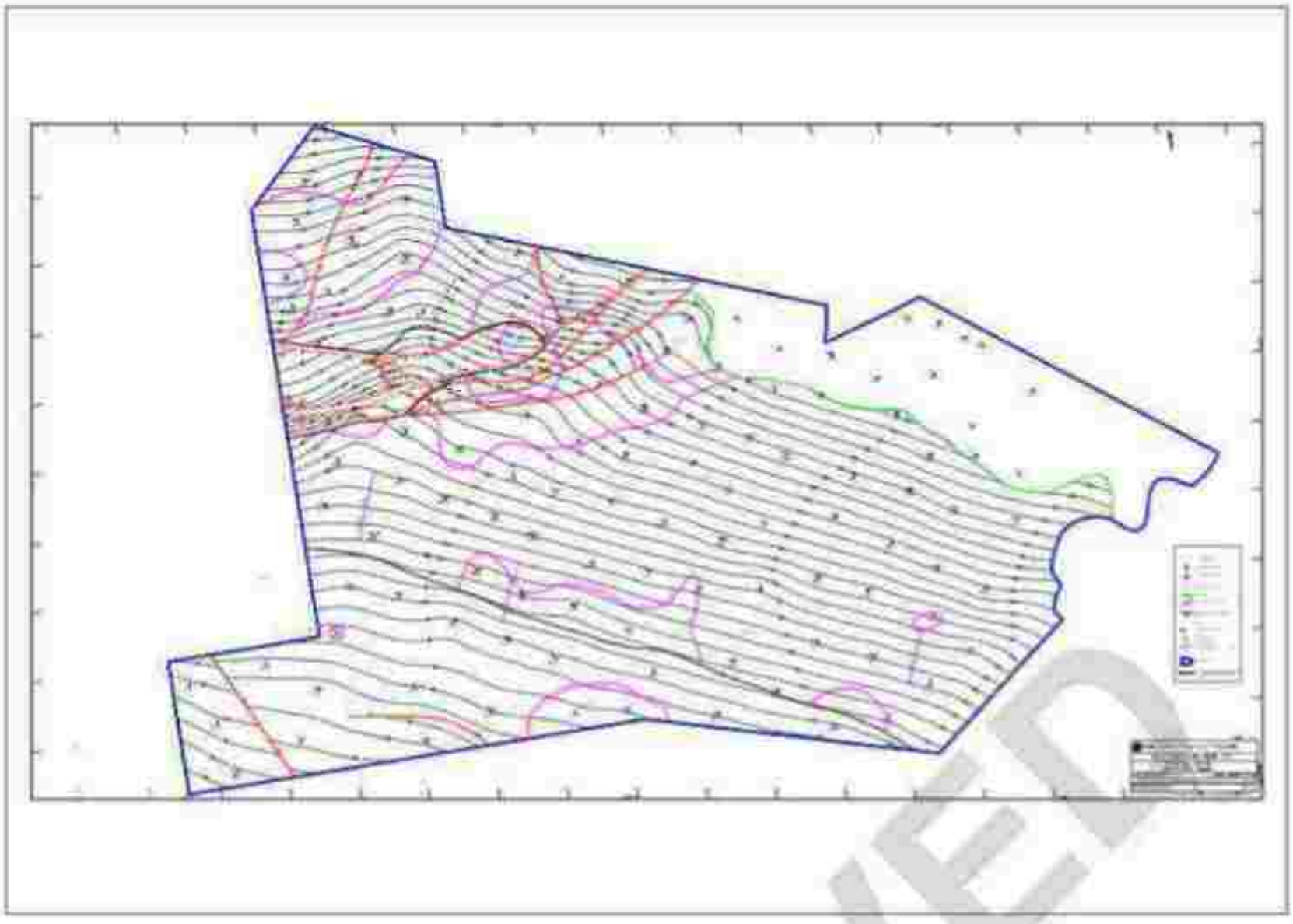
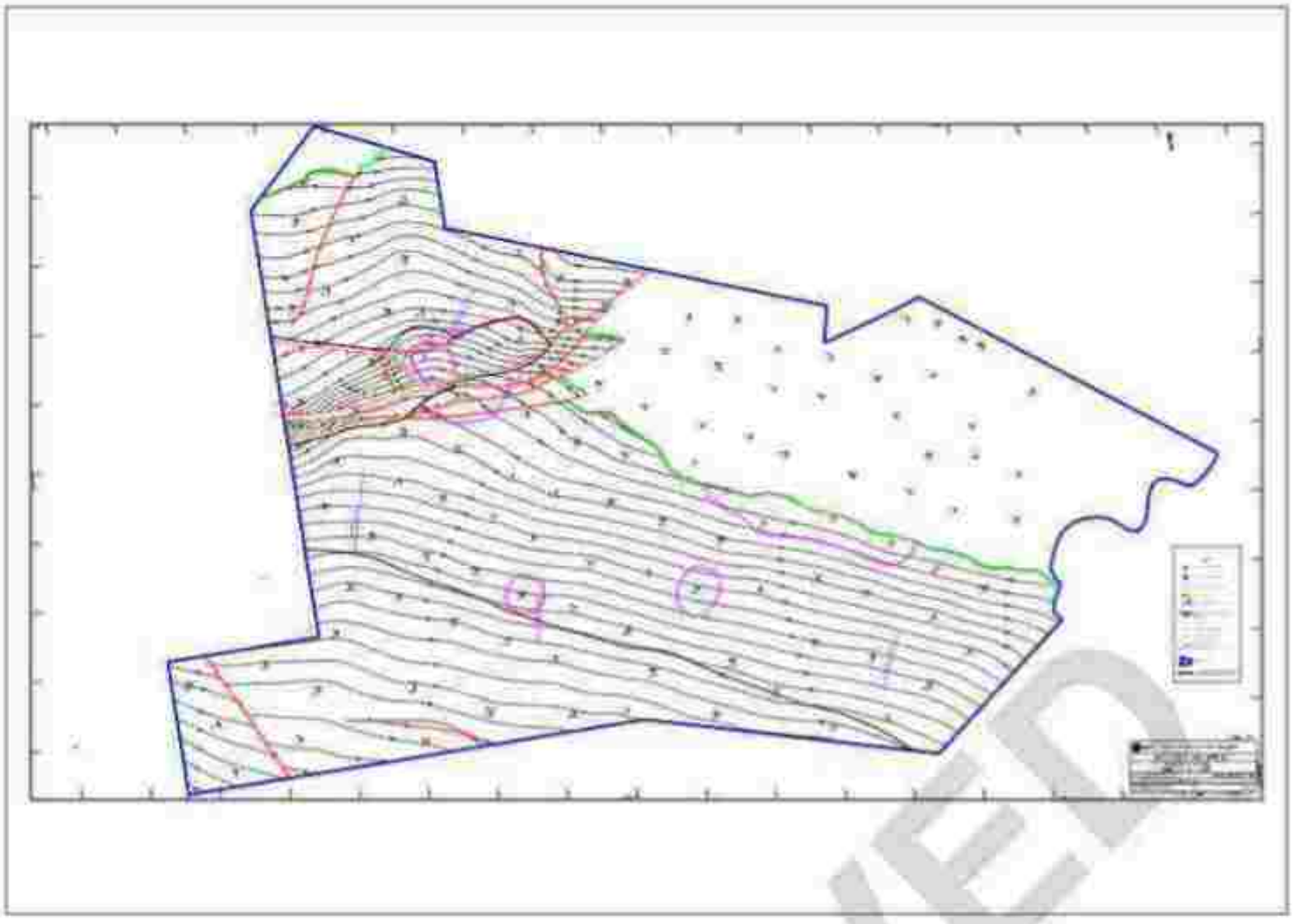


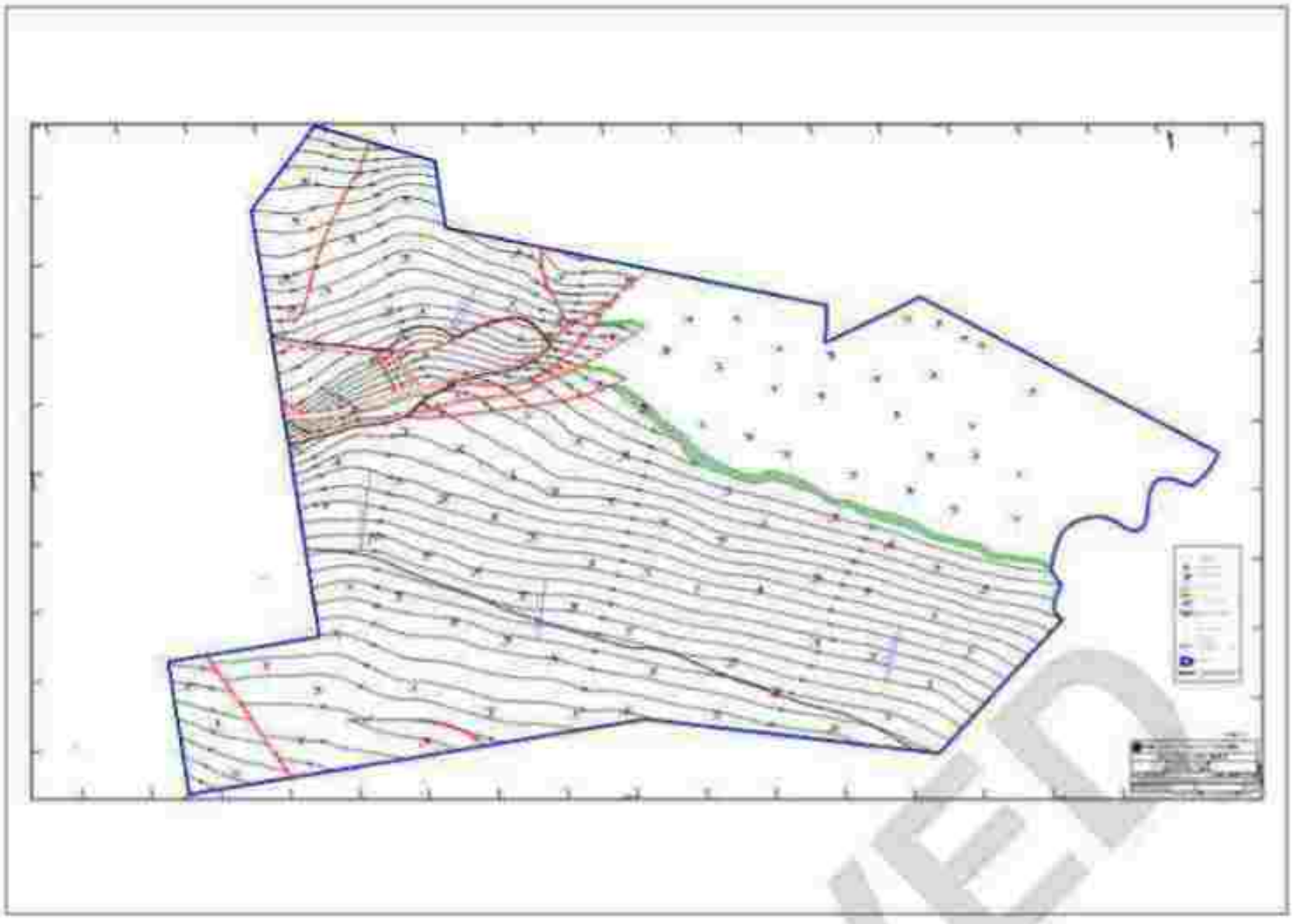
Plan / Plate 10A7



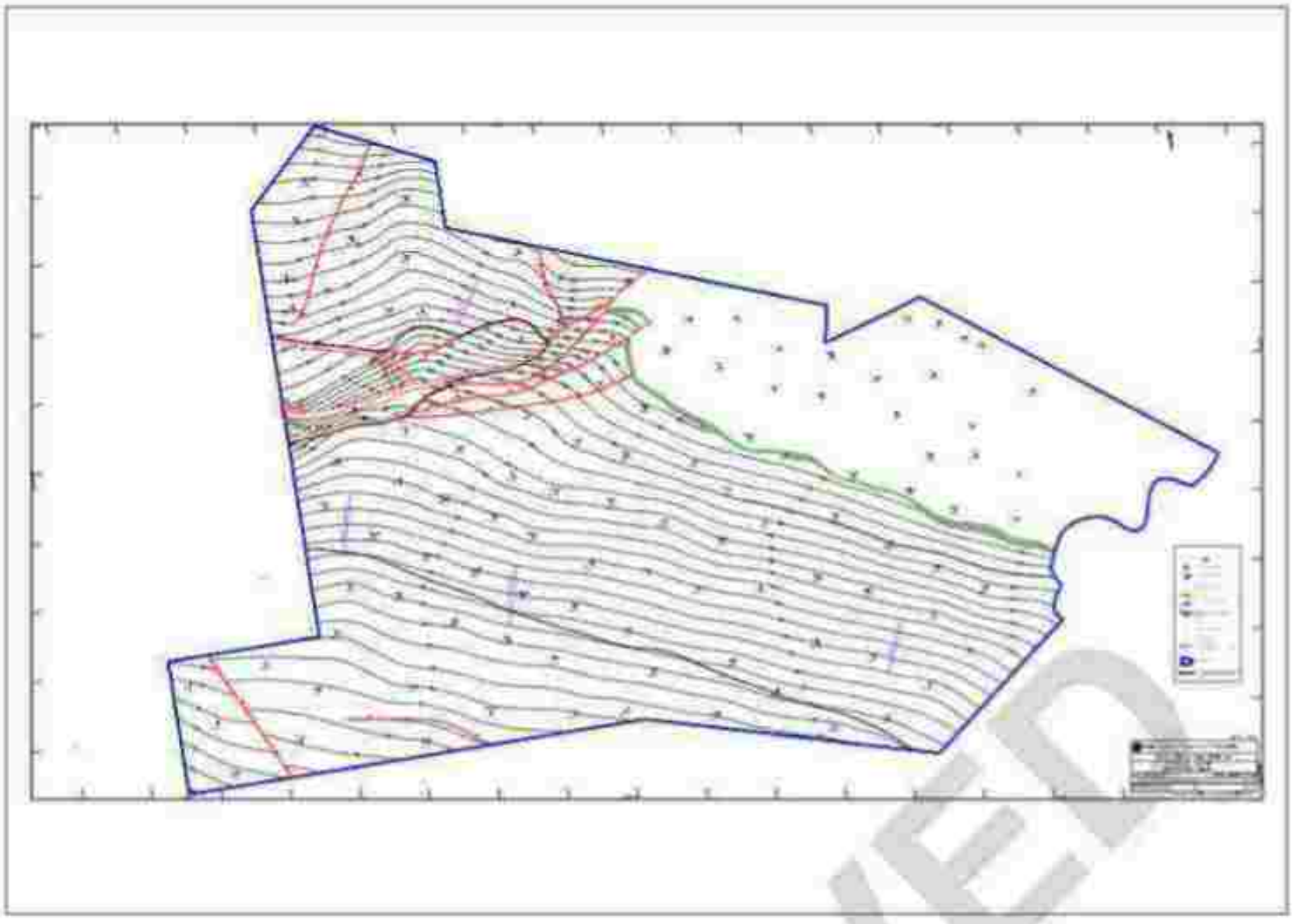
Plan / Plate 10A8



Plan / Plate 10A9



Plan / Plate 10A10



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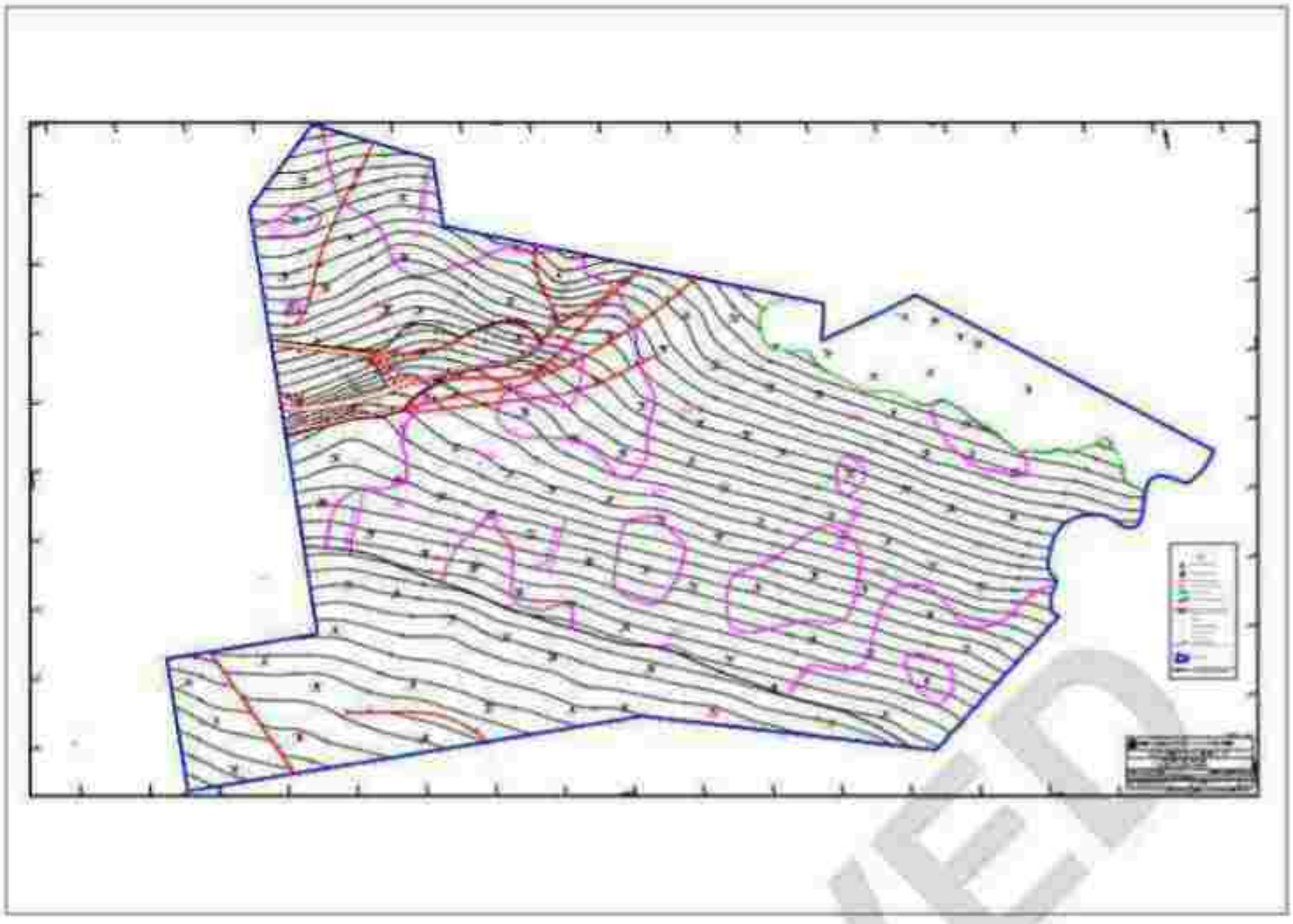

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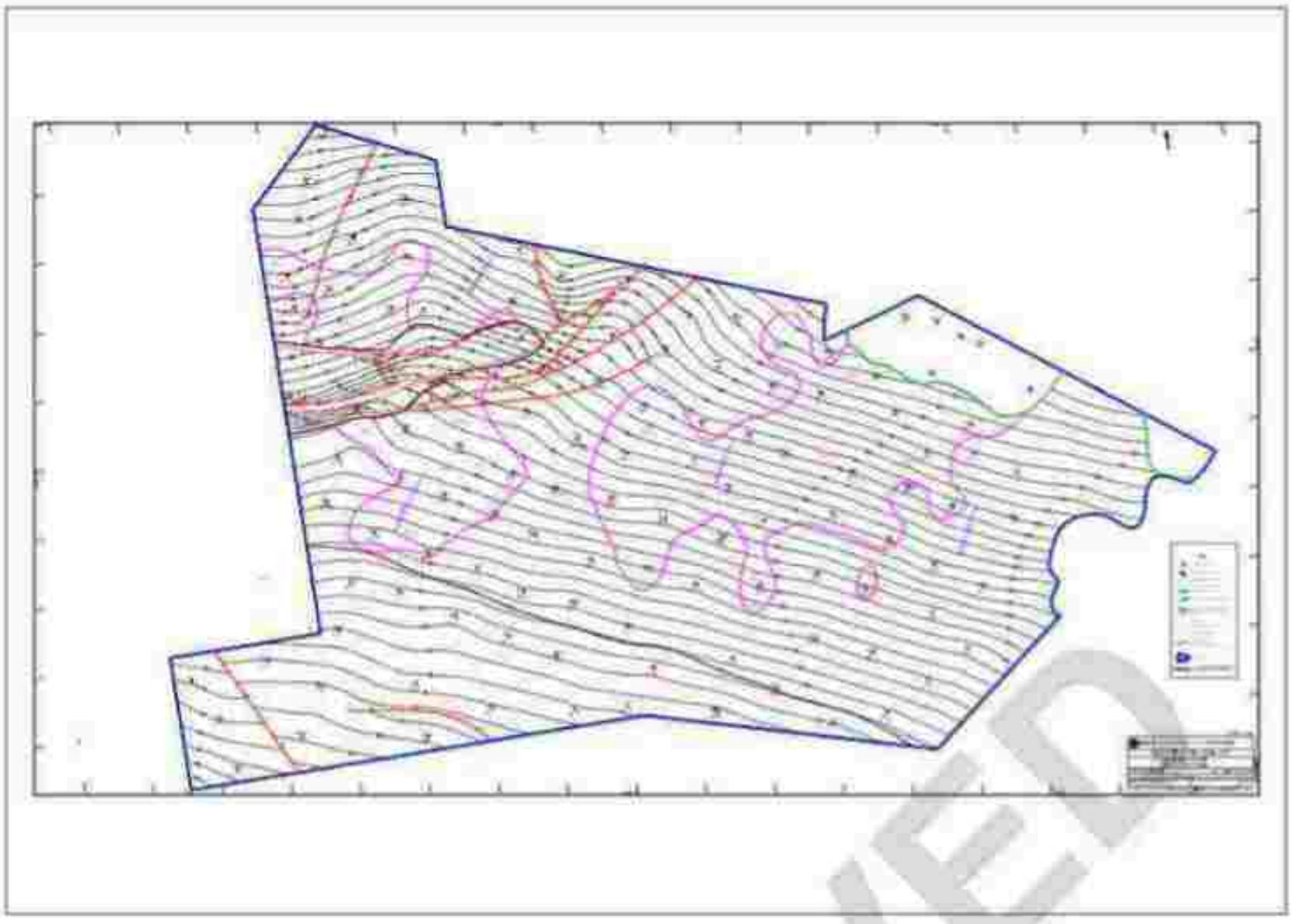

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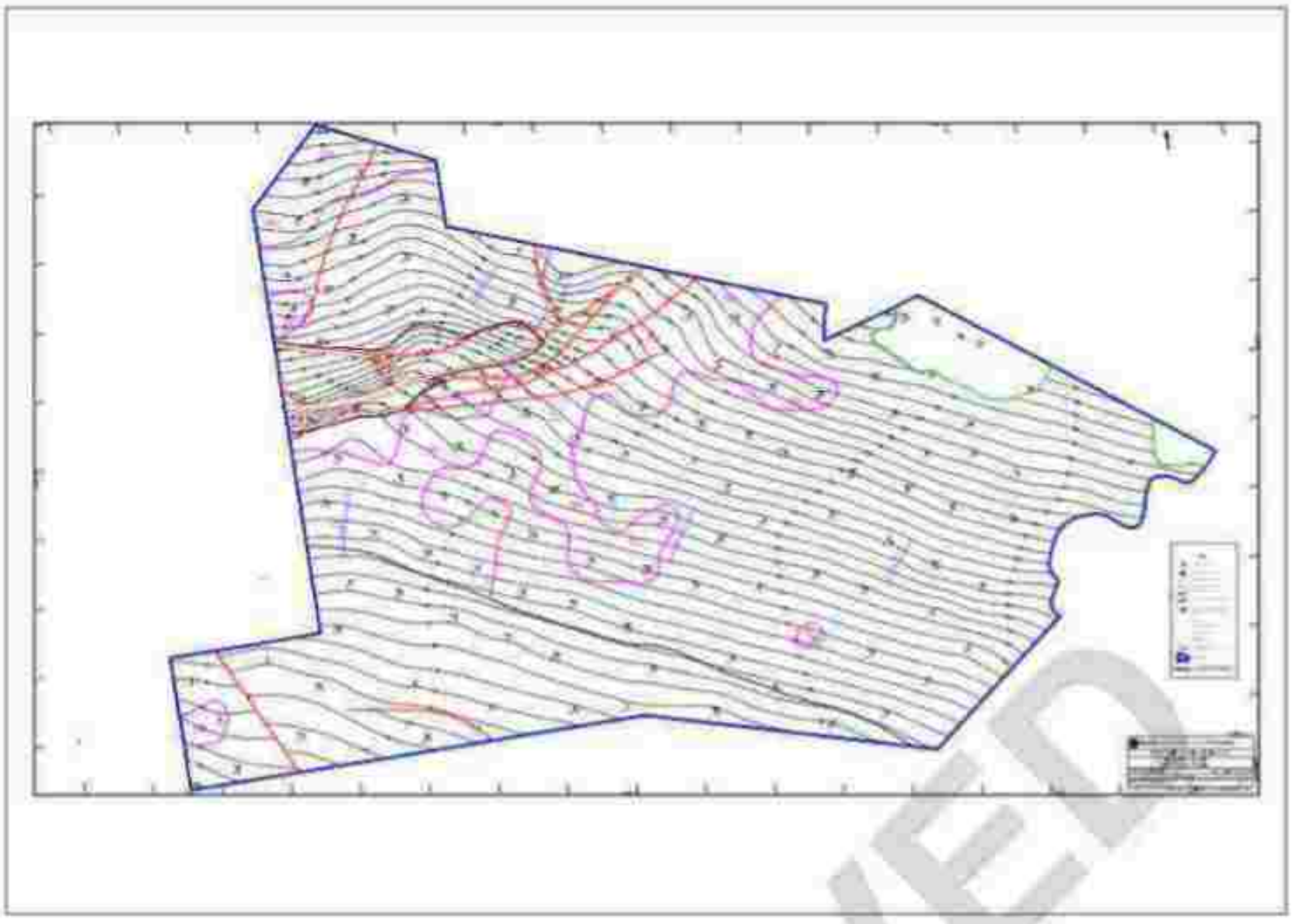

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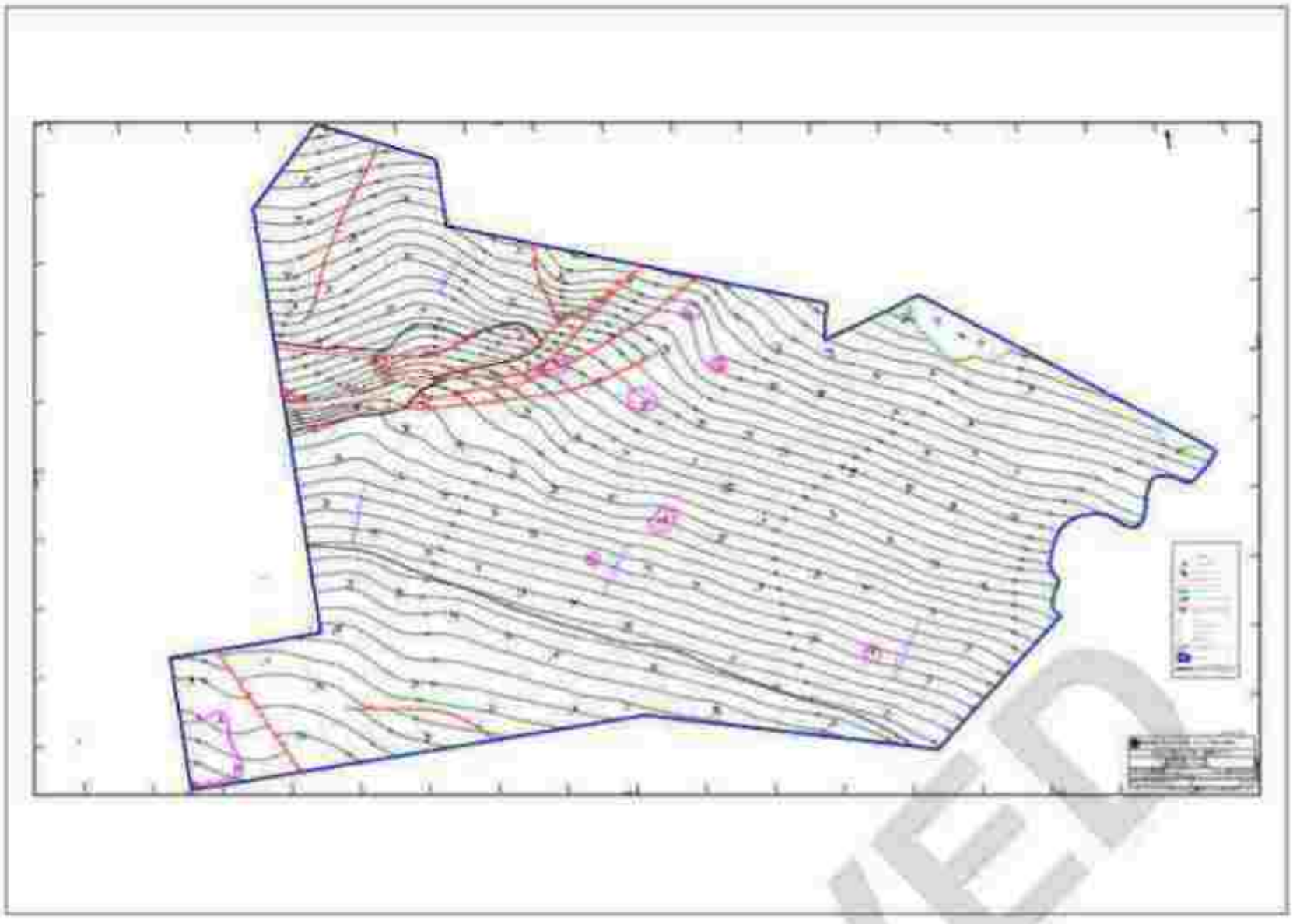

