GOVERNMENT OF TELANGANA
FOREST DEPARTMENT

From
Sri R.M.Dobriyal IFS.,
Principal Chief Conservator of Forests
& Head of Forest Force, (FAC)
Telangana State, "Aranya Bhavan",
Saifabad, **Hyderabad.**

To
The Spl. Chief Secretary to Government,
Forests Department,
Telangana State,
Hyderabad.

Ref.No.FC4/FC30/17/2023 Dated:04/03/2023.

Madam,

Sub: TSFD – F(C) Act, 1980 – Diversion of 2.81 Ha of Forest Land for construction of testing facility in Gajulpet RF of Mahabubnagar Forest Division in favour of M/s HBL Power Systems Ltd., Hyderabad – Furnishing of Additional information as sought by GoTS, EFS&T department –**Information Furnished**- Reg.

Ref:
1. Proposal nos FP/TG/ROAD/32903/2018 submitted through online on Ministry's website (www.forestclearance.nic.in).
2. PCCF, Rc.No. 8620/2017/FCA2, dt. 11-04-2018.
3. CF, Mahabubnagar Lr.No.54/2018/M4, dt.30.10.2018.
4. DFO, Mahabubanagar Lr.No.340/2017/S4, dt.26.01.2019 addressed to the PCCF(HoFF), Hyderabad.
5. PCCF's, Rc.No. 8620/2017/FCA2, dt. 07-02-2019.
6. DFO, Mahabubanagar Lr.No.340/2017/S4, dt.23.02.2019 addressed to the PCCF(HoFF), Hyderabad.
7. PCCF's, Rc.No. 8620/2017/FCA2, dt. 02-04-2019.
8. Govt Memo No.1360/For.I(1)/2019, EFS&T(For.I) Dept., dt. 27-01-2020.
9. PCCF's, Rc.No. 8620/2017/FCA2, dt. 19-02-2020.
10. APCCF/CF(FAC), Mahabubnagar Rc.No.54/2018/M4, Dt:20-11-2020.
11. PCCF's, Rc.No.8620/2017/FCA2, dt.16-12-2020.
12. Govt Memo No.1360/For.I(1)/2019, EFS&T(For.I) Dept., dt. 28-08-2021.
13. PCCF's, Rc.No.8620/2017/FCA2, dt.02.11.2021.
14. HBL Power System Ltd Rc.No.HBL/AMN/PCS/FL/2022/01m, dt.07.02.2023

Vide ref 12th cited, the State Government has informed that, Since there are no specific guidelines for testing facility of power systems of explosives and requested to get advise from the concerned state government departments, who are dealing with the subject of explosives and furnish the same to the govt and the same was communicated vide ref 13th cited.

Vide ref 14th cited, the HBL power systems has submitted the reply from the concerned department for clarification as desired by this office which is as follows:

Sl. No.	Information to be sought from the dept	Reply
1.	The Director General of Police, Lakdikapul Rd. Opposite Ravindra Bharathi, Red Hills, Lakdikapul , Hyderabad,	The Director General of Police office Hyderabad vide ref dated 03.12.2021 has submitted the information with a case study on the guidelines which mentions the

	Telangana-500004	preferable safety distance is 275 Mtrs for selection of site from dwelling and public highways. Copy enclosed.
2.	The Disaster Response and Fire Service Department, BRKR Bhawan, Hill Fort, Adarsh Nagar, Hyderabad, Telangana – 500063.	The UA informed that the matter does not come under Disaster Response and Fire Service Department purview.
3.	The Nagpur Explosive Department, CGO Complex, 5th A Block, Seminary Hills, Nagpur, Maharastra – 440001	The UA has informed that the Nagpur Explosive Department has already approved HBL drawing as per the applicable standards of Explosive Rules 2008 & STEC Guidelines.
4.	The pollution Control Board (PCB), A-3, Parayavaran Bhavan, Sanath Nagar Rd, Sanath Nagar Industrial Estate, Sanath Nagar, Hyderabad, Telangana – 500018.	The UA has informed that the pollution Control Board (PCB) office has stated that they are not aware on the specific guidelines required for setup and has advised to follow the explosive rules and the same has been mentioned in the consent for establishment.

Further, the UA has informed that the project is meant for manufacturing of Electronic Fuzzes, grenades etc. to Indian Armed Forces and testing is a prerequisite before Lot acceptance & Clearance and these products are being developed in association with Armament Research & Development Establishment (ARDE), Defense Research and Development Organization (DRDO). ARDE, DRDO has recognized HBL as the Development Cum Production Partner. In the development phase the testing is being carried out ARDE, Pune, in the production phase testing will be HBL responsibility. ARDE, DRDO has similar test facilities and is maintaining a minimum safety distance of 275 Mtrs and they are following the same norms and Telangana is the hub for manufacturing various defense items and HBL with the cooperation of State Government would like to offer 100% indigenous products to Indian Armed forces and requested this office to consider the above recommend for grant of permission for forest land diversion.

In view of the above, stating all the above facts the State Government are requested to forward the proposal with recommendation in Part-V to the GoI, MoEF & CC, IRO, Hyderabad for consideration of this proposal.

Encl: As above.

Signed by Rakesh Mohan Dobriyal
Date: 04-03-2023 10:08:21
Reason: Approved

Yours faithfully,

Prl. Chief Conservator of Forests
Head of Forest Force(HoFF)

Copy to

The Chief Conservator of Forests/Conservator of Forests, Jogulamba and the District Forest Officer, Mahabubnagar for information.

The Dy. General Manager, M/s HBL Power Systems Ltd., D.No.8-2-616, Plot No.4, Behind Minerva Grand Hotel, Road No.11, Banjara Hills, Hyderabad-500 034.

1885282/2023/FCA SECTION-PCCF

CIN: L40109TG1986PLC006745
Regd. Office :
Road No.10, Banjara Hills, Hyderabad - 500 034, T.S. INDIA,
Phone :+91-40-23355575, 23355085, Fax : +91-40-23355048
Email : contact@hbl.in, website : www.hbl.in

HBL Power Systems Ltd.

HBL/AMN/PCS/FL/2022/01 07th Feb 2023

To
Principal Chief Conservator of Forest & Head of Forest Force
Telangana State, "Aranya Bhavan",
Saifabad, Hyderabad.

Respected Sir,

Sub: Diversion of 2.81 Ha of Forest Land for Construction of Testing Facility at Gajulapet RF of Mahabubnagar Forest Division in favour of M/s HBL Power Systems Limited, Hyderabad –Furnishing of Additional information as sought by GoTS, EFS&T department – Clarification Requested – Reg.
Ref: Letter from your esteemed office vide Ref.No. 8620/2017/FCA-4 Dated 02.11.2021.

With reference to the above, we would like to bring the following points to your kind attention:

1) Vide your Letter Ref.No. 8620/2017/FCA-4 Dated 02.11.2021, additional information on specific guidelines if any applicable for set up of testing facilities has been sought from the following departments

   i) The Director General of Police, Lakdikapul Rd. Opposite Ravindra Bharathi, Red Hills, Lakdikapul, Hyderabad, Telangana-500004.

   ii) The Disaster Response and Fire Service Department, BRKR Bhawan, Hill Fort, Adarsh Nagar, Hyderabad, Telangana – 500063.

   iii) The Nagpur Explosive Department, CGO Complex, 5th , A Block, Seminary Hills, Nagpur, Maharastra- 440001.

   iv) The Pollution Control Board(PCB), A-3, Parayavaran Bhavan, Sanath Nagar Rd, Sanath Nagar Industrial Estate, Sanath Nagar, Hyderabad, Telangana-500018.

2) We have approached the DGP office, Hyderabad on the above subject and we understand that the DGP office Hyderabad has replied to your esteemed office in Dec 2021. We also understand from the DGP office that in their letter they have provided a case study on the guidelines which mentions the preferable safety distance is 275 Mtrs.

1885282/2023/FCA SECTION-PCCF

HBL

3) On approaching

   a. The Disaster Response and Fire Service Department, we understand that this subject will not come in their purview.

   b. The Nagpur Explosive Department has informed that they have already approved HBL drawing as per the applicable standards of Explosive Rules 2008 & STEC Guidelines.

   c. The Pollution Control Board (PCB) office has stated that they are not aware on the specific guidelines required for setup and has advised to follow the explosive rules and the same has been mentioned in the consent for establishment.

4) We would also like to bring to your kind attention that this project is meant for manufacturing of Electronic Fuzes, Grenades etc to Indian Armed Forces and testing is a prerequisite before Lot acceptance & Clearance.

5) These products are being developed in association with Armament Research & Development Establishment (ARDE), Defence Research and Development Organisation (DRDO). ARDE, DRDO has recognised HBL as the Development Cum Production Partner. In the development phase the testing is being carried out ARDE, Pune, in the production phase testing will be HBL responsibility.

6) ARDE, DRDO has similar test facilities and is maintaining a minimum safety distance of 275 Mtrs. We are following the same norms.

7) As we are aware Telangana is the hub for manufacturing various defence items and HBL with the cooperation of state government would like to offer 100% indigenous products to Indian Armed forces.

In this regard, we request you to kindly consider the above and recommend our file for grant of permission for forest land diversion.

Thanking you,

For HBL Power Systems Limited

T. Abdul Kalam
Authorized Signatory

HBL POWER SYSTEMS LTD. Hyderabad

-563-

018357

14 DEC 2021

GOVERNMENT OF TELANGANA
POLICE DEPARTMENT

From
Director General of Police,
Telangana State,
Hyderabad

To
The Principal Chief Conservation of Forests,
& Head of Forest Force, Telanagana State,
"Aranya Bhavan", Saifabad, Hyderabad.

Rc.No.113/K1/2018, dt. 03-12-2021

Sub: TS Police – Instructions on Time barred Tear Smoke Munitions and demolition material – Regarding.

FCA4
Dy.C.F.(IT)

Ref: Lr.No.8620/2017/FCA-4, dtd.02-11-2021, of Principal Chief Conservation of Forests & Head of Forest Force, Telanagana State, "Aranya Bhavan", Saifabad, Hyderabad.

& & &

With reference to the letter cited, the available information is enclosed herewith.

Yours faithfully,

14/12/21
for Director General of Police

DISPOSAL OF TIME BARRED / DEFECTIVE TEAR SMOKE MUNITIONS.

1. INTRODUCTION:

The tear smoke munitions manufactured by tear Smoke Unit has a fixed shelf life which is stamped on the label of the TSM as expiry date. If not used in the field within this period it should be downgraded and used for training purposes up to 7 years from date of manufacture. Munitions which has not been used for 7 years is required to be disposed off. At times there are instances when the munitions mal-functions viz. misfires, fails or leaks etc. there is a need to dispose off such munitions in such a way that it does not contaminate atmosphere or creates safety hazards. This paper present the method of disposal of time barred, blind or mis-fired Tear Smoke Munitions.

2. SEGREGATION OF MUNITIONS TO BE DISPOSED OFF:

Munitions required to be destroyed should be segregated and divided into separate groups, like CS/OC based munitions, wood piercing projectiles, Stun Munitions etc. Each category of munitions should be destroyed separately. It should be seen that munitions which causes the least damage to the burning pit should be destroyed first, followed by other munitions.

3. SELECTION OF SITE:

An area should be selected that is away from dwelling and public highways preferably at a safe distance of minimum 275mts. The history of prevailing wind conditions should be studied to determine the probable course of the smoke generated from the disposal site which will contain high concentration of tear and nauseating gases. Such smoke can be hazardous and the source of severe criticism if allowed to interfere with the public. Before destruction of munitions, wind direction must be checked again to confirm that it will not affect local population.

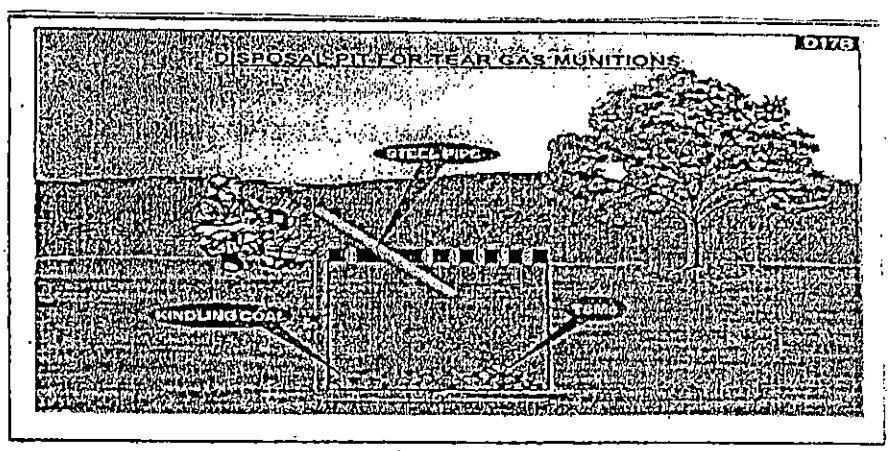
Cotntd..2

DISPOSAL PITS:

There are of two types:-

a) **Dug Pits:-** these pits of size 3 feet square and 5 feet depth are dug into the ground and covered with a ¼" (6.4mm) thick steel sheet of 5' X 5' perforated with many holes of ½" (12.7mm) diameter and one hole of 8" diameter. A steel pipe of approximates 6 inches diameter and 6 feet length be inserted in 8" hole at an angle greater than 45 degrees to feed munition for burning.

b) **Steel Box:-** A steel Box of 3' X 3' X51 Size with ¼" thick steel box can be fabricated with a cover perforated with many holes of 1/2 " diameter and one hole of 7' diameter. A steel pipe of 6' diameter and 6 feet length be made to act as feed chute. The box be firmly secured on ground before commencing disposal and the chute pipes be inserted through the bigger hole (7') at an angle more than 45 degrees to feed condemned munition.



Contd.. 3

5. METHOD OF DISPOSAL:

The pit should be filled with scrap lumber or similar material and kindled with rather large quantity of kerosene or burnt engine oil. The steel cover on the pit or box should be replaced before fire is slighted. When the fire has burned to the point where the bottom of the pit is covered with hot coals, the munitions are fed in the fire, one at a time through the pipe. When a round is burning, a large column of white smoke will emit from the pit. As this smoke diminishes, another round may be fed into the pit. When the complete rounds, including the cartridge cases are placed in the pit, the propelling charges will 'Cook off' blasting the projectiles violently across the pit. In some instance, the projectiles may be propelled out of the pit if the cover does not fit properly.

6. DISPOSAL OF STUN MUNITIONS:

Stun, Dye Marker Grenades, Stun Shells, SPAD (pepper spray) require more precautions than other type of munitions during disposal. These munitions explode upon functioning and will tend to scatter hot coals around the pit. All Stun munitions should be fed into the pit one at a time with a waiting period for each one to explode before the next one is put into the pit. Stun munitions / aerosol canister SPAD should be destroyed after all other types of munitions have been disposed off. This is because the explosion of these items may damage the earth pit to the extent that it will have to be repaired before further disposal operations can continue.

7. DISPOSAL OF SPECIAL TYPE OF MUNITIONS:

Wood piercing Shells should be fed down the pipe with nose end first. This minimizes the possibility of fuses functioning when they hit the bottom of the pit. If just one or two of these projectiles are to be destroyed during the operation, they may be placed in the pit before the fire is started. These should always be handled with utmost care and with a maximum of common sense.

Contd..4

Careless handling can cause serious injuries and even death. When burning CS/ OC loaded munitions the disposal crew should be equipped with gas masks and should make every effort to avoid the smoke. Any person who is agented by the irritant should be quickly removed to a safe area and face the wind. Symptoms will disappear in a few minutes.

8. SAFETY PRECAUTIONS:

a) Ensure location of pit is away from dwelling areas, living barracks and highly inflammable stores/areas.
b) Check direction of wind before commencing disposal.
c) Disposal team should be properly trained and aware of characteristics of he munitions being disposed off.
d) Ensure cover of pit is replaced before disposal is started.
e) Disposal personnel should stand at least 10 feet away from the pit . They should be fully equipped with goggles, helmets and gas masks. Munitions required to be disposed off should be kept group wise at least 30 yards away from the disposal pit, preferably in a covered location. Only a small quantity of munitions (not more than 10 at a time) should be kept near the pit for disposal.
f) In case of stun munitions this quantity should be only which is required for immediate disposal.
g) After the disposal operations are complete the pit may be filled in and marked, or if it is not badly damaged, it may be cleared out, repaired and used again.
h) Fire tender and fire fighting equipments should be available at disposal site.
i) Nursing Assistant along with first aid box should be available.
j) Preferably ambulance should be kept ready to meet the unforeseen incidents/
k) Munitions of unknown origin should not be disposed off with Tear Smoke Munitions.
l) Keep record of destruction.

If there is any doubt regarding proper method of disposal or handling of any type of Tear Smoke Munitions, expert advice from Tear Smoke Unit, Tekanpur (Gwalior) may be obtained before attempting disposal.

CONCLUSION:

Disposal of TSMs is a special type of operation and must be handled properly. The teams should be trained to carry out such operations before attempting them. Adequate safety precautions should be taken when disposal is being undertaken.

1885282/2023/FCA SECTION-PCCF

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Email : contact@hbl.in, website : www.hbl.in

HBL
HBL Power Systems Ltd.

HBL/DFO-MBNR/FCA/EIA/2020-21/01 Date: 05.09.2020

To
The District Forest Officer,
Mahabub Nagar circle,
Mahabub Nagar District, Telangana State.

Respected Sir,

Sub: Submission of EIA report on impact on neighboring forest against the testing facility proposed by HBL Power Systems Limited.

Ref: 1.Our letter to Addl PCCF(FCA) vide Ltr.No.HBL/FCA/Janampet/2017-18/02 Dated :31.03.2018
2.Letter from Principal Chief Conservator of Forest Ref No.8620/2017/FCA2 Dated :19.02.2020

With reference to the letter from PCCF vide ref no.8620/2017/FCA2 dated 19.02.2020, we have assigned the activity to study the impact on neighboring forest against the testing facility to M/s Pridhvi Envirotech Private Limited, Hyderabad,this organization is NABET accredited agencies for conducting EIA,s and present to EAC and SEAC committees across the country and M/s Uttam Blastech Private Limited, Hyderabad.

M/s Pridhvi Envirotech Private Limited have conducted an in-depth study of impacts of testing of Electronic Fuzes which are to be used for defence purposes on surrounding Flora and Fauna in the site proposed in Gajulapet Reserve Forest.

Accordingly, study is conducted on wave propagation and noise generated during testing of Electronic Fuzes through an agency by name M/S Uttam Blastech Private Limited. It is found that ground vibrations are dissipated within 5 Meters distance from test area and noise levels reported are 94 dB. The quantity of explosive used for testing is mg and Type of explosive used are lead Azide, Lead Styphanate and HMX type.

Based on the above, it was observe that, as the quantity of Explosives in the Electronic Fuze is 0.288 grams and Noise and Vibrations produced in testing of Electronic Fuzes dissipated within 5 -10 meters distance from test place

Considering the above levels of ground vibrations and noise, impacts on Flora and Fauna of Forest area in which test facility is proposed is assessed and found that very little disturbance and negligible on fauna in the area.

Contd.....2 Page

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HBL

Several measures are suggested in the report to reduce any possible impacts on flora and fauna. Also it is suggested to develop green belt in the test site and provide a compound wall as per the Ministry Defense guidelines. Also it is stated test is proposed to be conducted occasionally as per the Defense test requirements

The four copies EIA reports are enclosed herewith for your reference and necessary further action please.

Thanking you sir,

Yours truly
For HBL Power Systems Limited

Authorized Signatory
T.Abdul Kalam

1885282/2023/FCA SECTION-PCCF

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HBL
HBL Power Systems Ltd.

HBL/TSPCB-HO/Forest Dept/FCA/Testing Facility Guidelines/2022-23/02
Date: 12.07.2022

To,
The Member Secretary,
Telangana State Pollution Control Board,
Head Office, A-3,Paryavaran Bhavan,
Sanathnagar, Hyderabad-500018.

Respected Sir,

Sub : Request for guideline to setup Testing Facility for Electronic Fuze at Gajulapet RF of Mahabubnagar Forest Division-M/s HBL Power Systems Limited, Hyderabad-Reg

Ref : 1) Ltr from Forest Dept to TSPCB vide Ref.No.8620/2017/FCA-4 dated: 02.11.2021
2) Ltr from PCCF to Spl.Chief Secretary to TS Govt vide Ref.No.8620/2017/FCA-4 dated: 16.12.2020
3) Ltr from Addl.Prl.Chief Conservator of Forests,MBNR to PCCF vide Rc.No.54/2018/M4 , dated:20.11.2020
4) Ltr from HBL to DFO,MBNR vide ltr No.HBL/DFO-MBNR/FCA/EIA/2020-21/01, dated: 05.09.2020
5) Ltr from PCCF to DFO,MBNR and HBL,Hyderabad vide Rc.No.8620/2017/FCA2, dated:19.02.2020
6) CFE Order No.758-MHB/TSPCB/ZO-HYD/CFE/2022-1553 dated: 12.02.2022
7) HBL Ltr to Addl.PCCF Vide Ltr No.HBL/FCA/Janampet/2017-18/01 dated: 10.05.2017

With reference to the above, we would like to bring the following to your kind attention

1. We have requested to the Addl.PCCF, Forest Department, Hyderabad vide Ref(7) for diversion of 2.81 Ha of forest land on Compensatory Afforestation located in Mahbubnagar Forest Division to M/s HBL Power Systems Limited , Hyderabad to establish a "Testing facility of Ammunition Explosives".

2. In this connection, PCCF has requested to provide specific guidelines for "Setup of Testing Facility" vide their letter Ref.No.8620/2017/FCA-4 dated: 02.11.2021.

HBL

3. The above test facility is for testing of Explosives Train used in the Manufacturing of Electronic Fuzes & Grenades for which we have obtained the CFE vide Ref(6).

4. The PCCF has considered our application for Diversion of Forest after conducting the EIA for the proposed test facility.

5. EIA was carried by M/s Pridhvi Envirotech(P) Ltd,Hyderbad and EIA report was submitted to Forest Department vide our Letter Ref(4), report enclosed.

6. The EIA assessment concluded that the Impact on Flora and Fauna of the Forest area in which test facility was proposed is assessed and found that very little disturbance and negligible on Fauna in the area.

7. The EIA report also mentions that the test facility shall maintain a distance of 275 Mtrs from the Storage Area as per the applicable guidelines.

8. We have also obtained Approval for Construction of facilities for manufacturing of Electronic Fuzes & Grenades from Chief Controller of Explosives, Nagpur & approved site Layout is enclosed herewith in which a distance of 275Mtrs maintained between process area & storage area.

In this regard, we request you to please consider the above and do the needful at the earliest.

Thanking you Sir,

Yours truly,
For HBL Power Systems Limited

T.Abdul Kalam
(Authorised Signatory)

1885282/2023/FCA SECTION-PCCF

TELANGANA STATE POLLUTION CONTROL BOARD
ZONAL OFFICE: HYDERABAD

D. Krupanand
Joint Chief Environmental Engineer

H.No.6-3-1219, TS No.1 Part,
Block - C, Ward No.91, Near Country Club, Uma Nagar, Begumpet, Hyderabad
Phone: 040-23402495
Email: jcee-zhyd-tspcb@telangana.gov.in

CONSENT ORDER FOR ESTABLISHMENT – RED CATEGORY

Order No.758 -MHB/TSPCB/ZO-HYD/CFE/2022- 1553 **Date:12.02.2022**

Sub: TSPCB – ZOH – TSOCMMS - CONSENT FOR ESTABLISHMENT (CFE) for (Change of Product Mix) – **M/s. HBL Power Systems Limited, at Plot No: 72 to 81 and 84 to 88, Janampeta (Gp) & (V), Addakal (M), Mahabubnagar District** – Consent for Establishment of the Board under Sec.25 of Water (Prevention and Control of Pollution) Act, 1974 and under Sec.21 of Air (Prevention and Control of Pollution) Act, 1981 – Issued – Reg.

Ref:
1. Industry's CFE Order No. 758-MHB/TSPCB/ZO-HYD/CFE/2018-359, Date:28.09.2018.
2. Industry's submission of CFE application received through TS-OCMMS portal on 16.11.2021 at TSPCB, Regional Office, Hyderabad.
3. TSPCB, Regional Office, Hyderabad verification report dated:07.12.2021 received by Zonal Office, Hyderabad on 07.12.2021.
4. CFE Committee meeting held on 15.12.2021 at TSPCB, Zonal Office, Hyderabad.
5. T.O. CFE Rejection Lr.No. 758-MBNR/TSPCB/ZO-HYD/CFE/2021-1232, Date:28.12.2021.
6. Industry's submission of CFE appeal application received through TS-OCMMS portal on 11.01.2022 at TSPCB, Regional Office, Hyderabad.
7. TSPCB, Regional Office, Hyderabad verification report dated:25.01.2022 received by Zonal Office, Hyderabad on 25.01.2022.
8. CFE Committee meeting held on 08.01.2022 at TSPCB, Zonal Office, Hyderabad.

* * *

1. In the reference 1st cited, an application was submitted to the Board seeking Consent for Establishment (CFE) for change of product mix with capacities as mentioned below, with no additional investment.

Sl.No.	*Name of the Product*	*Capacity (After Change of Product Mix)*
1.	Assembly of Electronic Fuzes	50000 No.s /Month
2.	Assembly of Grenades	10000 No.s/Month

2. As per the application, the above activity is to be located at **Plot No: 72 to 81 & 84 to 88, Janampeta (GP) & (V), Addakal (M),Mahabubnagar District.**

3. The above site was inspected by the Assistant Environmental Engineer-III, Regional Office, Hyderabad, T.S. Pollution Control Board on 04.12.2021 and found that the industry is surrounded by **East:** Barrel Land; **West:** Agriculture land; **North:** Hillock; **South:** R & B road from National high way to Laxmipally village followed by Agriculture land.

4. The Board, after careful scrutiny of the application verification report of Regional Officer, Hyderabad, vide reference 2nd cited, recommendation by the CFE Committee meeting held on **08.01.2022** at TSPCB, Zonal Office, Hyderabad, hereby issues CONSENT FOR ESTABLISHMENT (CFE) to the industry for change of product mix under Section 25 of Water (Prevention and Control of Pollution) Act, 1974 and under Section 21 of Air (Prevention and Control of Pollution) Act, 1981 and the rules made there under. This Order is issued to manufacture the products mentioned at para (1) only.

5. This Consent Order now issued is subject to the conditions mentioned in Schedule 'A' and Schedule 'B'.

6. This order is issued from pollution control point of view only. Zoning and other regulations are not considered.

JOINT CHIEF ENVIRONMENTAL ENGINEER

Encl: Schedules "A & B".

To
M/s. HBL Power Systems Limited.,
Plot No: 72 to 81 and 84 to 88,
Janampeta (Gp) & (V), Addakal (M),
Mahabubnagar District.
Email Id: akalam@hbl.in

Copy submitted to the Member Secretary, TSPCB, Board Office, Hyderabad for information.
Copy to the Environmental Engineer, Regional Office, Hyderabad for information and necessary action.

SCHEDULE – A

1. Separate meters with necessary pipe-line shall be provided for assessing the quantity of water used for each of the purposes mentioned below.
    a. Industrial cooling.
    b. Domestic purposes.
    c. Processing whereby water gets polluted and pollutants are easily bio-degradable.
2. The industry shall provide a minimum stack height (H) to the DG sets as per the following formula.

    H = h + 0.2 SQRT (KVA)
    KVA = Total generation capacity, h = Height of building where DG Set is installed.
3. The generator shall be installed in a closed area with a silencer and suitable noise absorption systems. The ambient noise level shall not exceed 75 dB(A) during day time and 70 dB(A) during night time measured from a distance of 5mtrs from the DG Set.
4. The industry shall install and commission appropriate control and ventilation system for controlling the air pollution.
5. The industry shall take appropriate measures to ensure that the ground level concentrations shall comply with revised National Ambient Quality Norms notified by MoE&F, GoI on 16.11.2009.
6. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas. The applicant shall maintain good house keeping both within the factory and in the premises. All pipe valves, sewers, and drains shall be leak proof.
7. The solid waste arising in the premises shall be properly collected and disposed off.
8. There shall not be any perceptible odour outside the industry's premises.
9. All the rules and regulations notified by Ministry of Environment and Forests, Govt. of India in respect of noise pollution control measures shall be followed to avoid nuisance to public.
10. The proponent shall take measures to comply with the provisions laid down under Noise pollution (Regulation and Control) Amendment Rules, 2010 dated 11.01.2010 issued by MoE&F, GoI to control the noise to the prescribed levels.
11. The applicant shall obtain Consents for operation regularly from TSPCB, as required Under Sec. 25/26 of the Water (P&C of P) Act, 1974 and Under Sec. 21/22 of the Air (P&C of P) Act, 1981, for operation of the industry, before starting trial production. The Consent for Operation will be accorded only after ensuring compliance of all the conditions stipulated in this order.
12. The applicant shall comply with and carryout conditions issued by the Board in this consent order scrupulously. The applicant is liable for legal action as per the provisions of the relevant Acts in case of non-compliance of any conditions of the consent order.
13. Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves its right and power Under Sec. 27(2) of Water (Prevention and Control of Pollution) Act, 1974 and Under Sec.21 (4) of Air (Prevention and Control of Pollution) Act, 1981 to review any or all the conditions imposed herein and to make such alternation as deemed fit and stipulate any additional conditions for the purpose of the Act by the Board.
14. The applicant shall exhibit the consent of the Board in the factory premises at a conspicuous place for the information of the inspecting officers of different departments.
15. Telangana State Pollution Control Board reserves the right to review, impose additional condition or conditions, revoke, change or alter the terms and conditions of this Order. Also the Board reserves the right to withdraw the CFE without any prejudice/ notice on receiving any complaints by the Board regarding Environmental Pollution problems caused by the industry.
16. The industry is liable to pay compensation for any environmental damage caused by it, as fixed by the Collector and District Magistrate as civil liability.
17. Rain Water Harvesting (RWH) structure (s) shall be established on the plant site so that the ground water is recharged by the storm water.

18. The industry shall comply with Rules & Regulations notified by Ministry of Law and Justice, Govt. of India, regarding the Public Liability Insurance Act, 1991.

19. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Telangana State Water rules, 1976 and Air Rules 1982, to such authority (herein after referred to as the Appellate Authority) constituted under Section 28 of the Water (prevention and Control of Pollution) Act, 1974 and Section 31 of the Air (Prevention and Control of Pollution) Act, 1981.

SCHEDULE – B

1. This order is valid for a period of 5 years from the date of issue.
2. The industry shall report progress on implementation of the project to this office and T.S.Pollution Control Board, Regional Office, Hyderabad regularly.
3. The source of water is Bore well and the maximum permitted water consumption shall not exceed the following quantities:

Sl.No.	Purpose	Total (KLD) *(After Change of Product Mix)*
1.	Storage for Fire safety	10.0 KLD
2.	Green belt	30.0 KLD
3.	Domestic	10.0 KLD
	Total	**50.0 KLD**

4. The maximum waste water generation (KLD) shall not exceed the following:

Sl.No.	Purpose	Total (KLD) *(After Change of Product Mix)*
1.	Domestic	5.0 KLD
	Total	**5.0 KLD**

Effluent source	Standards to be complied	Mode of final disposal
Domestic (5.0 KLD)	---	Septic tank followed by soak pit.

5. The industry shall comply with the following for controlling air pollution

Sl.No.	Details of Stack	Stack 1 *(After Change of Product Mix)*
1	Attached to:	DG Set
2	Capacity of Boiler / Furnace / Kiln/ Incinerator/ D.G.Set / Others	250 KVA
3	Fuel form:	Diesel
5	Stack Height: i)Above the roof(m) ii)Above the ground(m)	$H = h + 0.2 (KVA)^{0.5}$ H = height of the stack from GL in mtrs. h = height of the building where DG set is installed, in mtrs.
6	Details of Air Pollution Control Equipment:	Acoustic Enclosures
7	Standards to be complied	SPM - 115 mg/Nm^3

6. As committed the industry shall carryout only assembling of Electronic Fuzes and assembling of Grenades. The rejected shall be returned to outsourced suppliers. The industry shall not carryout blasting of the rejected explosives.
7. The industry shall take all safety measures approved by the Chief Controller of Explosives.
8. The industry shall strictly comply with the Rules of the Explosives Rules 2008, Petroleum and Explosive Safety Organization (PESCO) for storage and handling of Explosives.
9. The industry shall strictly adhere to the Explosive Rules, 2008 and amendments thereof.
10. The industry shall not discharge any wastewater outside the factory premises.
11. The Solid wastes generated shall not exceed the following breakup quantities:

Sl. No.	Name and quantity of the Hazardous / Solid waste	Quantity *(After Change of Product Mix)*	Hazardous / as defined under HWM Rules, 2016	Method of Disposal
1.	Explosive waste	1 kg/month	--	Shall be returned to the outsourced supplier
2.	Empty MS Boxes	200 Nos./Month	--	Shall be sold out to authorized agencies after completer detoxification.

12. The industry shall collect the Explosive waste properly and shall return to the outsourced supplier.
13. The industry shall not dispose any solid waste outside the premises.
14. The industry shall not cause any air pollution / odour nuisance to the surrounding environment.
15. The industry shall develop 33% of the total area as thick green belt all along the boundary of the unit and also in the vacant places with all tall growing trees with wide leaf area.
16. The industry shall comply with all the Rules and Regulations specified in Water (P&C of P) Act, 1974, Air (P&C of P) Act, 1981 and Hazardous and other Wastes (Management and Transboundary Movement) Rules, 2016.
17. The industry shall not take up trial production with out obtaining Consent for Operation of the Board.
18. The industry shall not manufacture any extra products or extra capacities without obtaining CFE/CFO of the Board.
19. Rain Water Harvesting (RWH) structure (s) shall be established on the plant site so that the ground water is recharged by the storm water.
20. The industry shall comply with Rules & Regulations notified by Ministry of Law and Justice, Govt. of India, regarding the Public Liability Insurance Act, 1991.
21. The following rules and regulations notified by the MoE&F, GoI shall be implemented:
    a. Solid Waste Management Rules, 2016.
    b. Construction and Demolition Waste Management Rules, 2016.
    c. Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 & its amendments.
    d. Batteries (Management & Handling) Amendment Rules, 2010 & its amendments.
    e. E-Waste (Management) Rules, 2016.
    f. Bio-Medical Waste Management Rules, 2016 & its amendments.
    g. Plastic Waste Management Rules, 2016 & its amendments.
22. The industry shall comply with all the directions issued by the Board from time to time.
23. Concealing the factual data or submission of false information / fabricated data and failure to comply with any of the conditions mentioned in this order may result in withdrawal of this order and attract action under the provisions of relevant pollution control Acts.
24. The Board reserves its right to modify above conditions or stipulate any further conditions and to take action including revoke of this order in the interest of environment protection.

JOINT CHIEF ENVIRONMENTAL ENGINEER

To
M/s. IIBL Power Systems Limited.,
Plot No: 72 to 81 and 84 to 88,
Janampeta (Gp) & (V), Addakal (M),
Mahabubnagar District.

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भारत सरकार | Government of India
वाणिज्य और उद्योग मंत्रालय | Ministry of Commerce & Industry
पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन (पेसो) | Petroleum & Explosives Safety Organisation (PESO)
पूर्व नाम- विस्फोटक विभाग | Formerly- Department of Explosives
पाँचवा तेल, ए-ब्लाक, सी.जी.ओ.कॉम्प्लेक्स | 5th Floor, A-Block, CGO Complex,
सेमिनरी हिल्स नागपुर | Seminary Hills, Nagpur 440006
फोन (Phone):- 2510248 | फैक्स (Fax):- 2510577
ई-मेल | Email: explosives@explosives.gov.in

संख्या (No.): A/E/HQ/TG/20/118(E115238) दिनांक (Date): 17/12/2018

सेवा में (To),
M/S HBL Power Systems Ltd.,
ROAD NO. 10 BANJARA HILLS Hyderabad, Hyderabad
District- HYDERABAD, State- Telangana, Pincode - 500034

विषय: सर्वे नंबर- Survey No.: 72 to 81 amnd 84 to 88, नगर/गांव- Janampet, जिला: MAHBUBNAGAR, राज्य- Telangana में स्थित प्रस्तावित विस्फोटक विनिर्माण करने के लिए विनिर्माण फैक्टरी निर्माण स्वीकृति संबंध में।

Subject: **Proposed Manufacturing of Electronic Fuze filled with Explosives and Grenade Filling at Survey No.:72 to 81 amnd 84 to 88, Town/Village : Janampet, Distt. MAHBUBNAGAR, State. Telangana - Approval for construction regarding.**

महोदय | Sir(s),

कृपया आपके पत्र क्रमांक **HBL/AMN/CCE/JPT/F&G/2018/01** दिनांक **11/11/2018.** का अवलोकन करें। आपके द्वारा प्रस्तुत, विनिर्माण फैक्टरी के साइट तथा निर्माण-कार्य विवरण दर्शाता आरेखण अनुमोदित किया जाता है तथा प्रत्येक आरेखण की दो प्रतियां विधिवत पृष्ठांकित कर लौटाई जा रही है ।

Please refer to your Letter No. **HBL/AMN/CCE/JPT/F&G/2018/01** dated **11/11/2018.** The drawings submitted by you showing site and construction of the manufacturing factory are approved and two copies of the same are returned here with duly endorsed in token of approval.

आपके द्वारा अनुसूची V के भाग 2 के अंतर्गत (प्रतिलिपि संलग्न) निर्धारित प्रारूप में जिला प्राधिकरण से अनापत्ति प्रमाण पत्र प्राप्त करने के बाद ही, अनुमोदित साइट और निर्माण की योजना के अनुसार उपरोक्त निर्माण कार्य किया जा सकता है। आप नियम 102 और 103 के अंतर्गत आवेदन पत्र एई-12 (प्रतिलिपि संलग्न) में जिला प्राधिकरण से अनापत्ति प्रमाण पत्र के लिए आवेदन कर सकते हैं।

The construction of the same may be undertaken by you in accordance with the approved site and construction plans , only after obtaining NOC from the District Authority in the prescribed format under Part 2 of Schedule V (copy enclosed). You may apply for NOC to the District Authority under Rule 102 & 103 in Application form AE-12(copy enclosed).

विनिर्माण फैक्टरी का निर्माण कार्य पूर्ण होने पर, अनुज्ञप्ति जारी करने हेतु निम्नतलिखित दस्तावेज इस कार्यालय में प्रस्तुत किए जाएं :

On completion of the construction of the magazine, the following documents shall be submitted to this office for issue of licence:

1. प्ररूप AE-I में आवेदन (यदि मूल आवेदन के साथ प्रस्तुत नहीं किया गया हो तो)
   Application in form AE-I (if not submitted alongwith original application).
2. विनिर्माण फैक्टरी का पूर्णता-प्रमाण पत्र ।
   Completion certificate of the manufacturing factory.
3. विनिर्माण फैक्टरी के निर्माण हेतु इस कार्यालय द्वारा अनुमोदित आरेखण के प्रतिकृति के छह सेट । Six sets of replica of the drawings as approved by this office for construction of the manufacturing factory.
4. एक वर्ष का अनुज्ञप्ति शुल्क समाविष्ट करता, किसी भी राष्ट्रीयकृत बैंक के नाम आहरित, मुख्य विस्फोटक नियंत्रक , नागपुर के पक्ष में नागपुर में देय, रू 1200/- का डिमांड ड्राफ्ट । 5 वर्ष के शुल्क का भुगतान करने पर 5 साल के लिए अनुज्ञप्ति प्रदान की जा सकती है । आपने रु. 0/- का भुगतान पहले ही कर दिया है।
   A demand draft drawn in favour of the The Chief Controller of Explosives,Nagpur (M.S.) payable at Nagpur from any Nationalized Bank for Rs 1200/- covering of *licence fee* for one year. Licence can be granted for 5 years on payment of 5 year fee.
5. इस कार्यालय से होनेवाले पत्राचार पर हस्ताक्षर करने के लिए अधिकृत व्यक्तियों के नमूना हस्ताक्षर की सूची ।
   A list of specimen signatures of persons authorized to correspond with the office.
6. प्रमाणित फोरमन और कार्यरत तकनीकी व्यक्तियों की सूची ।
   List of certified Fore man and/ Technical Persons employed.
7. विस्फोटक नियम, 2008 के नियम 2 (37) के अंतर्गत आवश्यक अधिवासी के रूप में नामांकन और उनके हस्ताक्षर का साक्ष्यांकन (यदि प्रस्तुत नहीं किए हो तो) ।
   Nomination as occupier as required under Rule 2(37) of Explosives Rules, 2008 and attesting his signature(if not submitted).
8. अधिवासी द्वारा विधिवत 'सामने "काले रंग अमिट स्याही' द्वारा हस्ताक्षरित कलर पासपोर्ट साईज फोटो की छह प्रतियां (यदि प्रस्तुत नहीं किए हो तो) (विस्फोटक नियम, 2008 के नियम 2 (37) के अंतर्गत यथा परिभाषित)
   Six copies of colour passport size photographs duly signed by the occupier (as defined under Rule 2 (37) of Explosives Rules, 2008) 'in front' by 'black color indelible ink'.(if not submitted)
9. नियम 102 तथा 103 के अंतर्गत जिला प्राधिकारी द्वारा निर्धारित प्ररूप में जारी 'अनापत्ति प्रमाण-पत्र' की प्रति के साथ उनके द्वारा

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हस्ताक्षरित एवं मोहर लगे हुए आरेखण /प्लान ।
NOC issued by the District Authority under Rule 102 and 103 in prescribed form together with a copy of the drawings/plans endorsed with his sign and seal.

10. कारखाने अधिनियम 1948 के अंतर्गत संदर्भित कारखाने के पंजीकरण की प्रति।
Copy of registration of the subject factory under Factories Act 1948/ जिला मजिस्ट्रेट की उपस्थिति में निष्पादित. फार्म सीई -3 (प्रतिलिपि संलग्न) में रु. 50,000/- के क्षतिपूर्ति बांड की प्रति।
Rs. 50,000/- executed in presense of District Magistrate.

उपरोक्त दस्तावेजों के प्राप्त होने पर विस्फोटक नियम, 2008 के फार्म LE-1 में अनुज्ञप्ति प्रदान की जाएगी ।
A licence in form LE-1 of the Explosives Rules, 2008 will be granted on receipt of the above documents.

विनिर्माण फैक्टरी का निर्माण कार्य पूर्ण होने के पश्चात भी विस्फोटक के भंडारण हेतु विनिर्माण फैक्टरी को तब तक उपयोग में नही लाया जाएगा जब तक विस्फोटक नियम, 2008 के नियम 107 (3) के अंतर्गत उप मुख्य विस्फोटक नियंत्रक सिकंदराबाद द्वारा अनुज्ञप्ति विधिवत पृष्ठांकित कर जारी नही की जाती अथवा उपर्युक्त नियमों के प्रावधानों के अंतर्गत उसके प्रयोग हेतु लिखित अनुमति प्राप्त नही की जाती ।
The manufacturing factory when completed shall not be used for the manufacture of Electronic Fuze filled with Explosives unless the licence is granted and delivered to you duly endorsed by The Dy. Chief Controller of Explosives, Secunderabad under Rules 107(3) of the Explosives Rules, 2008 or written permission under provision to the said Rules to use the same is obtained.