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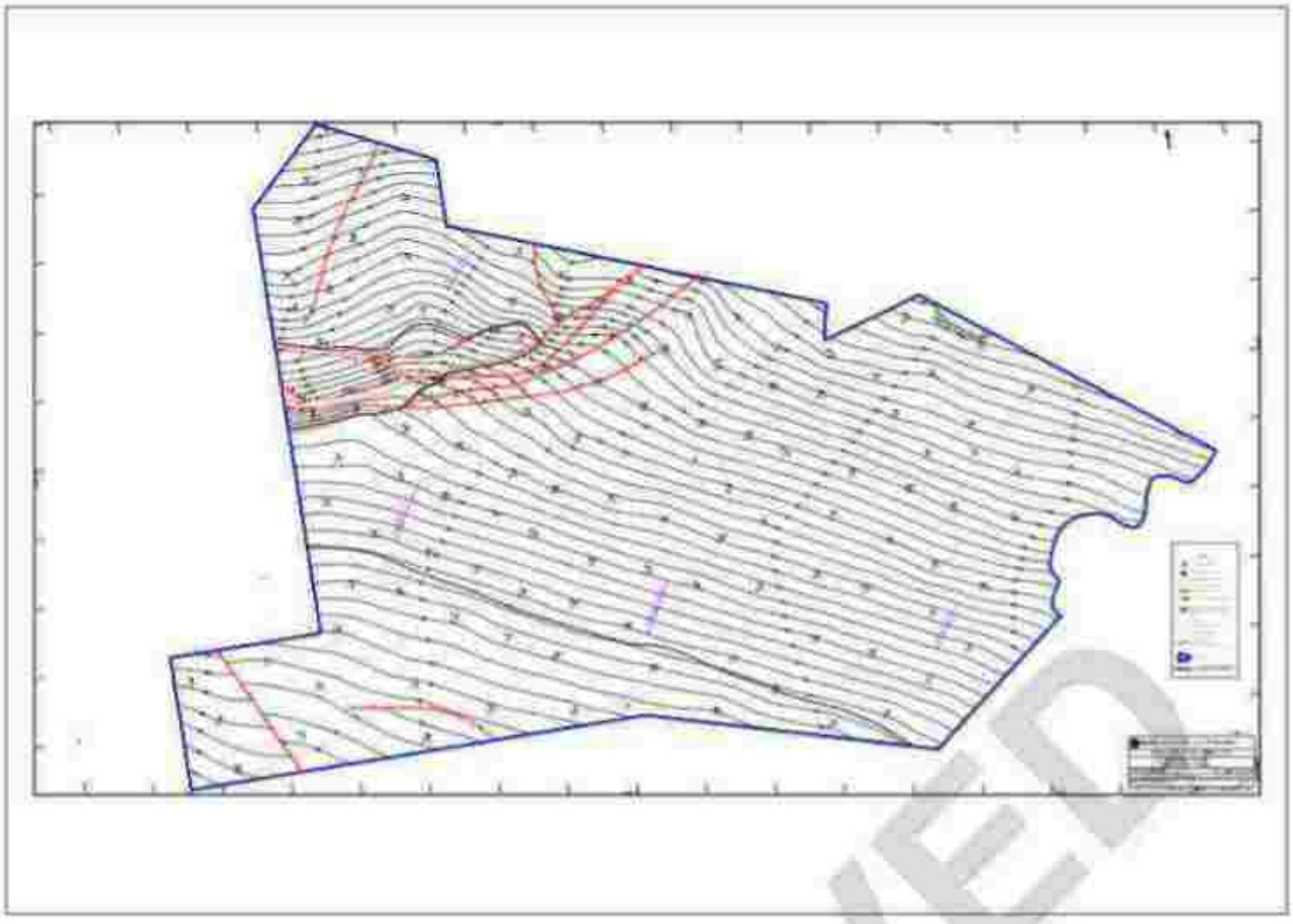

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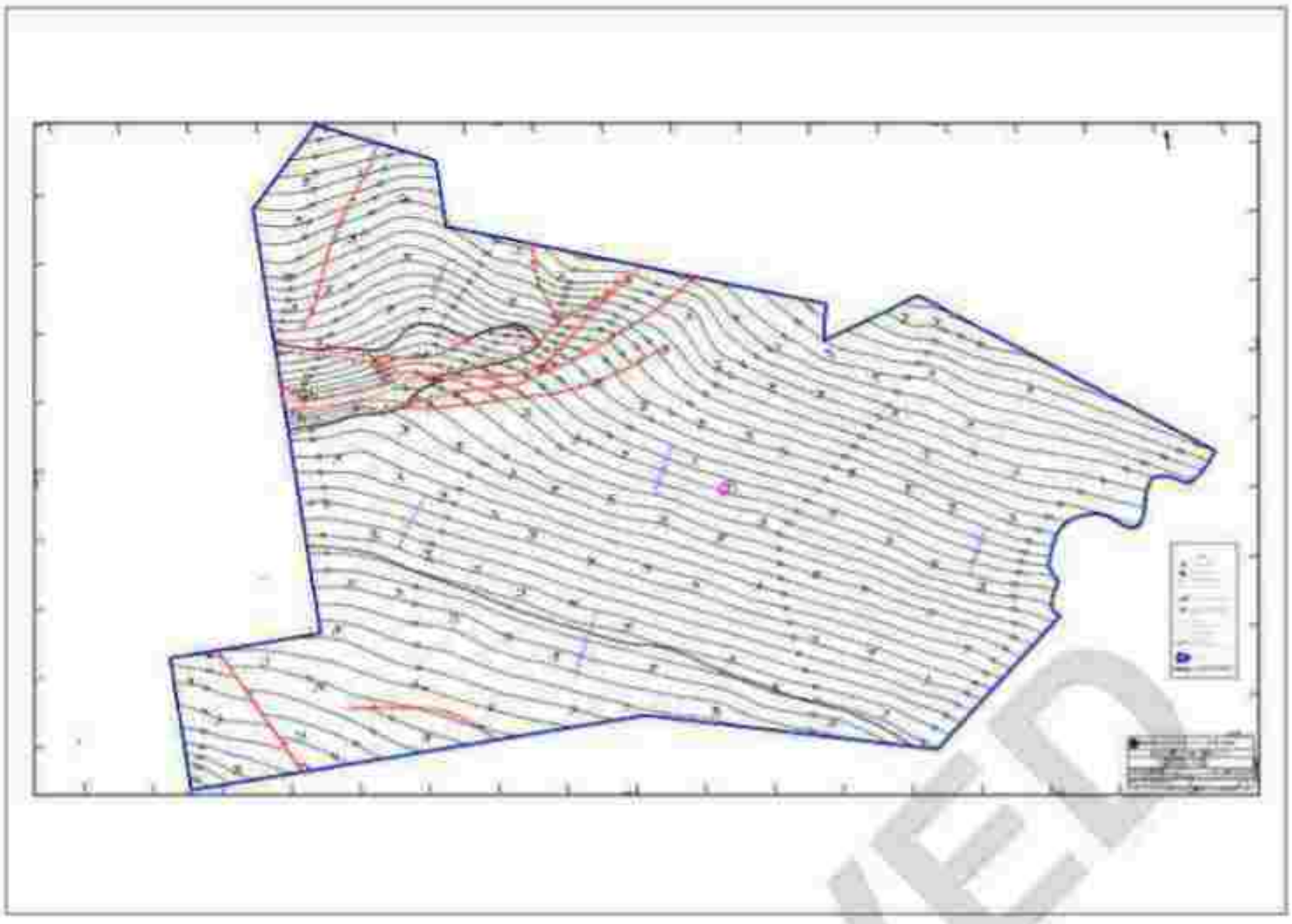

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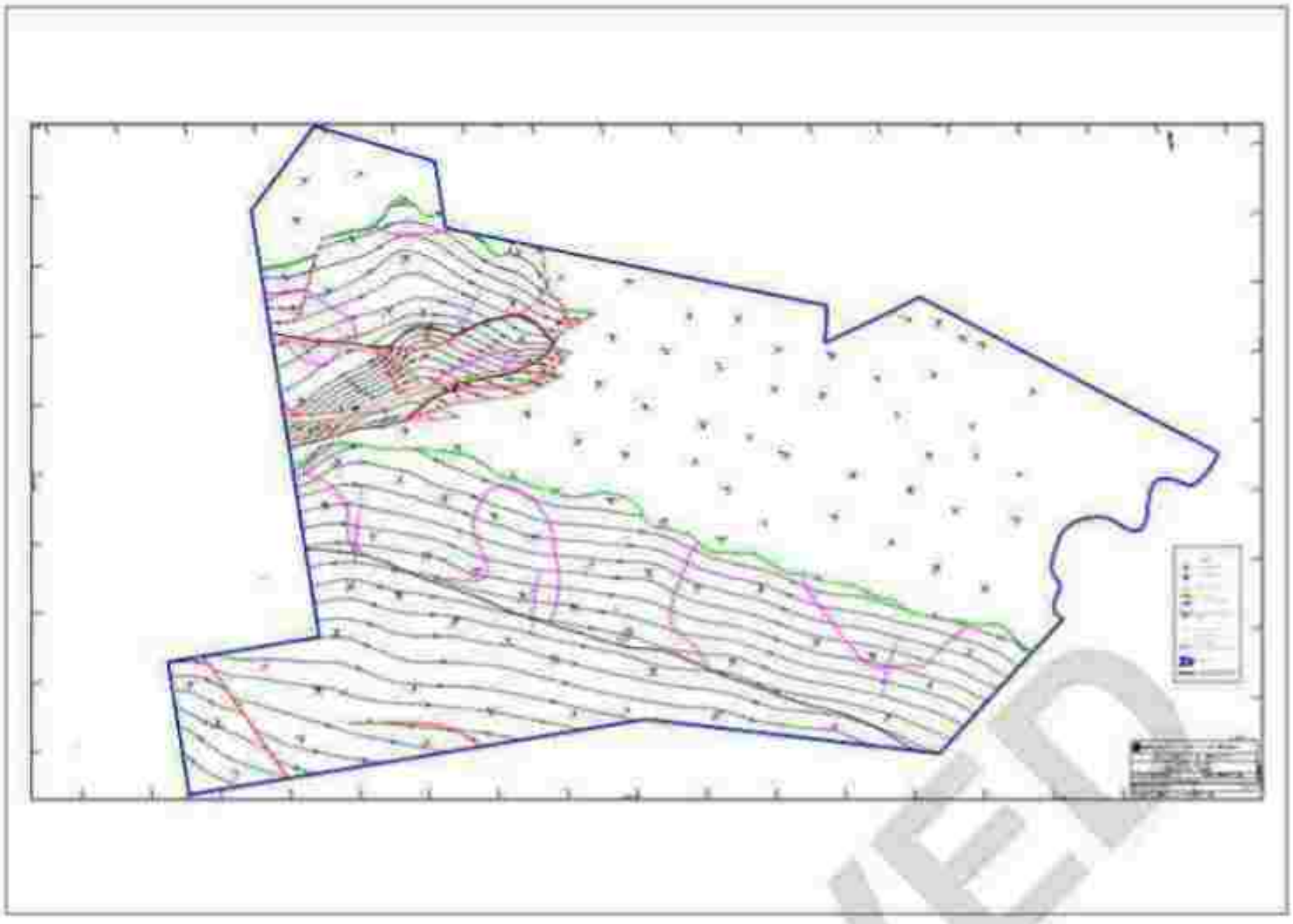

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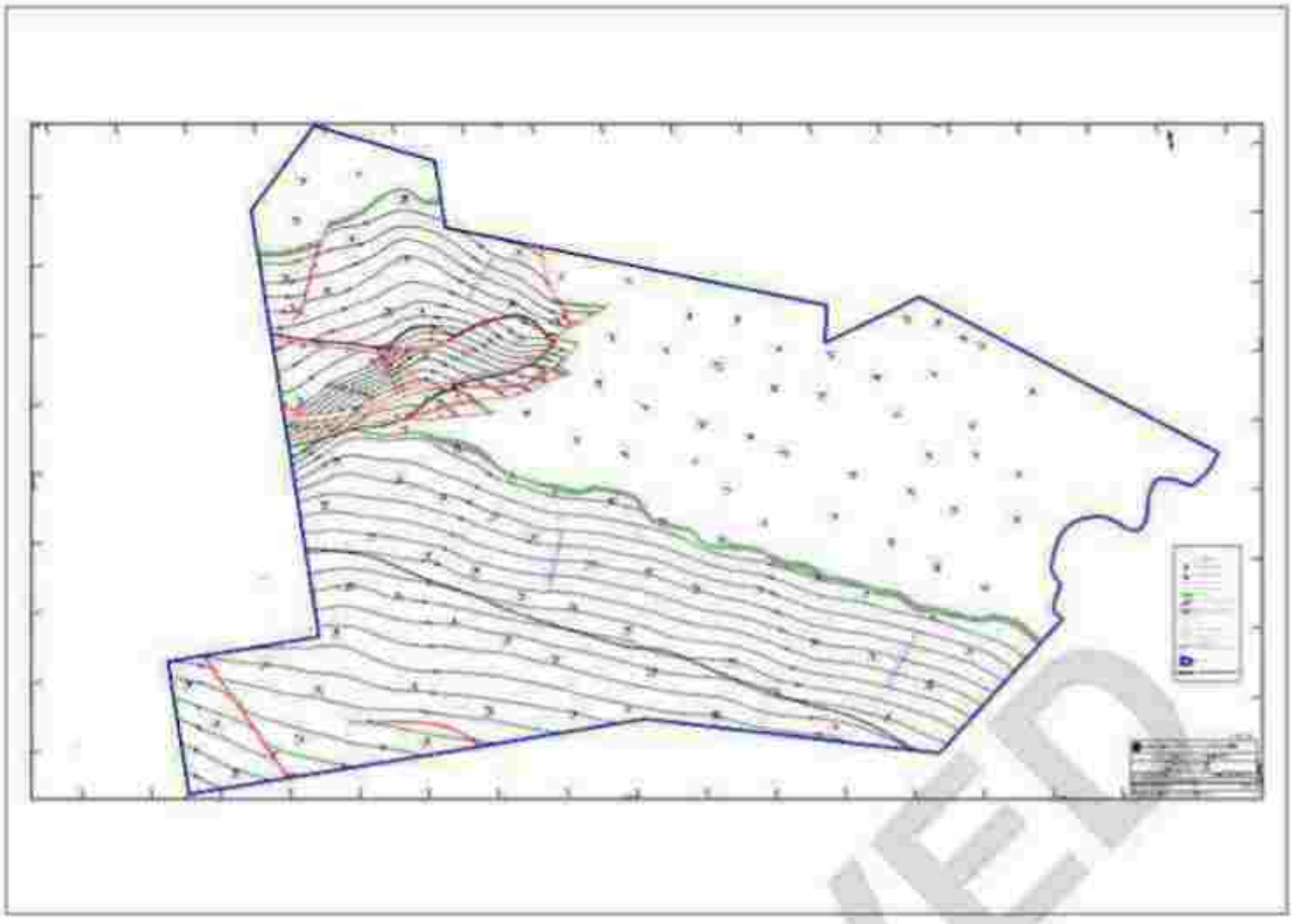

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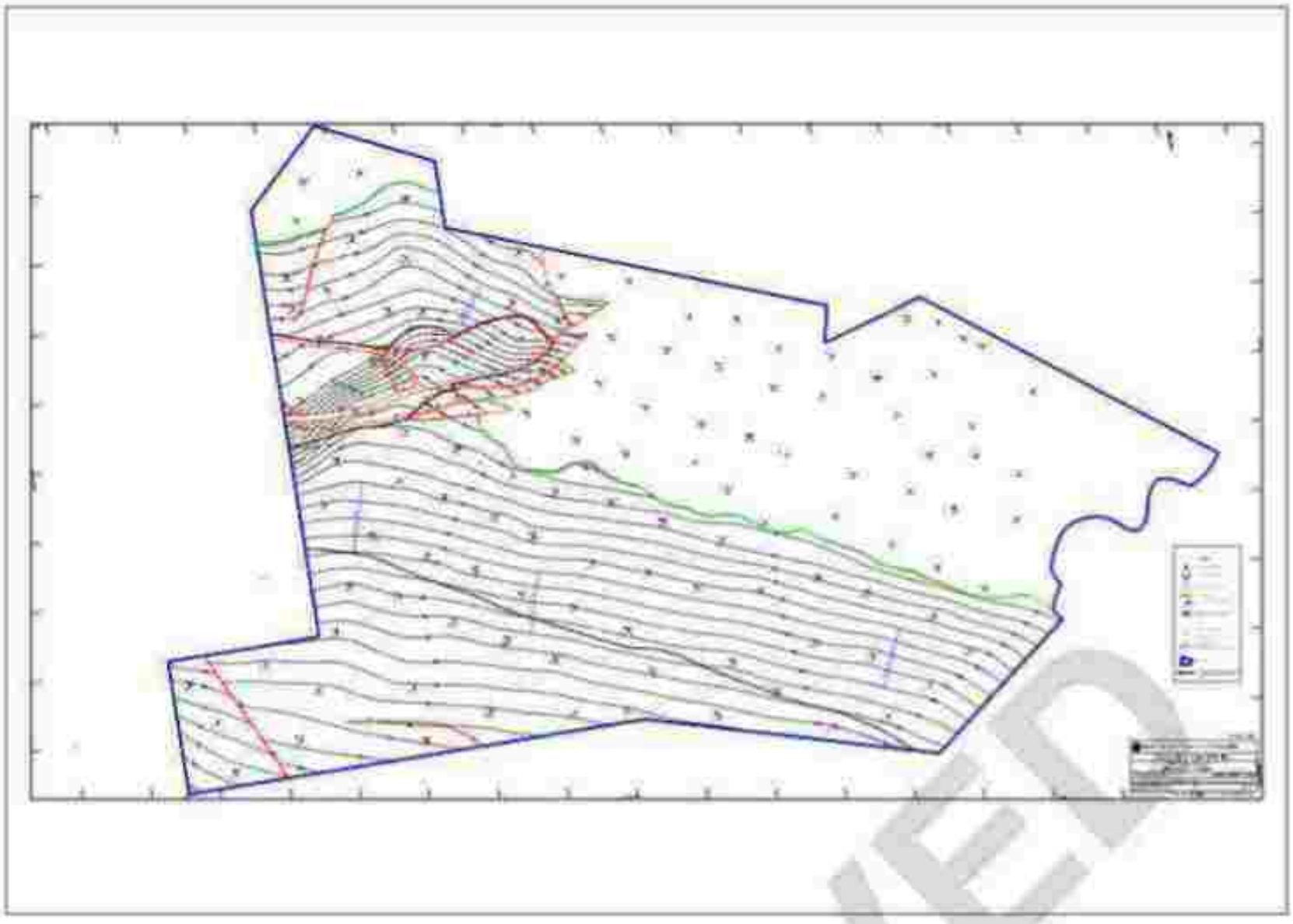

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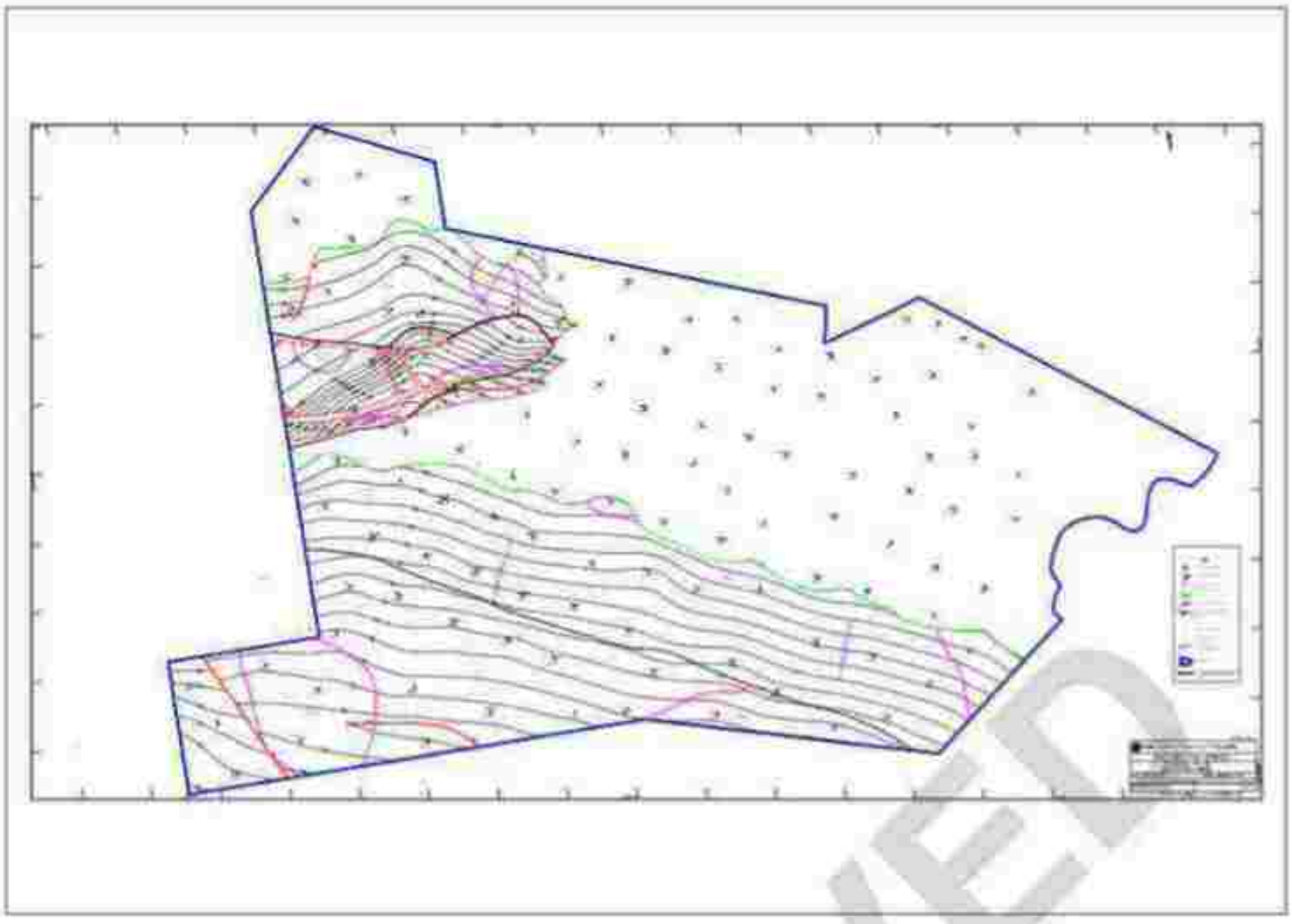

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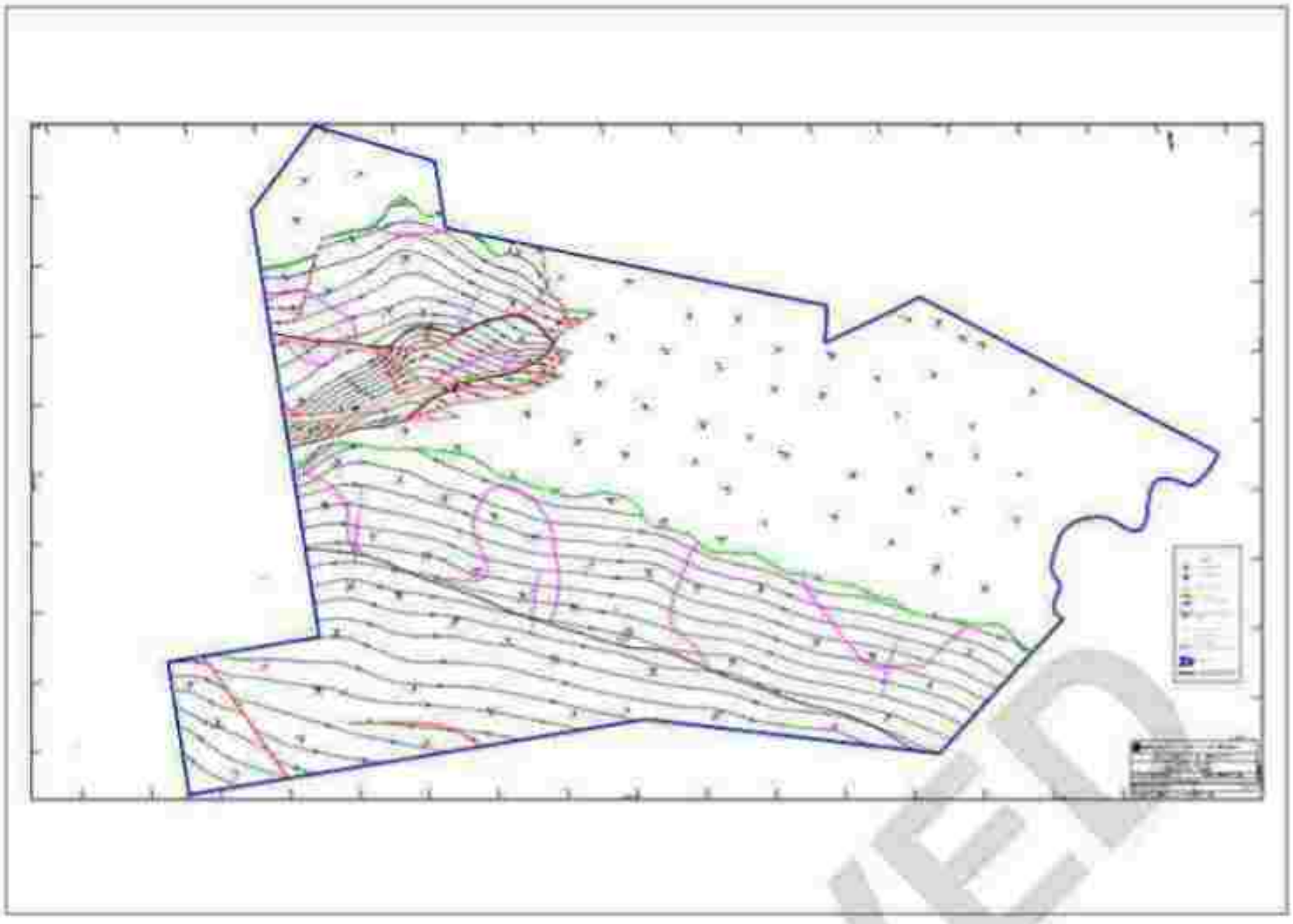

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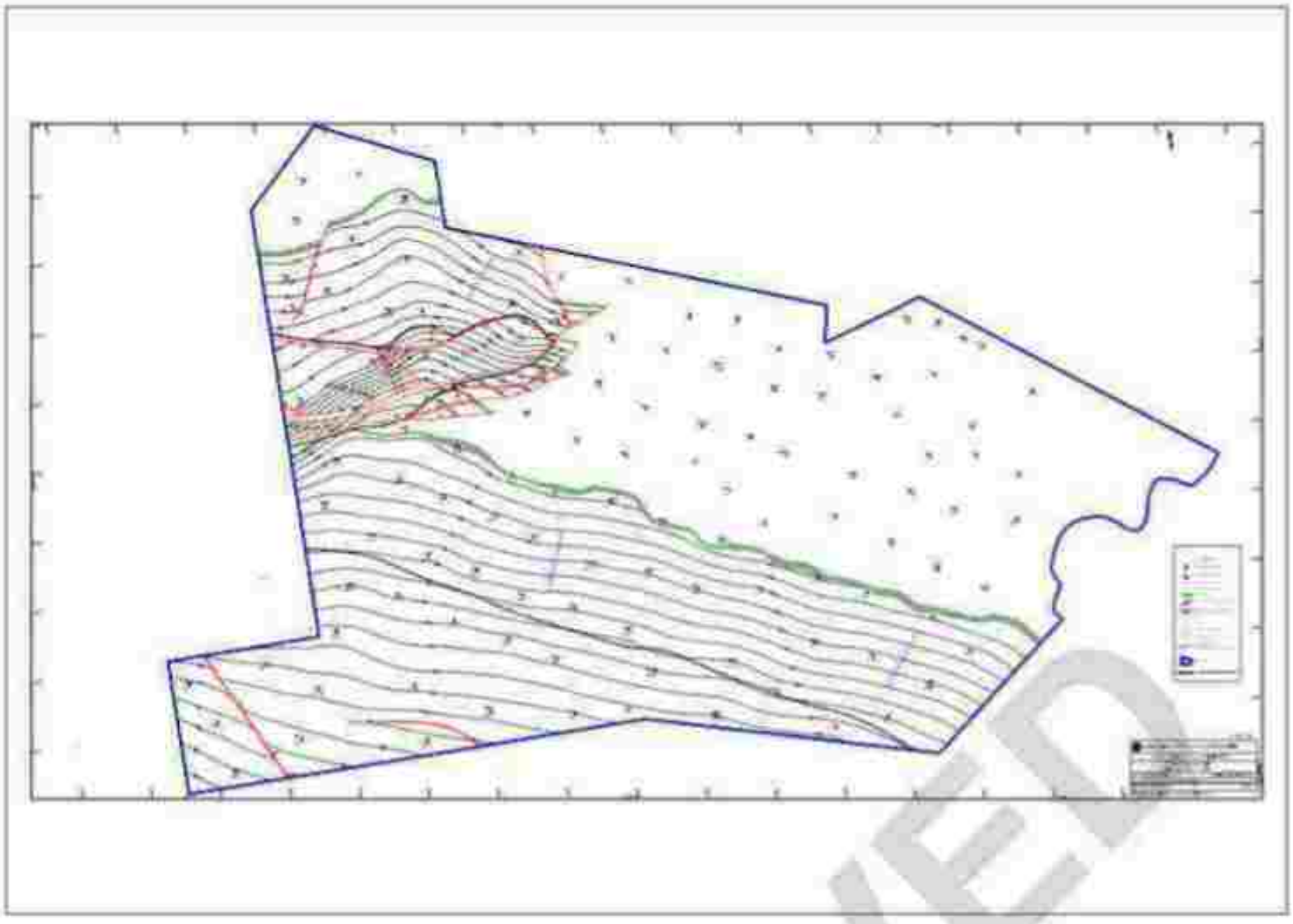

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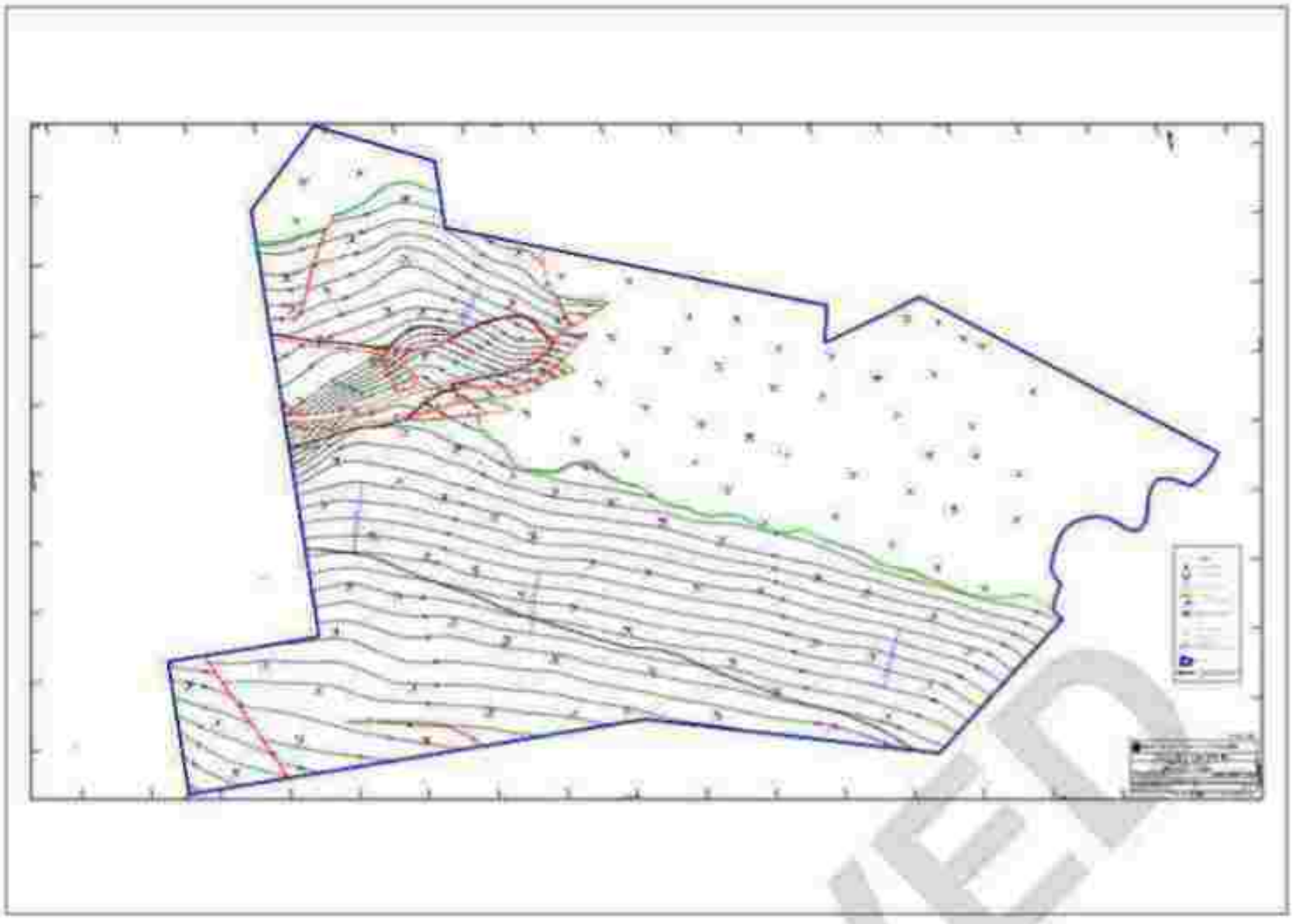