यदि किसी कारण से ऊपरोक्त विनिर्माण फैक्टरी के निर्माण का प्रस्ताव वापस लिया जाता है, तो इस कार्यालय को तदनुसार सूचित किया जाएगा ।
If for any reasons the proposal to construct the above manufacturing factory is dropped, this office shall be intimated accordingly.

फिर भी,यह अनुमोदन/अनुमति अन्य प्राधिकारियों से आवश्यक अनुमति/क्लीयरन्स प्राप्त करने से या यथा लागू अन्य विधियों से छूट नही देती है ।
This approval/permission, however, does not absolve from obtaining necessary permission/clearance from other authorities or under other statutes as applicable.

भवदीय | Yours faithfully,

(डा.एस.के.दीक्षित) | (Dr. S K Dixit)
विस्फोटक नियंत्रक | Controller of Explosives
कृते मुख्य विस्फोटक नियंत्रक | For Chief Controller of Explosives

प्रतिलिपि प्रेषित: | Copy Forwarded to:
1) संयुक्त मुख्य विस्फोटक नियंत्रक, दक्षिणांचल चेन्नै
The Jt. Chief Controller of Explosives, South Circle, Chennai
2) उप मुख्य विस्फोटक नियंत्रक सिकंदराबाद
The Dy. Chief Controller of Explosives, Secunderabad

कृते मुख्य विस्फोटक नियंत्रक | For Chief Controller of Explosives

अधिक जानकारी जैसे आवेदन की स्थिति, शुल्क तथा अन्य विवरण के लिए कृपया हमारी वेबसाइट http://peso.gov.in देखें ।
[For more information regarding status, fees and other details, please visit our web site http://peso.gov.in]

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भारत सरकार | Government of India
वाणिज्य और उद्योग मंत्रालय | Ministry of Commerce & Industry
पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन (पेसो) | Petroleum & Explosives Safety Organisation (PESO)
पूर्व नाम- विस्फोटक विभाग | Formerly- Department of Explosives
पाँचवा तल, ए-ब्लाक, सी.जी.ओ.कॉम्प्लेक्स | 5th Floor, A-Block, CGO Complex,
सेमिनरी हिल्स नागपुर | Seminary Hills, Nagpur 440006
फोन (Phone):- 2510248 | फैक्स (Fax):- 2510577
ई-मेल | Email: explosives@explosives.gov.in

संख्या (No.): A/E/HQ/TG/21/699(E115241) दिनांक (Date): 17/12/2018

सेवा में (To),
M/S HBL Power Systems Ltd.,
ROAD NO. 10 BANJARA HILLS Hyderabad, Hyderabad
District HYDERABAD, State- Telangana, Pincode - 500034

विषय: सर्वे नंबर- Survey No.: 72 to 81 amnd 84 to, नगर/गांव- Village-Janampet, Mandal Moosapet, जिला: MAHBUBNAGAR, राज्य- Telangana में स्थित प्रस्तावित विस्फोटक का बिक्री हेतु कब्जा करने के लिए मैगजीन/गोदाम निर्माण स्वीकृति संबंध में ।

Subject: **Proposed Possession for Sale of Explosives from a magazine situated at Survey No.:72 to 81 amnd 84 to, Town/Village : Village-Janampet, Mandal Moosapet, Distt. MAHBUBNAGAR, State. Telangana - Approval for construction regarding.**

महोदय / Sir(s),

कृपया आपके पत्र क्रमांक HBL/AMN/CCE/JPT/2018/F&G/MF-3 दिनांक 11/11/2018. का अवलोकन करें। आपके द्वारा प्रस्तुत, मैगजीन/गोदाम के साइट तथा निर्माण-कार्य विवरण दर्शाता आरेखण अनुमोदित किया जाता है तथा प्रत्येक आरेखण की दो प्रतियां विधिवत पृष्ठांकित कर लौटाई जा रही हैं ।

Please refer to your Letter No. HBL/AMN/CCE/JPT/2018/F&G/MF-3 dated 11/11/2018. The drawings submitted by you showing site and construction of the magazine/store house are approved and two copies of the same are returned here with duly endorsed in token of approval. **निम्नलिखित शर्तों के साथ | Subject to the conditions that**

1. 1. All the walls shall be 45 cm thick. 2. NAT type mounds instead of VIPT shall be provided.

आपके द्वारा अनुसूची V के भाग 2 के अंतर्गत (प्रतिलिपि संलग्न) निर्धारित प्रारूप में जिला प्राधिकरण से अनापत्ति प्रमाण पत्र प्राप्त करने के बाद ही, अनुमोदित साइट और निर्माण की योजना के अनुसार तथा दूरी फार्म डीई-2 (प्रतिलिपि संलग्न) में दर्शाए दूरी का अनुपालन करते हुए उपरोक्त निर्माण कार्य किया जा सकता है। आप नियम 102 और 103 के अंतर्गत आवेदन पत्र एई-12 (प्रतिलिपि संलग्न) में जिला प्राधिकरण से अनापत्ति प्रमाण पत्र के लिए आवेदन कर सकते हैं।

The construction of the same may be undertaken by you in accordance with the approved site and construction plans observing the distances shown in Distance Form 'DE-2' (Enclosed) , **only after obtaining NOC from the District Authority in the prescribed format under Part 2 of Schedule V (copy enclosed).You may apply for NOC to the Distrct Authority under Rule 102 & 103 in Application form AE-12(copy enclosed).**

मैगजीन/गोदाम का निर्माण कार्य पूर्ण होने पर, अनुज्ञप्ति जारी करने हेतु निम्नलिखित दस्तावेज इस कार्यालय में प्रस्तुत किए जाएं : On completion of the construction of the magazine, the following documents shall be submitted to this office for issue of licence:

1. प्ररूप AE-3 में आवेदन (यदि मूल आवेदन के साथ प्रस्तुत नहीं किया गया हो तो)
   Application in form AE-3 (if not submitted alongwith original application).
2. मैगजीन/गोदाम का पूर्णता-प्रमाण पत्र ।
   Completion certificate of the magazine/store house.
3. मैगजीन/गोदाम के निर्माण हेतु इस कार्यालय द्वारा अनुमोदित आरेखण के प्रतिकृति के छह सेट । Six sets of replica of the drawings as approved by this office for construction of the magazine/store house.
4. एक वर्ष का अनुज्ञप्ति शुल्क समाविष्ट करता, किसी भी राष्ट्रीयकृत बैंक के नाम आहरित, **मुख्य विस्फोटक नियंत्रक , नागपुर** के पक्ष में नागपुर में देय, रू 1900/- का डिमांड ड्राफ्ट । 5 वर्ष के शुल्क का भुगतान करने पर 5 साल के लिए अनुज्ञप्ति प्रदान की जा सकती है । आपने रु. 0/- का भुगतान पहले ही कर दिया है।
   A demand draft drawn in favour of the **The Chief Controller of Explosives,Nagpur (M.S.)** payable at Nagpur from any Nationalized Bank for Rs 1900/- covering of *licence fee* for one year. Licence can be granted for 5 years on payment of 5 year fee.
5. इस कार्यालय से होनेवाले पत्राचार पर हस्ताक्षर करने के लिए अधिकृत व्यक्तियों के नमूना हस्ताक्षर की सूची ।
   A list of specimen signatures of persons authorized to correspond with the office.
6. विस्फोटक नियम, 2008 के नियम 2 (37) के अंतर्गत आवश्यक अधिवासी के रूप में नामांकन और उनके हस्ताक्षर का साक्ष्यांकन (यदि प्रस्तुत नहीं किए हो तो) ।
   Nomination as occupier as required under Rule 2(37) of Explosives Rules, 2008 and attesting his signature(if not submitted).
7. अधिवासी द्वारा विधिवत 'सामने "काले रंग अमिट स्याही' द्वारा हस्ताक्षरित कलर पासपोर्ट साईज फोटो की छह प्रतियां (यदि प्रस्तुत नहीं किए हो तो) (विस्फोटक नियम, 2008 के नियम 2 (37) के अंतर्गत यथा परिभाषित)

1885282/2023/FCA SECTION-PCCF

Six copies of colour passport size photographs duly signed by the occupier (as defined under Rule 2 (37) of Explosives Rules 2008) 'in front' by 'black color indelible ink'.(if not submitted)

8. नियम 102 तथा 103 के अंतर्गत जिला प्राधिकारी द्वारा निर्धारित प्ररूप में जारी 'अनापत्ति प्रमाण-पत्र' की प्रति के साथ उनके द्वारा हस्ताक्षरित एवं मोहर लगे हुए आरेखण /प्लान ।
NOC issued by the District Authority under Rule 102 and 103 in prescribed form together with a copy of the drawings/plans endorsed with his sign and seal.

उपरोक्त दस्तावेजों के प्राप्त होने पर विस्फोटक नियम, 2008 के फार्म LE-3 में अनुज्ञप्ति प्रदान की जाएगी ।
A licence in form LE-3 of the Explosives Rules, 2008 will be granted on receipt of the above documents.

मैगजीन/गोदाम का निर्माण कार्य पूर्ण होने के पश्चात भी विस्फोटक के भंडारण हेतु मैगजीन/गोदाम को तब तक उपयोग में नहीं लाया जाएगा जब तक विस्फोटक नियम, 2008 के नियम 107 (3) के अंतर्गत उप मुख्य विस्फोटक नियंत्रक सिकंदराबाद द्वारा अनुज्ञप्ति विधिवत पृष्ठांकित कर जारी नहीं की जाती अथवा उपर्युक्त नियमों के प्रावधानों के अंतर्गत उसके प्रयोग हेतु लिखित अनुमति प्राप्त नहीं की जाती ।
The magazine/store house when completed shall not be used for the storage of Explosives unless the licence is granted and delivered to you duly endorsed by The Dy. Chief Controller of Explosives, Secunderabad under Rules 107(3) of the Explosives Rules, 2008 or written permission under provision to the said Rules to use the same is obtained.

यदि किसी कारण से ऊपरोक्त मैगजीन/गोदाम के निर्माण का प्रस्ताव वापस लिया जाता है, तो इस कार्यालय को तदनुसार सूचित किया जाएगा ।
If for any reasons the proposal to construct the above magazine/store house is dropped, this office shall be intimated accordingly.

फिर भी,यह अनुमोदन/अनुमति अन्य प्राधिकारियों से आवश्यक अनुमति/क्लीयरन्स प्राप्त करने से या यथा लागू अन्य विधियों से छूट नहीं देती है ।
This approval/permission, however, does not absolve from obtaining necessary permission/clearance from other authorities or under other statutes as applicable.

भवदीय | Yours faithfully,

(डा.एस.के.दीक्षित) | (Dr. S K Dixit)
विस्फोटक नियंत्रक | Controller of Explosives
कृते मुख्य विस्फोटक नियंत्रक | For Chief Controller of Explosives

प्रतिलिपि प्रेषित: | Copy Forwarded to:
1) संयुक्त मुख्य विस्फोटक नियंत्रक, दक्षिणांचल चेन्नै
The Jt. Chief Controller of Explosives, South Circle, Chennai
2) उप मुख्य विस्फोटक नियंत्रक सिकंदराबाद
The Dy. Chief Controller of Explosives, Secunderabad

कृते मुख्य विस्फोटक नियंत्रक | For Chief Controller of Explosives

अधिक जानकारी जैसे आवेदन की स्थिति, शुल्क तथा अन्य विवरण के लिए कृपया हमारी वेबसाइट http://peso.gov.in देखें ।
[For more information regarding status, fees and other details, please visit our web site http://peso.gov.in]

1885282/2023/FCA SECTION-PCCF

Reference No: A/EBO TG/21/699(E115241)

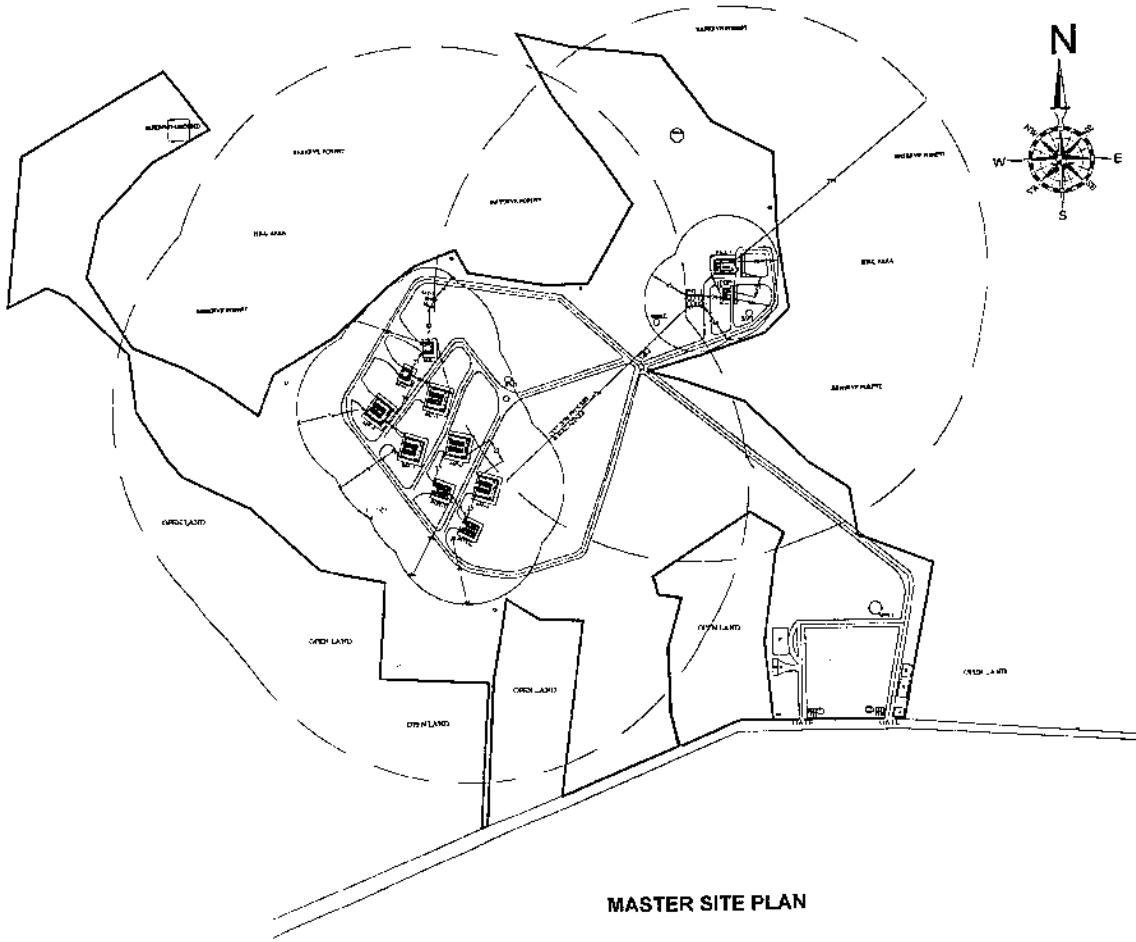
Form DE-2
(See rule 113 of the Explosives Rules, 2008)
(Distance Form to be attached to the licence)

Safety distances required to be kept clear around magazine for high explosives or fire works or factory licence number NA(E115241) in form LE-3 granted to M/S. HBL Power Systems Ltd., ROAD NO. 10 BANJARA HILLS ,Hyderabad, Telangana-500382 .

	Type of Structure(s)	Safety distances meters	
	Inside Safety Distances(ISD)	M	I M
1	Room or Workshop used in Connection with the Magazine	10	14
2	Any other Explosives Magazine or store House or Factory of the Applicant		
3	Magazine Office		
	Middle Safety Distances(MSD)		
4	Magazine Keeper's or Chawkidar's Dwelling house		
5	Railway including Minerals and Private Railways		
6	Canal (in active use) or other navigable water		
7	Dock or Pier or Jetty		
8	Public Highway or Public Road		21
9	Private Road which is PRINCIPAL means of access to a Temple, Mosque, Church, Gurudwara or other places of worships, Hospital, College, School or Factory		
10	River Embankment or Sea Embankment or Public Well		
11	Reservoir or Bounded tank/rope way		
12	Windmillor or Solar panel for Power Generation		
	Outside Safety Distances(OSD)		
13	Dwelling House		
14	Govt. and Public Building		
15	Temple, Mosque, Church or Gurudwara or other Places of Worships		
16	Shops, Market place, Public recreation and Sports Ground, College, School, Hospital, Theater, Cinema or other Building where the public are accustomed to assemble		
17	Factory		
18	Buildings or Works used for the Storage in Bulk of Petroleum, Sprit, gas, or other inflammable or hazardous substances		
19	Building or Works used for Storage and Manufacture of Explosives or of articles which contain Explosives		45
20	Aerodrome		
21	Furnace, Kiln or Chimney		
22	Quarry or mine pit head		
23	Power House or Electric Substation		
24	Wireless Station		
25	Warehouse or other Storage Building		
26	Any other Protected works		
	Overhead Electric lines		
27	Electric Power over head Transmission Lines above 440V		45
28	Electric Power over head Transmission Lines upto 440V		15

The Date : 17/12/2018

For Chief Controller of Explosives



MASTER SITE PLAN

DETAILS OF EXPLOSIVE BUILDINGS

BLDG No	NAME OF BUILDING	EXPL LIMIT KGS/NOS	CLASSIFICATION	SIOD (M)	PIOD	OOD EXP RULES	HALF OOD EXP RULES	OOD MAIN OFFICES / HOSPITAL (MTS)	PTRD (MTS)	OOD DWELLING HOUSES(MTS)	TYPE OF ROOFING
PROCESS BUILDINGS											
PAA-1	AMMUNITION ASSEMBLY	100	1.1	–	23	45	33	45	180	275	RCC
PGF-1	GRENADE FILLING	100	1.1	–	23	45	33	45	180	275	RCC
PS-1	STATIC TEST LAB	10	1.1	–	19	45	21	45	180	275	RCC
MAGAZINES											
MF-1	FUZE/ELECTRONIC TIMER	1000	1.1	24	–	148	74	150	180	275	RCC
MF-2	FUZE/ELECTRONIC TIMER	1000	1.1	24	–	148	74	150	180	275	RCC
MF-3	FUZE	1000	1.1	24	–	148	74	150	180	275	RCC
MF-4	FUZE	1000	1.1	24	–	148	74	150	180	275	RCC
MF-5	FUZE	1000	1.1	24	–	148	74	150	180	275	RCC
MD-1	DETONATORS(MICRO, RELAY SQUIBS, DETS FOR GRENADE)	6LACS/ 100 Kg	1.1	23	–	45	33	45	180	275	RCC
MF-1	EXPLOSIVES(TNT,LEAD-CHARGES, BOOSTER PELLETS)	1000	1.1	24	–	148	74	150	180	275	RCC
MC-2	EXPLOSIVES(TNT,LEAD-CHARGES, BOOSTER PELLETS)	1000	1.1	24	–	148	74	150	180	275	RCC
MFG-1	FILLED GRENADE (WITHOUT ELECTRONIC TIMER)	1000	1.1	24	–	148	74	150	180	275	RCC
MFG-2	FILLED GRENADE (WITHOUT ELECTRONIC TIMER)	1000	1.1	24	–	148	74	150	180	275	RCC

OTHER BUILDINGS

1. SECURITY OFFICE
2. SECURITY OFFICE
3. CENTRAL TRANSFORMER YARD
4. ELECTRICAL AND DG ROOM
5. DIESEL STORAGE YARD
6. ADMIN PARKING
7. ADMIN BUILDING
8. PLANT OFFICE

INDEX

FACTORY LAND BOUNDARY
BUILDINGS
VERTICAL/INNER FACE TRAVERSE (VRT)
NATURAL ANGLE TRAVERSE (NAT) MOUND
ROAD
PATHWAY
OOD - STEC
OOD - OUTSIDE QUANTITY DISTANCE
PIOD - PROCESS INSIDE QUANTITY DISTANCE
SIOD - STORAGE INSIDE QUANTITY DISTANCE
PTRD - PUBLIC TRAFFIC ROUTE DISTANCE
STATIC WATER TANK
WATCH TOWER

DIMENSION LEGEND

PIOD - PROCESS INSIDE QUANTITY DISTANCE
OOD - OUTSIDE QUANTITY DISTANCE
SIOD - STORAGE INSIDE QUANTITY DISTANCE
1/2 OOD - OUTSIDE QUANTITY DISTANCE AS PER ER 2000

ALL DIMENSIONS ARE IN METERS

DISCLAIMER

THIS IS THE PROPERTY OF HBL POWER SYSTEMS LTD. SUBJECT TO RETURN UPON DEMAND WITH THE UNDERSTANDING THAT IT IS NOT TO BE REPRODUCED COPIED OR USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTREST OF HBL POWER SYSTEMS

NOTES:

1. PROCESS BUILDINGS AND MAGAZINES SHALL BE CONSTRUCTED AS PER STEC PAMPHLETS
2. ELECTRICAL INSTALLATIONS AND FIRE PROTECTION SYSTEMS SHALL BE PROVIDED AS PER STEC PAMPHLETS
3. PIOD, SIOD SHALL BE MAINTAINED AS PER STEC PAMPHLETS
4. OOD OF PROCESS BUILDINGS AS PER EXPLOSIVE RULES SHALL BE MAINTAINED WITHIN HBL SITE BOUNDARY LIMITS
5. HALF OOD OF MAGAZINE BUILDINGS AS PER EXPLOSIVE RULES SHALL BE MAINTAINED WITHIN HBL SITE BOUNDARY LIMITS

CORRESPONDING ADDRESS:
M/s HBL POWER SYSTEMS LTD.
H-No 6-2-601, Road No.10
Banjara Hills,Hyderabad-34

SITE ADDRESS:
NAME: M/s HBL POWER SYSTEMS LTD

SURVEY NOs	72 TO 81 AND 84 TO 88
VILLAGE	JANAMPET (V),
MANDAL	MOOSAPET (M),
DISTRICT	MAHABUB NAGAR
STATE	TELANGANA
NEAREST RAILWAY STATION	MAHABUB NAGAR
NEAREST POLICE STATION	MOOSAPET (M),
NEAREST FIRE STATION	MAHABUB NAGAR

SITE PLAN

SCALE:	NTS
DATE:	10/11/2018
DRG. No.	FBL/PTA/MAIN/01
DRAWN BY	RVR
CHKD BY	RVR
APPD BY	TAR

For HBL POWER SYSTEMS LTD.
Authorised Signatory
M/s HBL POWER SYSTEMS LTD.
AUTH. SIGNATORY

TAHSILDAR MOOSAPET Mandal Mahbubnagar Dist.