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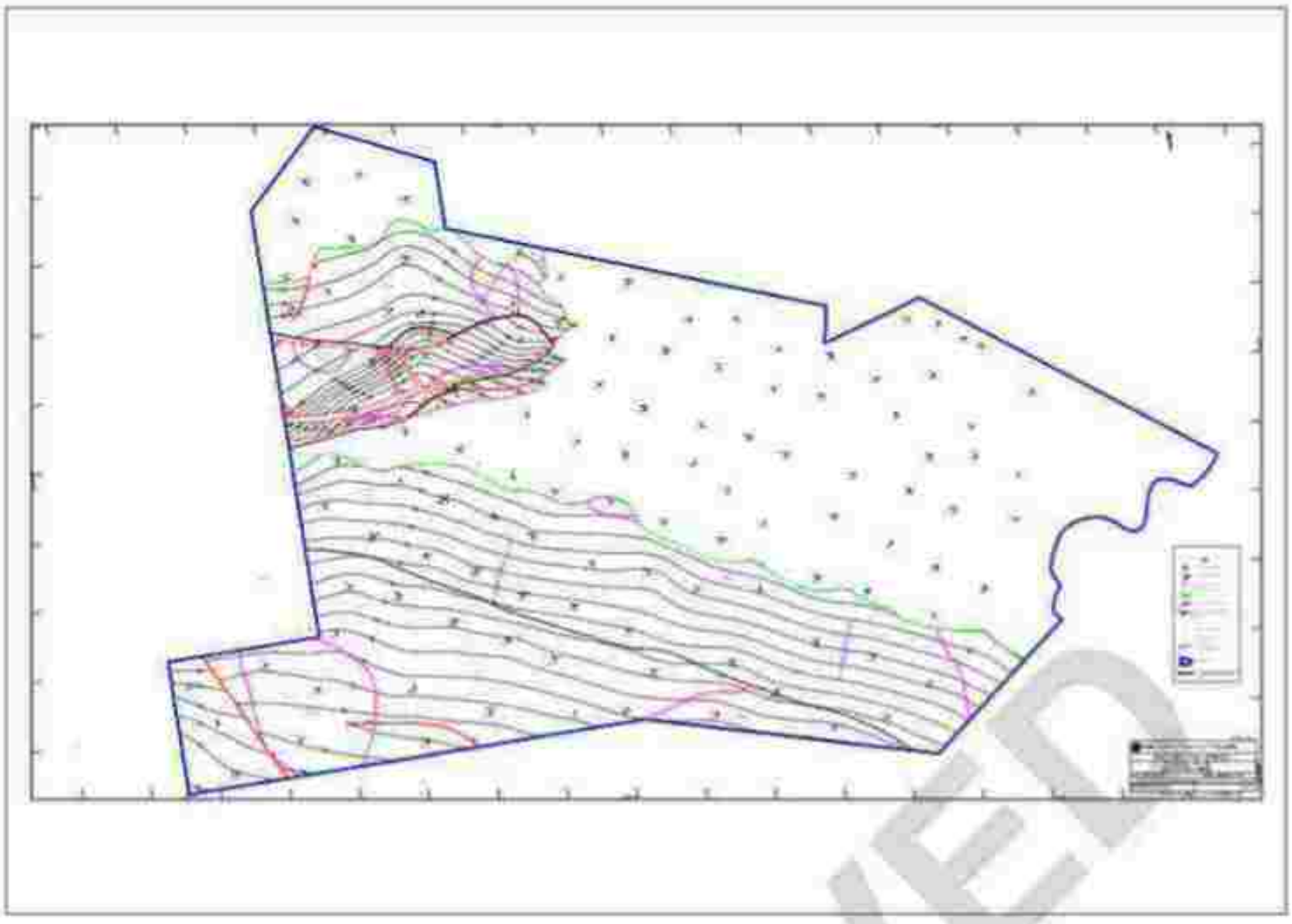

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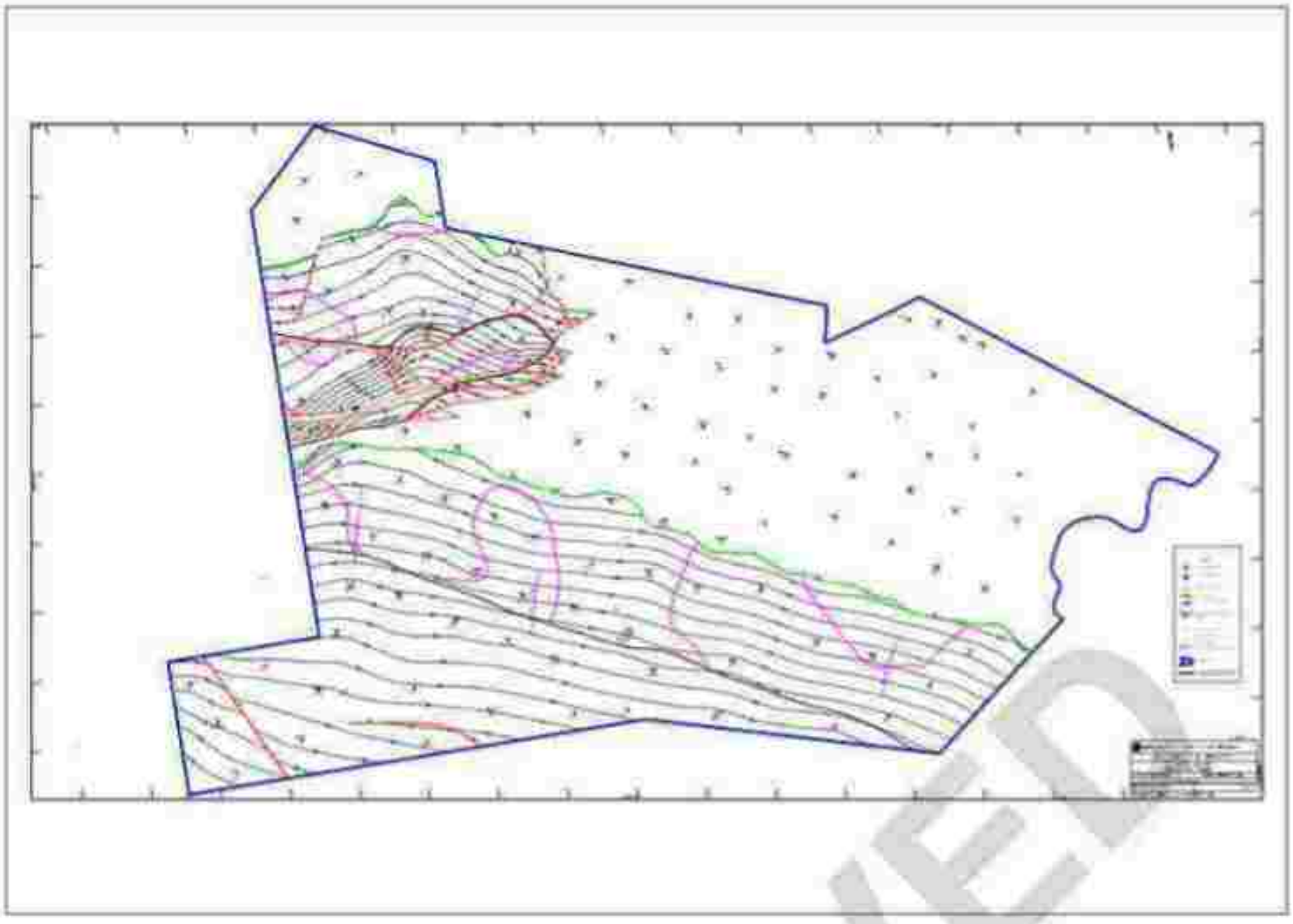

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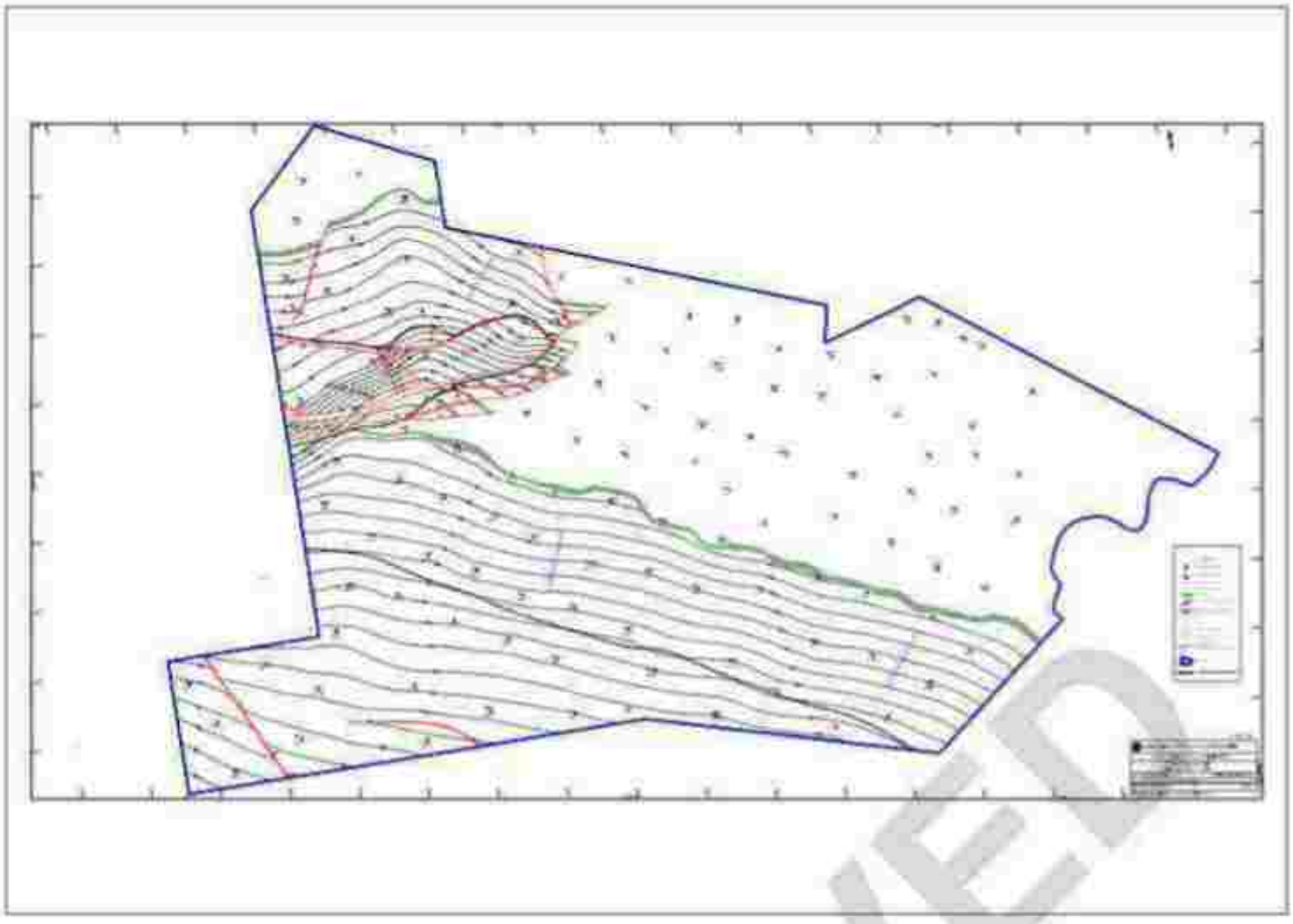

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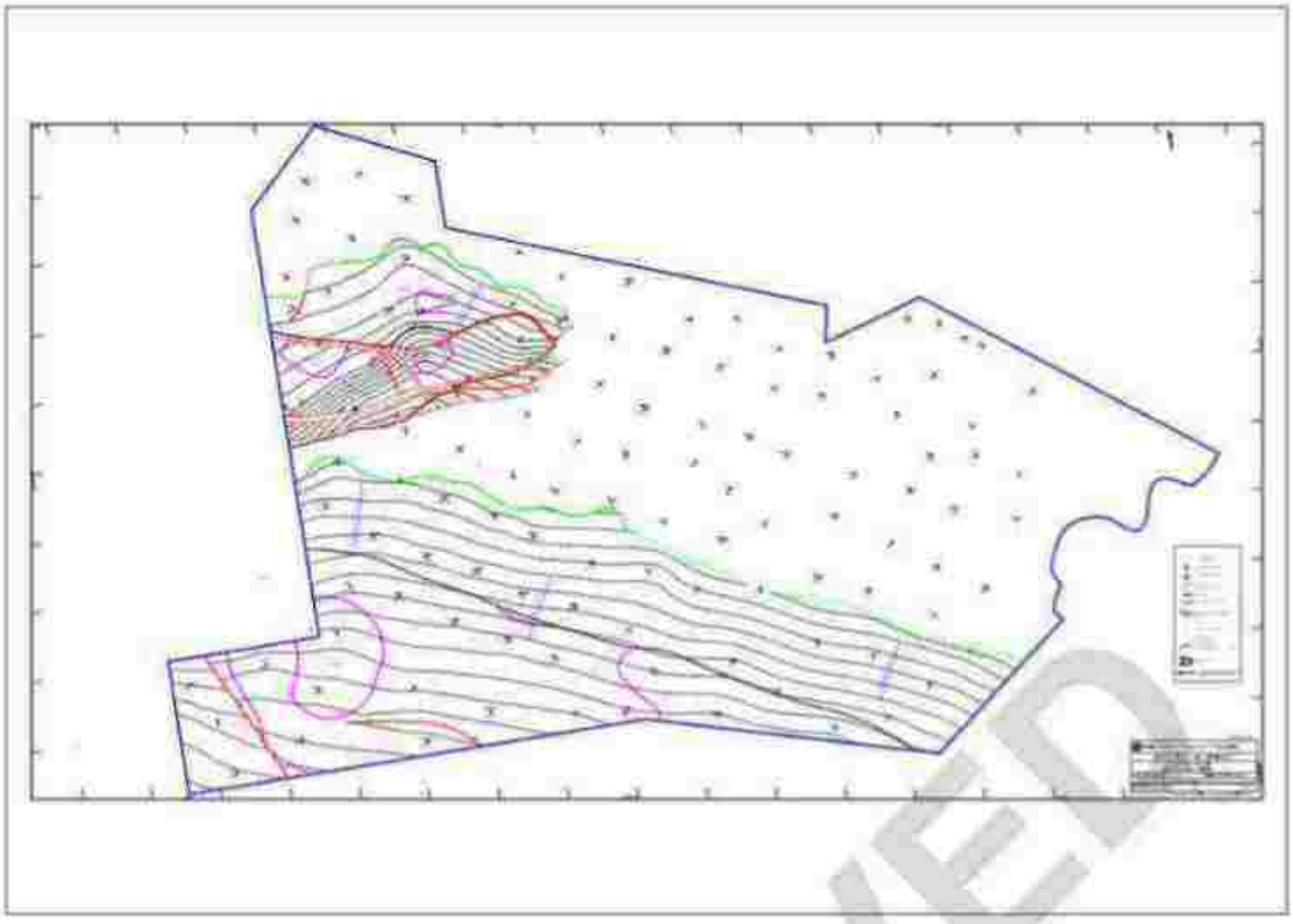

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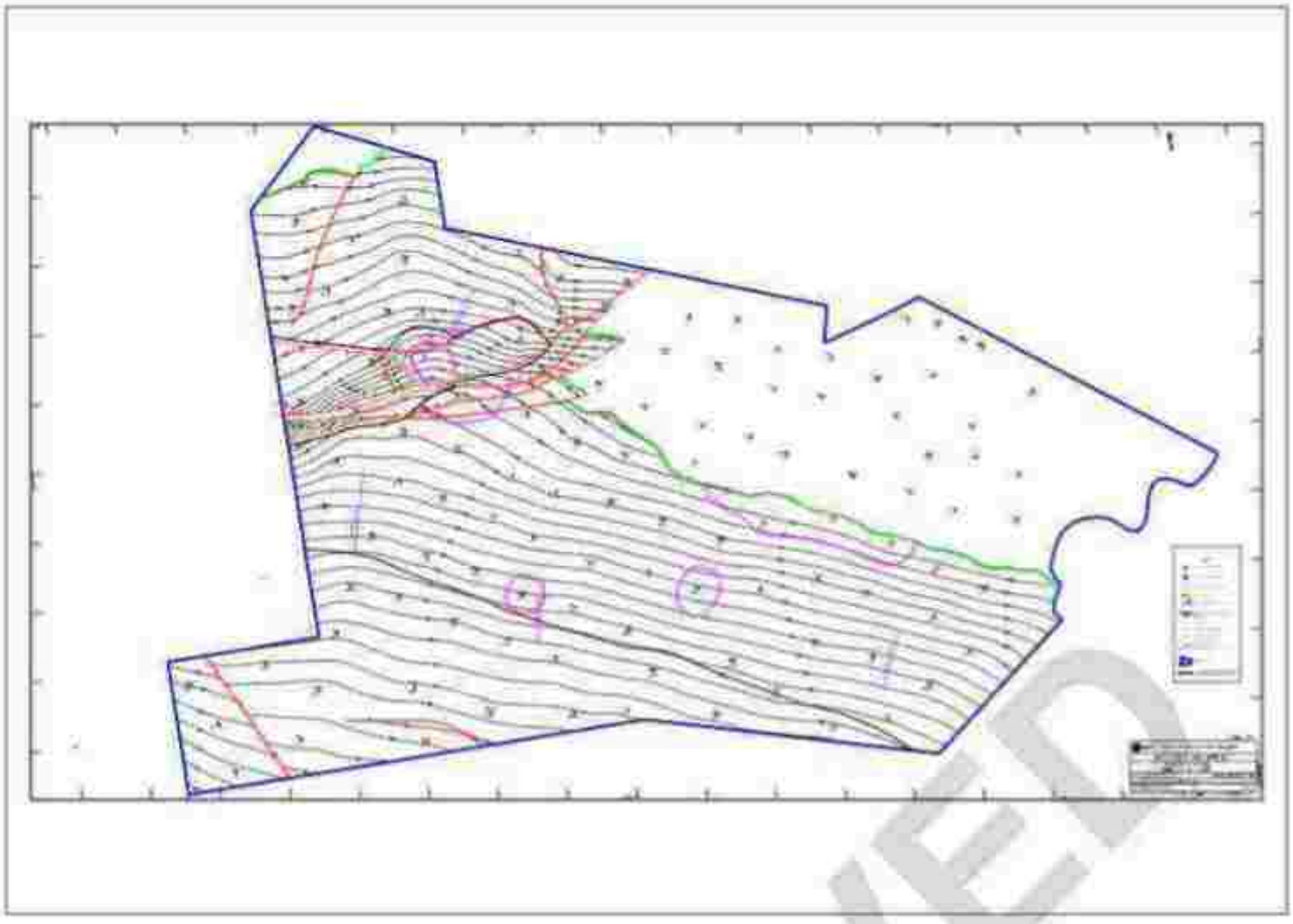
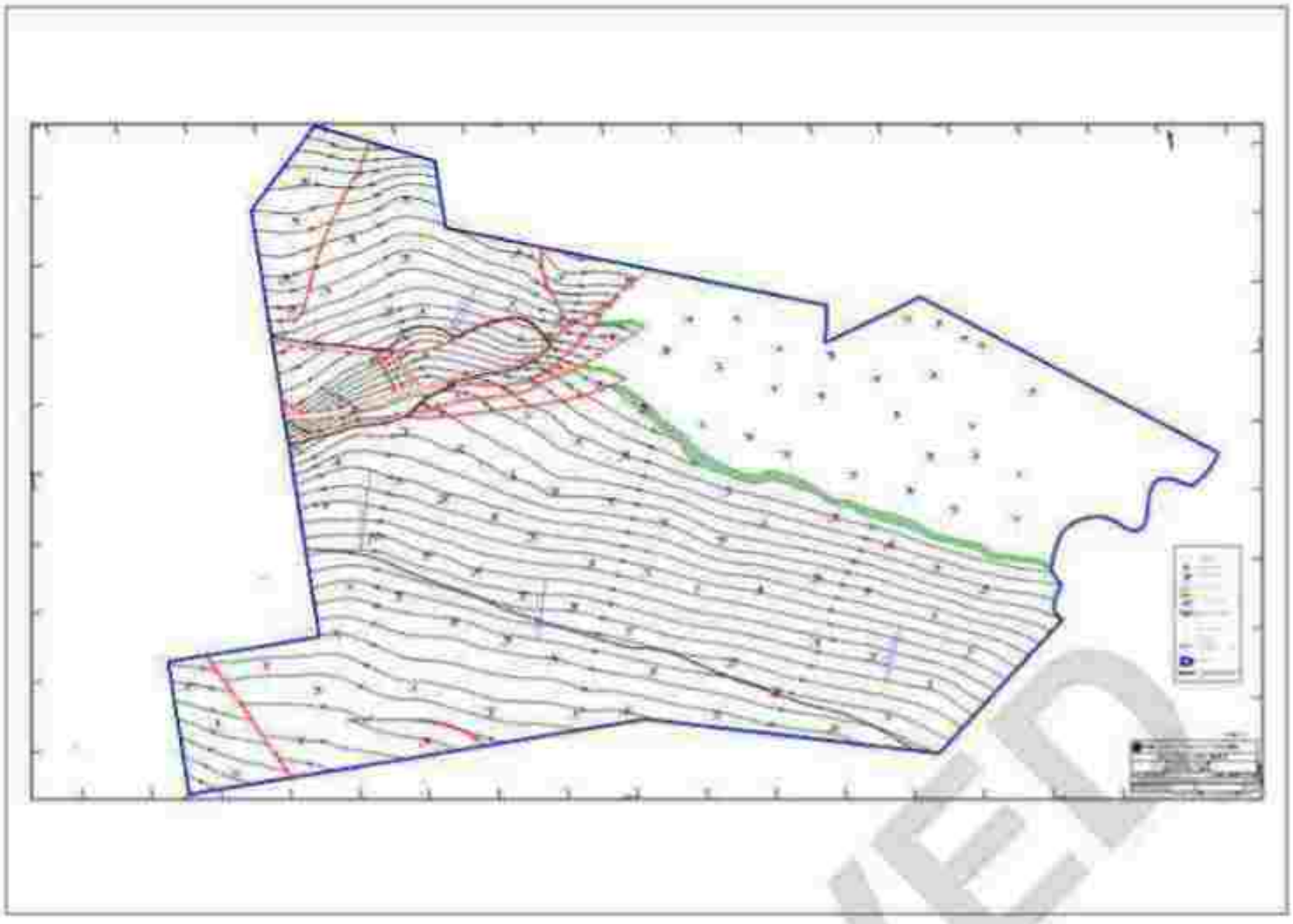
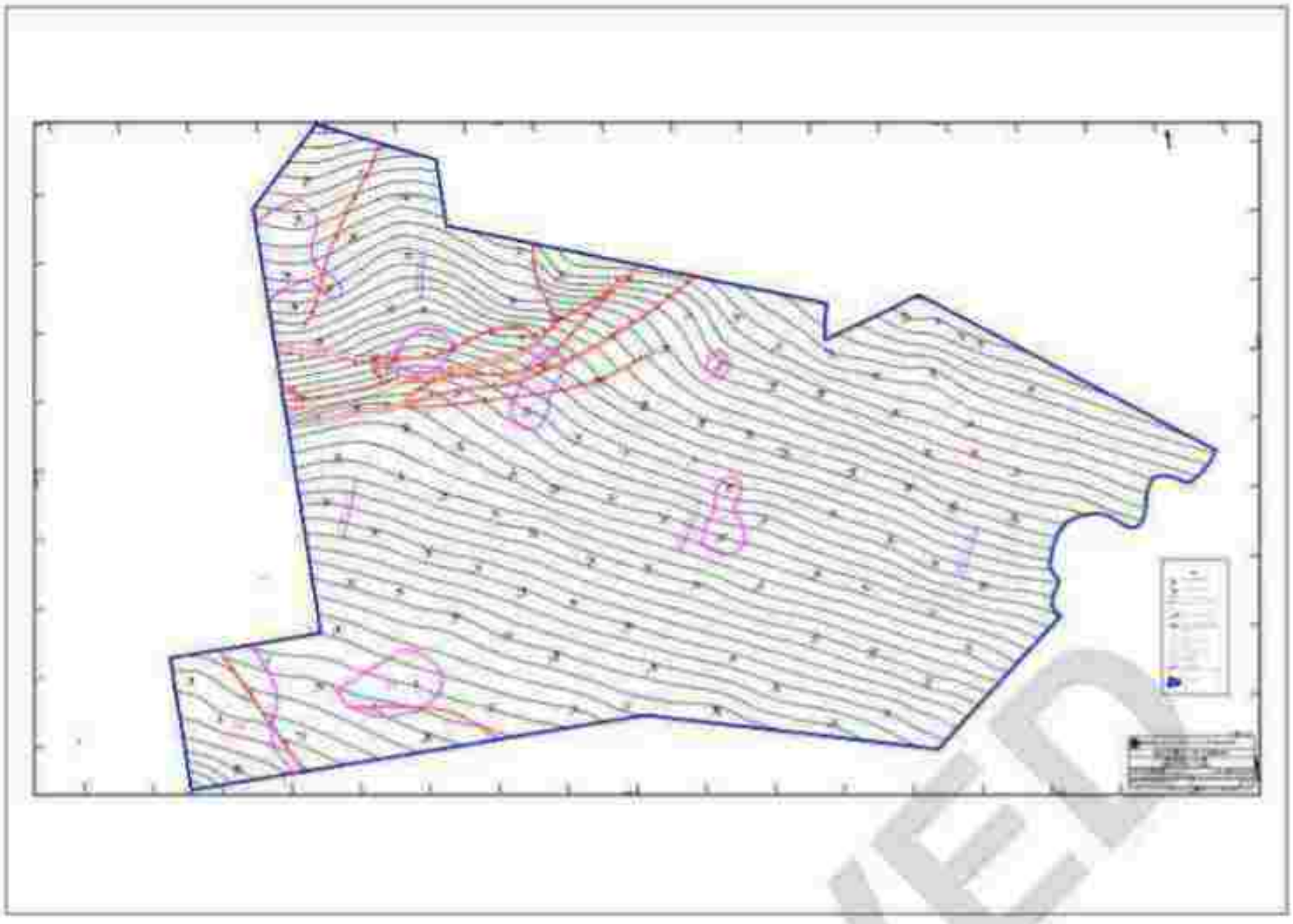