Collector & Dist. Magistrate Mahbubnagar.

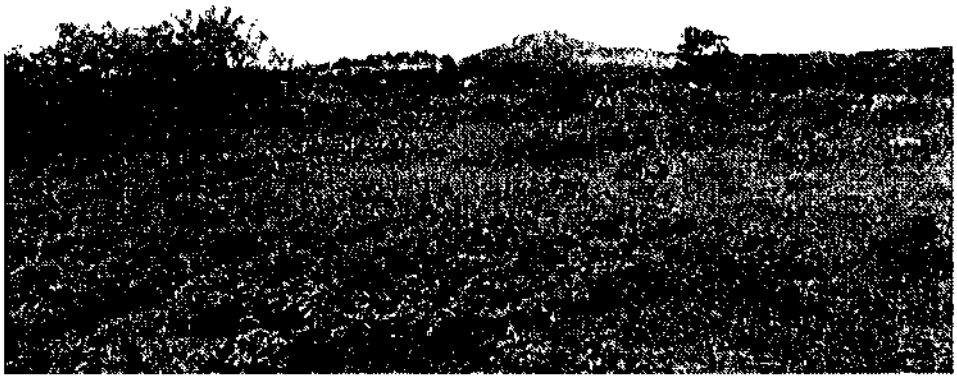
507

ENVIRONMENTAL IMPACT ASSESSMENT OF FUZE TEST FACILITY AT JANAMPET, MAHABUBNAGAR

OF

M/S HBL POWER SYSTEMS LIMITED

Sy.No. 72-81 & 84-88, Janampet (V),
Moosapet (M), Mahabubnagar (D),
Telangana.



Submitted By

M/s. HBL Power Systems Limited,
Sy. No. 72-81 & 84-88, Janampet (V),
Moosapet (M), Mahabubnagar (D),
Telangana.

Studies & Documentation By

M/s. Pridhvi Envirotech (P) Ltd.,
Plot No. 184/C, Lawn House,
4th Floor, Vengal Rao Nagar,
Hyderabad – 500 038.
Ph: 040 – 40179770.
Fax: 040 – 66730926
Email: info@pridhvienviro.com
pvr@pridhvienviro.com

NABET ACCREDITATION Sl. No. 130, Rev. 89 Dated 11th July, 2020

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Executive Summary

M/S HBL Power Systems Limited requested M/S Pridhvi Envirotech Pvt. Ltd. to conduct an in-depth study of impacts of testing Fuzes they manufacture which are to be used for defence purposes on surrounding Flora and Fauna in the site proposed in Gajulapet Reserve Forest.

Accordingly, study is conducted on wave propagation and noise generated during testing of Fuzes in their Janampet Facility through an agency by name M/S UttamBlastech Limited. It is found that ground vibrations are dissipated within 5 Meters distance from test area and noise levels reported are 94 dB.

The quantity of explosive used for testing is mg and Type of explosive used are lead Azide, Lead Styphanate and HMX type.

Based on the above, we observe that, as the quantity of Explosives in the Fuze is negligible at 0.288 grams **(375.21 mg of TNT Equivalent)** and Noise and Vibrations produced in testing of Fuzes dissipated within 5 -10 meters distance from test place

Considering the above levels of ground vibrations and noise, impacts on Flora and Fauna of Forest area in which test facility is proposed is assessed and found that very little disturbance on fauna in the area. Also it is stated test is proposed to be conducted occasionally as per the Defense test requirements

Several measures are suggested in the report to reduce any possible impacts on flora and fauna. Also it is suggested to develop green belt in 50% of the test site (1.4 Hectares) with a overall cost of Rs. 21 lakhs in the next 5 years period and provide a compound wall as per the Ministry of Defense guidelines

TEAM & CREDENTIALS OF ORGANISATION

Following team members were associated with this project.

1. P.V. Raju – Co-ordinator, Pridhvi envirotech (P) limited
2. Srikant Vairagare - UttamBlastech P Limited – Blast expert
3. I Sivarama Krishna – Ecology and Bio Diversity Expert
4. Srinivas Yatham - Team Member
5. Sheshu - Team Member
6. Naresh - Team Member
7. KalayniChakravarthula – Team Member

M/S Pridhvi Envirotech Pvt. Ltd. is NABET Accredited agency for conducting EIA's and present to EAC and SEAC committees across the country. The latest certificate is enclosed at Annexure – I

CHAPTER 1.0
INTRODUCTION

Introduction:

HBL Power Systems Limited was established in the year 1977 as Hyderabad Batteries Ltd under the Companies Act, 1956 to carry on the business of manufacturing Batteries. The Company's registered office is located at H.No:8-2-601, Road No.10, Banjara Hills, and Hyderabad 500034.

HBL Power Systems Ltd is a research-based manufacturing organization with a focus on engineered products and services. The company is engaged in manufacturing different products catering to the needs of various customer segments like Telecom, Engineering Industry, UPS, Oil & Gas, Power, Railways, Solar, Permanent Magnetic Motors, Aviation, and Defence Sectors etc. The company's products are marketed in India and 80+ countries. The Company has 6 manufacturing facilities and 27 sales offices across India. The company's products are marketed in India and 80+ countries.

Keeping in view the company's strength in R&D, Technology, Precision Manufacturing and Value Engineering, the company is now diversifying its operations in to Ammunition manufacturing, under the "Make in India" program launched by the Honorable Prime Minister of India, the company is establishing a facility to manufacture various Ammunition products for use in military applications.

1.1 Project Location Details:

Proposed Project is located in Sy No. 72 to 81 & 84 to 88, Janampet Village, Moospeta Mandal, Mahabubnagar District, Telangana State - 509382.

The Land is surrounded by Gajulapet Reserve Forest on North Side, Janampet-Laxampally Road on south side and Private Lands on East & West Sides.

The surrounding lands are barren land and not much cultivation is carried out. There are no water bodies, canals, rivers in and around the site.

The National Highway is approximately 1.5 KM from the site and the nearest dwelling houses/habitation is approx. 500 Mtrs from the Site.

There are no assembly places like cinema, playing field, shopping area, schools, hospitals, places of worship etc. in a radius of 500 Metres radius from the site boundary.

1.2 Need of the Proposed Acquisition:

The project is envisaged to cater to the requirements of Indian Army for the proposed manufacturing of Ammunition products.

Above mentioned products involve manufacturing, assembly & Testing of Ammunition Explosives. The project needs to be implemented in accordance with the guidelines issued by the " Storage & Transport of Explosives Committee, Centre for Fire, Explosive & Environment Safety" & Petroleum and Explosives Safety Organization.

According to these guidelines, certain minimum quantity/safety distances need to be employed between process building to process buildings, process buildings to storage magazines, testing facilities to other explosives/non explosive areas, explosives areas/ explosive buildings to non-explosives areas, dwelling houses, public transport roads, highways etc.

Proposed acquisition of forestland is for set-up of Testing Facility for Ammunition Explosives.

The guidelines pertaining to the scope of this application are as mentioned below:

1. Storage area comprising mainly of explosives magazines and storehouses should be sited at a minimum distance of 275 m from the process area & explosives testing area.

2. The dwelling houses, places of assembly, hospitals, National Highways etc. should not be within 275 m from any of the potential explosion site.

3. Burning ground for disposal of bulk explosive/Burning pit for disposal of small arms ammunition by burning, subject to a minimum separation of 275 m

CHAPTER 2.0
ABOUT THE STUDIES

In order to meet the statutory guidelines of location of the test site, HBL proposed to acquire 2.81 Ha of adjacent forest falling in Gajulpet Reserve Forest of Mahbubnagar Forest Division for construction of Testing Facility. Location plan is attached as the Annexure I to the project report. M/s HBL Power Systems Limitedas a precautionary measure asked M/s Pridhvi Envirotech Pvt ltd to study the impact of this testing on the fauna of immediate vicinity. M/s Pridhvi Envirotech (P) Limited, an accredited agency to study the environmental impacts, approached Uttam Blastech(P) Limited to study the levels of ground vibrations and noise, the proposed test blasting can produce.

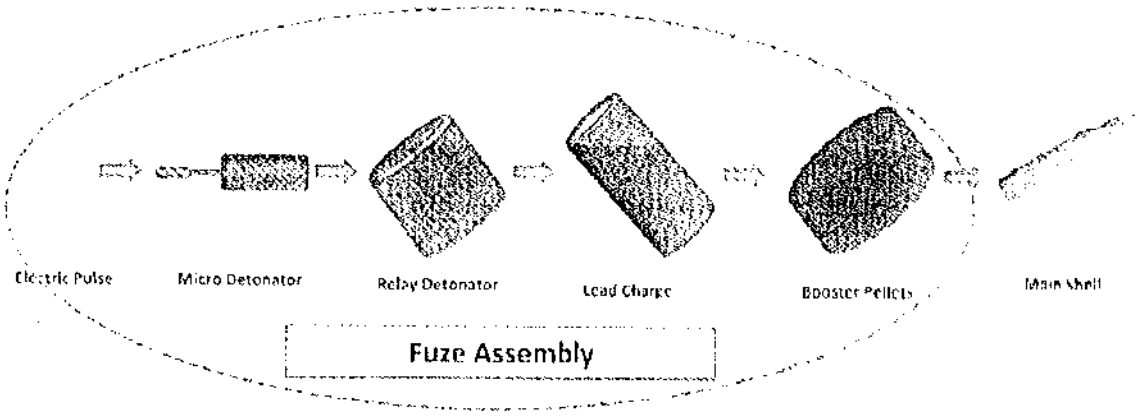
2.1 Details of Testing Facilities:

HBL intends to manufacture various types of Electronic Fuzes for Artillery Shells, Mortars, Rockets, Mines, Grenades and similar munition of war.

Typically, Electronic Fuze consists of an explosive train comprising of detonators with/without booster pellet based on the application.

Figure 2.1

Typical Firing Train in Fuze:



HBL Scope of supply is pertaining to supply of Electronic Fuzes only that are used for various applications in Artillery Shells, Mortars, Grenades, Mines, Rockets and similar munition of war. The firing train may vary based on application.

The Proposed facility is intended for testing of firing train up to lead charge. Details of Explosive components and net quantity of explosives is as detailed below.

2.2 Details of Explosive Components:

Micro Detonator:

These are electrically ignitable on receiving the power source from We reserve battery; it is a tiny component and filled with Lead Azide, Lead Styphnare and HMX.

Relay Detonator:

Relay Detonators is initiated by the Micro Detonator, it is a small component filled with Lead Azide, HMX/RDX and Percussion Composition.

Lead Charge:

Lead Charge is initiated by Relay Detonator; Lead Charge has a composition of HMX/RDX with binder.

Booster Pellet:

Booster Pellet is initiated by the lead Charge. Booster Pellet is made of HMX or RDX or Tetryl. However for testing purpose Booster will not be used.

The Total Explosive Qty is much less than the Explosive present in a typical commercial detonator that is used in Mining Activities. A comparison is provided herewith for ready reference.

Table 2.1: Comparison of Explosive quantity vis -a vis Commercial detonation

Description	HBL Explosive Train			Commercial Detonator		
	Net Explosive (mg)	TNT Equivalence	Net Wt of TNT (mg)	Net Explosive (mg)	TNT Equivalence	Net weight of TNT (mg)
Lead Styphnate	15.8	0.42	6.636	60	0.42	25.2
Lead Azide	69	0.34	23.48	160	0.34	54.4
Secondary Explosive (PETN/HMX/RDX/Tetryl)	203	1.70	345.10	500	1.66	830.0
Net Explosives (mg)	287.8		375.216	700		909.6

The above table depicts that amount of explosives used for Electronic Fuze testing is just 287.8 mg or 375.216 mg of TNT which is very less amount, a commercial detonator is equivalent to 909.6mg of TNT.

CHAPTER 3.0
SITE AND ITS ENVIRONMENTAL SENSITIVITY

3.1 Site Details

3.1.1 Project Location Details

Proposed Project is located in Sy.No. 72 to 81 & 84 to 88, Janampet Village, Moospeta Mandal, Mahbubnagar District, Telangana State - 509382.

The Land is surrounded by Gajulapet Reserve Forest on North Side, Janampet-Laxampally Road on south side and Private Lands on East & West Sides.

In order to meet the guidelines of Ministry of Defence for testing facilities of blasting, HBL proposed to acquire 2.81 Hectares of Forest land adjacent to its facility which is falling in Gajulapet Reserve Forest

The Overall lay out of the plant and proposed test facility is given figure 3.1 below

3.2 Details of Forest Land proposed to be taken

A total land area of 2.81 Hectares are proposed to be taken for constructing test facility in Gajulapet. Following are Long Lats of the forest land proposed to be taken.

Table 3.1: Latitudes and longitudes of the proposed forest land to be taken

S.no	Latitude	Longitude
1	16°38'23.50"N	77°57'41.98"E
2	16°38'23.78"N	77°57'42.26"E
3	16°38'26.38"N	77°57'40.72"E
4	16°38'28.28"N	77°57'41.15"E
5	16°38'30.30"N	77°57'43.20"E
6	16°38'31.38"N	77°57'45.40"E
7	16°38'33.50"N	77°57'43.81"E
8	16°38'30.66"N	77°57'38.41"E
9	16°38'25.33"N	77°57'37.69"E
10	16°38'25.94"N	77°57'39.17"E
11	16°38'25.58"N	77°57'40.00"E