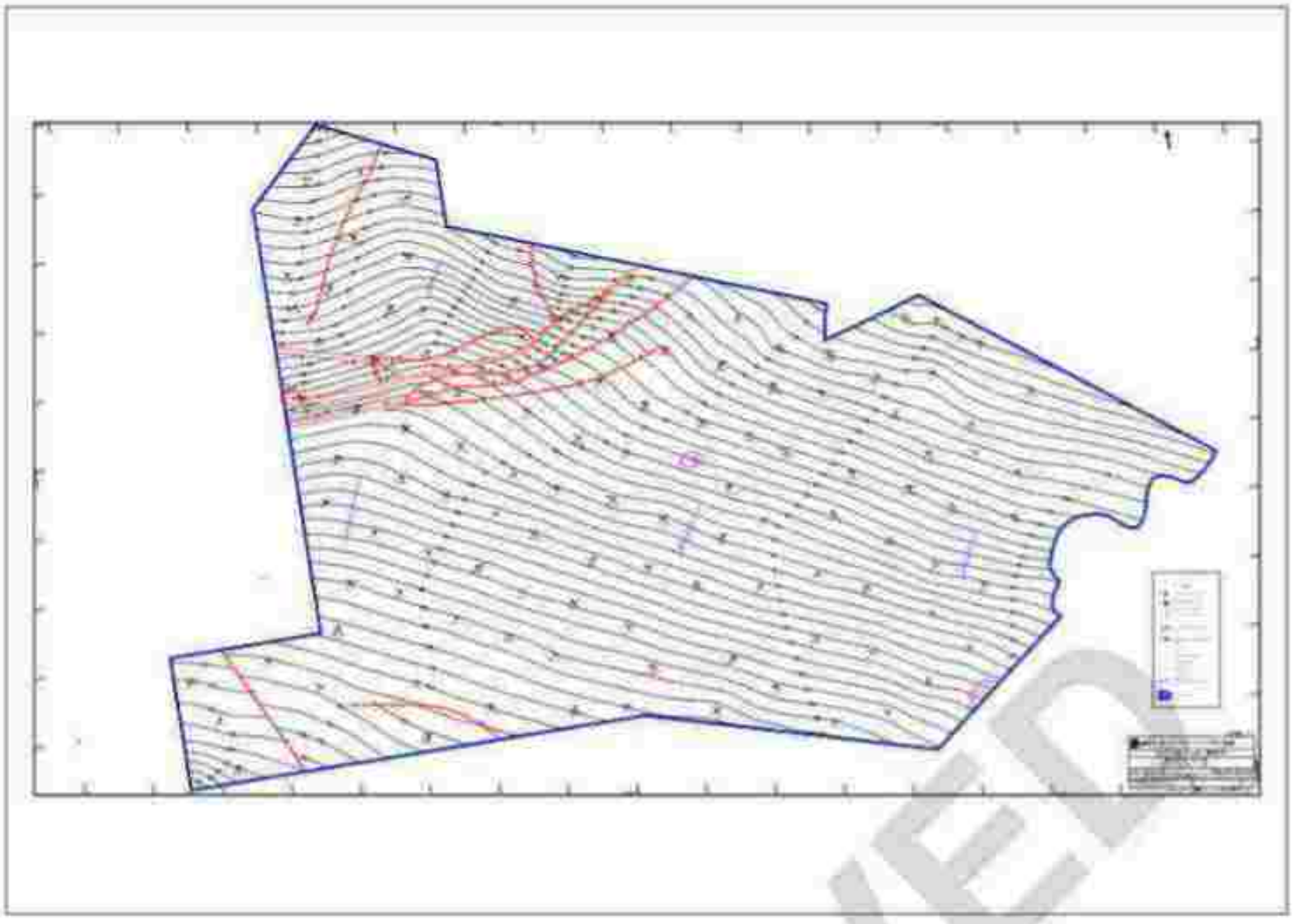
Plan / Plate 10A29



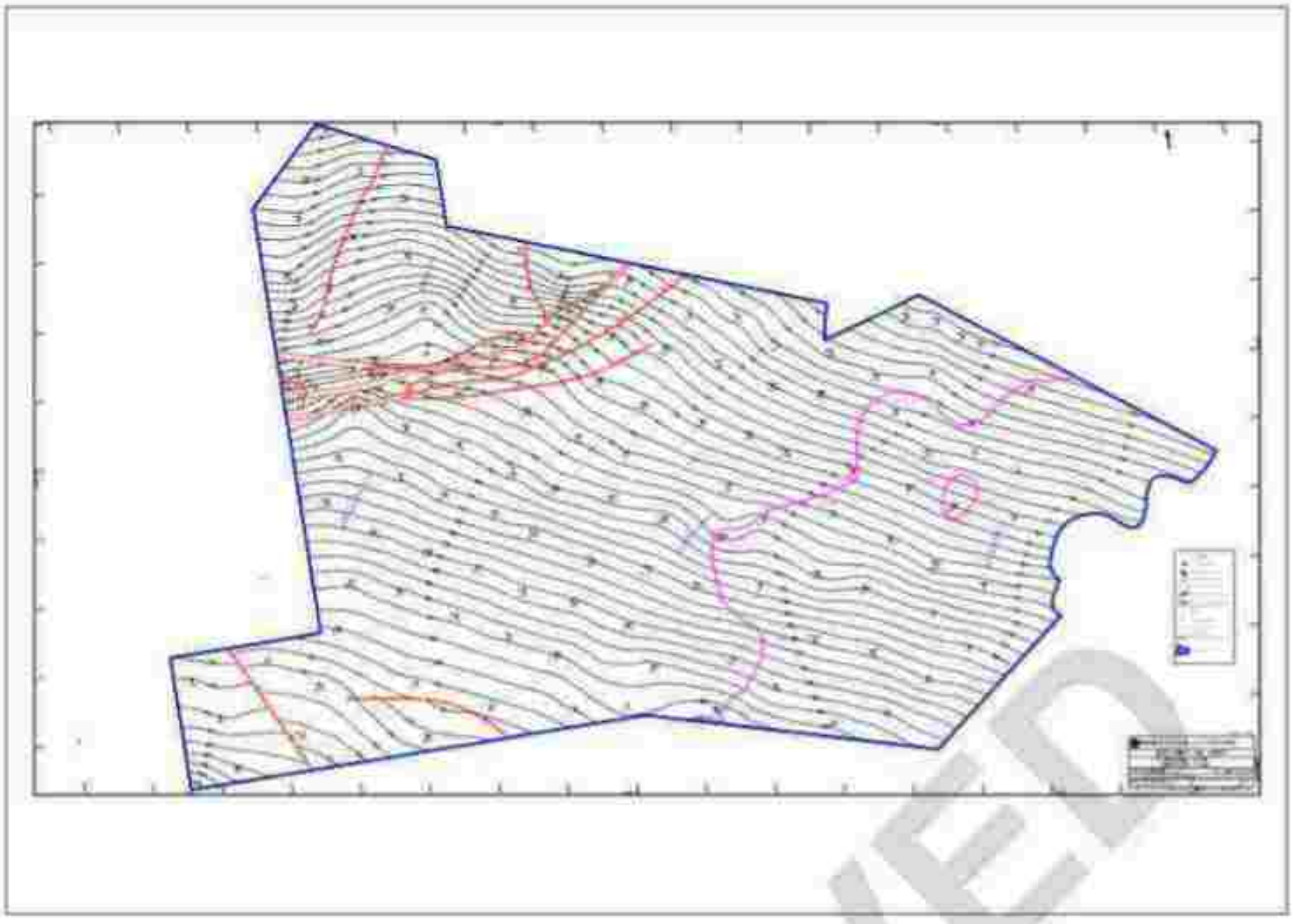
Plan / Plate 10A30



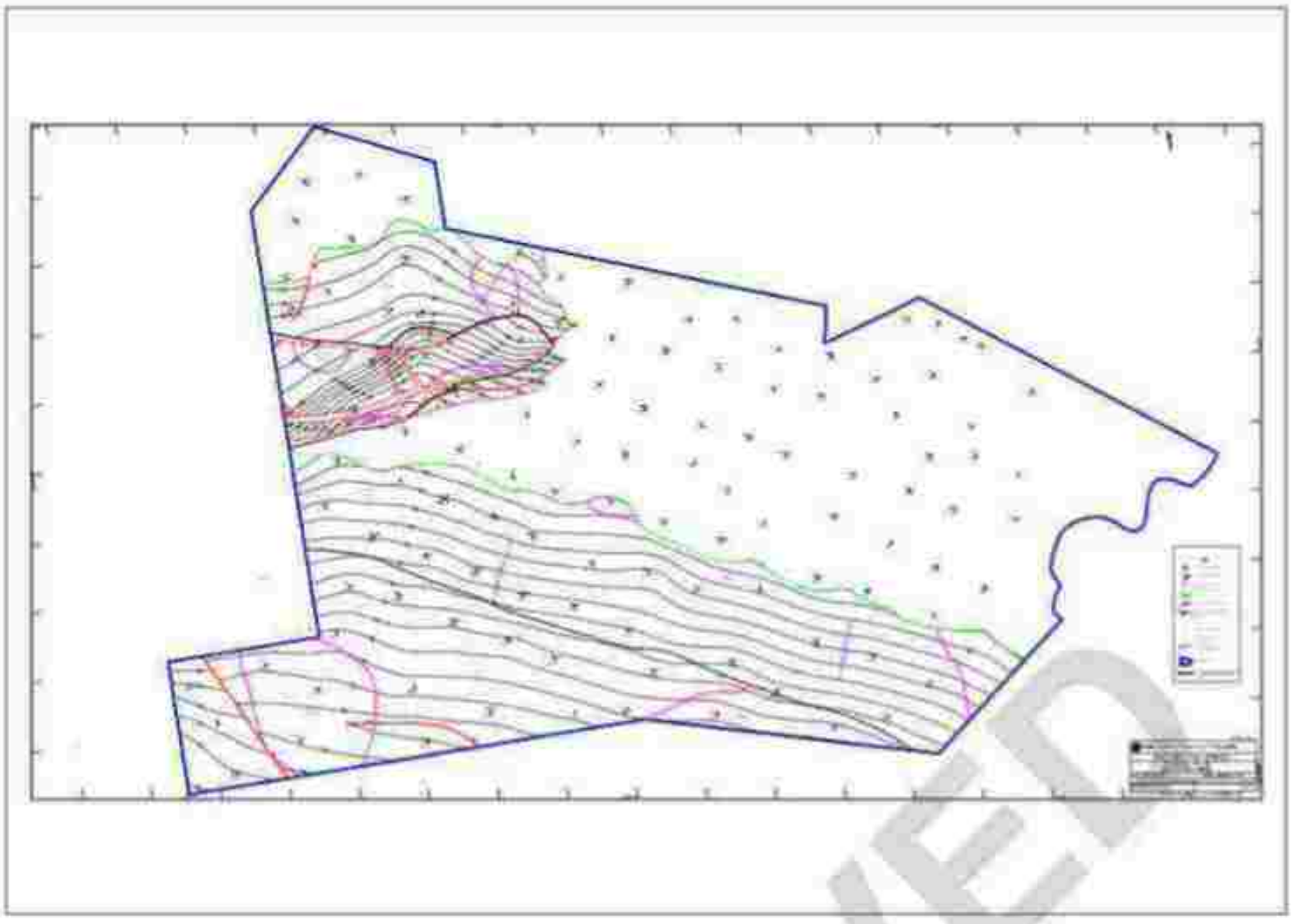
Plan / Plate 10A31



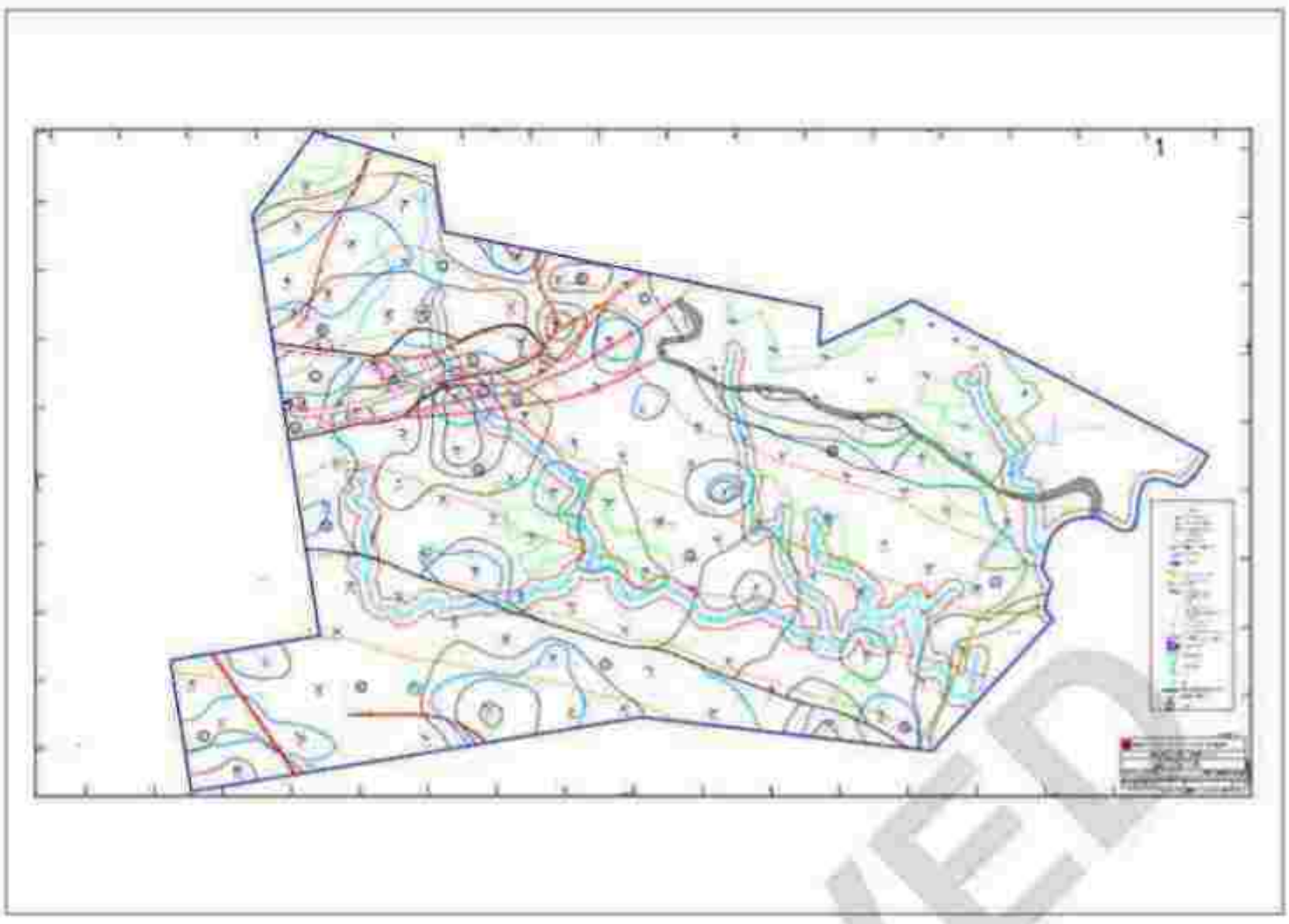
Plan / Plate 10A32



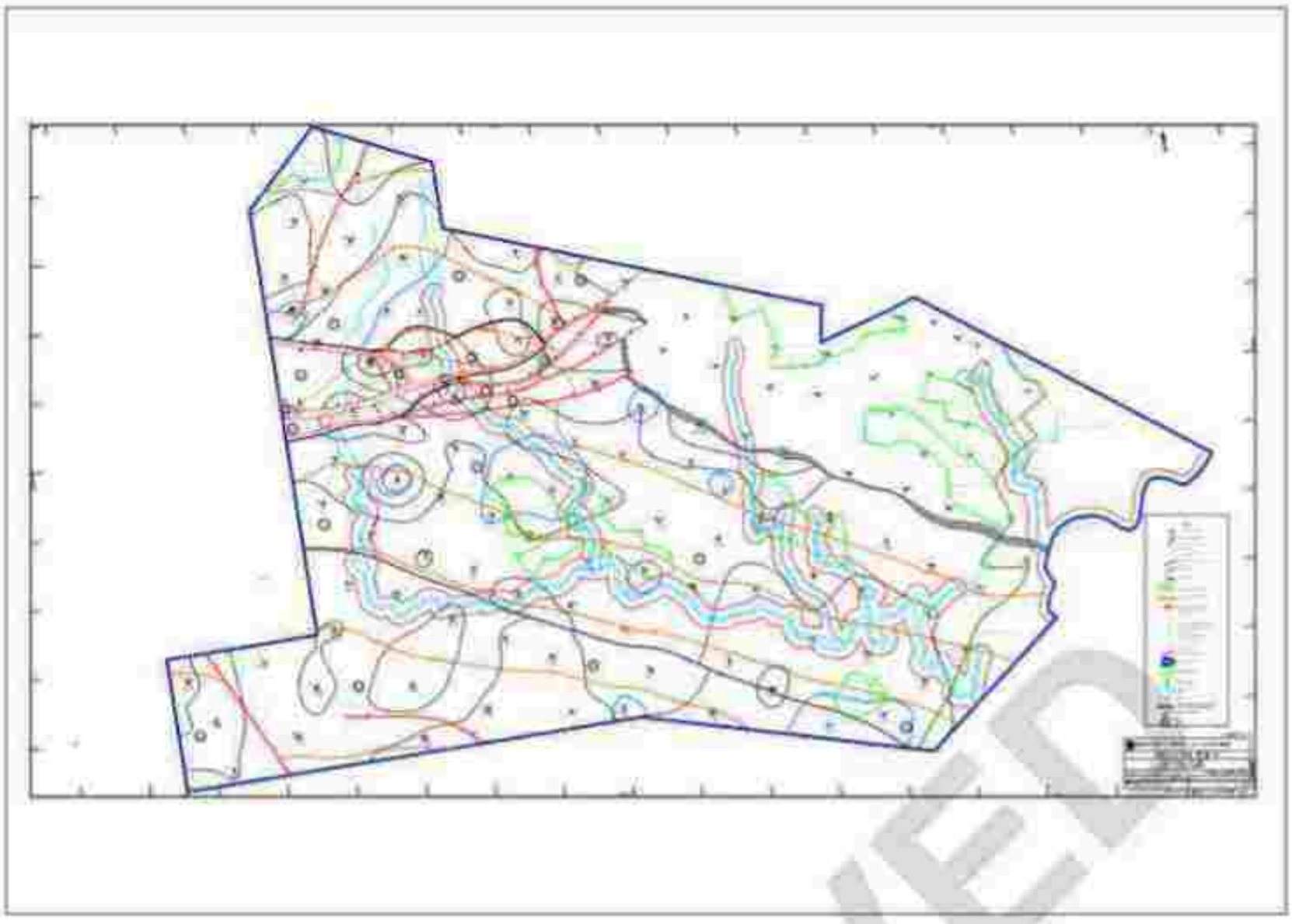
Plan / Plate 10A33



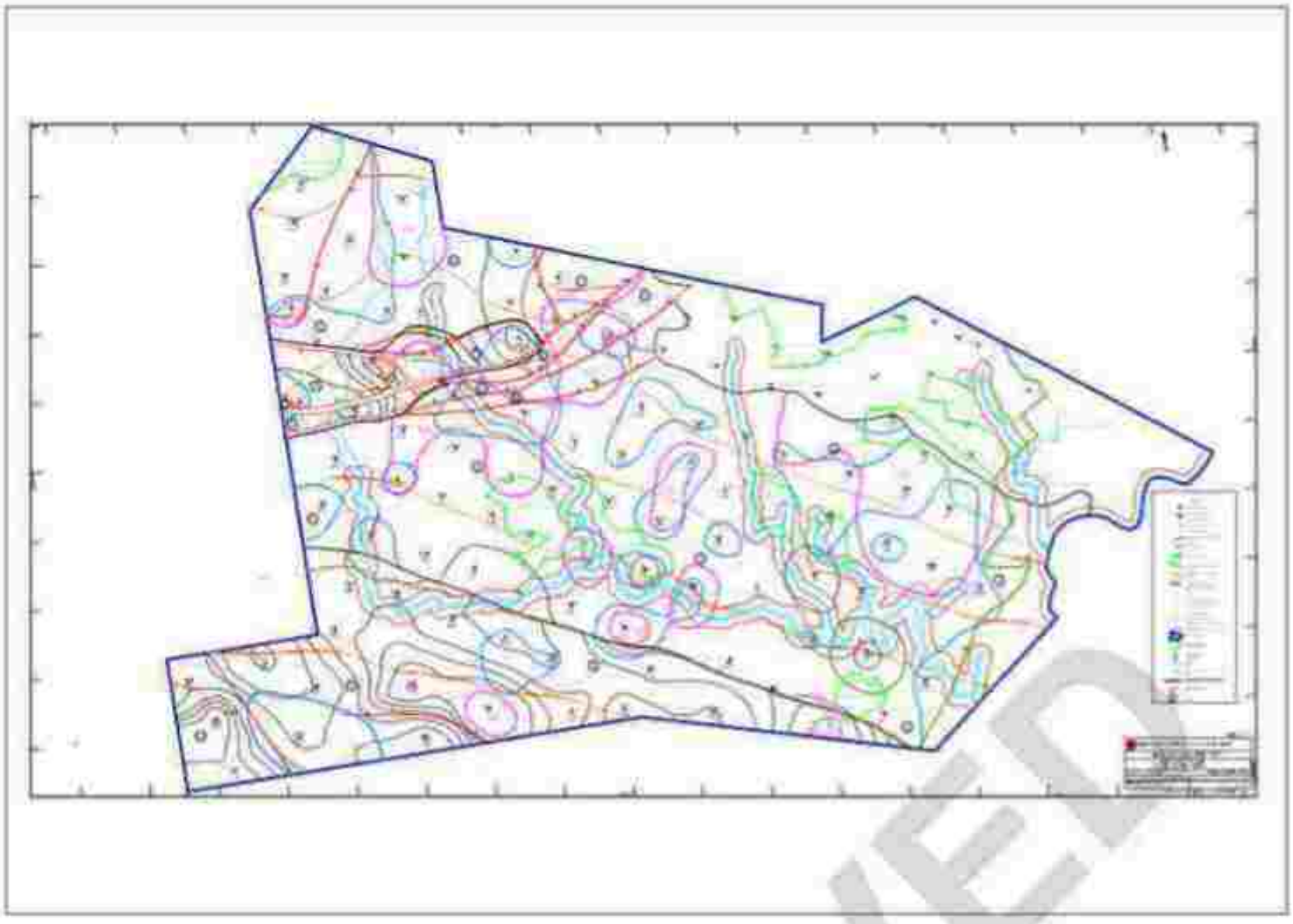
Plan / Plate 10B1



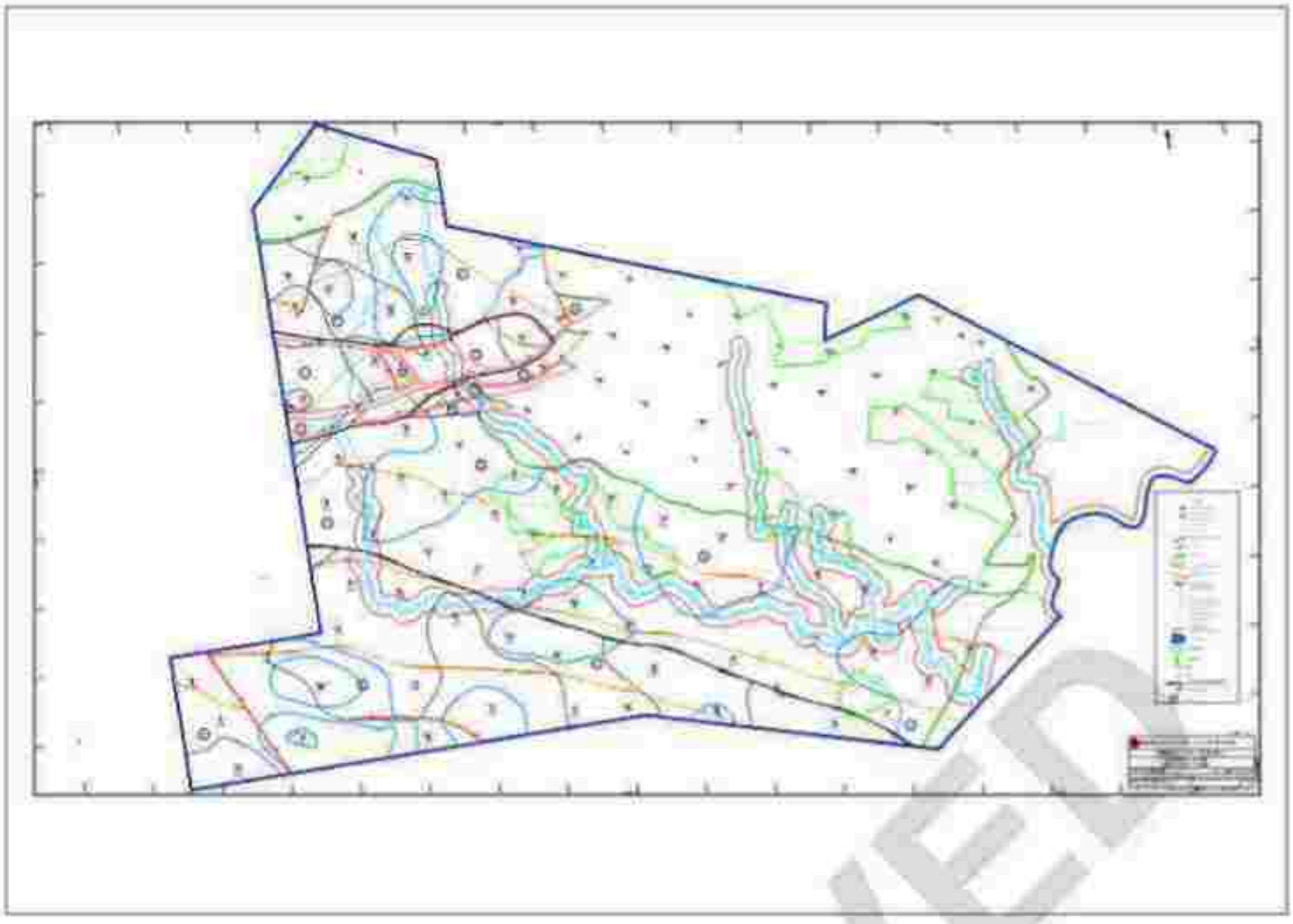
Plan / Plate 10B2



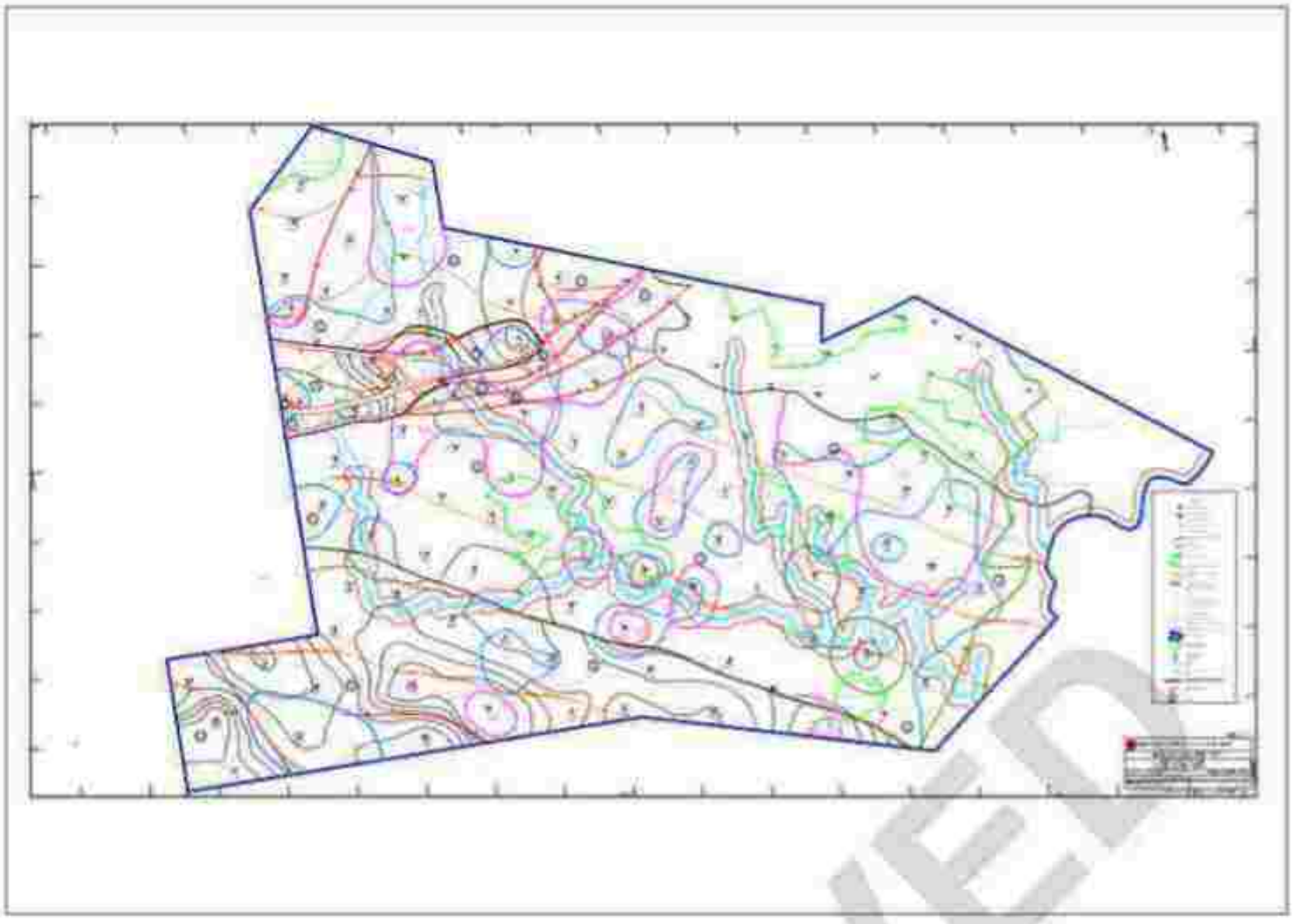
Plan / Plate 10B3



Plan / Plate 10B4

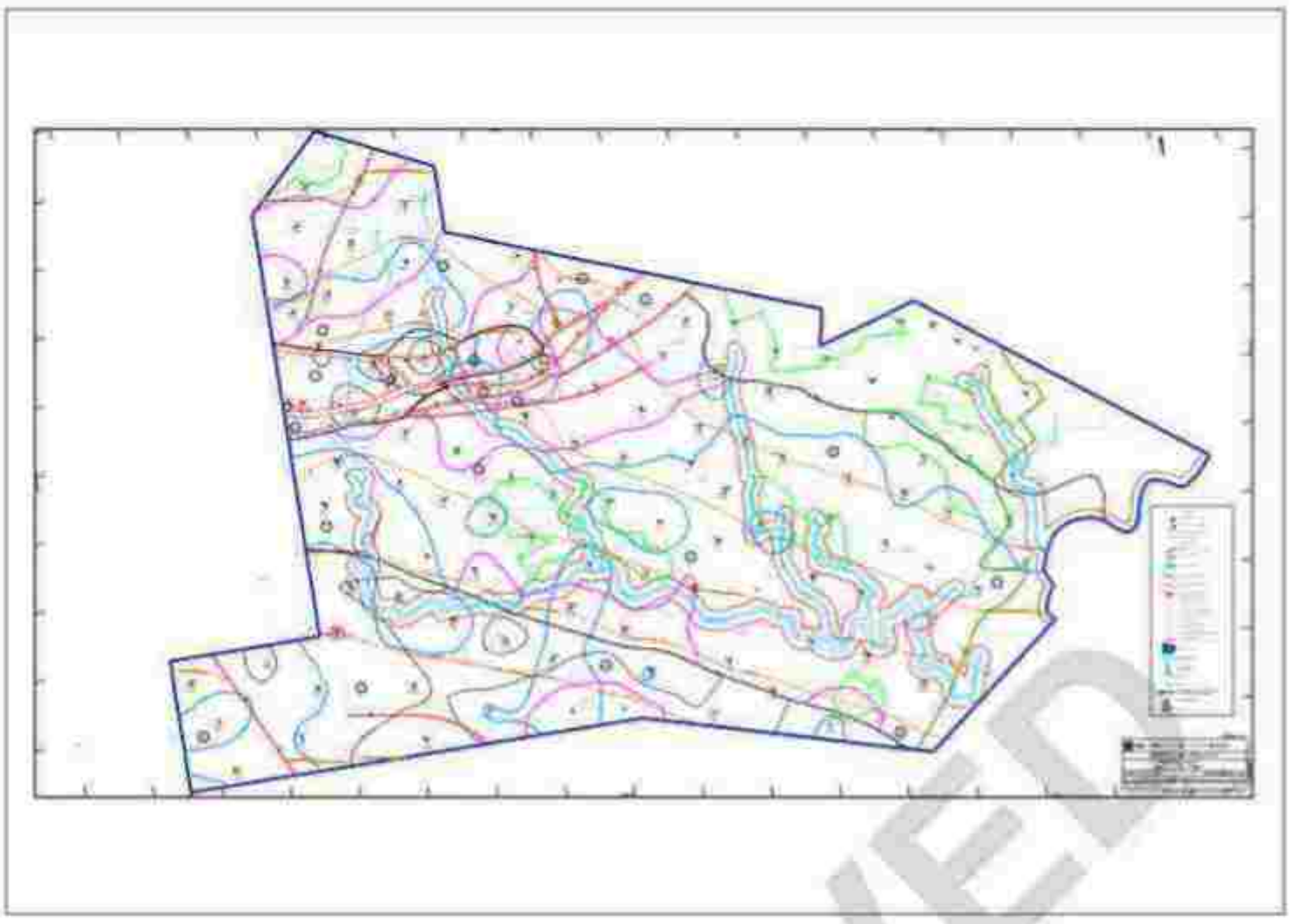


Plan / Plate 10B5



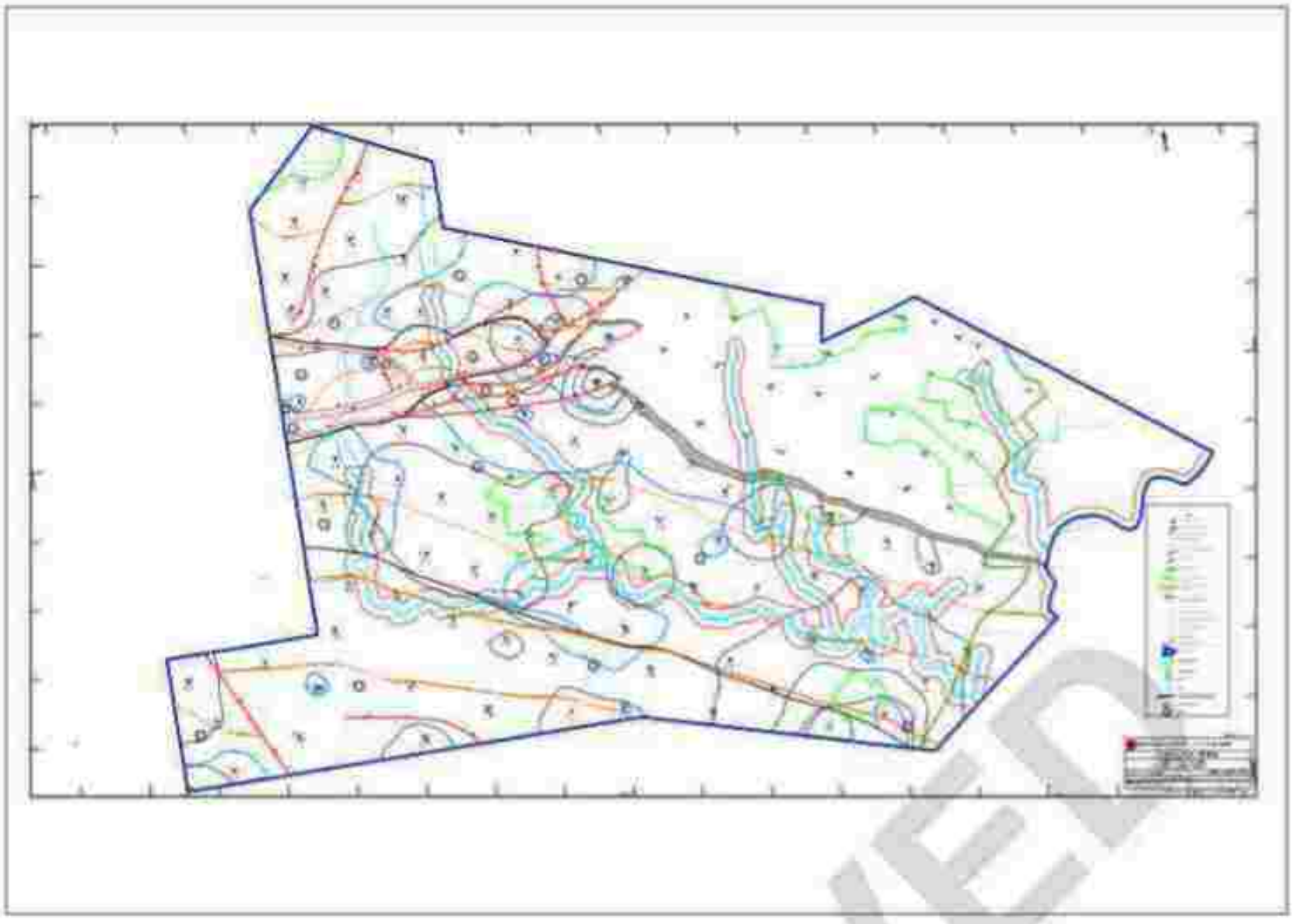
Plan / Plate 10B6

Plan / Plate 10B7

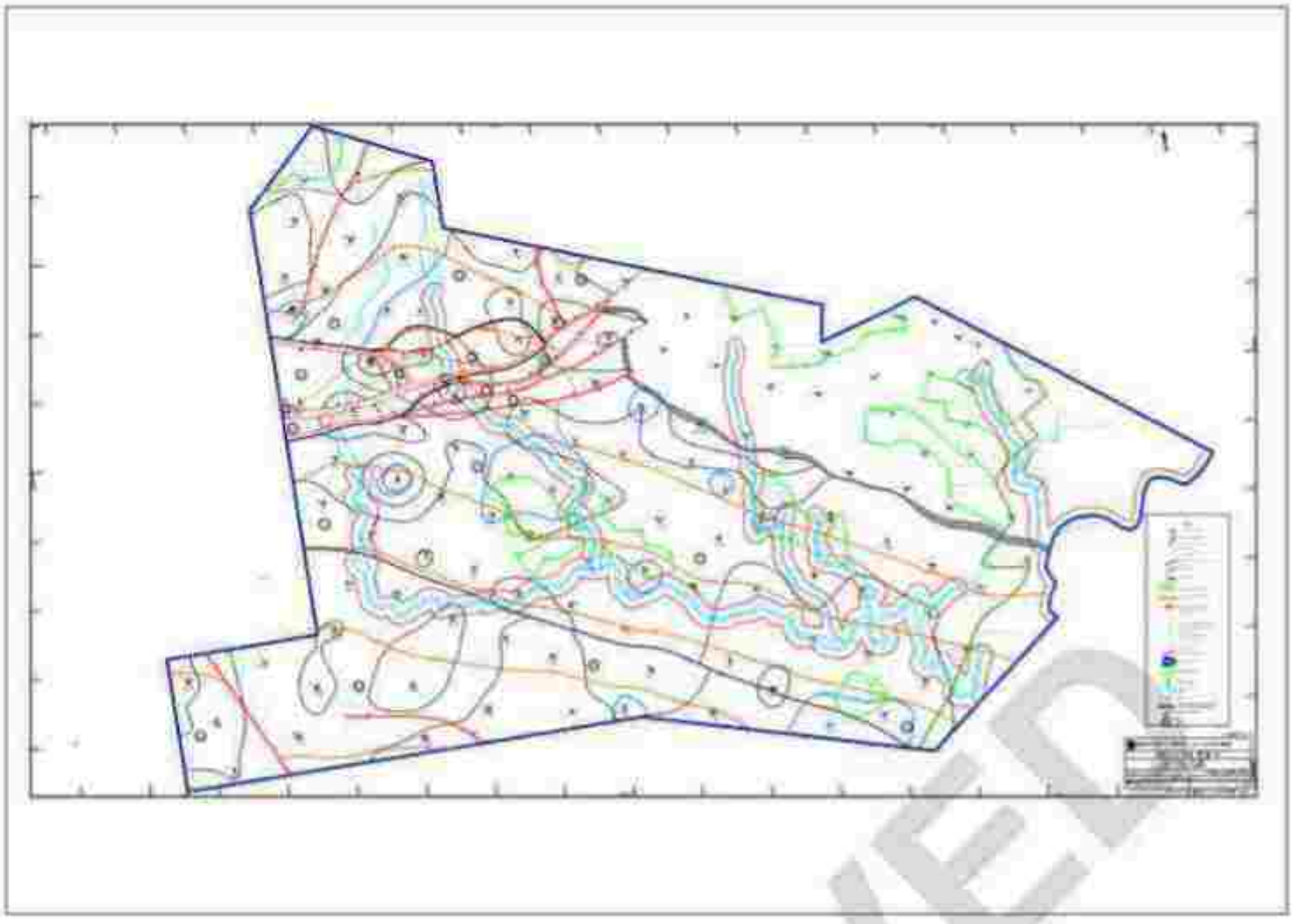


Plan / Plate 10B8

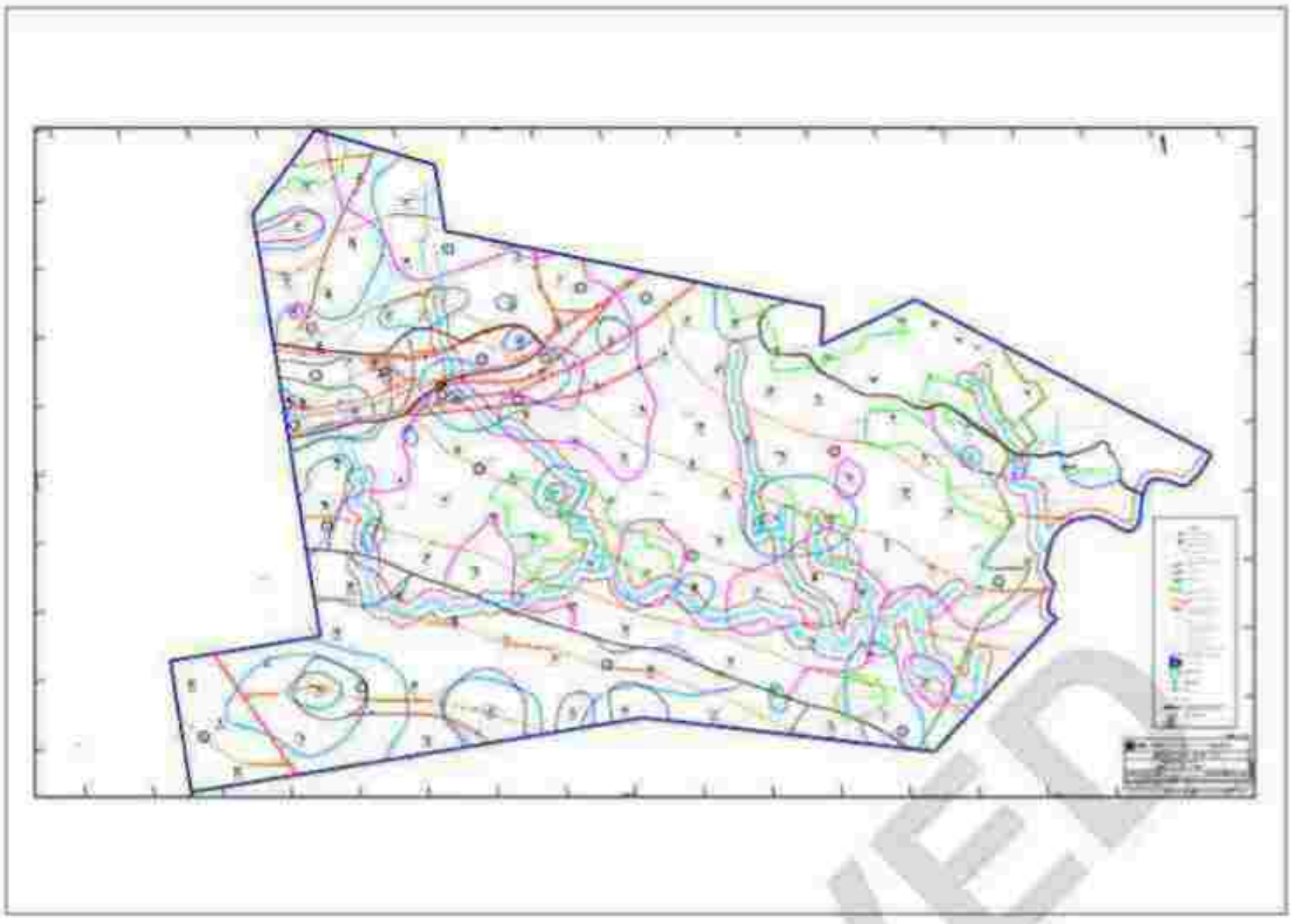
Plan / Plate 10B9



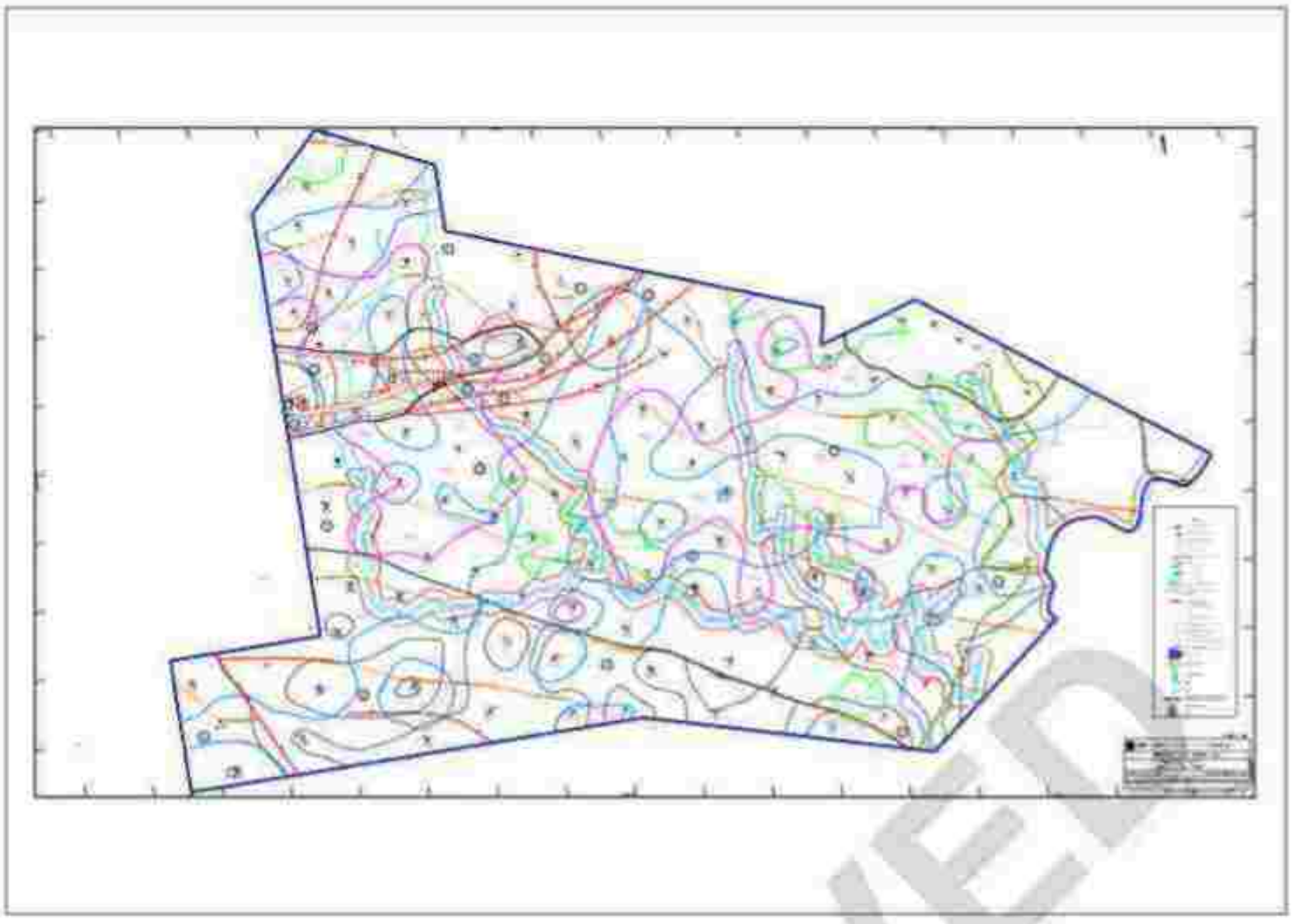
Plan / Plate 10B10



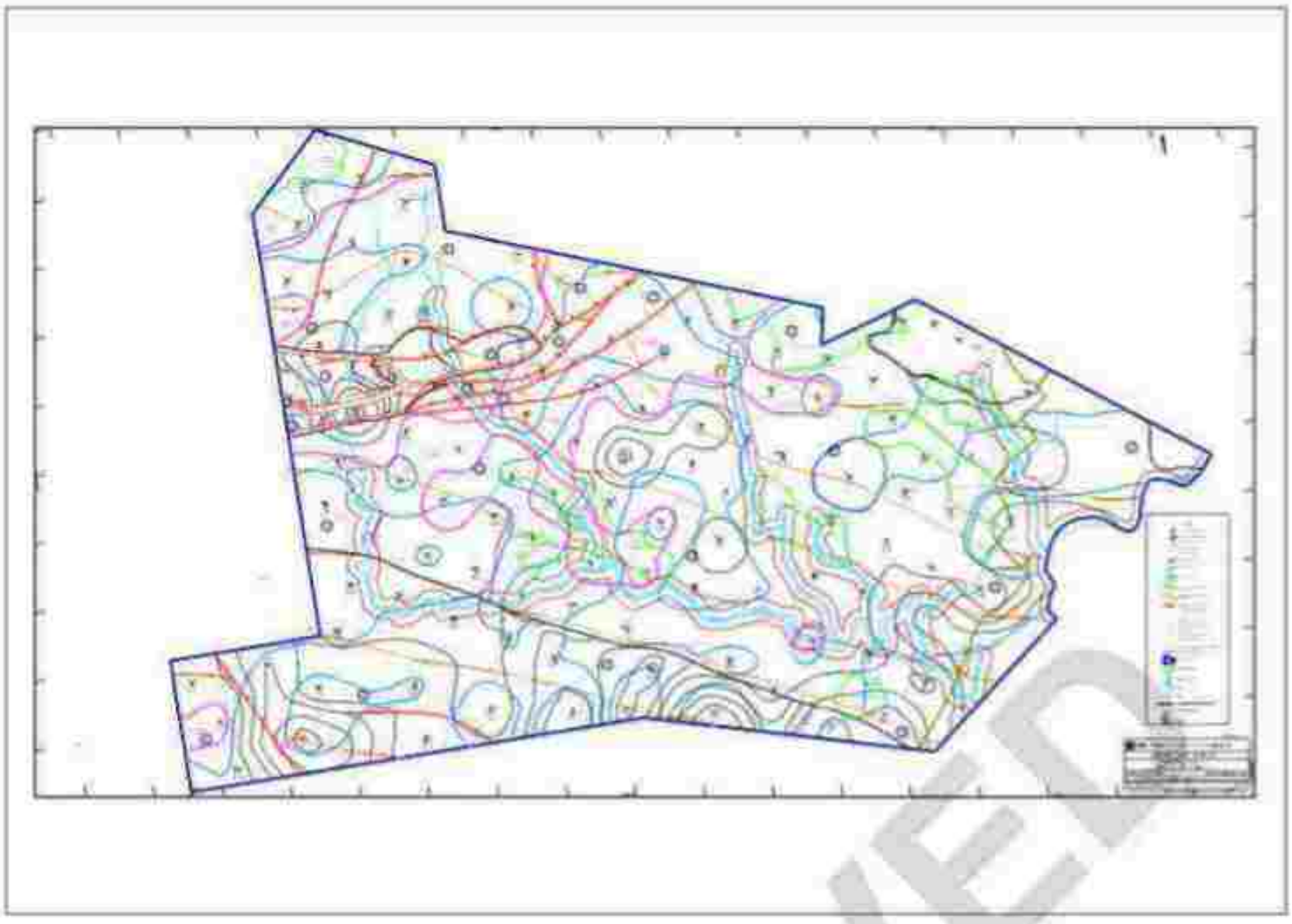
Plan / Plate 10B11



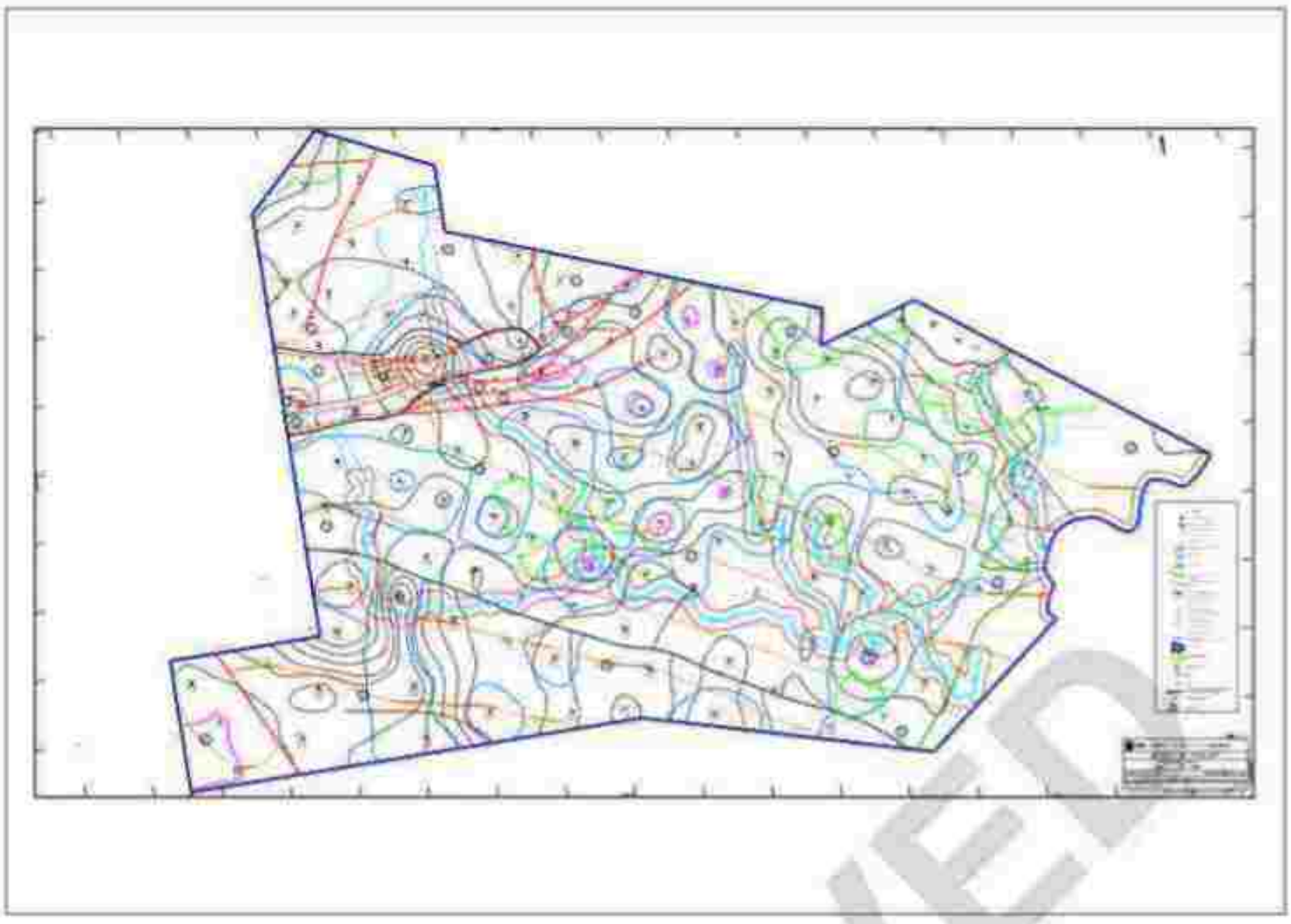
Plan / Plate 10B12



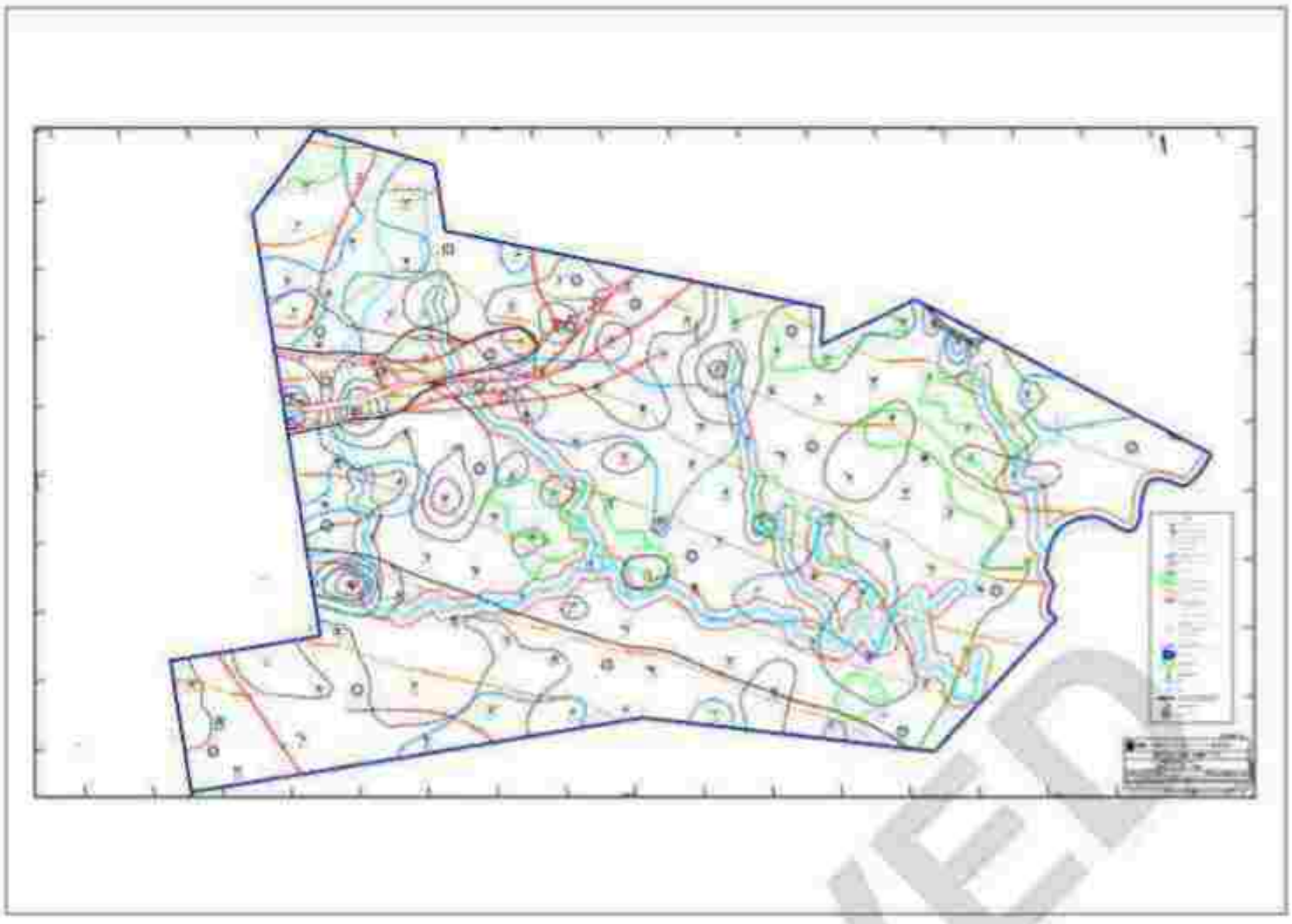
Plan / Plate 10B13



Plan / Plate 10B14

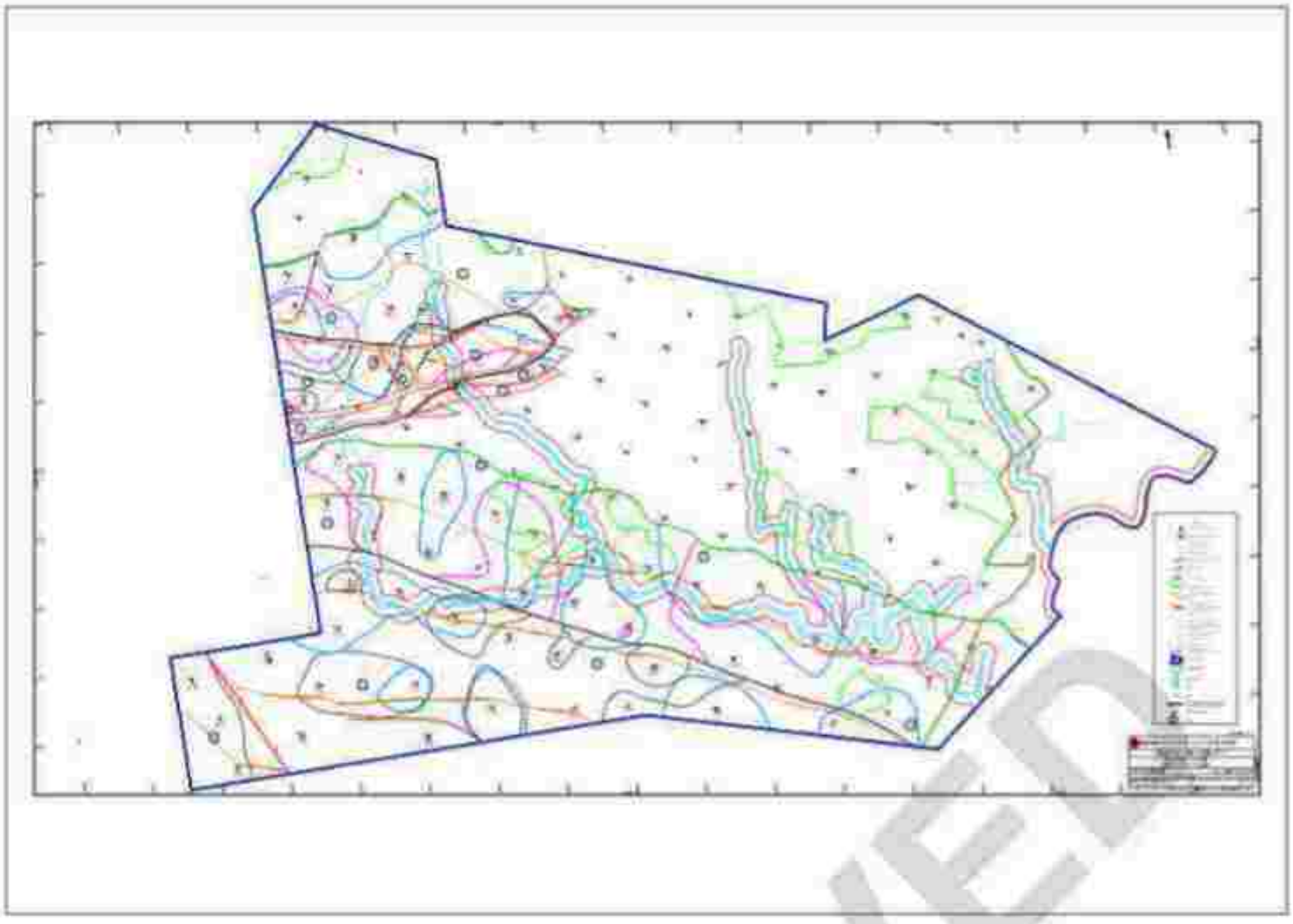


Plan / Plate 10B15

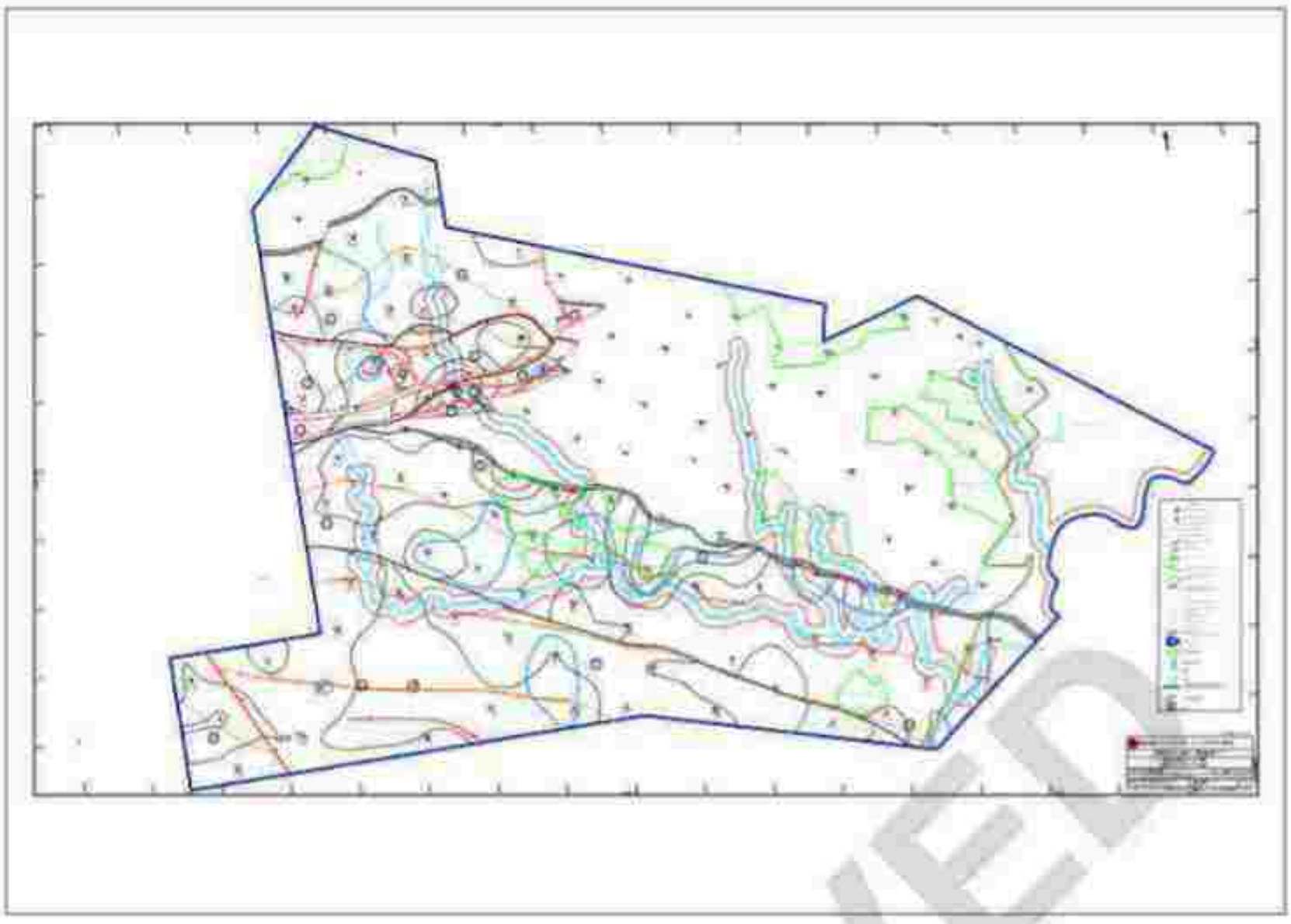


Plan / Plate 10B16

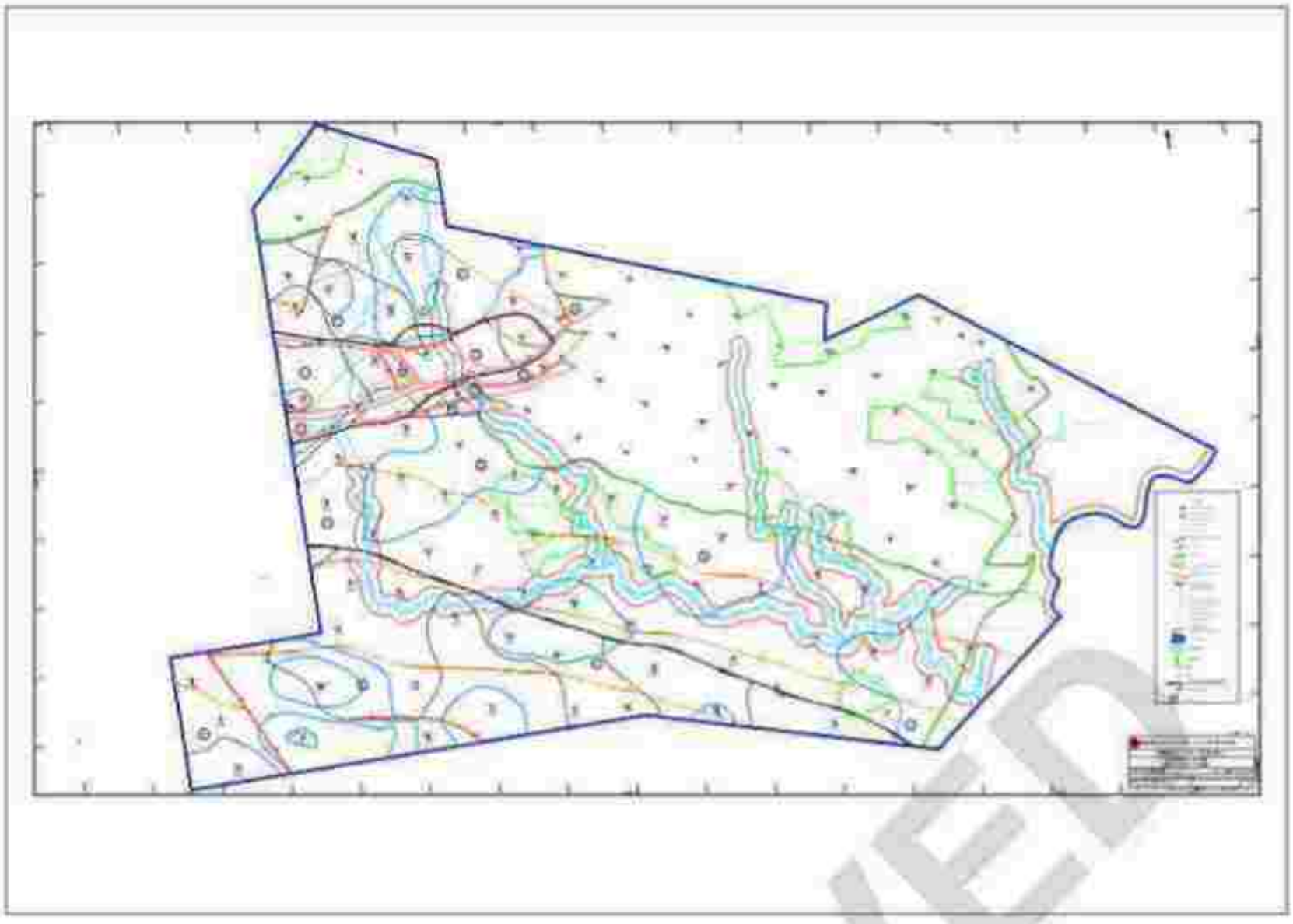
Plan / Plate 10B17



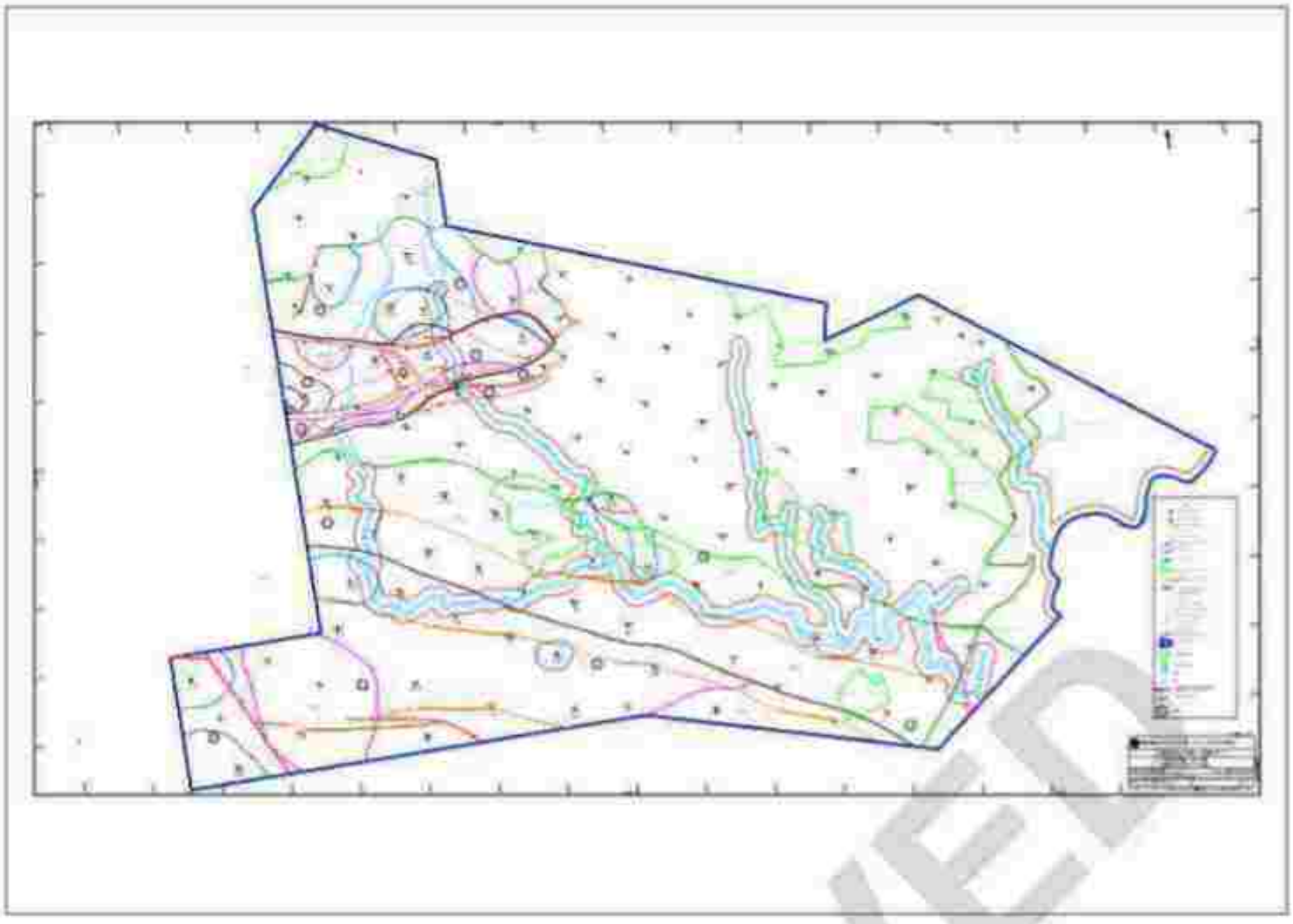
Plan / Plate 10B18



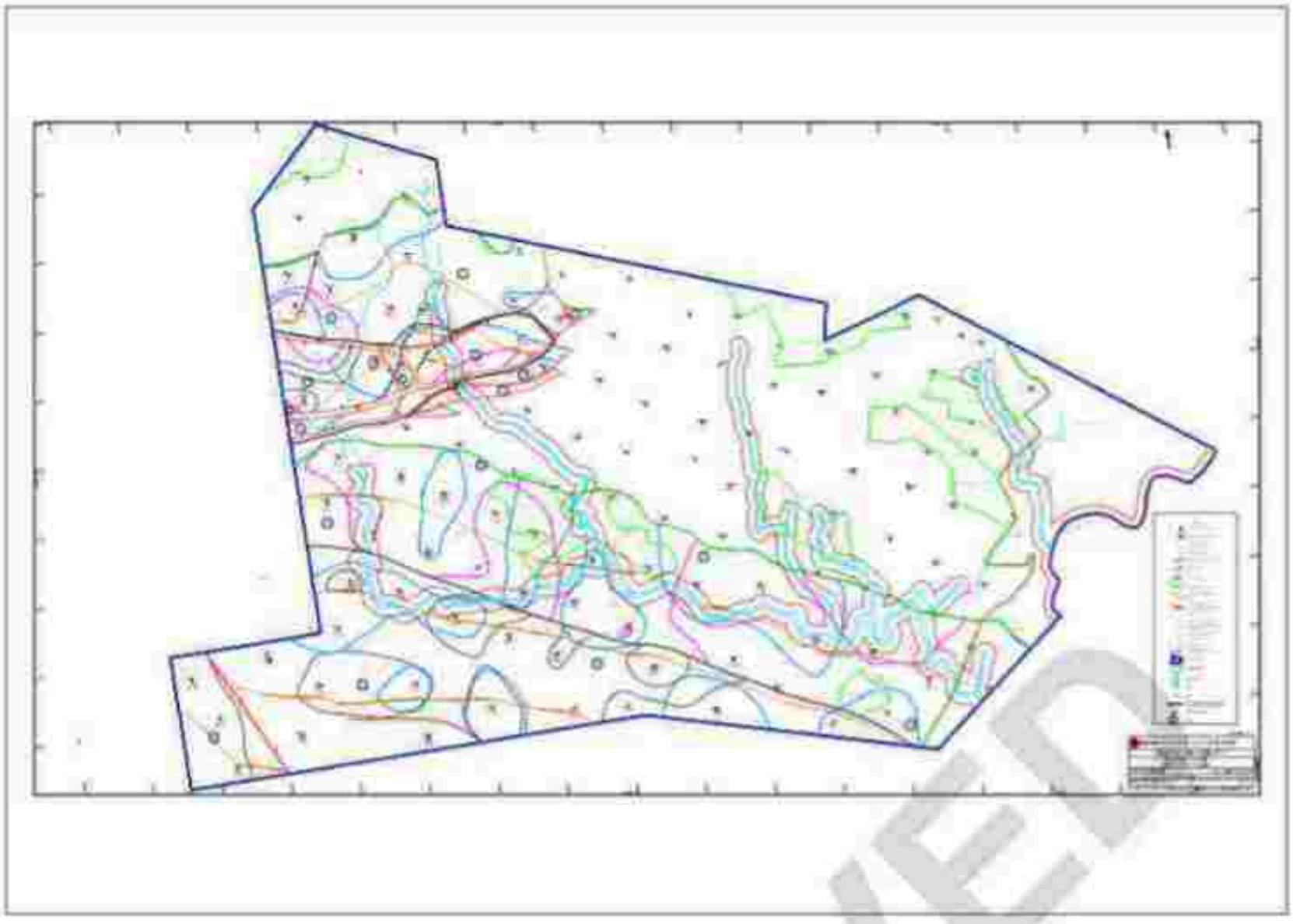
Plan / Plate 10B19



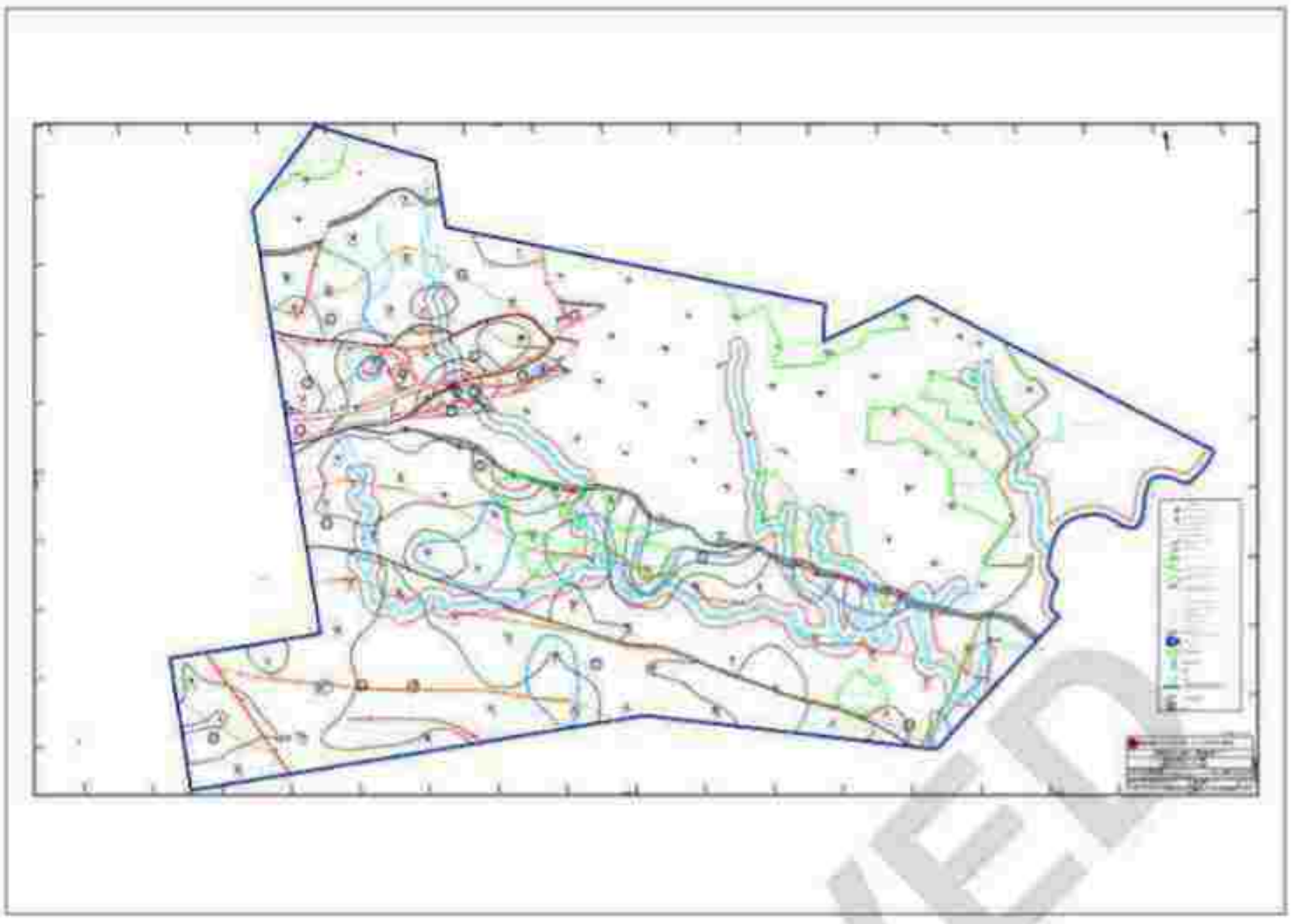
Plan / Plate 10B20



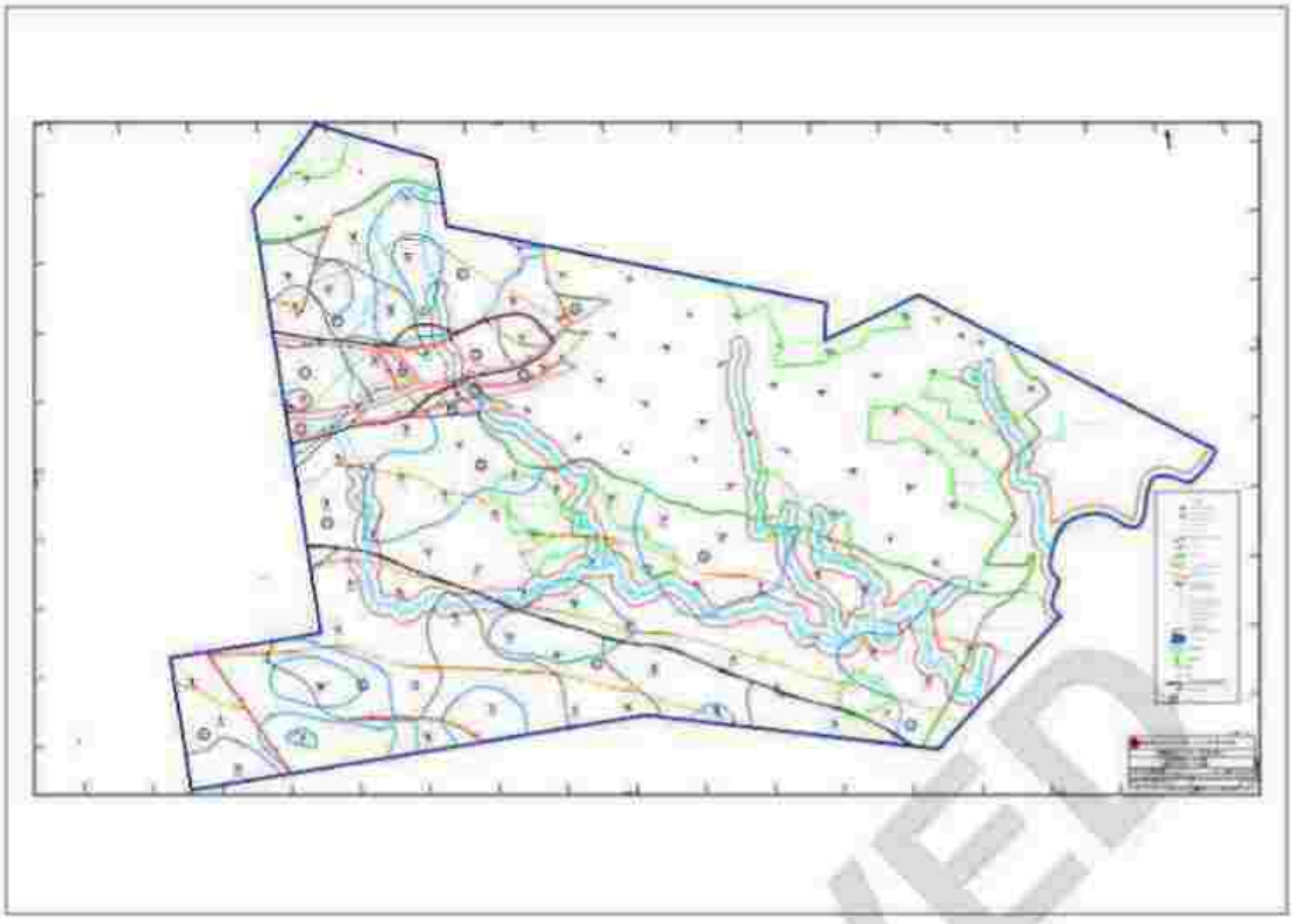