The Topo sheet of area and 10 KM is given at **Figure3.1**

The Topo sheet of the 5 KM Radius is given below at **Figure 3.2**

The Base map of the study area is given at **Figure 3.3**

The Google Map of the site is given at **Figure 3.4**

Figure3.1: Topo sheet of the proposed site and Surroundings

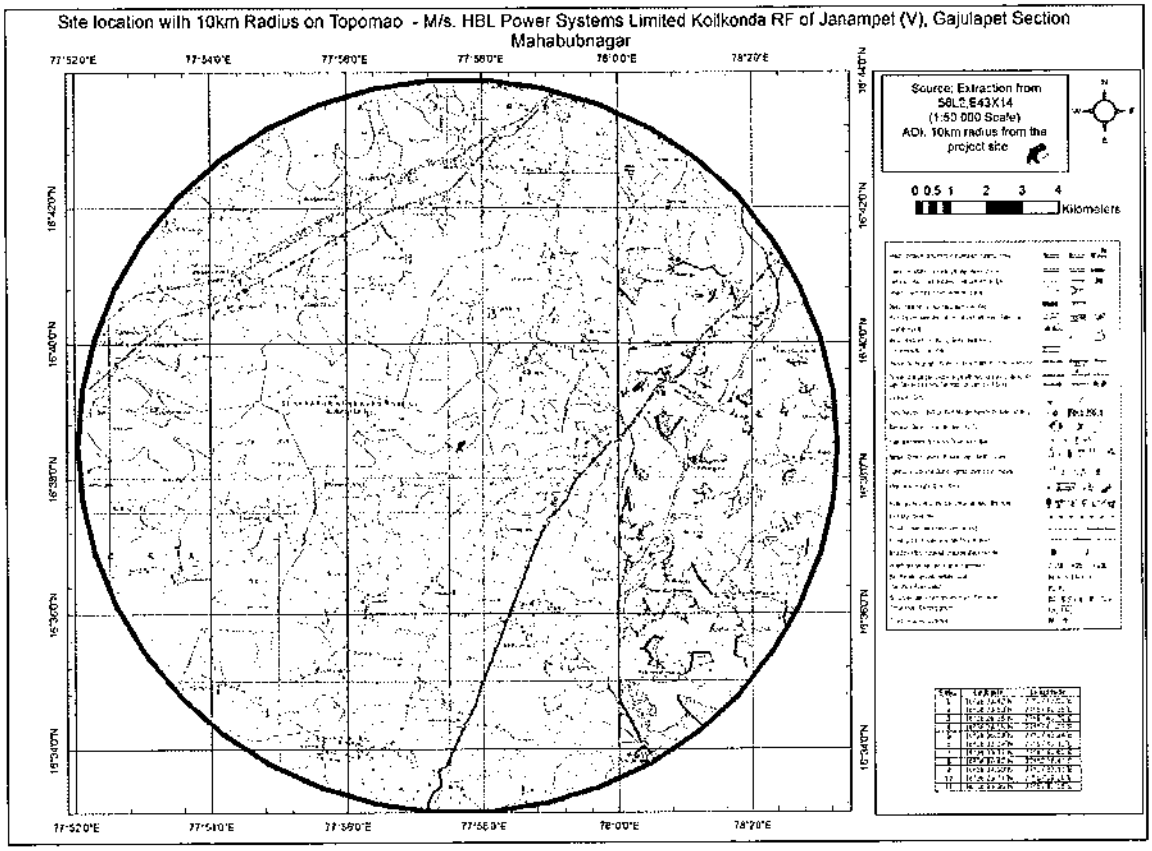


Figure 3.2: Topo sheet of the 5 KM Radius

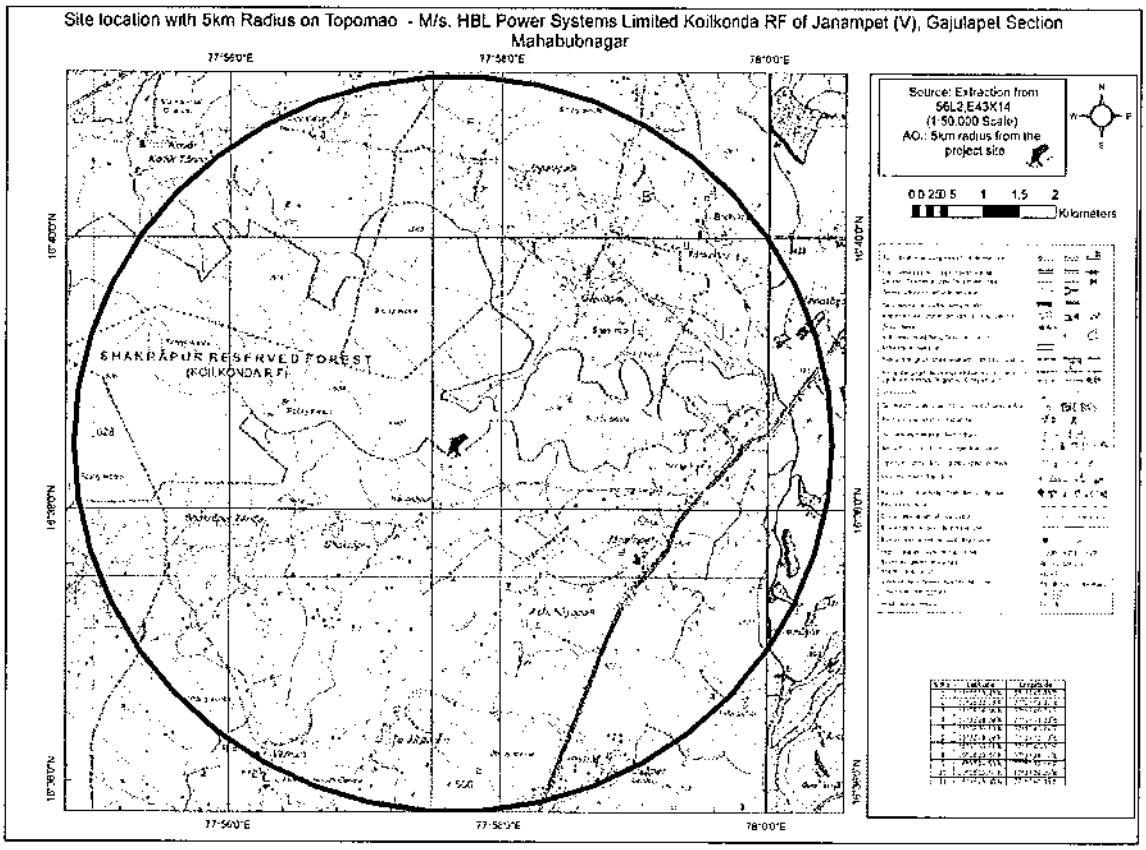


Figure 3.3: Base map of the study area

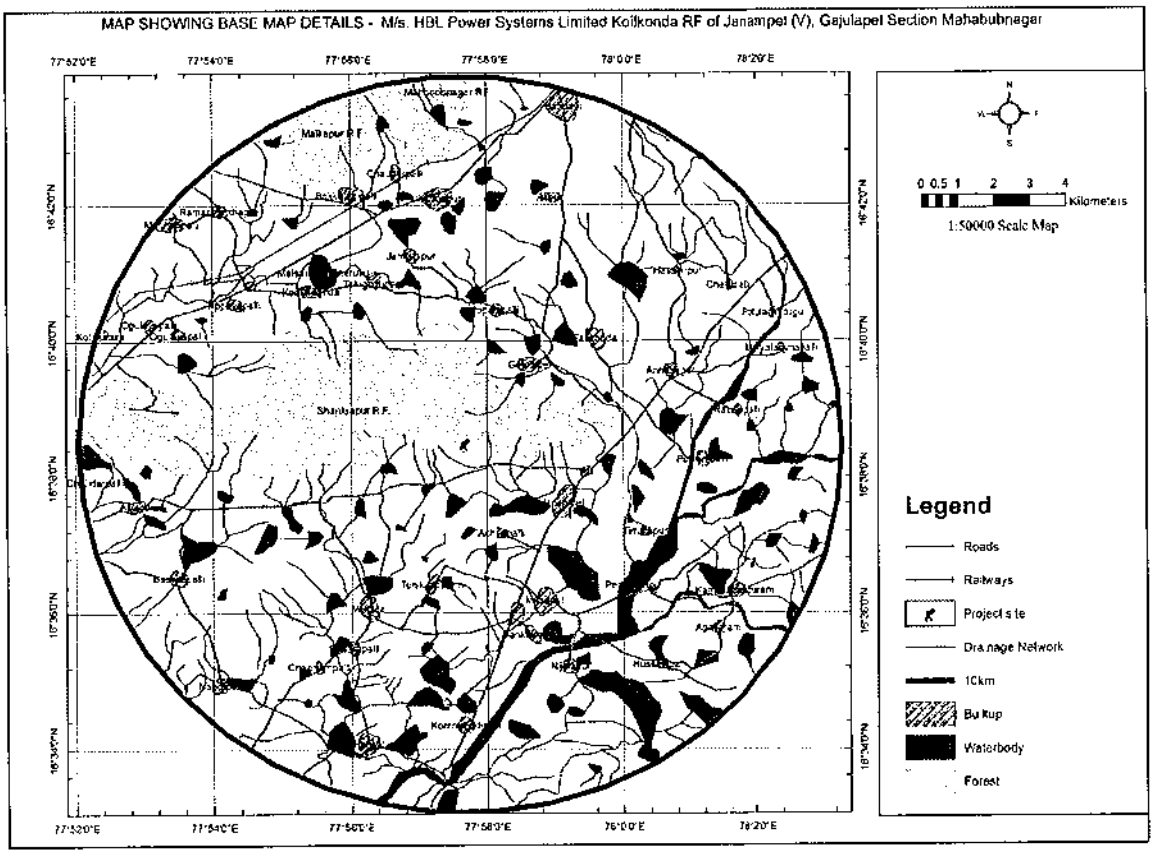
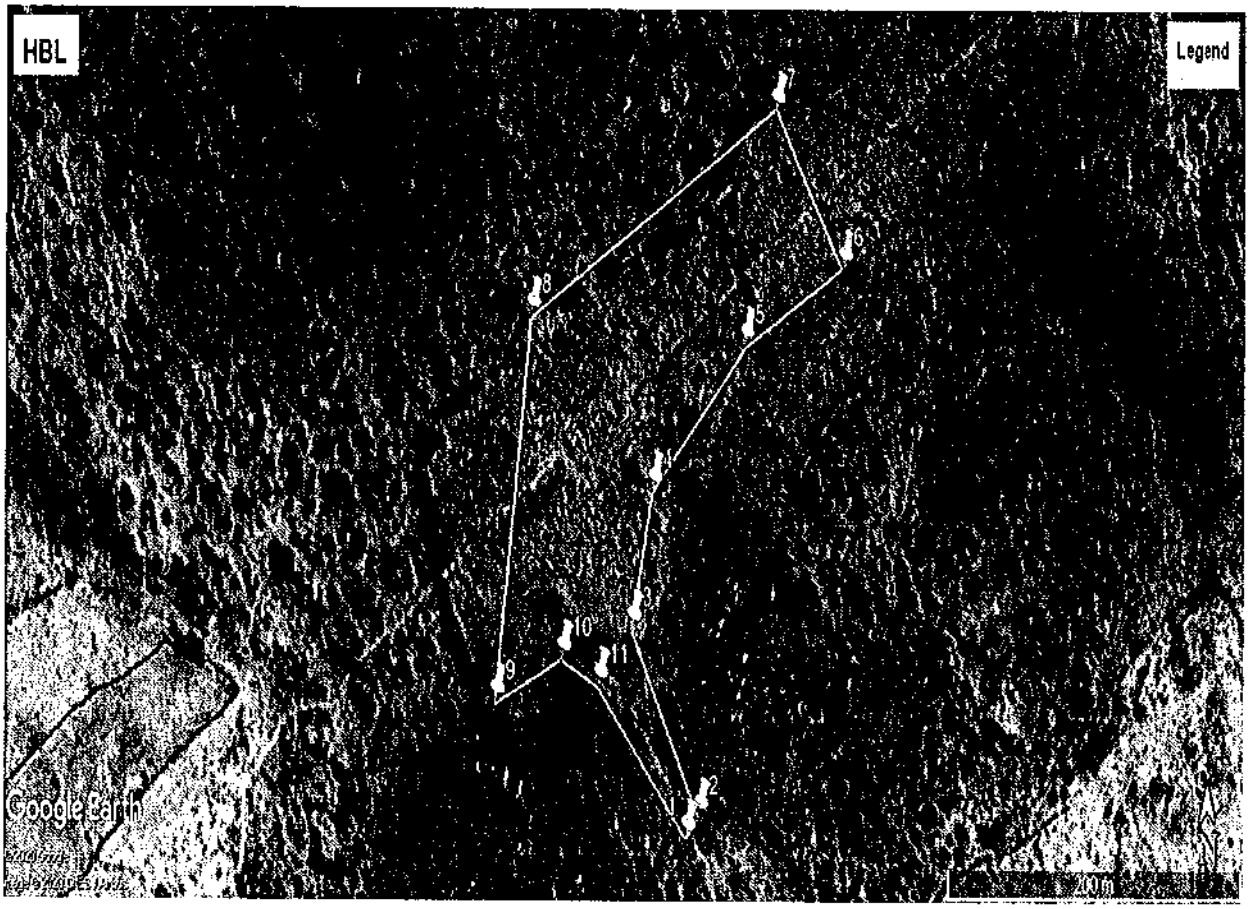


Figure: 3.4 Google Map of the site



3.3 Sensitivity of the Site

The test site proposed is in Gajulapet RF which is part of Shankrapur RF. The nearest villages to the site are Gajulapet which is 2.51 KM in the North Direction and Janampet Village is at 2.61 KM in South Eastern Direction.

Pedavagu which is a stream flowing at a distance of 5.58 KM in the North Eastern Direction and two tanks are at a distance of 0.99 KM and 1.21 KM in the South Eastern and South Direction

Apart from the Shakrapur RF in which site is located, there are two other RFs in 10 KM distance which are Malkanpur RF in Northern Direction at a distance of 7.94 KM and Mahaboobnagar RF is at 9.23 KM in the Northern direction.

There are no Eco-sensitive zones or wild life sanctuaries within 10 KM radius of the site

Currently the area is having eucalyptus plantation (A total of 1371 plants)
Source: Report of the Forest Range Officer of Mahaboobnagar

CHAPTER 4.0
BIOLOGICAL ENVIRONMENT

4.1 Introduction

Ecological studies are one of the important aspects of Environmental Impact Assessment with a view to conserve environmental quality and biodiversity. The present objective is to study an area of 10 km radius from the project site. Ecological systems show complex inter-relationships between biotic and abiotic components including dependence, competition and mutualism. Biotic components comprise of both plant and animal communities, which interact not only within and between themselves but also with the abiotic components Viz., physical and chemical components of the environment. The main aim of Conservation of Biodiversity is to ensure "No Net Loss" as per Convention on Biological Diversity (CBD), the Ramsar Convention, and the Convention on Migratory Species (CMS). The further loss of biodiversity is unacceptable. Biodiversity must be conserved to ensure it survives, continuing to provide services, values and benefits for current and future generations. This objective is considered during the present ecological assessment.

4.2 Scope of work

Scope of work is to identify the ecologically sensitive receptors based on literature survey and field investigations, quantification of impacts on flora and fauna in core and buffer zones and to suggest appropriate mitigation measures. The scope will also cover to identify any rare, endangered, endemic, threatened (REET) species of flora or fauna in the project site or core area as well its buffer zone (up Jato 10 km radius). The impact of noise and vibration by the proposed activity on biodiversity of the study area are to be ascertained. The study also designed to suggest suitable mitigation measures and conservation plan, if necessary for REET species if any.

4.3 Reconnaissance of the Study Area

Flora and fauna studies were carried out during Monsoon season (August 2020). The study area analyzed with GIS tools and marked ecosensitive areas for primary data collecting points (sampling points) which also cover ecosystems of the region in all directions.

The proposed project site is open land with very less vegetation cover. Further, no major tree cutting is involved within the proposed site boundary. Thus, no forest Clearance is required for the proposed development. Most of the region is dry, scrub and mesophytic conditions. Vegetation is limited to pond side and roadside. The study area considered as 10 km radial distance around the project site, comprises mostly of dense trees near the Reserve forests.

The proposed project falls in

- 6D – Deccan Peninsula Deccan Plateau as per the Biogeography Classification of India.
- Hot Semi arid type as per the India's Köppen climate classification.

The vegetation of the study area falls under

- ✓ 5A: Southern tropical dry deciduous forests C3: Southern dry mixed deciduous forest;
- ✓ 6A: Southern tropical thorn forests DS1: Southern thorn scrub, 2S1: Secondary dry deciduous forest

By revised classification of Indian forest types (Champion and Seth, 1968). These types of forests are seen throughout the Eastern Ghats and few parts of Western Ghats of the country.

The possible impacted regions are studied. Number of sampling points studied based on area-species graph method. 16 sampling points are studied for statistical analysis. Secondary data gathered from working plan from State Forest Department and standard published articles from

international and national journals. The faunal species (particularly higher mammals and Birds) and other medicinal plants data discussed with elderly people from nearby villages. Data validation of existing and reported species, their global, national and local status and their importance are discussed with officials of forest department, local villagers, scientists and professors from Universities, BSI and ZSI.

There are no protected forest or un-classed Forest within the core zone (Proposed unit) of the project (declared Protected under "The Indian Forest Act, 1927") and "Forest (Conservation) Act, 1980 with Amendments Made in 1988". (Source: Forest Department). No forest Clearance is required for the proposed activity. No wetland notified under "The Ramsar Convention – 1971" or listed under "the National wetland Conservation Programme – 2009" is reported within 10 km from project boundary.

Extent: The flora and faunal resources are surveyed upto macro level based on the secondary data and habitat specific field observations for primary data. The data collected is a representative of the various ecosystems and their services. The ecological services are compared at ground level with local villagers and impacts are identified based on the other environmental parameters and pollution tolerance level.

Rationale for Survey Method: There are 3 reserve forests including Gajulapeta RF in which is site is falling in the study area. Hence, sampling points are mainly based on the vegetation and wind direction. The present sampling sites are also cover the ecological significant areas and project specific impacted zones. The present study period supports good number of herbaceous species, which are under blooming are easily identified during this season.

Identification of Species: Most of the species in the study observed are very common. Identification of certain doubtful Species of flora and fauna are identified through local field guides. Unidentified species found are confirmed by researchers.

Secondary data: The key referral material taken from Mahabubnagar Forest working plan (2013-22). Certain published papers related to region in the recent years are also considered. Ground validation has done through elderly village people and personal field visits. In case of vertebrate wildlife, the data is largely based on authentic secondary sources such as the research Publications, reports of ZSI, forest and wildlife departments, fisheries department etc.

4.4 Sampling locations

In core area, sampling locations taken all along the project site, whereas in buffer area, 16 locations are selected for carrying out the statistical analysis. Under each location, one belt transect (100m X 10m) is laid for the study. Thus, a total of 16 points analyzed for statistical parameter keeping in view of covering all the possible native species of study area.

4.5 Methodology

4.5.1 Equipment / Instruments deployed

- Digital Camera (NIKON 42 X zoom)
- GPS (Accurate readings available in Mobile and inbuilt camera)
- Binoculars (OLYMPUS 10 X 50 DPSI)
- Field observation book, Field guides, Pen, Measuring tape etc
- PAST –statistical software for Biodiversity.
- MS-Excel for Phyto-sociological calculations and graphs.

4.5.2 Survey Types used:

1. Reconnaissance survey (Near Agricultural, Human habitations and Road side)
2. Stratified Random Sampling method
3. Quadrate and belt transact method for floral species
4. Point count method for birds
5. Indirect evidences
6. Personal interviews with local villagers

4.5.3 Methodology for Floral analysis

The vegetation structure of the region was sampled at selected habitats. The buffer zone area is predominant with crops and plantations. Sampling near pond side and road side are restricted to dense covered regions. To avoid the biased results, statistical analysis has been carried out near all major ecosystems. Validation of secondary data undertaken at regional level of the study area. The status of each identified species has been given in terms of four categories such as "Dominant", "Common", "Sporadic", and "Rare". This status is mainly based on Density, Frequency and Abundance estimated during the field visit.

Quantification done through quadrant method and belt transaction method. During quadrant method, trees (20m X 20m), shrubs (5m X 5m) and herbs (1m X 1m) are recorded depending upon prevailing geographical conditions and bio-diversity aspects of study area. Belt transect method floral species are studied in an area of 100m X 10m. Recorded the Girth at Breast Height (GBH) for trees with greater than 30 cm along with species name, its phenology (flowering, fruiting.) while sampling. The plants are identified using standard field guides published by Forest Department also by using websites. Unidentified species during the field study are photographed for further investigation. Only photographs are taken during the field survey and no damage is created

to flora and fauna during the sampling. None of the specimens is collected for herbarium voucher specimens.

4.5.4 Primary Data Collection, Data validation & Analysis

Only tree species with more than 30 cm GBH in the buffer zone are considered for quantification. Preparation of list of flora is prepared after proper identification of species from experts. The photographs are sent to reputed scientists, Forest officials for validating the primary data.

The standard phyto-sociological methods of Mishra (1968) for density, frequency, and abundance are calculated. Relative values of these were calculated by following Philips (1959). Important Value Index (IVI) was calculated by adding up these three values of relative frequency, relative density and relative dominance (Curtis, 1959). In the case of shrubs, herbs and saplings abundance status was given as per direct field observation. Diversity indices such as Shannon–Wiener Indices of Diversity index, Evenness, Dominance, A/F ratio are also calculated through standard methods and by using software tools such as PAST.

4.5.5 Methodology for Faunal analysis

Intensive surveys for mammals were conducted by using transect method in all major habitats and recorded the species through direct and indirect evidences. Species were identified using "A pictorial guide to the Mammals of the India" by Vivekmenon (2014) Prater (1997).

For Birds, point count method was applied where, at one point birds seen or heard 50 m radius has been recorded for 5 minutes. After this, a gap of 10 minutes, repeated the observations and recorded the species number. All the species were identified using "A field guide to the birds of the Indian Sub-Continent" by Ranjit Manakadan et.al (2011), Bird life international web site http://datazone.birdlife.org/home.

Reptiles were identified by direct or indirect evidences and literature cited is the book of Indian Reptiles and Amphibians by J.C. Daniel (2002), Snakes of India by Whitaker (2016).

Amphibians are surveyed both at aquatic and terrestrial systems searching under the logs and stones, digging through litter and soil, searching short bushes and tree hollows and under fallen barks and water-catching. The books referred are Amphibians of Peninsular India by Ranjit Daniel (2004).

Sampling of Invertebrates were done along the transect passing through various habitats, species identification was made using standard field guides (Antram, 2002; Evans, 1932; Kunte, 2000).

4.5.6 Vegetation structure and composition

During the present study, around **172 floral species** are recorded from primary and secondary sources. The overall study area consists of agricultural fallow / Barren / uncultivable / waste land. The list of plant species recorded during field survey and also from literature from the study area is given in **Annexure-II.**

4.5.7 Status of the terrestrial vegetation

In the core zone (Within the proposed site) is within the Reserve forest block.. The number of trees that are directly get impacted are quantified. Most of them are mesophytic trees such as *Wrightia tinctoria, Grewia hirsute, Capparis zeylanica, Eucalyptus globules, Ziziphus oenopolia, Carissa spinarum, Gmelina asiatica.* The herb species includes *Croton bonplandianum, Parthenium hysterophorus, Hyptis suaveolens, Tridax procumbens, Tephrosia purpurea, Calotropis procera, Calotropis gigantea, Prosopis juliflora, Lantana camara, Cleome viscose are commonly present.* But the buffer zone habitat is relatively less rich in biodiversity due to agri

ecosystem and topography and physical habitat. There are thick green rugged hills in the core zone. However owing to summer, annual herbaceous species were very rare and confined to areas such as irrigated croplands or other areas with adequate moisture.

Vegetation near Reserve forest: The species commonly noticed with or without teak are:

Anogeissus latifolia (Tirman), Terminalia tomentosa (Nallamaddi), Cochlospermum gossypoium, Chloroxylon swietenia (Billudu), Hardwickia binata (Narepa), Lannea grandis (Gumpena), Pterocarpus marsupium (Bijasal), Grewia populifolia, Wrightia tinctoria (Pala-Kordsha) (Chennangi), Givotia rottleriformis, Dalbergia paniculata, Diospyros malanoxylon, Buchanania latifolia, Premna tomentosa etc. Neem (*Azadirachta indica*) and Seethaphal (*Annona squamosa*) are grown mostly by natural regeneration in thorny bushes along with other species.

4.5.7.1 Non- forest vegetation of the study area

Owing to unsuitable summer conditions, almost all annuals have died and withered away. Only a few isolated individual annual species were scatted here and there depending upon availability of moisture and protection. Besides all common avenue trees, social and agro-forest species and the orchards, a few scattered perennial bushes of *Cassia auriculata, Ziziphus numularia, Randia dumetorum, Cassia siamea, Holoptelea integrifolia, Butea monosperma, Catunaregam spinosa* etc were common in all wastelands and along the roadsides and filed bunds.

4.5.8. Ecological services of the region:

Useful Plants in the Study Area: The direct dependence of the local people on the local plant species is observed within the study area takes essentially three forms – utilization as food, for traditional medicinal purposes and a range of secondary uses.

Medicinal Plants: Medicinal Plants in the area comprises of *Achyranthes aspera* (roots, seeds), *Alternanthera sessilis*(plant), *Gloriosa superba (leaves, flower, roots), Azadirachtaindica*(leaves, seeds), *Calotropis*

gigantea (latex), *Euphorbia hirta*(plant), *Leucas aspera* (leaves),*Sidaacuta* (roots, leaves), *Solanum surratense* (roots), *Vitex negundo* (leaves).

Secondary-use Plants: Secondary use plants in the area consists of *Agave americana* (plant-fibre for rope), *Sidaacuta* (stem-fibre for rope).

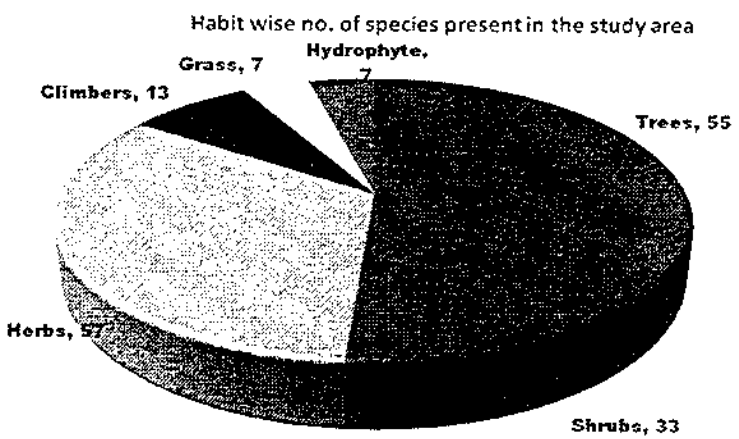
4.5.9. Quantitative analysis

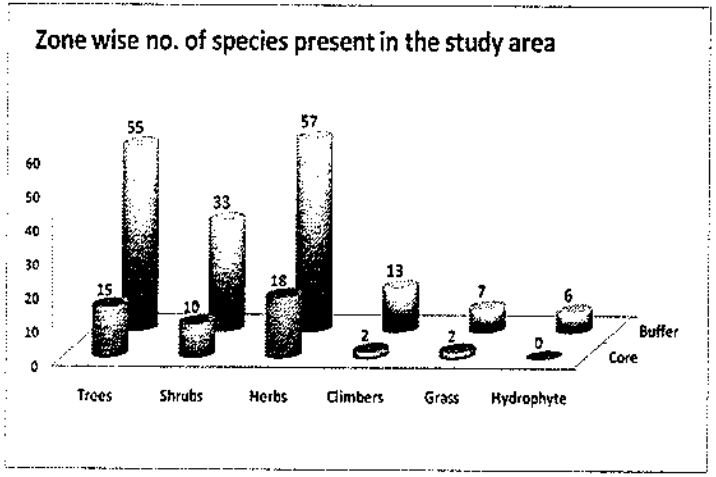
The study area is mainly focused through secondary data validation from primary observations. Checklist is prepared and marked the species noticed during rapid assessment. 16 transects were plotted in all the sampling points and finalized the number of transects through Area-Species graph. Top 14 tree species showing highest IVI.

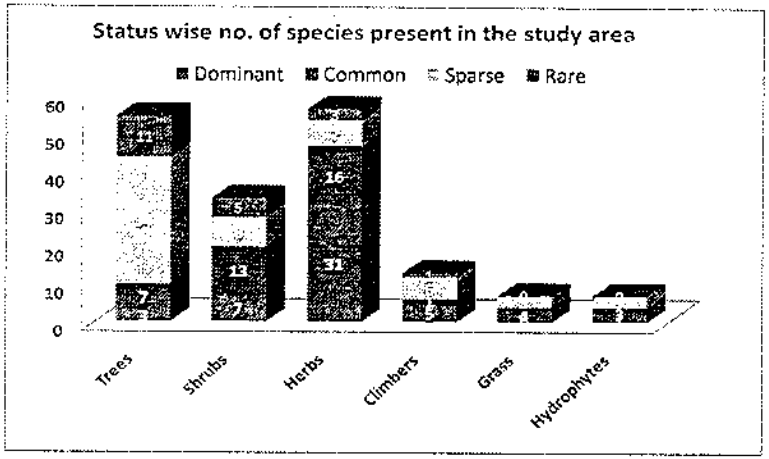
Table 4.1: Phytosociological data of trees in the study area:

S.No	Scientific Name	Density	Rel Density	Frequency	Rel Frequency	Abundance	Rel Abundance	IVI
1	*Butea monosperma*(Lam.) Taub.	0.30	3.16	20.00	3.70	1.50	6.07	12.94
2	*Cassia siamea*Lam.	0.40	4.21	35.00	6.48	1.14	4.63	15.32
3	*Eucalyptus globulus* Labill.	0.75	7.89	20.00	3.70	3.75	15.18	26.78
4	*Gmelina asiatica*L.	0.70	7.37	45.00	8.33	1.56	6.30	22.00
5	*Holopteleaintegrifolia* (Roxb.)	0.35	3.68	25.00	4.63	1.40	5.67	13.98
6	*Morindatinctoria*Roxb.	0.45	4.74	45.00	8.33	1.00	4.05	17.12
7	*Tamarindusindica*L.	0.50	5.26	35.00	6.48	1.43	5.78	17.53
8	*Wrightiatinctoria*(Roxb.) R.Br.	1.40	14.74	60.00	11.11	2.33	9.45	35.30
9	*Ziziphus oenopolia* (L.) Mill.	0.90	9.47	55.00	10.19	1.64	6.63	26.28
10	*Capparis zeylanica* L.	1.05	11.05	55.00	10.19	1.91	7.73	28.97
11	*Carissa spinarum*L.	0.75	7.89	40.00	7.41	1.88	7.59	22.89
12	*Catunaregam spinosa* (Thunb.) Tirveng.	0.30	3.16	30.00	5.56	1.00	4.05	12.76
13	*Erythroxylummonogynum*Roxb.	0.45	4.74	30.00	5.56	1.50	6.07	16.37
14	*Grewiahirsuta*Vahl	1.20	12.63	45.00	8.33	2.67	10.80	31.76
								300.00

Figure 4.1: Graph showing Important Value Index of dominant tree species in the study area







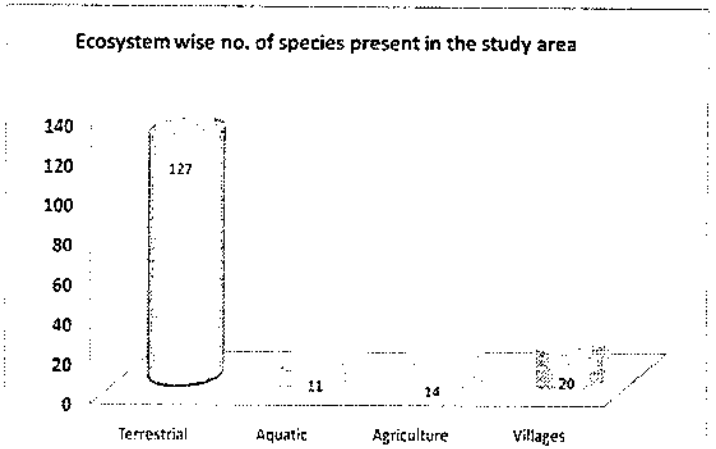
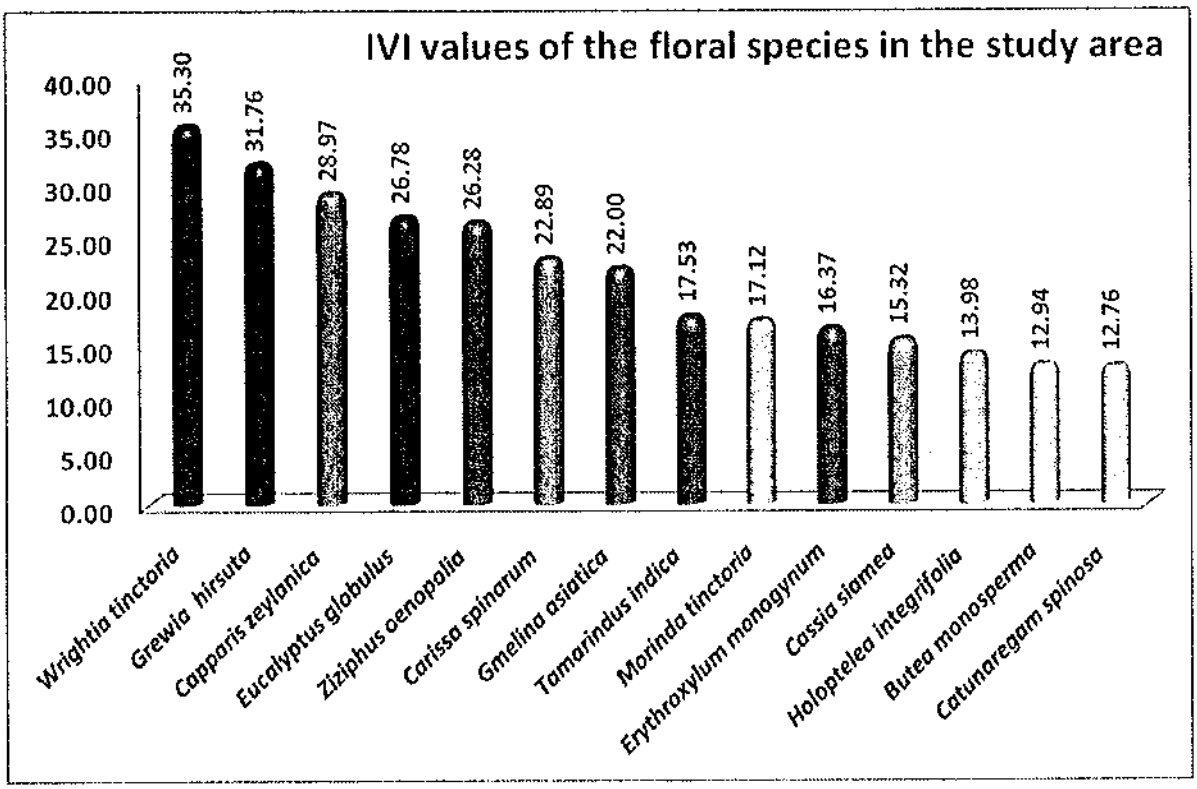


Figure 4.2: Graph showing habit wise no. of species present in the study area



Vegetation Analysis: (Data interpretation)

Table4.2: Biodiversity indices values of the sampling sites in study areas:

a	A/F value	0.046
b	Shannon H	2.585
	Simpson 1-D	0.921
c	Dominance D	0.079
	Evenness	0.947

a. **Distribution pattern (A/F ratio):** The ratio between abundance and frequency was used to interpret the distribution pattern of species (Whitford, 1949). Distribution pattern of species in the study area is identified as **random distribution** as the value of A/F

ratio is **0.046.** This distribution of species is random because of several ecosystems randomly distributed in the study area.

b. The Shannon indices value of study area is **2.585**indicates **Moderate diversity** (Normal diversity in ecological studies is 1.5 to 3.5 range (Kerkhoff, 2010).

c. Population size and Dominance of the species is **8%** and Evenness is around **98%** (Indicates the species are **evenly distributed** in the study area). This might be due to contiguous patches of natural species such as*Azadirachtaindica, Prosopis juliflora*(near the villages),*Peltophorumpterocarpum, Delonix regia* and Subabul *(*near road side*)*

d. Frequency indicates A<B=C>D=E as per the Raunkiaer's law of frequency classification indicates that species diversity is distributed maximum for 20 to 60%

4.6 Terrestrial Fauna

Protocols for fauna: Fauna is all of the animal life of any particular region or time and which depends largely on the vegetation type and the abiotic features of the region. As the animals are move from one place to another, the list of vertebrates is mainly prepared based on secondary data from Forest department and research articles.

Mammals surveys are carried out by using direct evidences such as Vocal, scat, Pugmarks and secondary data validation in all major habitats. Species were identified using "A pictorial guide to the Mammals of the India" by Prater (1997), Pradhan (2004). **Bird surveys** are carried out by Point count method near ponds preferably during dawn and desk. List of birds is prepared with available literature from the study area and preliminary observations. Identification of birds will be done using "A pictorial guide to the birds of the Indian Sub-Continent" by Salim Ali and S.D. Ripley (1998). **Reptilian** surveys are carried out by using direct evidences for snakes and lizards and indirect evidences collected from

local villagers. **Amphibian** surveys are carried out by using both aquatic and terrestrial ecosystems. During randam surveys, observation are made near aquatic bodies and list is prepared from secondary data base. Invertebrate surveys are carried out along the transect passing through various habitats and photographs will be taken. Species identification will be made through standard field guides (Antram, 2002; Evans, 1932; Kunte, 2000) and reputed scientists of the same field.

4.6.1 Fauna within the Core and buffer zones:

Throughout the study area, there no direct evidence of wild animal species observed. In Mammals, Three stripped Squirrels are sighted apart from few reptilian species. From the secondary source (local people near villages), it is also revealed that presence of common snakes exists here. The faunal composition generally with arboreal and semi arboreal based animals. Within the core zone few common bird species such as Common Crows, doves are sighted apart from few garden lizards. Butterflies and dragonflies are fairly common near vegetation. Most mammals and birds listed were of very rare occurrence. There were no resident birds or wild mammals as evidenced by the absence of nests of birds or resting or hiding places of mammals. Only Crows, Parrots, Doves, Weaver birds and Mynas were more common among birds. Among the reptiles, Lizards, Garden lizards were very common. Rat snake and Monitor lizard were confirmed by local villagers during the survey. The amphibians were relatively more frequent but not abundant. The presence of other wild mammals is doubtful and it is based on the secondary data and the information provided by the local villagers and forest beat officers only.

4.6.2 Endemic, Threatened and Endangered Species:

From the present survey, it appears that none of the terrestrial species are under endangered and threatened species, and not listed in the Schedule-I of the Indian Wildlife (Protection) Act, 1972 as amended in 1991.

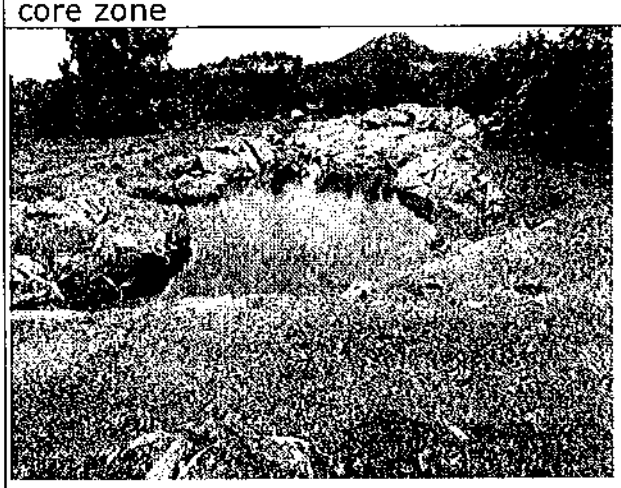
4.6.3 Effect on Migratory corridors, Nesting and Breeding sites:

There are no migratory corridors, nesting and breeding sites within the study area.

FIG 4.3 Field Photos Of the Site

Herbaceous species in the open are of core zone

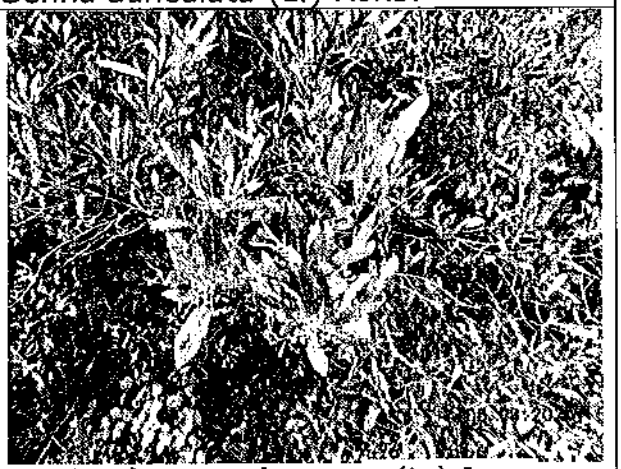
Field observation during site visit



Small pond in the buffer zone

Senna auriculata (L.) Roxb.

Core proposed project area habitat



Dodonaeaviscosa · (L.) Jacq.

 *Ziziphus oenopolia* (L.) Mill.	 *Jasminum roxburghianum*Wall. ex C.B.Clarke
 *Carissa spinarum*L.	 *Gloriosa superba*L.
 *Eucalyptus citriodora*Hook.	 Field observation by ecologist during site visit

	
Holopteleaintegrifolia (Roxb.)	*GrewiahirsutaVahl*
	
Tamarindus indica L.	*Phoenix sylvestris* (L.) Roxb.
	
Butea monosperma(Lam.) Taub.	Agriculture activity in the buffer zone adjoining to the proposed activity

CHAPTER 5.0
Environmental Impacts Due to Testing of Fuse

5.1 Environmental Impacts

Use of Explosive results in the following unwanted aspects:

1. Gases.
2. Heat.
3. Ground Vibrations.
4. Noise.

Gases and Heat dissipated into the atmosphere and are negligible in test scenario

It's the Ground Vibrations and Noise that are capable damaging the surrounding structures and can cause impact on fauna in the vicinity. Particularly this aspect needs to be verified as proposed test facilities are Reserve Forest

5.2 Ground Vibrations:

Effect of ground vibrations on structures and human beings is a well-researched topic that resulted in every country formulating its acceptable limits. However, effects of Ground Vibrations and Air Overhead Pressure is being researched now.

In Indian DGMS (Director General of Mines Safety), vide his Technical circular No.7 of 1997 prescribed the following limits.

Table 5.1: Permissible Peak Particle Velocity (PPV) at the foundation levelof structures in the mining areas in mm\sec

TYPE OF STRUCTURES	DOMINANT EXCITATION FREQUENCY		
	< 8 Hz	8 - 25 Hz	> 25 Hz
A) Buildings / structures not belonging to the owner.			
Domestic Houses /Structures (Kacha, Brick and Cement).	**5**	**10**	**15**
Industrial buildings (RCC and Framed Structure).	**10**	**20**	**25**
Objects of Historical Importance and Sensitive structures.	**2**	**5**	**10**
B) Buildings belonging to the owner with limited span of life.			
Domestic Houses /Structures (Kacha, Brick and Cement).	**10**	**15**	**20**
Industrial buildings (RCC and Framed Structure).	**15**	**25**	**50**

Propagation of Ground Vibrations (V) depend on the Distance (D) from the place of initiation and the Quantity (Q) of Explosives used.

V ∝D/Q Meaning.

Vibrations Generated increase with the increasing quantity and

Decrease with the Distance.

5.3 Impacts of Noise &Vibration on wild life

Sound pressure level (SPL) is responded to in a logarithmic manner and sound levels are measured on a logarithmic decibel scale (dB), which corresponds fairly well to the human hearing response. The zero end of the scale corresponds to a pressure of about 0.00002 N/m2 and a value

of 120 dB corresponds to about 20 N/m2 – a level at which pain will be experienced.

where I = intensity of actual sound, Io = intensity of sound Io at threshold level

Human hearing extends from frequencies (perceived as pitch) from about 20 Hz (cycles per second) to about 20,000 Hz (20 kHz). SPL levels are often weighted. One commonly used is the A-weighting network that assigns weights to sounds based on audibility to human hearing (low weights to low frequency sounds < 1000 Hz and higher weights to more audible high-frequency sounds). This is denoted as dB(A) in some studies. Other ways of representing levels of sound include Leq = equivalent continuous sound level and SEL = sound exposure level integrated over 1 second. In general, sound attenuates as the square of the distance from the source and is greater at higher frequencies.

Animals rely on meaningful sounds for communication, navigation, avoiding danger and finding food against a background of noise. Here noise is defined as "any human sound that alters the behaviour of animals or interferes with their functioning". The level of disturbance may be qualified as damage (harming health, reproduction, survivorship, habitat use, distribution, abundance or genetic distribution) or disturbance (causing a detectable change in behaviour).

An earlier review of this subject contains some considerable information on the effects of acute noise on hearing loss in vertebrates (especially mammals), but concludes that, at the time, little or no knowledge of the effect on animals was known. A review of the effect of noise concluded that there was no evidence of noise having a significant impact on cattle (milk production), swine, poultry (egg hatching) or mink (kits produced). However, the effect on wildlife may be more significant than on domestic species. Greater behavioural and physiological responses to noise have been reviewed and studied with special emphasis on the greater noise.

5.4 The sensitivities of various groups of wildlife for ground vibrations and Noise can be summarized as:

Mammals < 10 Hz to 150 kHz; sensitivity to -20 dB

Birds (more uniform than mammals) 100 Hz to 8-10 kHz; sensitivity at 0-10 dB

Reptiles (poorer than birds) 50 Hz to 2 kHz; sensitivity at 40-50 dB

Amphibians 100 Hz to 2 kHz; sensitivity from 10-60 dB

CHAPTER 6.0
TEST BLASTING & RESULTS

6.1 Experimental test carried out & Results

To assess the impact of Testing of Fuze and measure the Noise and Vibrations generated 2 NOMIS Make Mini super graphs, whose specifications are Annexure 2 this report were used.

Test firing were conducted on 10th August 2020 in Janampet site premises

6.2 Method of testing:

Testing of Fuze consists of putting the Fuze in a metal crucible and blasting it using electric power. Crucible is placed in the open around 2 meters away.

Fig 6.3 Blast experiment Photographs

One instrument was placed at 0.5 meter from the place of Firing of Fuze i.e. firing crucible and another around 2 meters as can be seen the above picture.

Trigger limits were set at 92 Db of Noise and 0.50 mm/sec of PPV (Peak Particle Velocity) of Vibrations.

6.3 Explosive quantity used:

The quantity of explosive used for testing is 287.8 mg (TNT equivalent of 375.216 mg) and Type of explosive used are lead Azide, Lead Styphanate and HMX type.

6.4 Test Results:

1st instrument recorded placed at 0.5 Meter, recorded Noise level of 94 Db and negligible Vibrations of 0.127 mms 0 Hz.

Waveform recorded is Annexure II to this report.

2ndinstrument placed at 2 Meters distance failed to trigger as the Noise or Vibrations at that point were less than the trigger limit.

6.5 Conclusion:

Based on the above, we observe that, as the quantity of Explosives in the Fuze is negligible at 287.8 mg o**r 375.216 mg of TNT equivalent** and Noiseand Vibrations produced in testing of Fuzes dissipated within 5 -10 meters distance from test place

The team also visited actual test site where proposed testing facilities are planned. The Site is open on all sides surrounded by small hillocks consisting of eucalyptus plantations. No fruit bearing tress were observed. No animals of significant size such as Deer, Bear, Foxes were observed.

CHAPTER 7.0
ENVIRONMENTAL IMPACTS AND RECOMMENDATIONS

7.1 Summary of Biotic studies

A reconnaissance study was carried out during Monsoon season 2020 with a team of experts in study area of 10 km radius from the proposed Project site. Secondary data collected from various sources along with local people and listed out the floral and faunal species at higher level. Two more reserved forests present within the study area of 10 KM radius

Around 172 plant species are recorded from the study area. No migratory corridors or breeding grounds for faunal species present here. Few direct and indirect impacts on ecological aspects are noticed during operation phases of the project and proper mitigation measures were suggested along with detailed greenbelt plan.

The quantitative analysis shows that the distribution pattern (A/F ratio is identified as random distribution as the value of A/F ratio is 0.046. The Shannon indices value of study area is 2.58 indicates Moderate diversity. Population size and Dominance of the species is 8% and Evenness is around 95% (Indicates the species are evenly distributed in the study area). This might be due to contiguous patches of natural species such as *Wrightia tinctoria, Grewia hirsute, Capparis zeylanica, Eucalyptus globules, Ziziphus oenopolia, Carissa spinarum, Gmelina asiatica*. Raunkiaer's law of frequency classification indicates that species diversity is distributed maximum for 20 to 60%, which indicates the most common species in the buffer zone.

The impacts that my occur from proposed activity on fauna are likely to the disturbance created to local movement of Reptiles, Mammals and birds. Even though the noise levels of the proposed activity are within the permissible limits for faunal activity, the disturbance created during transportation in Reserve forest may affect the feeding, breeding and movement of higher level fauna.However this factor will not likely to be

affected as testing is not done on a regular basis and will only be carried our occasionally for lot clearance

Likely settling of dust to be generated by movement of vehicles on leaves may results in to stunted growth of vegetation and may also affect the capacity of production. Direct impact on trees and shrubs are limited to internal road made during the activity. However There will be very minimal movement of vehicles, as this facility is intended for testing only and which is carried out occasionally.

Mitigation measures such as use of electrical vehicles without any emissions are recommended in proposed activity area, roads maintenance, regulation of traffic, vehicle speed, fencing, compensatory afforestation in reserve forest, and other measures suggested by forest department to conserve vegetation and wildlife shall reduce the impacts considerably. Maintenance of greenbelt in buffer zones should be as per the five-year plan given under Greenbelt development

7.2 Environmental Impacts envisaged

Project specific and Site-specific Impacts identified:

- Proposed activity is likely to give mild disturbance on local movement of Reptiles, Mammals and birds. However the noise levels of the proposed activity are within the permissible limits for faunal activity
- Likely settling of dust to be generated by movement of vehicles on leaves may results in to stunted growth of vegetation and may also affect the capacity of production.
- Direct impact on trees and shrubs are limited to internal road made during the activity.
- Indirect impacts such as threat to surrounding flora is through collection of fuel wood by labour during the construction work, for cooking purposes and thereby loss of trees.