Plan / Plate 10B21



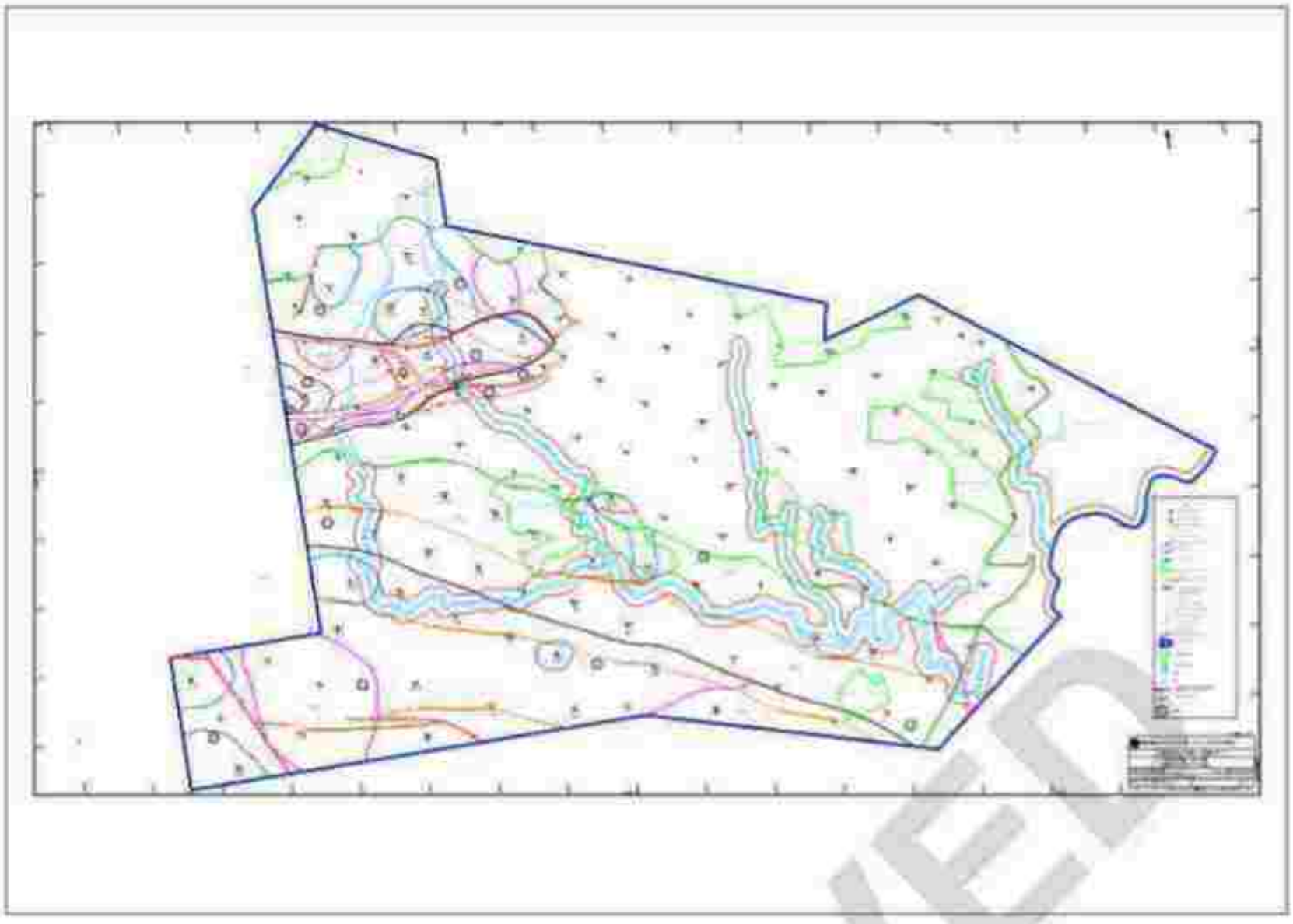
Plan / Plate 10B22



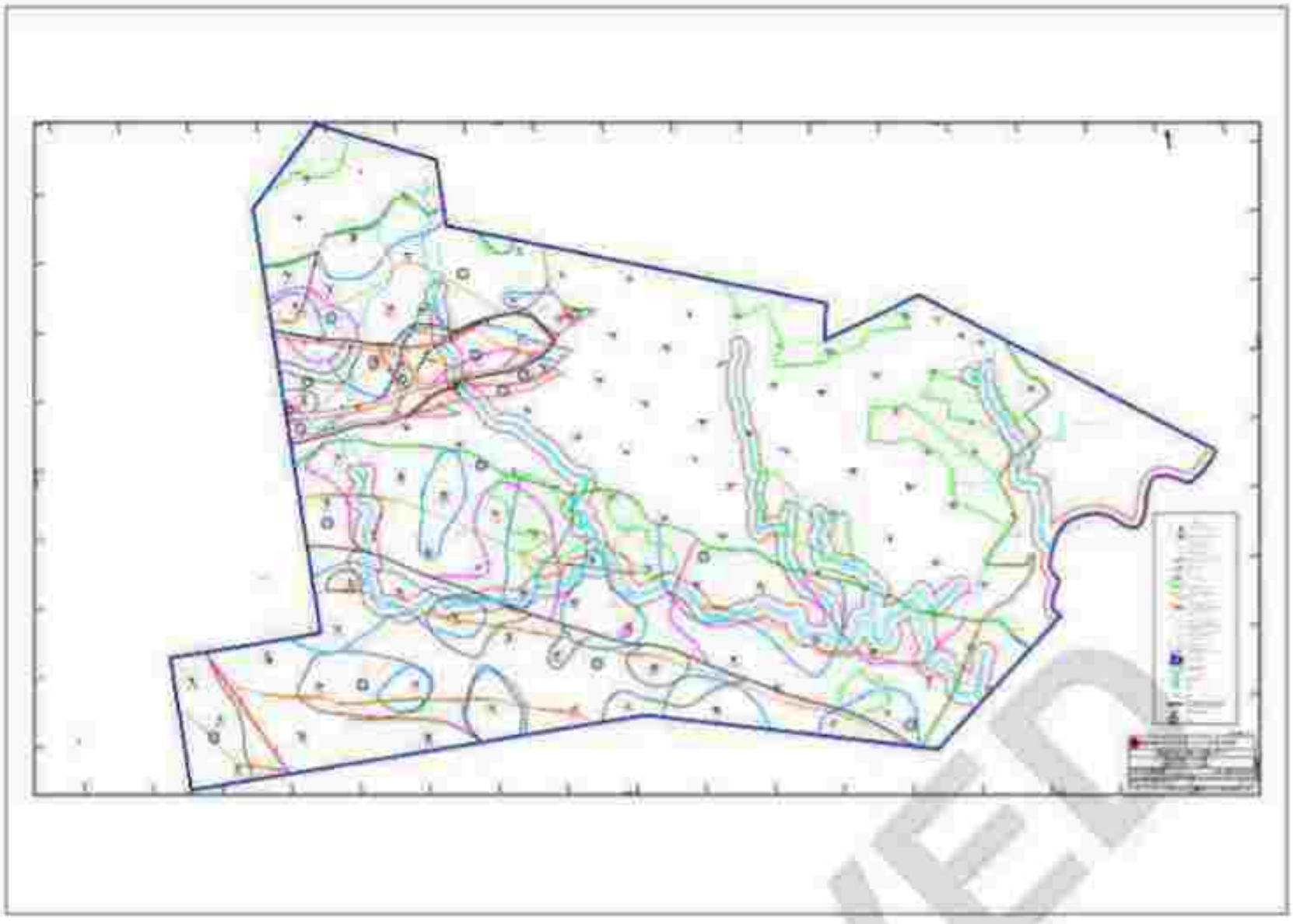
Plan / Plate 10B23



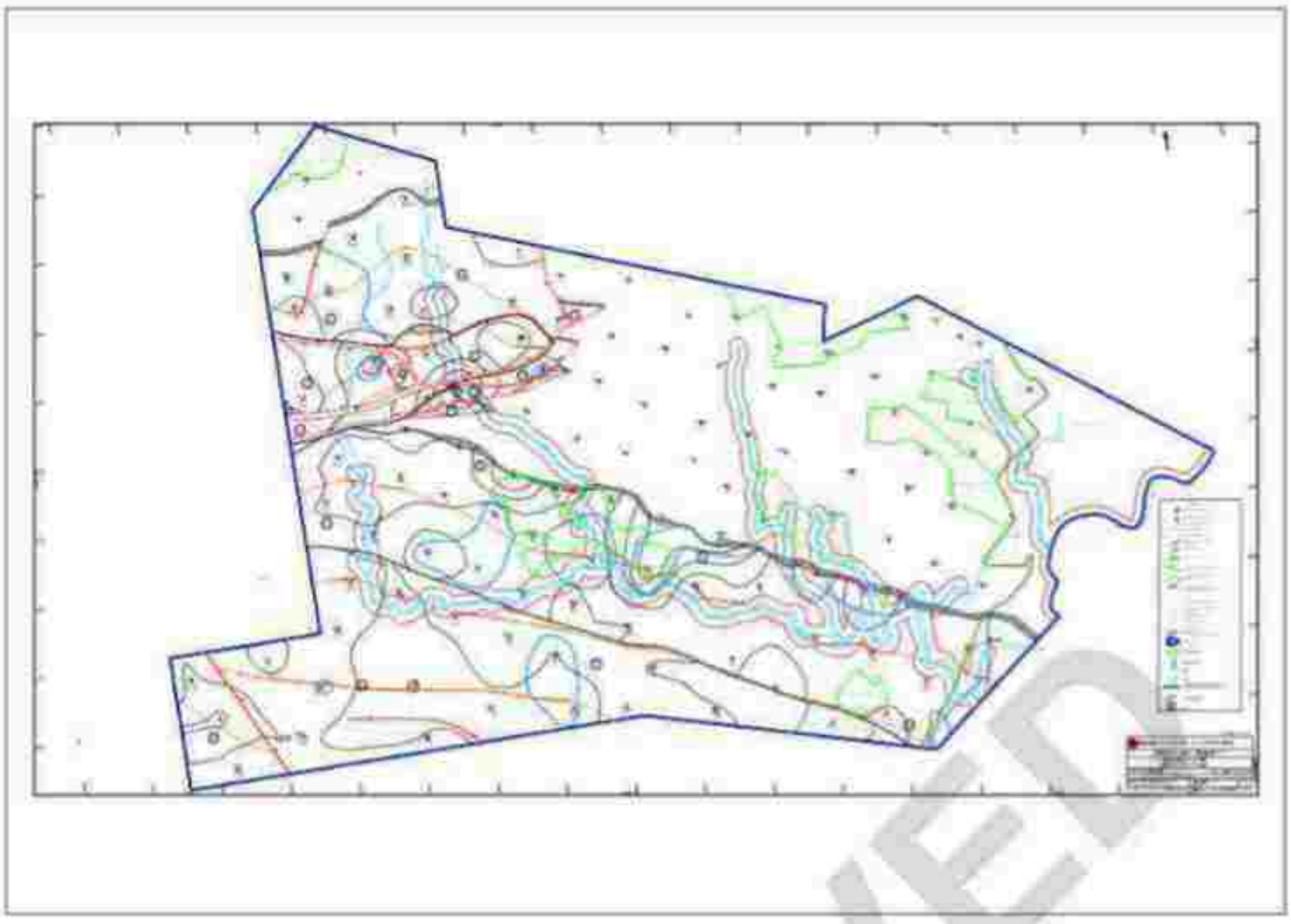
Plan / Plate 10B24



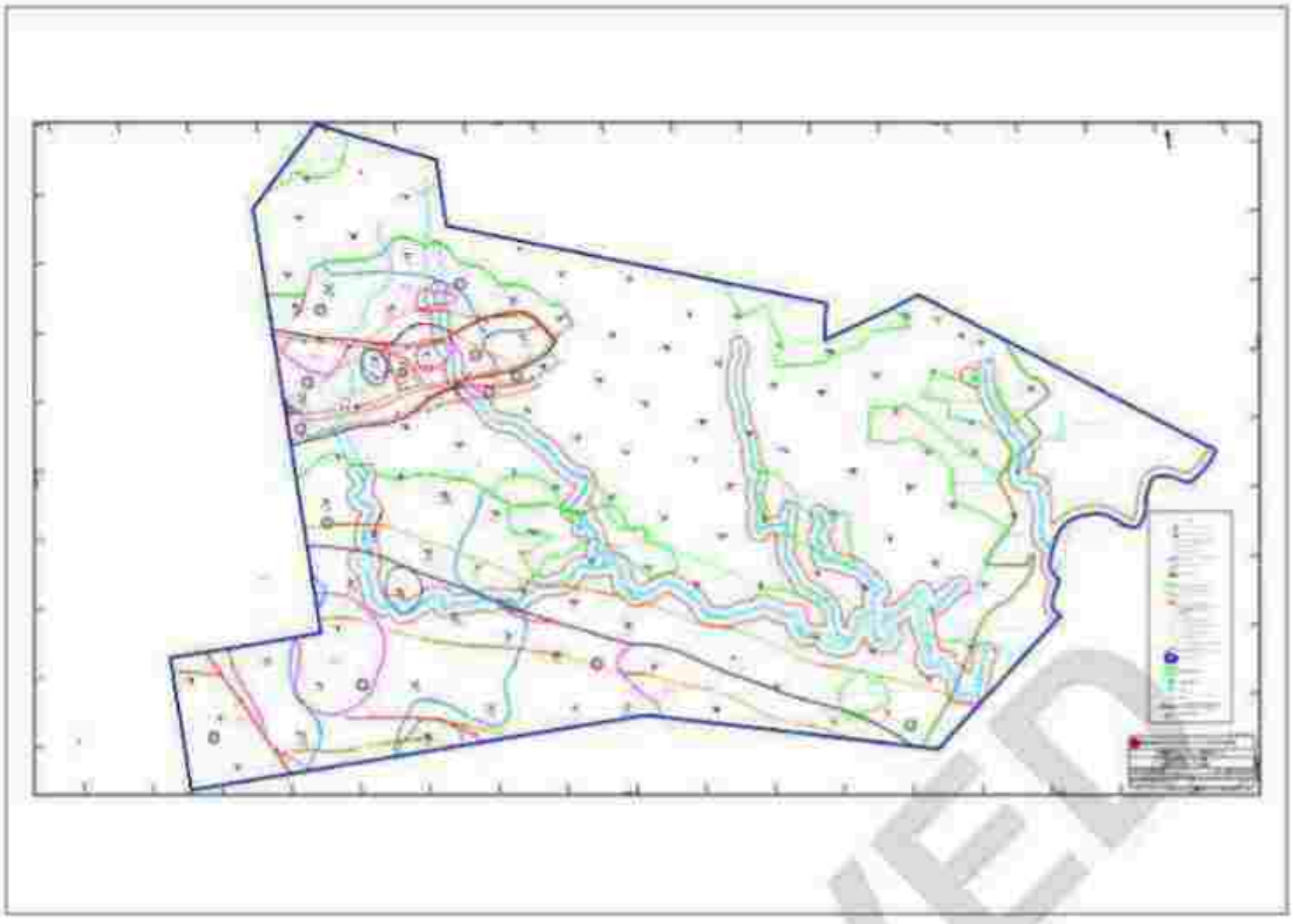
Plan / Plate 10B25



Plan / Plate 10B26

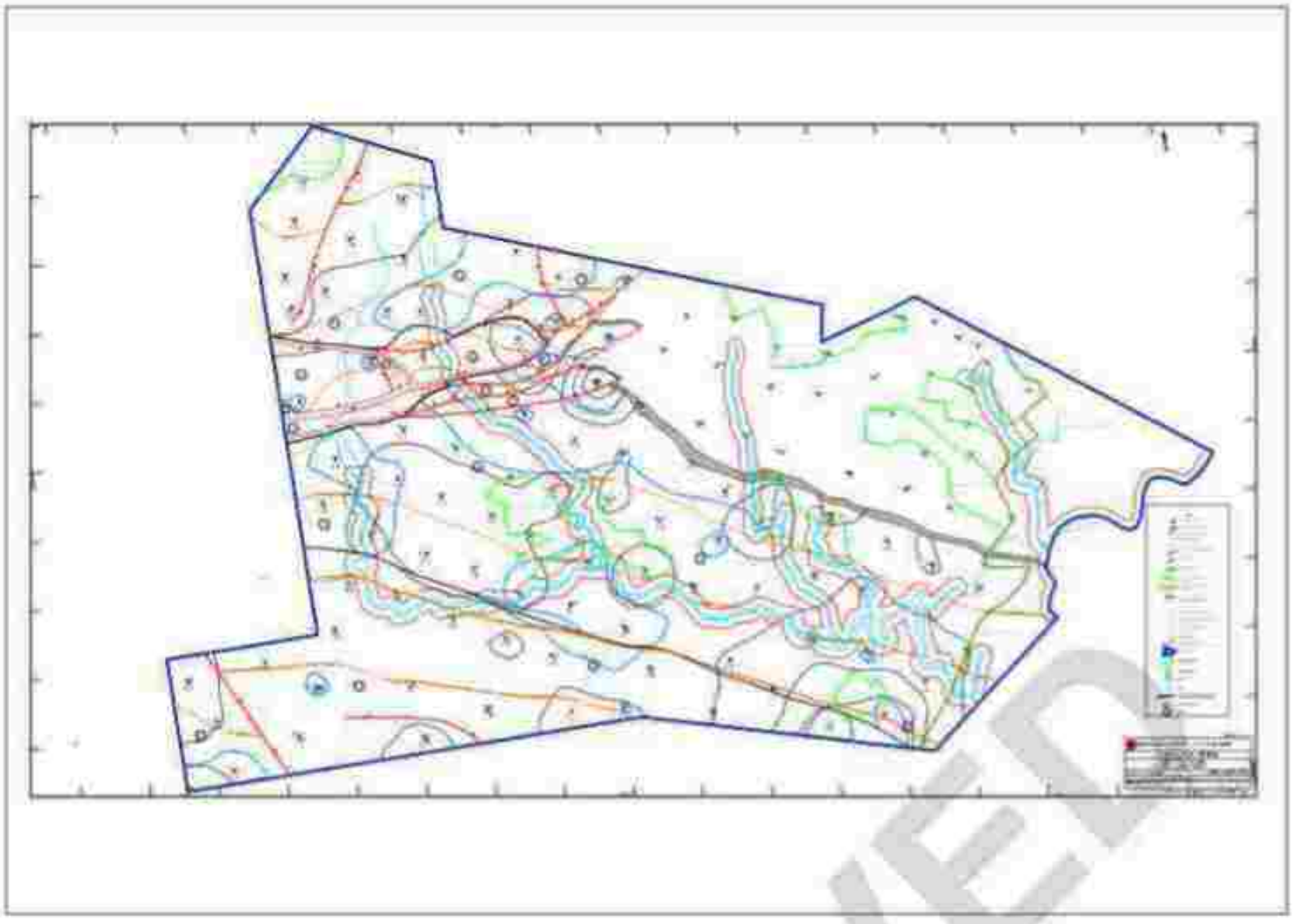


Plan / Plate 10B27

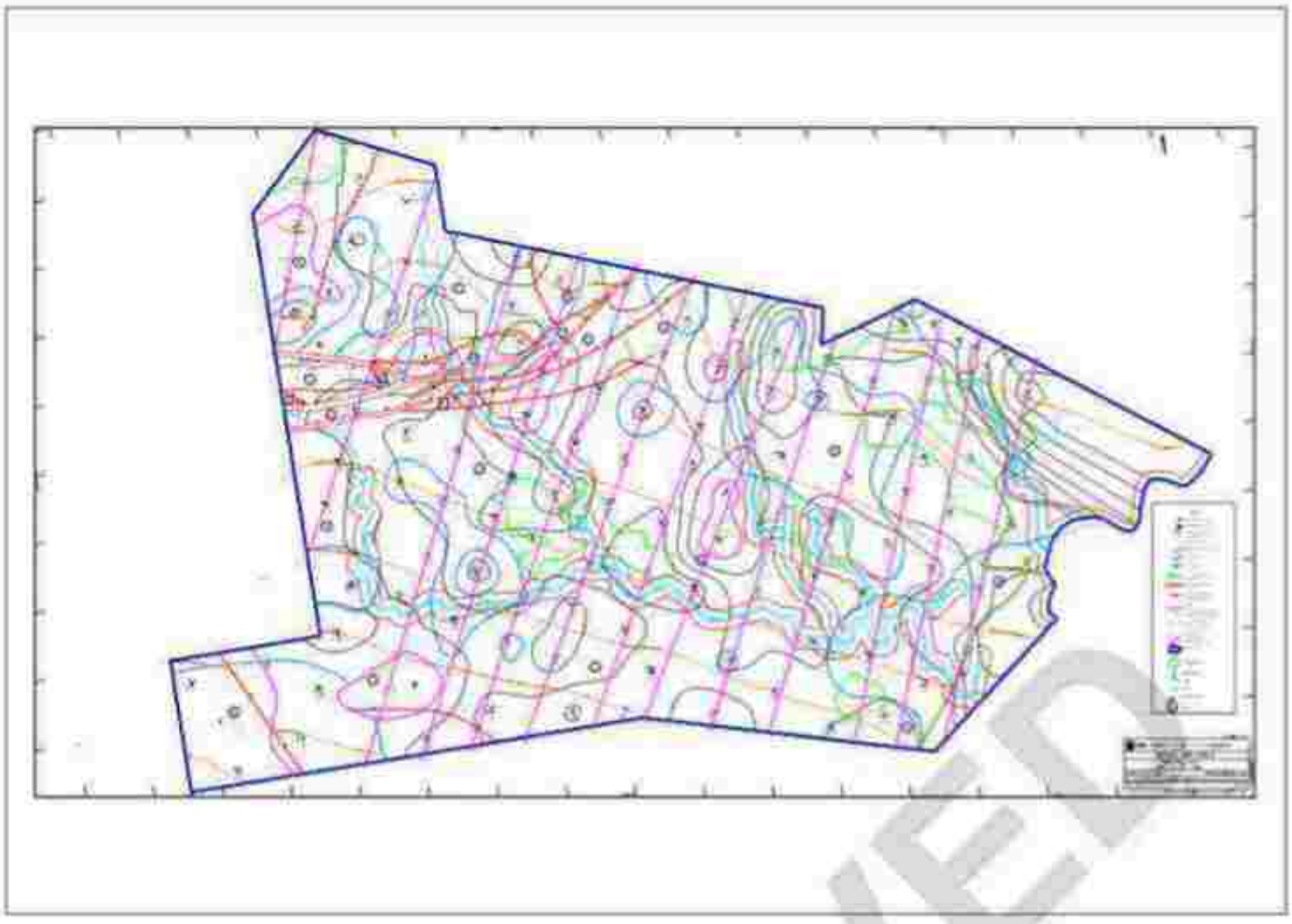


Plan / Plate 10B28

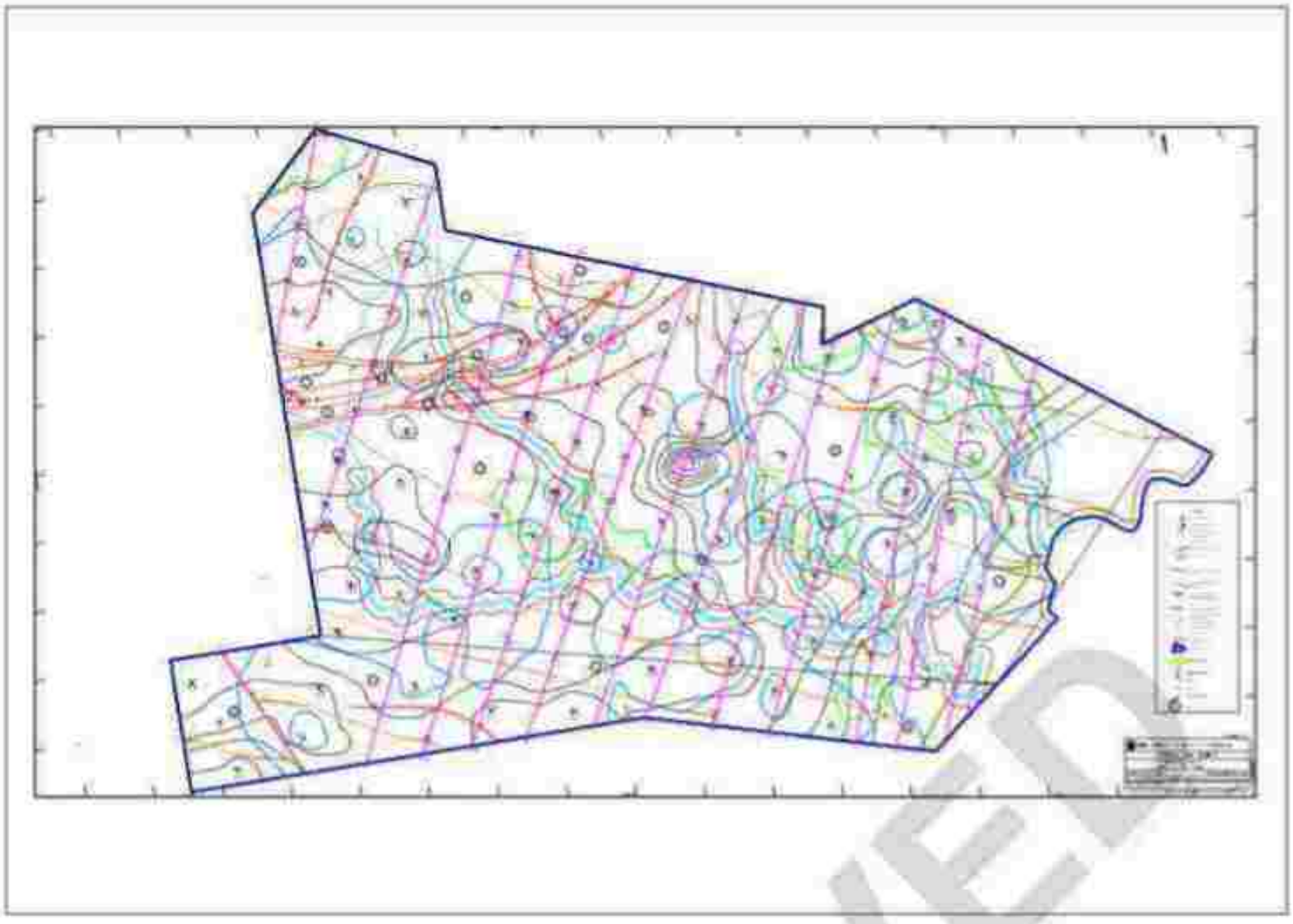
Plan / Plate 10B29



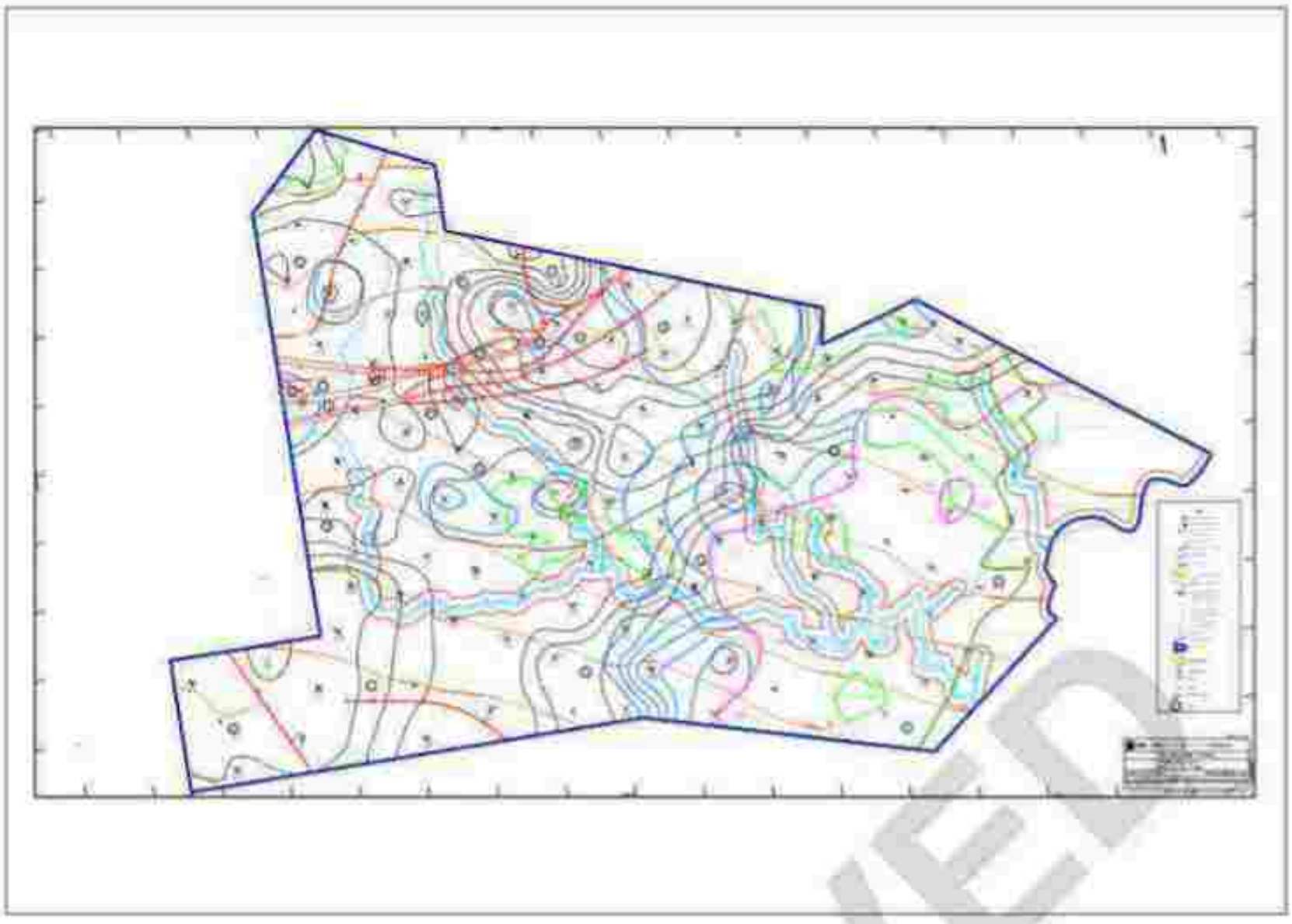
Plan / Plate 10B30



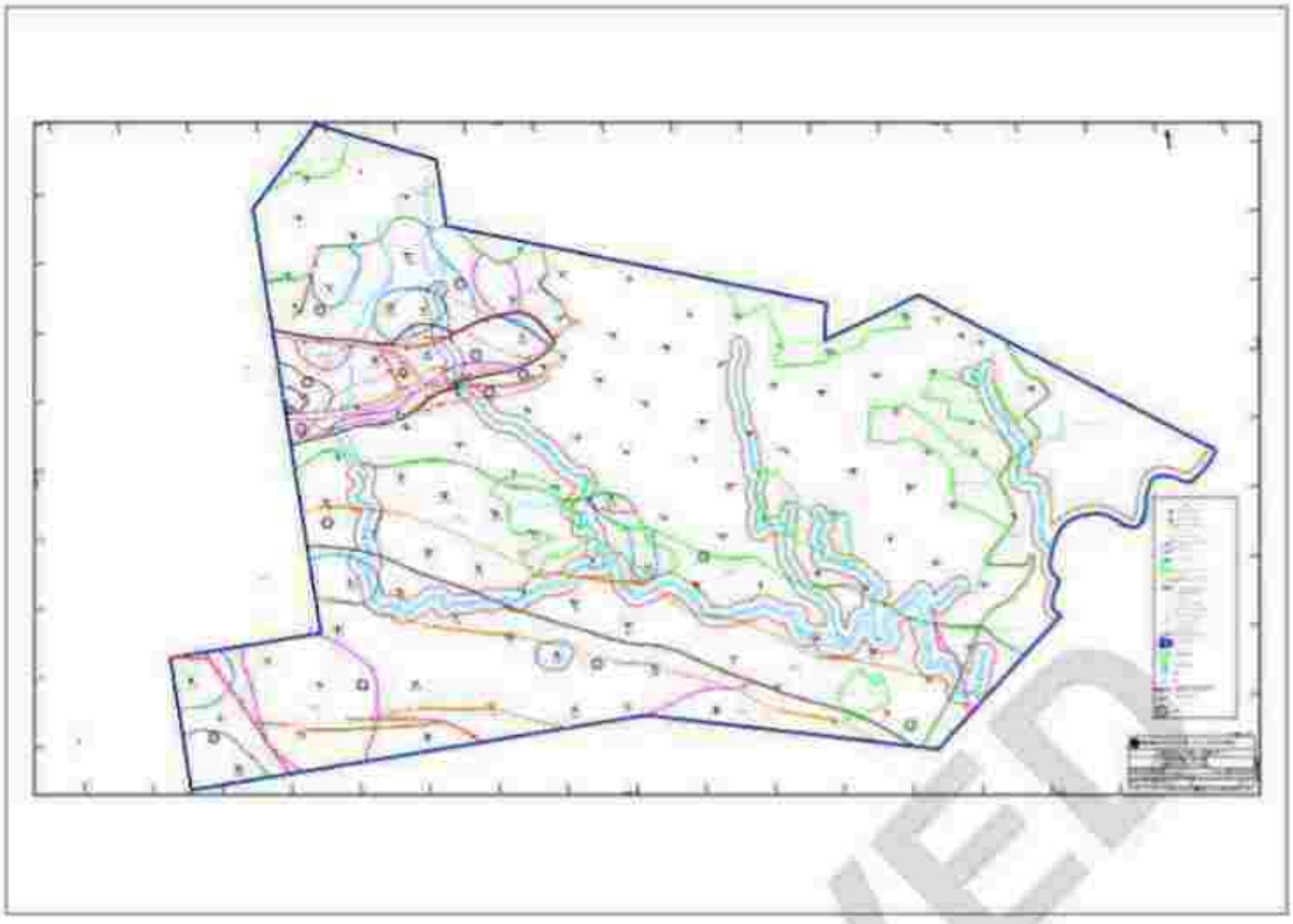
Plan / Plate 10B31



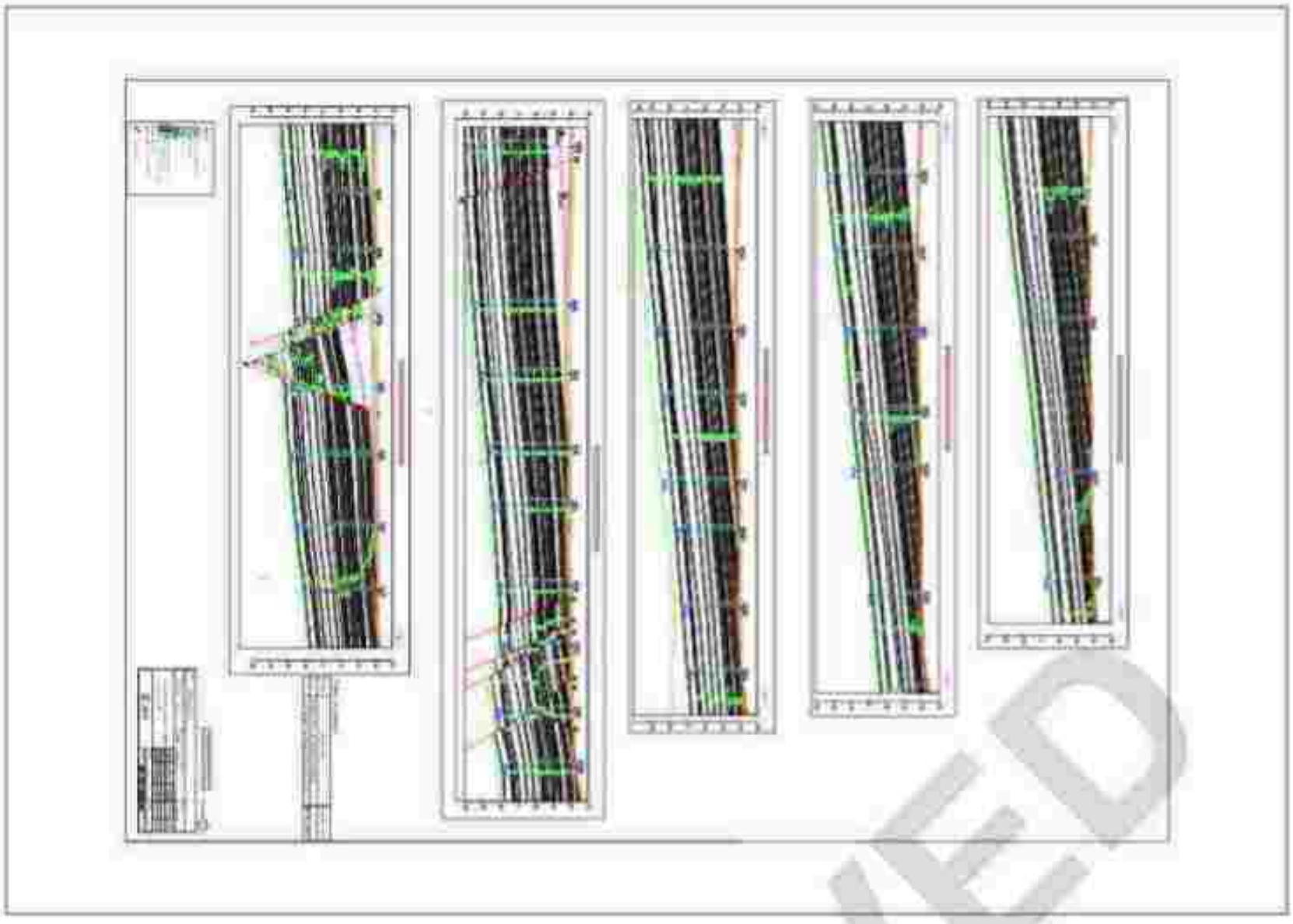
Plan / Plate 10B32



Plan / Plate 10B33

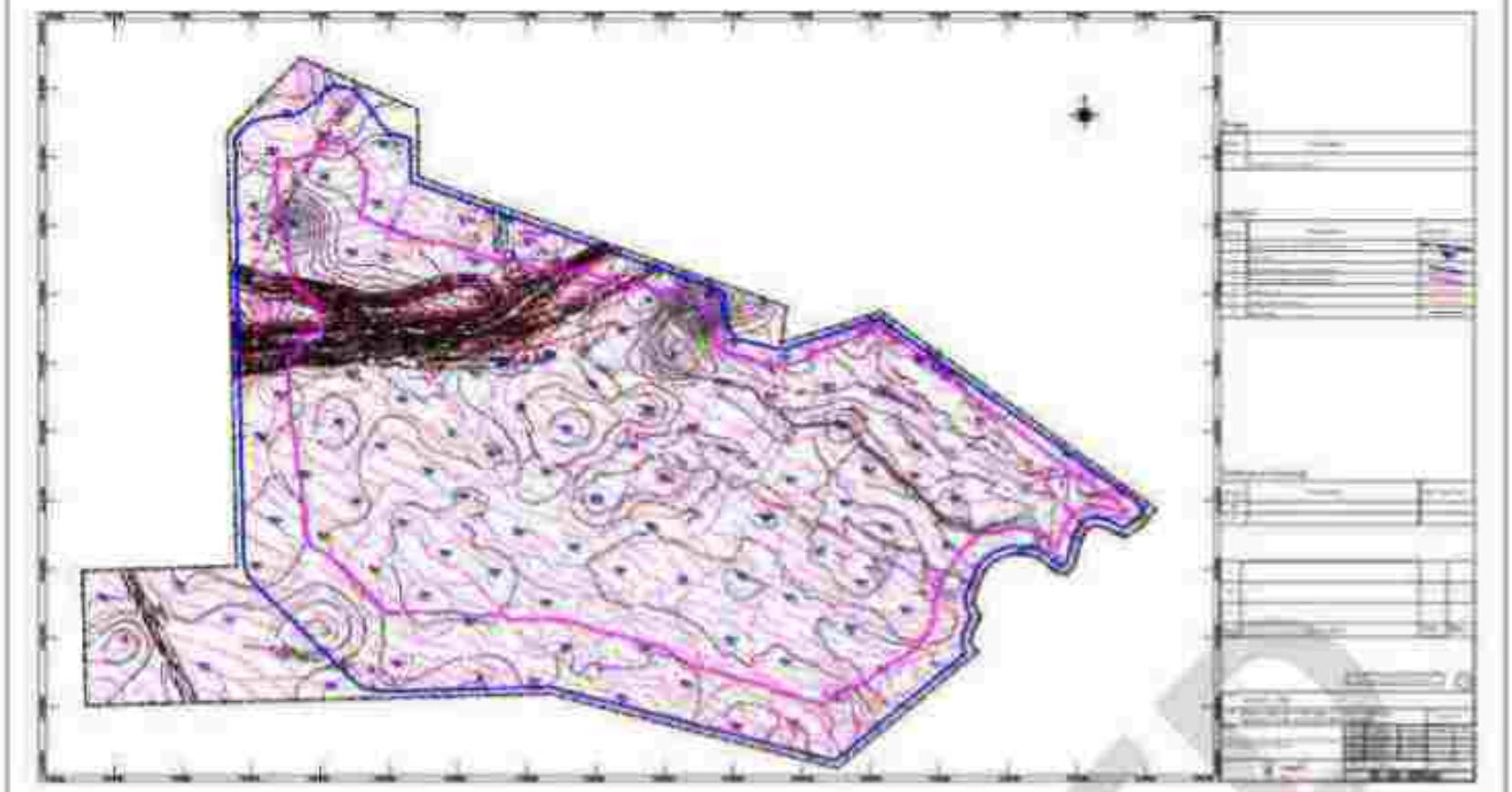


Plan / Plate 11A1