Mitigation measures suggested:

- The activity shall be undertaken with limited staff really involved in the activity.
- No plants shall be raised at a distance of 10 sq m from the project core boundary. This will discourage the bird movement near the proposed site and less impact will occur to local resident birds.
- Initial monitoring of faunal movements should be recorded by ecologist during first phase of operational stage which will help mitigate any disturbance on fauna
- Approach road used by vehicles shall be kept clean and clear of dust. All earth work shall be protected to minimize dust generation
- Management activities such as dust suppression measures during movement of vehicles in proposed activity area, roads maintenance, regulation of traffic, vehicle speed, fencing, compensatory afforestation in reserve forest, and other measures suggested by forest department to conserve vegetation and wildlife shall reduce the impacts considerably.
- A thick green belt shall be developed by following the regulatory norms at a permissible distance from the test site so that avian species will not be disturbed during testing.
- Labour should not be allowed to stay close the site go avoid any un -intended destruction of fauna

Positive impacts on Ecological aspects:

Due the present plantation, activities near the proposed activity site and buffer zone the species diversity will be enhanced. More dust resistant fruit yielding trees near the villages and roadside will improve the economic condition of the buffer zone villagers. Involving local villagers in plantation activities and educating the people on importance of biodiversity leads to protection and conservation of flora and fauna in long term.

Aesthetics: The beauty of the region will be enhanced through various flowering plants which intern attracts bird species of the region.

Carbon sink: Within the study area i.e in the buffer zone, the mass avenue plantation activities, and enriching existing forests contribute to mitigating climate change as these actions increase the rate and quantity of carbon sequestration in biomass. Introduction of trees on non-forest or degraded forestlands, Village plantations, restoration of natural forest, watershed protection, orchards and perennial cultures, agro-forestry activities enhance the ecological and economic values.

Mitigation measures of Handling of Explosives

Following safe guards shall be considered while handling and test of the explosives

- Testing of not more than 1 FUZE at once.
- Avoid Firing during Cloudy and Rainy days.
- Avoid firing during morning and evening when birds are around for water and food
- Suitable Boundary Wall protecting the test site shall be constructed as per the norms provided by' Security Manual for Licensed defence Industries' by Ministry of Defence, Department of defence Production, New Delhi

CHAPTER 8.0
ENVIRONMENTAL MANAGEMENT PLAN

8.1 Introduction

8.1.1 Ecological Management

All the plantation activities of the project are as shown in the layout map. The proposed project land area is 2.81 ha and out of which it is proposed develop green belt in an area of 50% ie., 1.4 Hectares

8.2 Considered Aspects and Major Impacts

- Impacts on Flora & fauna due to noise generated by testing activity and dust released during operation period.
- Impacts on Flora & fauna due to removal of top soil.
- Secondary impacts of Contamination Air, water, soil & generation of high noise due to transportation and proposed activity.

8.2.1 Developmental Phase

- Restriction of proposed activity activities to defined project areas, which is ecologically less sensitive.
- Restrictions on location of labour camps and offices for project staff near the project area to avoid human induced secondary additional impacts on the flora and fauna species.
- Cutting, uprooting, coppicing of trees or small trees present in and around the project site for cooking, burning or heating purposes by the labourers will be prohibited and suitable alternatives for this purpose will be found.
- Along the major construction work the peripheral greenbelt should be developed in the prescribed area, so that; it will grow to become a full-fledged green cover by the time the construction is over.

8.3 EMP for Ecological Conservation

Technical Director & VP shall ensure that

Prior to commissioning of plant following structural measures are provided:

- Efficient measures for air, water & soil pollution prevention & control to reduce the level of contaminants in environmental attributes
- Efficient measures for prevention & control of noise to reduce the changes in ambient noise level
- Required Safety plans for protection of ecological features especially micro level plantation area of vicinity are prepared & implemented before commissioning & routine operation of the Project and followed during entire project life by all employees & contractors.

8.4 During entire project activity period, following mitigation measures are implemented & followed:

- Regular monitoring for Emission & Ambient air quality, Noise and water & wastewater quality and soil quality as per monitoring plan.
- Proper & efficient implementation of non-structural preventive /precautionary /control measures as well as procedures suggested for prevention/control of major hazards in the proposed unit.
- As suggested in below Greenbelt Development Plan, development & maintenance of adequate dense Greenbelt as per CPCB guideline near proposed activity area and buffer zone throughout project life.
- Before commissioning of proposed activity, properly formulated procedures (including necessary/required SOPs) and action plan for various operation of concern to eliminate the chances of impacts on ecological features of the local area have been prepared & implemented by Environment & safety Manager.
- The supervision shall be done by Environment & safety Manager on daily basis throughout the life of the project starting from the commissioning of the production unit.

Environment & safety Manager shall regularly supervise:

- The efficacy & Adequacy of the implemented mitigation measures for prevention of environmental pollution.
- The functioning of all concern employees and contractor to ensure that the EMP, Procedures & SOPs for prevention of impacts on ecological features of the local area are implemented properly and all employees are using necessary PPEs as directed by Superior.

8.5 Greenbelt Development

In forested habitat projects, the plantations shall be taken up wherever appropriate for ecological enhancement and habitat enrichment. Needs of the local villagers shall also to be considered. Plantations along roads and other vacant area shall be taken up as per the requirement. Proper attention and management is required to maintain the survival rate of the planted species.

8.5.1 Characteristics of a greenbelt:

The major consideration in greenbelt design and development is the density (number per Ha) and width of the greenbelt. Just a row of scattered and isolated trees will not form a greenbelt. Similarly, lawns and few ornamental herbs and shrubs are not going to make a greenbelt. Ideally, a green belt is a thick plantation of at least 15 m width on all sides of industrial units. The density of trees should be at least 1500 to 2000 trees per hectare. The general criteria for selection of plants for greenbelt are:

1. It is preferable to go for tall and evergreen plants, which are locally adapted. Exotic species except those which got naturalized should not be introduced.
2. Trees with multiple uses are more desirable than the useless fast growing species. They should be able to provide at least non-timber products such as minor fruit, flower, fodder etc.

3. The plants chosen for greenbelt should be structurally and functionally similar to the local trees.
4. Exotic Species with invasive potentials should not be planted.
5. They should be capable of growing under the given set of environmental conditions.
6. Resistance to wind, cyclones, dust, heat, water logging or drought etc. are among the other considerations.
7. Even if it is the most suitable species, it is desirable to avoid monocultures (single species). Poly-culture or mixed culture of different species is always better than a single species.

8.5.2 Selection of plants will also take into consideration:

For absorption of gases released during Testing and vehicular transport:

- Tolerance towards pollutants in question, at concentrations, that are not too high to be instantaneously lethal, Longer duration of foliage,
- Freely exposed foliage, through Adequate height of crown,
- Openness of foliage in canopy,
- Big leaves (long and broad laminar surface),
- Large number of stomata apertures
- Stomata well- exposed (in level will the general epidermal surface).

Removal of suspended particulate matter

- Height and spread of crown
- Leaves supported on firm petioles,
- Abundance of surface on bark and foliage, through
- Roughness of bark,
- Epidermal outgrowth on petioles,
- Abundance of axillary's hairs,
- Hairs or scales on laminar surfaces
- Stomata protected (by was, arches/ rings, hairs, etc.)

Company shall follow the following five-year comprehensive

- ✓ Company shall follow the following five-year comprehensive greenbelt development program after that the company shall keep following the prevailing practices of greenbelt management.
- ✓ Company shall maintain all necessary facilities for irrigation of greenbelt in good condition and necessary maintenance of irrigation facilities shall be done regularly.
- ✓ Company shall regularly assess survival rate of planted trees & shrub and if required necessary re-plantation shall be done to ensure healthy & dense greenbelt area in proposed premises.
- ✓ For re-plantation, if required, company shall acquire saplings from local private/government (Forest & Other) nursery.
- ✓ Company shall do fertilization as required for healthy & dense greenbelt development.

8.5.3 Management Period

The properly designed greenbelt area, irrigation facilities, Sapling storage & maintenance area and storage for greenbelt development resources/tools etc. shall be provided in construction phase prior to commissioning of plant operation. The necessary structural maintenance shall be done throughout the extent of operation phase. The greenbelt development guidelines and five year program shall be initiated with inception of construction phase of project and shall be implemented & practiced as routine throughout the project life.

8.5.4 Budgetary Provision

Considered in capital & recurring cost for Ecological Conservation & Protection

8.5.5 Responsible Authority

Project Proponent, Project manager, accounting head/manager, Site Officer & engineers, Contractors.

8.5.6 Activity Plan:

Plantation techniques include selection of seed or sapling, preparation of land, alignment in the form of rows and columns, digging of pits, size of pits, filling of pits with mixtures of garden soil and organic manure, pre-treatment of pits with insecticides for control of termites, filling the pit after transplantation, watering and weeding schedules, gap filling or replacement of dead saplings and many other practices involved in the establishment and maintenance of plantations. Standard practice will be followed for planting of saplings in pits of substantial dimensions, 45cm x 45cm x 45cm for trees at a distance of 2 m and shrubs almost half of these dimensions with a distance of one meter. The pits shall then be filled with neem cake and manure in appropriate proportions. Saplings planted in the pits will be watered liberally. As a matter of regular practice, it is suggested that thick rows of plants should be grown all along and around the boundary of the Project site. A list of plants suggested for greenbelt near the buffer zone is given here. A large variety of fruit baring plant species suggested under the green belt plan (As per the list given in CPCB manual for CZ X 3 page 186) and around 28 lakhs financial budget is proposed to develop the habitat.

The list of fruit baring plant species that are to be raised under afforestation and their number and preferred locality in the buffer zone of the study area: (1.4 ha)

Table 8.1: List of Suggested plants for greenbelt Development

S.No	Botanical Name	Common Name	As per CPCB Manual	Site	No	Space in m	Each	Area
A	B	C	D	E	F	G	H	I=E*G
1	*Aegle marmelos*(L.) Corrêa	Velaga	A22	A1	600	2 X 2	4	2400
2	*Anona squamosa* Linn.	Seethafal	A37	A1	500	2 X 2	4	2000
3	*Artocarpusheterophyllus*Lamk.	Jack fruit tree	A42	A1	100	3 X 3	9	900
4	*AzadirachtaindicaA*.Juss.	Neem	A44	A1	100	5 X 5	25	2500
5	*Emblica officinalis* Gaertn.	Amla	E1	A1	500	3 X 3	9	4500
6	*Ficus religiosa* Linn.	Raavi	F7	A1	58	5 X 5	25	1450
7	*Mangiferaindica* Linn.	Mango	M5	A2	500	3 X 3	9	4500
8	*Psidumguayava*Linn.	Guava	P20	A1	500	2 X 2	4	2000
9	*Syzigiumcumini* Linn.	Neredu	S20	A2	100	5 X 5	25	2500
10	*Tamarindusindica* Linn.	Chinta	T2	A2	50	5 X 5	25	1250
11	*Terminalia catappa*L.	Baadam	T8	A2	500	2 X 2	4	2000
12	*Ziziphus mauritiana*Lam.	Regu	Z1	A3	500	2 X 2	4	2000
13	*Nerium odoratum*Lam.	*Ganneru*	N1	C	500	2 X 2	4	2000
					4508			30000

Table 8.2: Proposed financial Budget for the development of Greenbelt development (Rs in Lakhs)

S.No	Component	Total estimate	First year	Second year	Third year	Fourth year	Fifth year
1	Plantation of trees and ornamental plants	3.0	1.0	1.0	1.0		
2	Soil (50 trucks @5000) = 2.5 L	2.5	1.5	1.0	0	0	0
3.	Pit making 4500 no * Rs 50 = Rs 2.25 L / Landscaping Rs 75000 Total = 3 L	3.0	1.0	1.0	1.0	0	0
4	Gardener's Cost AMC (1 Nos) LS 2 Lakhs per Annum	6.0	2.0	2.0	2.0	0	0
5	Fertilizers cost	1.5	0.5	0.5	0.5		
6	Water supply and Protection	5.0	1.0	1.0	1.0	1.0	1.0
Grand Total		**21.0**	**7.0**	**6.5**	**5.5**	**1.0**	**1.0**

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ANNEXURE – I
NABET CERTIFICATE OF PRIDHVIENVIRO TECH (P) LIMITED

Quality Council of India

National Accreditation Board for Education & Training

CERTIFICATE OF ACCREDITATION

Pridhvi Enviro Tech Private Limited,

184/C, Lawn House, Vengal Rao Nagar,
Hyderabad - 500038, Telangana

Accredited as **Category - A** organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA-EMP reports in the following Sectors:

Sl. No.	Sector Description	Sector (as per) NABET	Sector (as per) MoEFCC	Cat.
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	Mining of minerals - Underground mining	1	1 (a) (ii)	B
2	Thermal power plants	4	1 (d)	B
3	Metallurgical industries (ferrous & nonferrous) - both primary & secondary	8	3 (a)	A
4	Cement plants	9	3 (b)	A
5	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	21	5 (f)	A
6	Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes	31	7 (c)	A
7	Common Municipal Solid Waste Management Facility (CMSWMF)	37	7 (i)	B
8	Building and construction projects	38	8 (a)	B
9	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RA AC minutes dated May 17 and June 28, 2019 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/19/3018 dated July 30, 2019. The accreditation needs to be renewed before the expiry date by Pridhvi Enviro Tech Private Limited, Hyderabad, following due process of assessment

Sr. Director, NABET
Dated: June 20, 2019

Certificate No.
NABET/ EIA/1922/ RA 0132

Valid till
03.06.2022

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ANNEXURE II

LIST OF FLORA AND FAUNA IN THE STUDY AREA

1.0 PLANT SPECIES RECORDED (* secondary data)

S.No.	*Botanical Name*	Common name	Family	Habit
1	*Acacia leucophloea*(Roxb.)	Tellathumma	Leguminosae	Tree
2	*Acacia nilotica*(L.) Delile	Nallathumma	Leguminosae	Tree
3*	*Aegle marmelos*(L.) Corrêa	Velaga	Rutaceae	Tree
4	*Alangiumsalviifolium*(L.f.) Wangerin	Vudugachettu	Cornaceae	Tree
5	*Albiziaamara*(Roxb.) B.Boivin	Konda sigara	Leguminosae	Tree
6	*Albizia lebbeck* (L.) Benth.	Dirisanam	Leguminosae	Tree
7	*Anogeissuslatifolia*(Roxb. ex DC.) Wall.	Chirumanu	Combretaceae	Tree
8*	*AzadirachtaindicaA*.Juss.	Vepa	Meliaceae	Tree
9	*Bauhinia purpurea* L.	Bodhanta	Leguminosae	Tree
10	*Borassusflabellifer*L.	Thadichettu	Arecaceae	Tree
11	*Butea monosperma*(Lam.) Taub.	Modhuga	Leguminosae	Tree
12*	*Cassia fistula* L.	Rela	Leguminosae	Tree
13	*Cassia siamea*Lam.	Seema thangedu	Leguminosae	Tree
14	*Chukrasiatabularis*A.Juss.	Konda vepa	Meliaceae	Tree
15*	*Citrus limon* (L.) Burm. f.	Nimma	Rutaceae	Tree
16	*Cocos nucifera* L.	Kobbari	Arecaceae	Tree
17	*Couroupitaguianensis*Aubl.	Narlinga	Lecythidaceae	Tree
18*	*Dalbergia sissoo* DC.	Sisu	Leguminosae	Tree
19	*Delonix regia* (Hook.) Raf.	Chittikesaram	Leguminosae	Tree
20	*Diospyros melanoxylon* Roxb	Tunki	Ebenaceae	Tree
21	*Eucalyptus citriodora*Hook.	Lemon scented gum	Myrtaceae	Tree
22	*Ficus benghalensis*L.	Marri	Moraceae	Tree
23	*Ficus hispida*L.f.	Medipandu,Bemmeduakulu	Moraceae	Tree
24	*Ficus religiosa* L.	Ravi	Moraceae	Tree
25	*Gmelina asiatica*L.	Kavavagummudu	Lamiaceae	Tree
26	*Holoptelea integrifolia (*Roxb.*)*	Nemalinara	Ulmaceae	Tree
27	*Leucaena leucocephala* (Lam.) de Wit	Jabarichettu	Leguminosae	Tree
28	*Limoniaacidissima*L.	Velaga	Rutaceae	Tree
29	*Mangiferaindica*L.	Mamidi	Anacardiaceae	Tree
30	*Millettiapinnata*(L.) Panigrahi	Kanuga	Leguminosae	Tree
31	*Morindatinctoria*Roxb.	Maddichettu	Rubiaceae	Tree
32	*Pavettaindica*L.	Lakkapapidi	Rubiaceae	Tree
33	*Peltophorumpterocarpum*(DC.) K.Heyne	Kondachintha	Leguminosae	Tree
34	*Phoenix sylvestris* (L.) Roxb.	Eethachettu	Arecaceae	Tree
35	*Phyllanthus emblica* L.	Usiri	Phyllanthaceae	Tree
36	*Pithecellobium dulce* (Roxb.) Benth.	Simachinta	Leguminosae	Tree
37*	*Plumeria alba* L.	Telladevaganneru	Apocynaceae	Tree
38	*Plumeria rubra* L.	Erradevaganneru	Apocynaceae	Tree
39	*Polyalthiacerasoides*(Roxb.) Hook.f. & Thomson	ChilakaDuddi	Annonaceae	Tree
40	*Prosopis chilensis* (Molina) Stuntz	Mulla thumma	Leguminosae	Tree
41	*Prosopis juliflora*(Sw.) DC.	English tumma	Mimosaceae	Tree
42	*Pterospermumheyneanum*G.Don	Duddika	Malvaceae	Tree
43	*Samaneasaman*(Jacq.) Merr.	Nidraganeeru	Sapindaceae	Tree
44	*Sapindusemarginatus*Vahl	Kunkudu	Sapindaceae	Tree
45	*Soymidafebrifuga* (Roxb.) A. Juss.	Somi	Meliaceae	Tree
46	*Syzygiumcumini*(L.) Skeels	Neredu	Myrtaceae	Tree
47	*Tamarindusindica*L.	Chintha	Leguminosae	Tree

48	*Tecoma stans* (L.) Juss. ex Kunth	Pasupuganneru	Bignoniaceae	Tree
49	*Tectonagrandis*L.f.	Teak	Lamiaceae	Tree
50*	*Terminalia catappa*L.	Badham	Combretaceae	Tree
51	*Terminalia elliptica*Willd.	Inumaddi	Combretaceae	Tree
52	*Trema orientalis*(L.) Blume	Bogguchettu	Ulmaceae	Tree
53*	*Wrightiatinctoria*(Roxb.) R.Br.,	Palakodisa	Apocynaceae	Tree
54	*Ziziphus mauritiana*Lam.	Regu	Rhamnaceae	Tree
55	*Ziziphus oenopolia* (L.) Mill.	Pariki	Rhamnaceae	Tree
56	*Abutilon indicum*(L.) Sweet	Thutturubenda	Malvaceae	Shrub
57	*Agave americana* L.	Gitta nara	Asparagaceae	Shrub
58	*Caesalpiniabonduc*(L.) Roxb.	Gachapodha	Leguminosae	Shrub
59	*Caesalpiniapulcherrima*(L.) Sw.	Rathnagandhi	Leguminosae	Shrub
60	*Calotropis gigantea* (L.) Dryand.	Tellajilledu	Apocynaceae	Shrub
61	*Calotropis procera*(Aiton) Dryand.	Errajilledu	Apocynaceae	Shrub
62	*Capparis zeylanica* L.	Aru donda	Capparaceae	Shrub
63	*Carissa spinarum*L.	Kavali	Apocynaceae	Shrub
64*	*Catunaregam spinosa* (Thunb.) Tirveng.	Manga	Rubiaceae	Shrub
65	*Clerodendrumphlomidis*L.f.	Kond-takal	Lamiaceae	Shrub
66	*Datura stramonium* L.	Ummetha	Solanaceae	Shrub
67*	*Erythroxylummonogynum*Roxb.	Dedaraaku	Erythroxylaceae	Shrub
68	*Euphorbia tirucalli*L.	Tirukalli	Euphorbiaceae	Shrub
69	*Grewiahirsuta*Vahl	JaaniChettu	Tiliaceae	Shrub
70	*Grewiaflavescens*Juss.	Jana	Malvaceae	Shrub
71	*Helicteresisora*L.	Goobathadu	Malvaceae	Shrub
72	*Hyptissuaveolens* (L.) Poit.	Danthitulasi	Lamiaceae	Shrub
73	*Ipomoea carnea*Jacq.	Rubber mokka	Convolvulaceae	Shrub
74	*Ixora coccinea* L.	Ramabanam	Rubiaceae	Shrub
75	*Jasminum angustifolium*Vahl.	Adavimalli	Oleaceae	Shrub
76	*Jasminumcuspidatum*Rottler		Oleaceae	Shrub
77	*Jasminum roxburghianum*Wall. ex C.B.Clarke	Garuda malli	Oleaceae	Shrub
78	*Lantana camara* L.		Verbenaceae	Shrub
79	*Leonotisnepetifolia*(L.) R.Br.	Rana bheri	Lamiaceae	Shrub
80	*Morinda pubescens Sm.*		Rubiaceae	Shrub
81	*Opuntia dillenii*(Ker Gawl.) Haw.	Naga jamudu	Cactaceae	Shrub
82*	*Phoenix acaulis* Roxb.	Chitteetha	Palmae	Shrub
83	*Senna auriculata* (L.) Roxb.	Tangedu	Leguminosae	Shrub
84	*Senna occidentalis* (L.) Link	Kasintha	Leguminosae	Shrub
85*	*Solanum pubescens*Willd.	Uchintha	Solanaceae	Shrub
86	*Solanum surattense*Burm. f.	Nelavakudu	Solanaceae	Shrub
87*	*Toddaliaasiatica* (L.) Lam.	Konda kasintha	Rutaceae	Shrub
88	*Xanthium strumarium*L.	Marula-Mathangi	Asteraceae	Shrub
89	*Azollapinnata subsp. africana* (Desv.)		Salviniaceae	Hydrophyte
90	*Eichorniacrassipes*Solms		Pontederiaceae	Hydrophyte
91	*Hydrilla* Rich.		Hydrocharitaceae	Hydrophyte
92	*Ipomoea aquatica*Forssk.	ThootiKoora	Convolvulaceae	Hydrophyte
93	*Lemna minor*Hegelm.		Araceae	Hydrophyte
94	*Limnophilaheterophylla*R. Br.		Plantaginaceae	Hydrophyte
95	*Typha angustata*L.	Jammu	Typhaceae	Hydrophyte
96	*Acalyphaindica*L.		Euphorbiaceae	Herb
97	*Achyranthes aspera* L.	Uttareni	Amaranthaceae	Herb
98	*Aervalanata*(L.) Juss	Thelagapindi	Amaranthaceae	Herb
99*	*Aeschynomene aspera L*	Neetijeeluga	Leguminosae	Herb