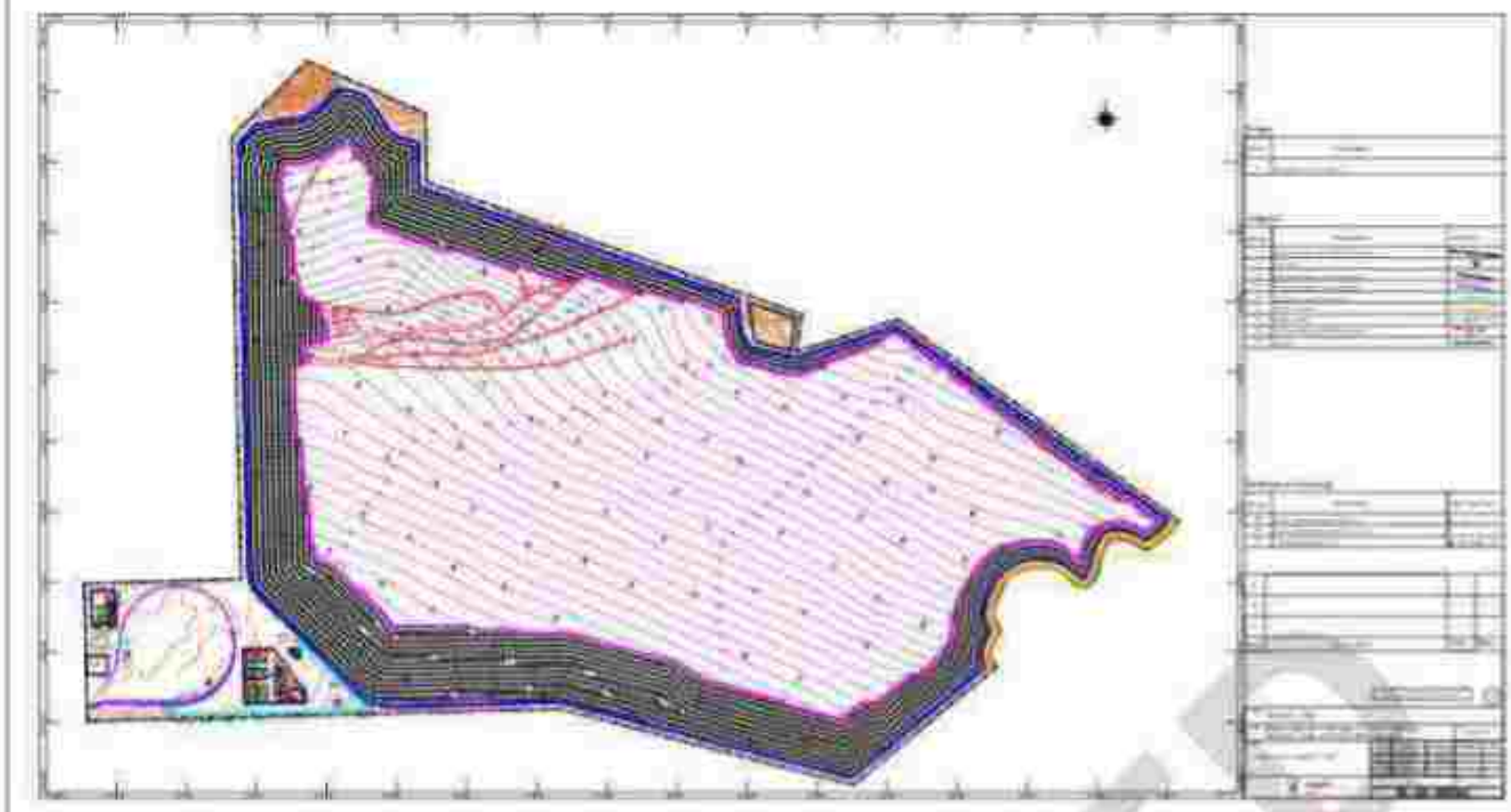


Plan / Plate 12

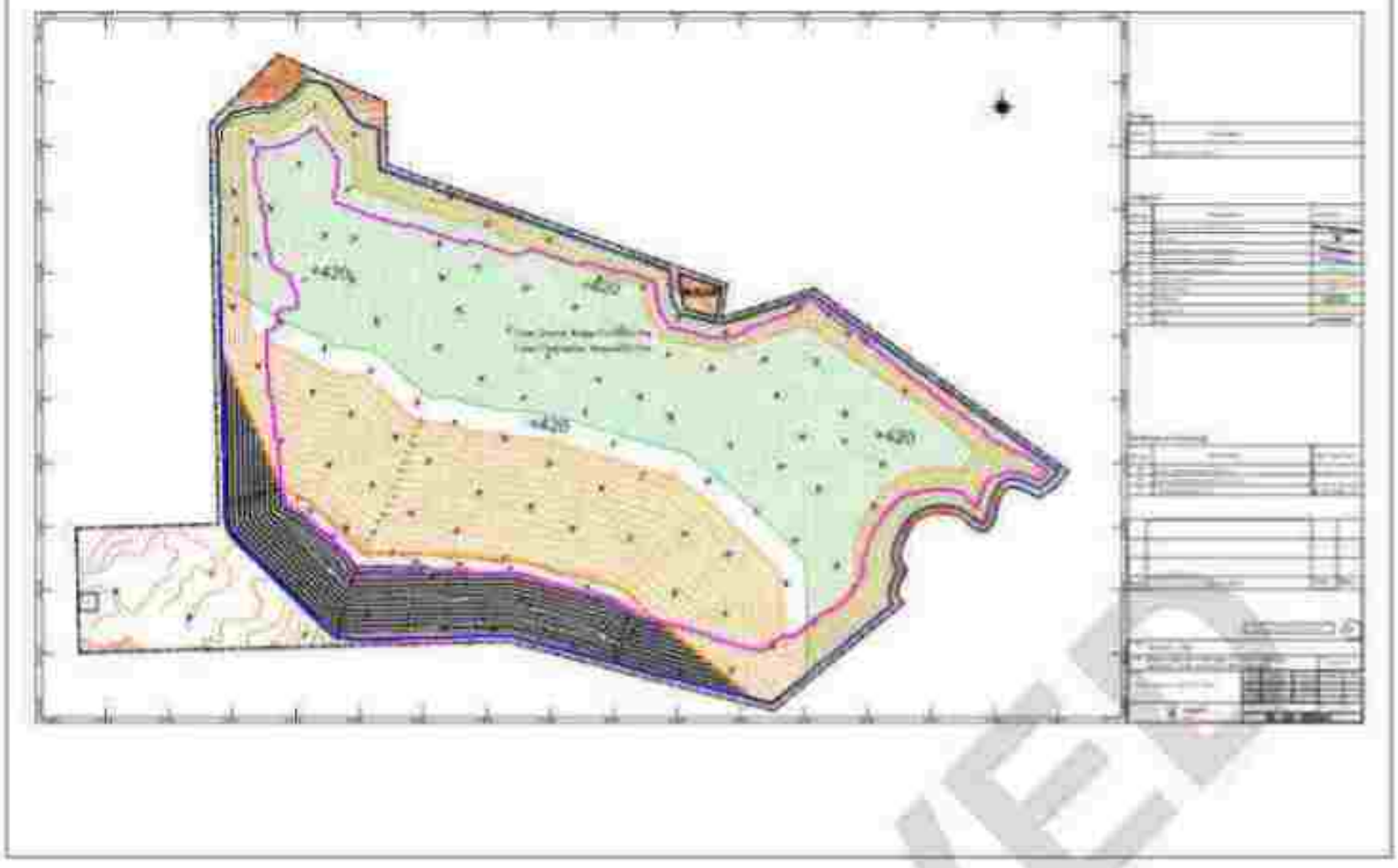
OC Plate-13



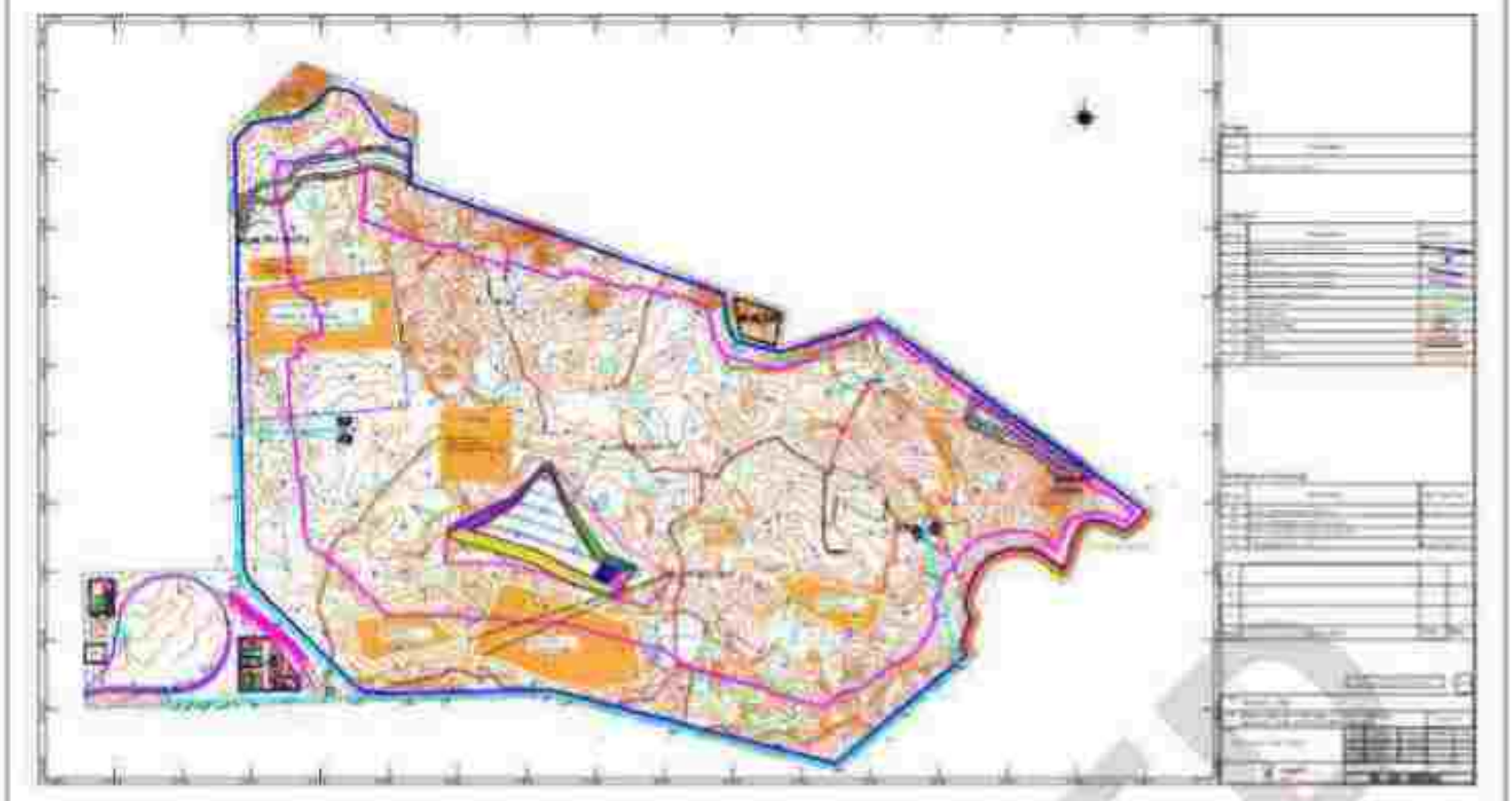
OC Plate-14



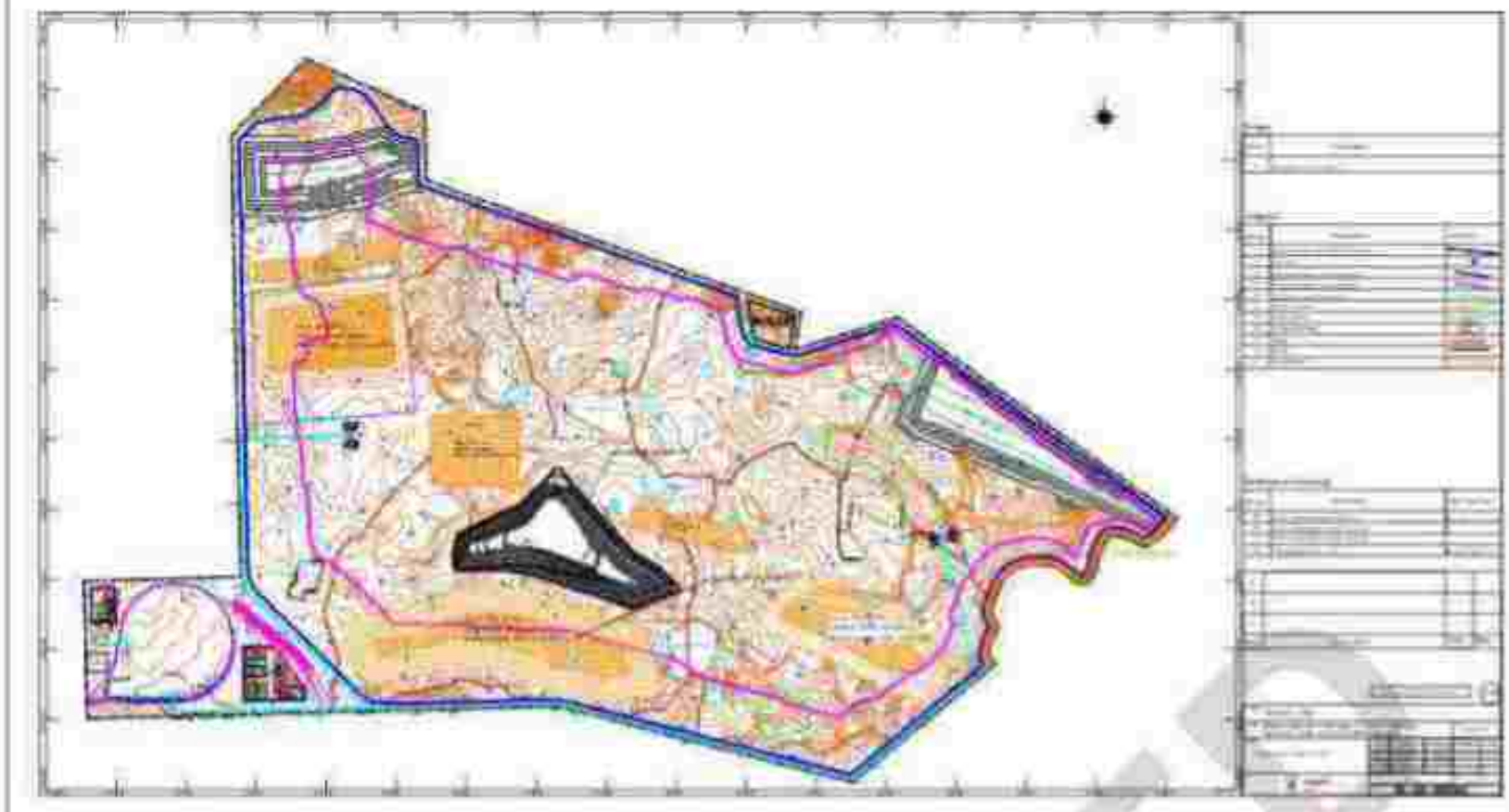
Plan / Plate 20



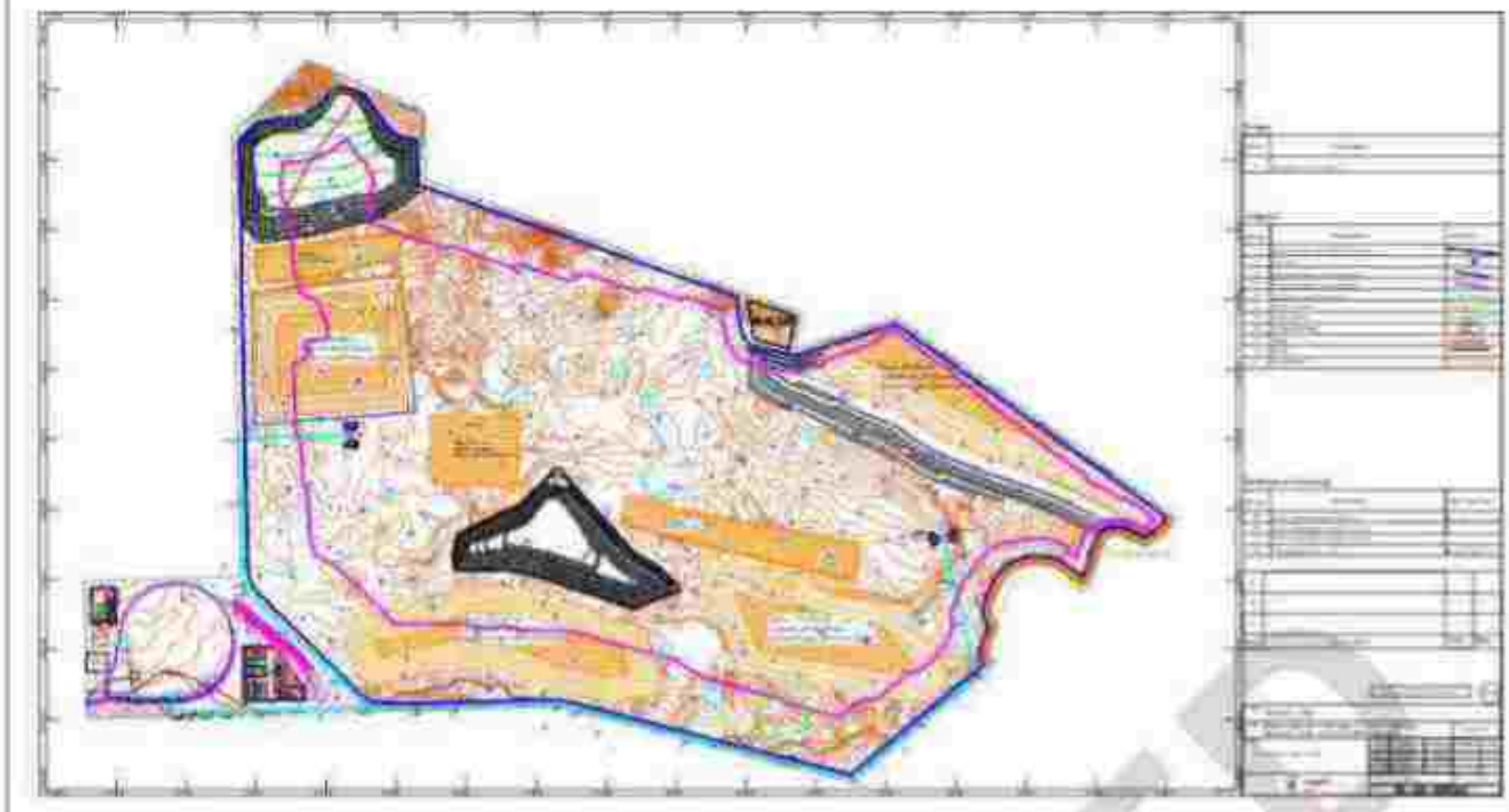
Plan / Plate 21A



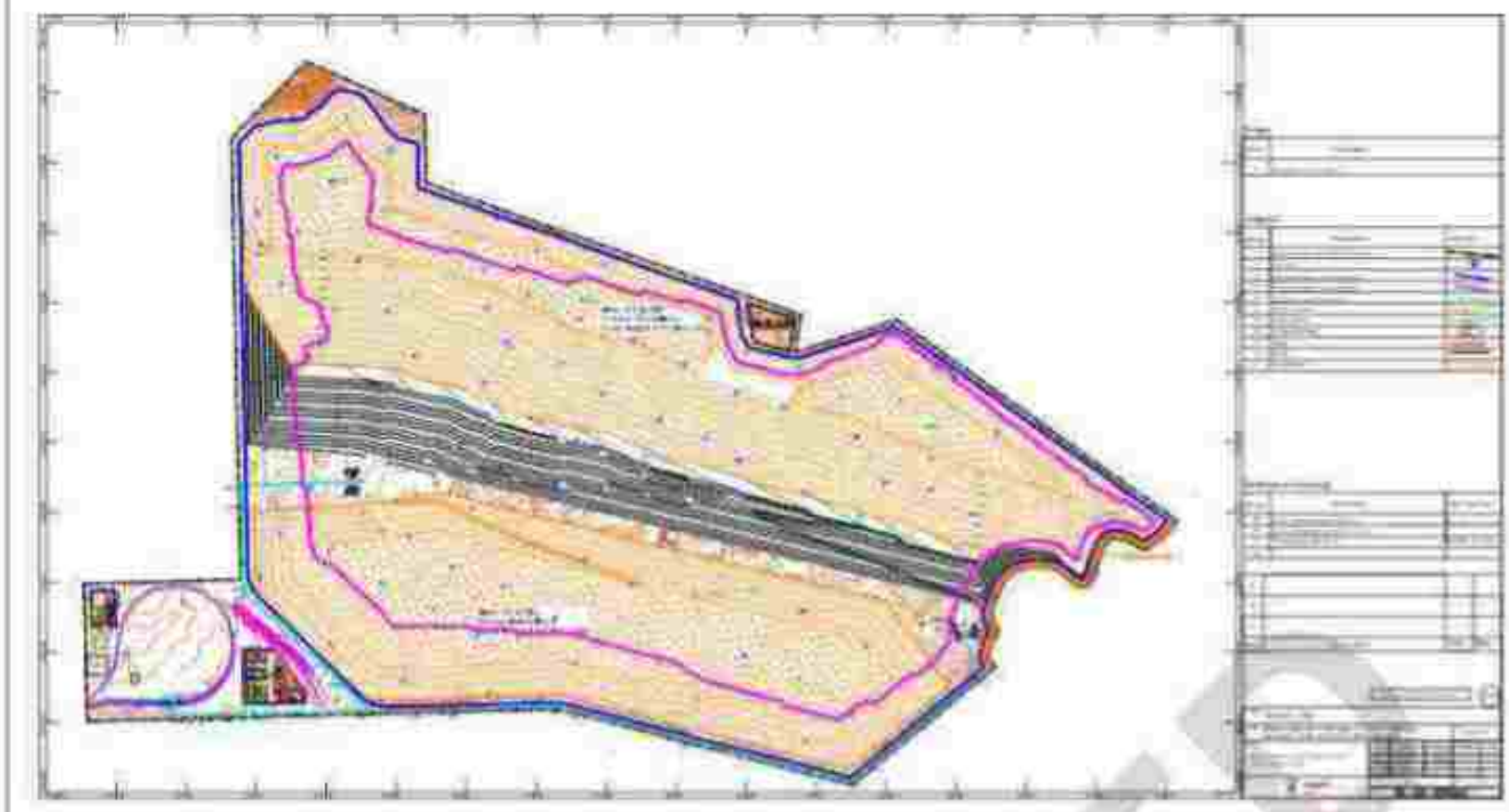
Plan / Plate 21B



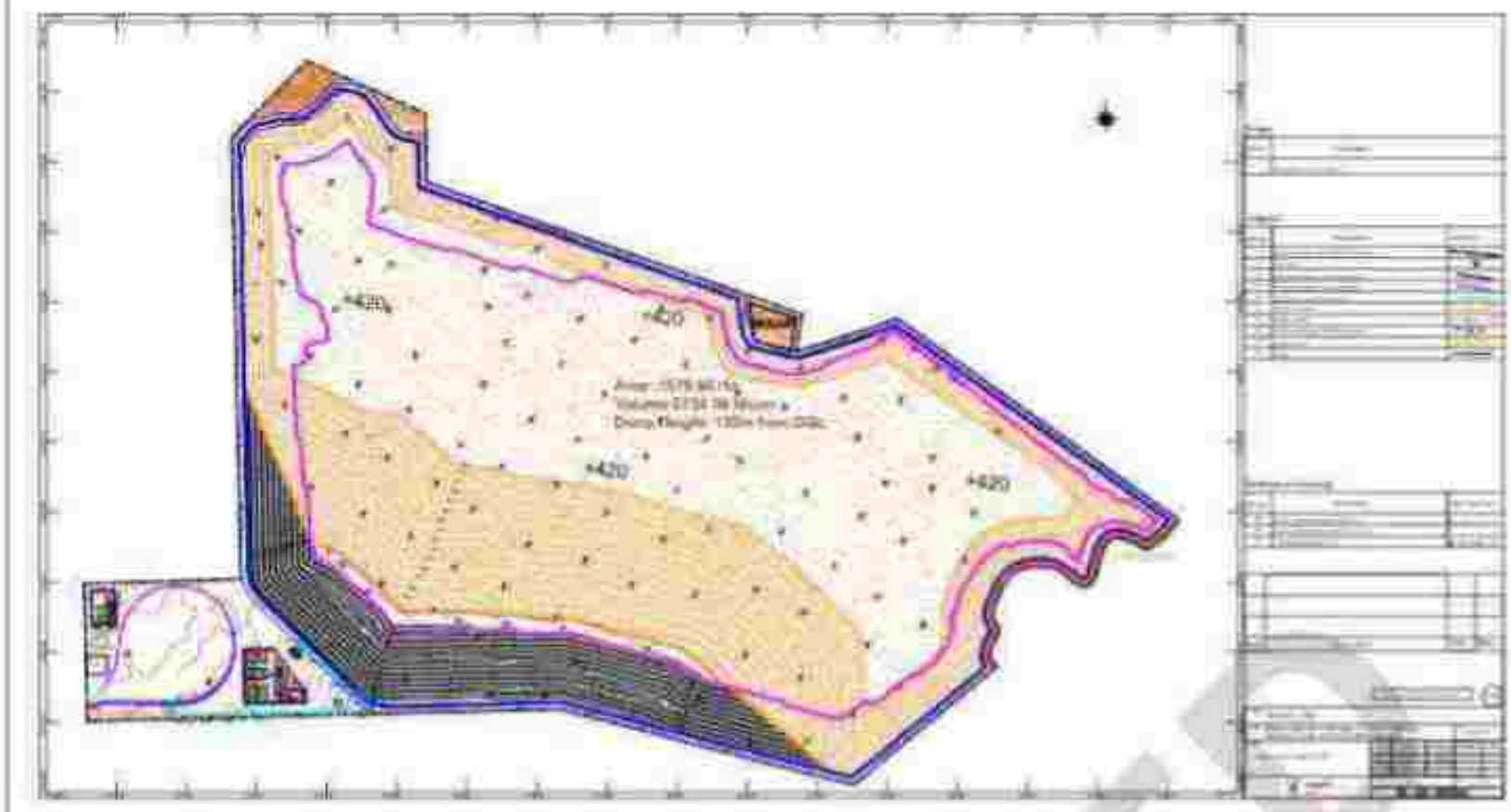
Plan / Plate 21C



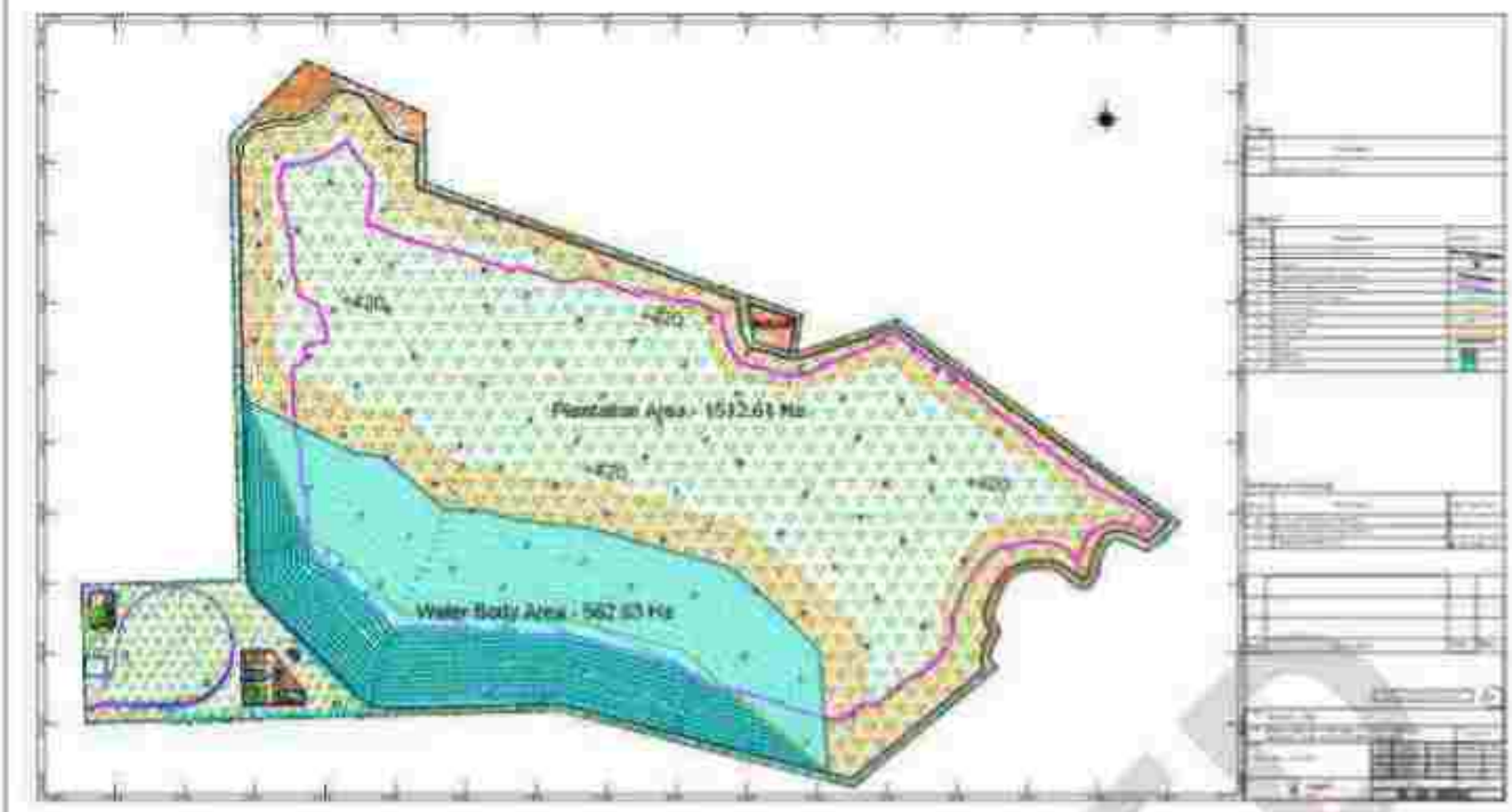
Plan / Plate 21D



Plan / Plate 21E



Plan / Plate 22



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Government of India Receipt Portal

RECEIPT

Transaction Ref.No. 1512220009288 Dated: Dec 15 2022 12:03PM

Received from M/S. NTPC LIMITED with Transaction Ref.No. 1512220009288

Dated Dec 15 2022 12:03PM the sum of INR 550100 (Five Lakhs Fifty Thousand One Hundred Only) through Internet based Online payment in the account of

Coal and Lignite, , Application Processing fee- Mining Plan of NTPC Talaipalli,

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

Printed On: 15-12-2022 12:7:21

Courtesy :- Controller General of Accounts

Fee Acknowledgement

Counterfoil (Office Copy)

		Transaction Id.:	5ce7576ede1061660877
Reference No.:	1094/2024	Payment Gateway ID:	577642711241108504
		Status:	success
Received From :	NTPC Limited		
The Sum of Rs. :	300000		
Fee Type:	Petition Filing Fees	Dated :	Nov 27, 2024, 4:40 PM
Fee Mode:	Net Banking		
Fee Period:			
Petitioner/ Organisation Name:	NTPC Limited		