100	*Ageratum conyzoides*(L.) L.	Vasavi	Asteraceae	Herb
101	*Aloe vera* (L.) Burm.f.	Kithanara	Tiliaceae	Herb
102*	*Alternanthera sessilis*(L.) R.Br. ex DC.	Ponagantiaku	Amaranthaceae	Herb
103	*Amaranthus spinosus* L.	Mulla thotakoora	Amaranthaceae	Herb
104*	*Amaranthus viridis*L.	Chilakathotakoora	Amaranthaceae	Herb
105	*Andrographis echioides*(L.) Nees	Chalavalapurikada	Acanthaceae	Herb
106	*Argemone mexicana L.*	Brahmadandi	Papaveraceae	Herb
107	*Barleriaprionitis*L.	Pachagorinta	Acanthaceae	Herb
108	*Blumeamollis* (D. Don) Merr.	Kukkapogaku	Asteraceae	Herb
109	*Boerhaviadiffusa*L.	Atikimamidi	Nyctaginaceae	Herb
110	*Borreriahispida* Spruce ex K.Schum.		Rubiaceae	Herb
111	*Catharanthus roseus* (L.) G.Don	Billagannеru	Apocynaceae	Herb
112	*Celosia virgata*Jacq.	Guruga	Amaranthaceae	Herb
113	*Cleome aspera* J.König ex DC		Cleomaceae	Herb
114	*Cleome viscosa*L.	Kukkavomintha	Cleomaceae	Herb
115	*Crotalaria juncea*L.	Janumu	Leguminosae	Herb
116*	*Croton bonplandianus*Baill.	Vana mokka	Euphorbiaceae	Herb
117	*Desmodiumdichotonum*(Willd.) DC.		Leguminosae	Herb
118	*Eclipta alba* (L.) Hassk.	Guntagalagara	Asteraceae	Herb
119	*Euphorbia hirta*L.	Nanubalu	Euphorbiaceae	Herb
120*	*Evolvulusalsinoides* (L.) L		Convolvulaceae	Herb
121	*Gomphrena serrata* L.	Tellabendumalli	Amaranthaceae	Herb
122	*Hygrophilaauriculata* (Schumach.) Heine	Mundlagobbi	Acanthaceae	Herb
123	*Indigoferahirsuta*L.	Kolapattitulu	Leguminosae	Herb
124	*Indigoferalinnaei*Ali		Leguminosae	Herb
125	*Justicia procumbens*L.		Acanthaceae	Herb
126	*Leucas aspera* (Willd.) Link	Tummi	Lamiaceae	Herb
127	*Ludwigia perennis* L.	Lavangakayamokka	Onagraceae	Herb
128	*Mimosa pudica*L.	Atthipathi	Leguminosae	Herb
129	*Mollugocerviana* (L.) Ser.		Molluginaceae	Herb
130	*Ocimumcanum*Sims.	KukkaTulasi	Lamiaceae	Herb
131	*Oldenlandiaumbellata*L.	Chiru veru	Rubiaceae	Herb
132	*Oxalis corniculata*L.	Indian Sorrel	Oxalidaceae	Herb
133*	*Parthenium hysterophorus*L.	Vayyaribhama	Asteraceae	Herb
134	*Pavoniazeylanica*Cav.	Karubenda	Malvaceae	Herb
135	*Phyllanthus amanus*	NelaUsiri	Euphorbiaceae	Herb
136	*Phyllanthus maderaspatensis*L.		Phyllanthaceae	Herb
137	*Plumbago zeylanica*L.	Agnimaata	Plumbaginaceae	Herb
138	*Portulaca oleracea* L.	Pappu Kura	Portulacaceae	Herb
139	*Sesuviumportulacastrum*(L.) L.	Thikka Kura	Aizoaceae	Herb
140	*Sidaacuta*Burm.f.	Medabirusaku	Malvaceae	Herb
141	*Sidacordifolia*L.	Chiru Benda	Malvaceae	Herb
142	*Sonchus oleraceus* (L.) L.		Compositae	Herb
143	*Sphaeranthus indicus* L.	Bodasaramu	Asteraceae	Herb
144*	*Tephrosia purpurea*(L.) Pers.	Vempali	Leguminosae	Herb
145	*Tribulus terrestris* L.		Zygophyllaceae	Herb
146	*Tridaxprocumbens*(L.) L.	Gaddichamanthi	Asteraceae	Herb
147	*Triumfettapentandra*A.Rich.	Chirusitrika	Malvaceae	Herb
148	*Urenalobata*L.	Peddabenda	Malvaceae	Herb
149	*Vanda tessellata*	Kodikallachettu	Orchidaceae	Herb
150	*Vernonia cinerea*(L.) Less.		Compositae	Herb
151	*Waltheriaindica*L.	Nalla Benda	Malvaceae	Herb

152	*Ziziphus nummularia*(Burm.f.) Wight &Arn.	Nelaregu	Rhamnaceae	Herb
153	*Brachiariaeruciformis*		Poaceae	Grass
154	*Cynodondactylon*	Garika	Poaceae	Grass
155	*Cyperuscastaneus*		Poaceae	Grass
156	*Cyperusflavidus*		Cyperaceae	Grass
157	*Cyperusrotundus*L.		Cyperaceae	Grass
158	*Digitariaciliaris*		Poaceae	Grass
159	*Eragrostistenella* (L.) P.Beauv.exRoem.&Schult.		Poaceae	Grass
160*	*Abrusprecatorius* L.	Gurivinda	Leguminosae	Climber
161	*Asparagus racemosus*Willd.	Pilli Gaddalu	Asparagaceae	Climber
162	*Cardiospermum halicacabum*L.	BuddaKakara	Sapindaceae	Climber
163	*Cissusquadrangularis*L.	Nalleru	Vitaceae	Climber
164	*Clitoriaternatea*L.	Sanku-Pushpamu	Leguminosae	Climber
165	*Cuscuta reflexa* Roxb.		Convolvulaceae	Climber
166	*Dioscorea pentaphylla* L.	Adavigunusuthega	Dioscoreaceae	Climber
167*	*Gloriosa superba*L.	Adavinabhi	Liliaceae	Climber
168	*Ipomoea macrantha*Roem. &Schult.		Convolvulaceae	Climber
169	*Ipomoea nil* (L.) Roth.		Convolvulaceae	Climber
170*	*Ipomoea obscura* (L.) Ker Gawl.		Convolvulaceae	Climber
171	*Pergulariadaemia* (Forssk.) Chiov.	Dustapu-Teega	Apocynaceae	Climber
172	*Rivealypocrateriformis*Choisy.	Bodditeega	Convolvulaceae	Climber

Secondary data Source: Forest department Mahaboobnagar Forest division Working plan (2013-2022),

* indicates that data is collected from Secondary source

2. LIST OF FAUNA & THEIR CONSERVATION STATUS

2.1. Checklist of Mammalian species in the Study Area (* indicates Pirmary data)

S.No.	*Scientific Name*	Common Name	Family	WPA Status	IUCN
1	*Sus scrofa*	Wild Boar	Suidae	Schedule III	LC
2	*Funambulus palmarum*	Three striped palm squirrel	Sciuridae		LC
3	*Bendicotabengalensis*	Indian mole rat	Muridae		LC
4	*Bendicotaindica*	Bandicoot rat	Muridae		LC
5	*Mus booduga*	Little Indian Field mouse	Muridae		LC
6	*Mus musculus*	House Mouse	Muridae		LC
7	*Rattus rattus*	House rat	Muridae		LC
8	*Lepus nigricollis*	Black-naped Hare	Leporidae	Schedule IV	LC
9	*Herpestesjavanicus*	Common Indian Mongoose	Herpestidae	Part II of Schedule II	LC
10	*Felis chaus*	Jungle cat	Felidae	Part II of Schedule II	LC
11	*Rhinopomahardwickii*	Lesser Mouse-Tailed Bat	Chiroptera		LC
12	*Cynopterus sphinx*	Short-Nosed Fruit Bat	Chiroptera	Schedule V	LC
13	*Pipistrelluscoromandra*	Indian Pipistrelle	Chiroptera		LC
14	*Vulpusbenghalensis*	Wild fox	Canidae	Part-I of Sch-II	LC

IUCN: International Union for Conservation of Nature and Natural Resources;

EX: Extinct; CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near Threatened; LC: Least Concern; DD: Data Deficient. IW(P)A: Indian Wildlife (Protection) Act, 1972.

Source:

- Mahaboobnagar Forest division Working plan (2013-2022),

- Vivek Menon (2014), *Indian Mammals: A Field Guide.* Hachette Book Publishing India Pvt. Ltd., Gurgaon, India, pp 1-522;
- IUCN (2015). *The IUCN Red List of Threatened Species.* Version 2015-4;

Aves:

All the listed birds are Least Concern under IUCN and Schedule - IV under Indian Wildlife Protection Act (1972) (* directly obsereved bird from the study area)

Scientific name	Common Name	Family	I - WPA	IUCN
Acridotheresristis	Common Myna	Sturnidae	Schedule IV	LC
Acrocephalusagricola	Paddy field Warblers	Acrocephalidae	Schedule IV	LC
Acrocephalusstentoreus	Reed Warbler	Acrocephalus	Schedule IV	LC
Actitishypoleucos	Common Sandpipper	Scolopacidae	Schedule IV	LC
Amaurornisphoenicurus	White Breasted Water Hen	Rallidae	Schedule IV	LC
Anastomusoscitans	Open Billed Storks	Ciconiidae	Schedule IV	LC
Anthusrufulus	Paddy pipet	Motacilladae	Schedule IV	LC
Apus affinis	House Swift	Apodidae	Schedule IV	LC
Ardea alba	Large Egrets	Ardeidae	Schedule IV	LC
Ardea intermedia	Medium Egret	Ardeidae	Schedule IV	LC
Ardeolagrayii	Pond Heron	Ardeidae	Schedule IV	LC
Bubulcus ibis	Cattle Egret	Ardeidae	Schedule IV	LC
Calidristemminckii	Temminck's Stint	Scolopacidae	Schedule IV	LC
Centropussinensis	Crow Pheasant	Cuculidae	Schedule IV	LC
Cerylerudis	Pied Kinglisher	Cerylidae	Schedule IV	LC
Charadriusalexandrinus	Kentish Plovers	Charadriidae	Schedule IV	LC
Charadriushiaticula	Ringed Plover	Charadriidae	Schedule IV	LC
Cinnyrisasiaticus	Purple Sunbird	Nectariniidae	Schedule IV	LC
Cisticola juncidis	Streaked Fantail Warbler	Cisticolidae	Schedule IV	LC
Copsychussaularis	Oriental Magpie Robin	Muscicapidae	Schedule IV	LC
Coraciiformesasbenghalensis	Indian Roller	Coraciiformesidae	Schedule IV	LC
Cypsiurusbalasiensis	Asian Palm Swift	Apodidae	Schedule IV	LC
Delichonurbicum	Northern House Martin	Hirundinidae	Schedule IV	LC
Dendrocittaformosae	Grey Treepie	Corvidae	Schedule IV	LC
Dicrurusmacrocercus	Black Drongo	Dicruridae	Schedule IV	LC
Dinopiumbenghalense	Lesser Golden Backed Woodpecker	Picidae	Schedule IV	LC
Egrettagarzetta	Little Egret	Ardeidae	Schedule IV	LC
Elanus caeruleus	Black Shouldered Kite	Accipitridae	Schedule IV	LC
Eremopterixgrisea	Ashy crowned Sparrow lark	Alaudidae	Schedule IV	LC
Eudynamysscolopacea	Asian Koel	Cuculidae	Schedule IV	LC
Euodicemalabarica	White Throated Munia	Estrildidae	Schedule IV	LC
Francolinuspondicerianus	Grey Patridge	Phasianidae	Schedule IV	LC
Fulicaatra	Common Coot	Rallidae	Schedule IV	LC
Gallinagogallinago	Common Snipe	Scolopacidae	Schedule IV	LC
Gallinulachloropus	Common Moorhen	Rallidae	Schedule IV	LC

Gracupica contra	Asian Pied starling	Sturnidae	Schedule IV	LC
Halcyon smyrnensis	White Breasted Kingfisher	Halcyonidae	Schedule IV	LC
Haliasturindus	Brahminy Kite	Accipitridae	Schedule IV	LC
Himantopushimantopus	Black winged stilt	Recurvirostridae	Schedule IV	LC
Hirundodaurica	Red Rumped Swallows	Hirundinidae	Schedule IV	LC
Laniuscristatus	Brown shrike	Laniidae	Schedule IV	LC
leptocomazeylonica	Purple Rumped Sunbird	Nectariniidae	Schedule IV	LC
Lonchuraatricapilla	Black Headed Munia	Estrildidae	Schedule IV	LC
Lonchurapunctulata	Spotted Munia	Estrildidae	Schedule IV	LC
Megalaimahaemacephala	Copper Smith Barbet	Megalaimidae	Schedule IV	LC
Meropsorientalis	Small Bee eater	Meropidae	Schedule IV	LC
Milvus migrans	Black kite	Accipitridae	Schedule IV	LC
Motacilla alba	White wagtail	Motacillidae	Schedule IV	LC
Nyctyornisathertoni	Blue tailed Bee eaters	Meropidae	Schedule IV	LC
Passer domesticus	House Sparrow	Passeridae	Schedule IV	LC
Pavocristatus	Indian Peafowl	Phasianidae	Schedule I	LC
Phalacrocoraxniger	Little Cormorant	Phalacrocorax	Schedule IV	LC
Phylloscopusmaculipennis	Ashy Warblers	Phylloscopidae	Schedule IV	LC
Ploceusphilippinus	Baya Weaver	Ploceidae	Schedule IV	LC
Porphyrioporphyrio	Purple Moorhen	Rallidae	Schedule IV	LC
Priniahodgsonii	Grey Breasted Prinia	Cisticolidae	Schedule IV	LC
Psittaculaeupatria	Alexandrine Parakeet	Psittacidae	Schedule IV	LC
Psittaculakrameri	Rose ringed Parakeet	Psittacidae	Schedule IV	LC
Pycnonotuscafer	Red Vented Bulbul	Pycnonotidae	Schedule IV	LC
Saxicola caprata	Pied bush chat	Muscicapidae	Schedule IV	LC
Saxicoloidesfulicata	Indian Robin	Muscicapidae	Schedule IV	LC
Sterna hirundo	Common Terns	Sternidae	Schedule IV	LC
Streptopeliaorientalis	Spoted dove	Columbidae	Schedule IV	LC
Sturniapagodarum	Brahminy Starlings	sturnidae	Schedule IV	LC
Tachybaptusruficollis	Little Grebe	Podicipedidae	Schedule IV	LC
Tephrodornispondicerianus	Common Wood Shrike	Prionopidae	Schedule IV	LC
Turdoidescaudata	Common Babbler	Timaliidae	Schedule IV	LC
Turdoidesmalcolmi	Large Grey Babblers	Timaliidae	Schedule IV	LC
Turdoidesstriata	Jungle Babbler	Timaliidae	Schedule IV	LC
Vanellus indicus	Red wattled Lapwing	Charadriidae	Schedule IV	LC

*Status assigned by the IUCN, where – CR – Critically Endangered; EN – Endangered; LC – Least Concern; NT – Near Threatened; VU – Vulnerable, DA – Data Deficient, NE – Not Evaluated, R : Resident; RM : Resident Migratory; M: Migratory. All the birds observed from the study area.

Idenfication Sources:

- Mahaboobnagar Forest division Working plan (2013-2022).
- Ali, S and Ripley, S.D. 1969.Handbook of the Birds of India and Pakistan together with those of Nepal, Sikkim, Bhutan and Ceylon,3. Stone Curlews to Owls. Oxford University Press, Bombay, 327pp.
- IUCN 2019. The IUCN Red List of Threatened Species. Version 2018-2. <http://www.iucnredlist.org>
- Grimmett, R., Inskipp, C and T. Inskipp, 2001. Pocket Guides to the Birds of the Indian Subcontinent. Cristopher Helm Publishers, Oxford University Press, 384pp.

2.2 List of Reptiles either spotted or reported from the study area. (* indicates Direct observations)

Scientific Name	Common Name	Family	IWPA	IUCN
Calotes versicolor	Common Garden Lizard	Agamidae		LC
Sitanaponticeriana	Fan-throated lizard	Agamidae		LC
Calotesrouxi	Forest Calottes	Agamidae		LC
Chameleozylanicus	Chameleon	Chemeleonidae	Sch- II	LC
Dendrelaphistristis	Common Indian Bronze back	Colubridae		LC
Lycodonaulicus	Common Wolf Snake	Colubridae		LC
Ptyas mucosa	Indian Rat Snake	Colubridae	Sch- II	LC
Ahaetullanasutus	Common tree Snake	Colubridae		LC
Enhydrisenhydris	Common Smooth Water Snake	Colubridae		LC
Macropisthodonplumbicolor	Green keel back	Colubridae		LC
Xenochrophis piscator	Checkered Keel back	Colubridae	Sch- II	LC
Bungarus caeruleus	Common Indian Krait	Elapidae		LC
Hemidactylus brooki	Brook's Gecko	Geckkonidae		LC
Hemidactylus flaviviridis	Northern house Gecko	Geckkonidae		LC
Mabuyacarinata	Common Skink	Scincidae		LC
Varanus bengalensis	Indian Monitoring Lizard	Varanidae	Sch- II	LC
Viperaruselli	Russell's viper	Viperidae	Sch- II	LC

Mahaboobnagar Forest division Working plan (2013-2022),

2.3. List of **Amphibians** either spotted or reported from the study area.

Scientific Name	Common Name	Family	Status	IWPA
Bufo melanostictus	Common Indian Toad	Bufonidae	LC	Sch-IV
Euphlyctiscyanophlyctis	Skittering Frog	Ranidae	LC	Sch-IV
Euphlyctishexadactylus	Indian Pond Frog	Ranidae	LC	Sch-IV
Hoplobatrachustigerinus	Indian Bull Frog	Ranidae	LC	Sch-IV
Polypedates maculates	Common Tree Frog	Rhocophoridae	LC	Sch-IV

*Status assigned by the IUCN, where – CR – Critically Endangered; EN – Endangered; LC – Least Concern; NT – Near Threatened; VU – Vulnerable, DA – Data Deficient, NE – Not Evaluated

Sources for Amphibians:

- Mahaboobnagar Forest division Working plan (2013-2022),
- Ranjit Daniels (2004). Amphibians of Peninsular India
- Romulus Whitaker & Ashok Captain (2006). *Snakes of India; Dreko Books, Chennai, pp 1-146;*
- IUCN (2015); *The IUCN Red List of Threatened Species.* Version 2015-4;
- *Schedules I to VI: Indian Wildlife (Protection) Act, 1972.*

2.4 List of **Butterflies** either spotted or reported from the study area. (* indicates Primary data)

Scientific Name	Common Name	Family
Discolampa ethion	Banded blue Pierrot	Lycaenidae
Tarucusextricatus	Rounded Pierrot	Lycaenidae
Danaus genutia	Stripped tiger	Nymphalidae
Euremahecabe	Common Grass Yellow	Pieridae
Ceporanerissa	Common gull	Pieridae
Borbocinnara	Rice Swift	Hesperiidae
Taractroceramaevius	Common Grass Dart	Hesperiidae
Euchrysopscnejus	Gram Blue	Lycaenidae
Pseudozizeeriamaha	Pale Grass Blue	Lycaenidae
Acraea terpsicore	Tawny Coster	Nymphalidae
Euploea core	Common Indian Crow	Nymphalidae
Pieris rapae	Cabbage white	Pieridae
Leptosianina	psyche	Pieridae
Neptishylas	Common Sailer	Nymphalidae
Phalantaphalantha	Common Leopard	Nymphalidae
Mycalesisperseus	Common Bush Brown	Nymphalidae
Danaus chrysippus	Plain Tiger	Nymphalidae
Atrophaneuraaristolochiae	Common rose	Papilionidae
Atrophaneura hector	Crimson Rose	Papilionidae
Belenoisaurota	Pioneer	Pieridae
Pantoporiahordonia	Common Lascar	Nymphalidae
Castaliusrosimon	Common Pierrot	Lycaenidae
Junoniaalmana	Peacock Pansy	Nymphalidae
Tirumala limniace	Blue Tiger	Nymphalidae
Junonialemonias	Lemon Pansy	Nymphalidae
Ariadne ariadne	Angled Castor	Nymphalidae
Graphiumagamemnon	Tailed Jay	Papilionidae
Delias eucharis	Common jezebel	Pieridae

Sources :

1. Gunathilagaraj, K., T.N.A. Perumal, K. Jayaram, M. Ganesh Kumar, 1998.Some South Indian Butterflies. Published under Project Lifescape, Indian Academy of Sciences, Bangalore, 270 pp.
2. Kehimkar, I. 2008. The book of Indian butterflies. Bombay Natural History Society and Oxford University Press, Mumbai. 497p.
3. Kunte, K. 2000. India - A Lifescape: Butterflies of Peninsular India. Indian Academy of Sciences, Bangalore, Universities Press. 270p
4. Thulsi Rao, K., M. Prudhvi Raju, S.M. Maqsood Javed and I. Siva Rama Krishna, 2004: A checklist of Butterflies of NagarjunasagarSrisailam Tiger Reserve. Andhra Pradesh. Zoos' Print Journal19(12): 1713-1715.

ANNEXURE III

Test Record of Ground Vibrations