

## Ports and Logistics

AVPPL/MoEF/2021-22/1766

Date: 19<sup>th</sup> November 2021

To,  
Additional Principal Chief Conservator of Forests (C),  
Ministry of Environment Forest and Climate Change (MoEF&CC),  
Regional Office (Southern Zone), Kendriya Sadan,  
IV<sup>th</sup> Floor, E&F Wings, 17<sup>th</sup> Main Road, II<sup>nd</sup> Block,  
Koramangala, Bangalore-560034  
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**Subject:** Submission of Half Yearly Compliance Report (HYCR) to Conditions of Environmental Clearance (EC) for the Period April 2021 to September 2021 - Reg.

**Reference:** EC for building stone quarry project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala; by M/s. Adani Vizhinjam Port Pvt. Ltd. vide **No. 1200/EC2/2018/SEIAA dated 01.03.2019**

Dear Sir,

This has reference to the Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA issued on 3<sup>rd</sup> March 2019 (vide reference cited) by the State Environmental Impact Assessment Authority (SEIAA), Kerala for the building stone quarry project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala of M/s Adani Vizhinjam Port Private Limited (AVPPL).

The Half Yearly EC Compliance Report (HYCR) of the conditions stipulated in the cited reference for the period from **April 2021 to September 2021** is enclosed herewith for record and reference. You are requested to kindly acknowledge the receipt of the same.

Thanking you.



Yours Sincerely  
Rajesh Jha  
MD & CEO – Authorized Signature  
Enclosed: As mentioned above



Copy to: State Environment Impact Assessment Authority (SEIAA), K.S.R.T.C Bus Terminal Complex, 4th Floor, Thampanoor, Thiruvananthapuram, Kerala

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# **Building Stone Quarry Project**

**Survey No. 555/2 at Nagaroor Village,  
Chirayinkeezhu Taluk, Thiruvananthapuram District**

Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019


**Half Yearly Compliance Report (HYCR)  
for the Period April 2021 to September 2021**

Project Proponent




**Adani Vizhinjam Port Private Ltd. (AVPPL)**

**November 2021**


	Adani Vizhinjam Port Private Limited (AVPPL)	From: April 2021 To: September 2021
Building Stone Quarry Project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District		

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period April 2021 to September 2021		
S. No.	Conditions	Compliance Status as on September 30, 2021
Specific Conditions		
1	The mining should be conducted with Non-Electric Detonator (NONEL) Method thereby minimizing air blast, fly rock and ground vibration.	<p><b>Complied</b></p> <p>Mining is being conducted using Non-Electric Detonator (NONEL) method of controlled blasting only; to minimize the air blast, fly rock and ground vibration. Till date no incident to fly rock has been recorded.</p> <p>Adani Vizhinjam Port Pvt. Ltd. (AVPPL) had engaged Anna University, Department of Mining Engineering, Chennai to conduct a scientific study on Blast Induced Ground Vibration for the Quarry. Altogether 10 experimental blast rounds were conducted. Comprehensive vibration monitoring was carried out during the blasting experiment. In all the 10 trial blasts, ground vibrations were monitored at 47 locations around the blasting sites and neighboring village which includes domestic houses and other prominent structures of the village such as the houses are not belonging to the owner of mine management.</p> <p>Based on the scientific study, it is concluded that the blast induced ground vibrations and noise levels generated by the controlled blasting carried out in the quarry are safe and well within the permissible limit as per recommendations of Directorate General of Mine Safety (DGMS) and therefore is not affecting the residential buildings and other structures. Further, it had been observed that no flying fragments or projectiles travelled beyond 10 m from the site of blast. Hence, it was inferred through the study report that controlled blasting can be carried out at the Quarry. The Study Report is enclosed as <b>Annexure 1</b>.</p>
2	Extract a maximum of 7 lakh tons of building stone within a period of two years. Further permission for mining may be considered based on the requirement then and environmental assessment.	<p><b>Will be Complied</b></p> <p>During the compliance period (April 2021 to September 2021), a total of 2.725 Lakh Tons of building stones have been extracted and a total cumulative quantity of 9.006 Lakh Tons of building stones have been extracted from inception of mining on 02.07.2019 till 30.09.2021.</p>


	Adani Vizhinjam Port Private Limited (AVPPL)	From: April 2021 To: September 2021
Building Stone Quarry Project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District		

Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period April 2021 to September 2021		
S. No.	Conditions	Compliance Status as on September 30, 2021
		In view of the additional requirement of building stone for completion of phase 1 of the Vizhinjam project, SEIAA decided to issue EC for the extraction of a further 10.79 Lakh Tons granite rock for the period from 2021-22 to 2023-24 subject original EC conditions vide their order No. 1200/EC2/2018/SEIAA dated 16.11.2020 (A copy of the order was submitted along with the HYCR for the period October 2020 to March 2021). The Modified Approved Mining Plan is enclosed as <b>Annexure 2</b> .
3	The proponent shall file an affidavit that he will expend Rs. 15 lakhs as a part of CER in consultation with Local Self Government.	<b>Complied</b> AVPPL have submitted to SEIAA an affidavit dated 08.11.2019 duly signed by the MD and CEO vide letter AVPPL/SEIAA/2019-20/945 dated 15.11.2019 that Rs. 15 Lakhs will be spent as a part of Corporate Environment Responsibility (CER) in consultation with the Local Self Government. A copy of the affidavit was submitted along with the HYCR for the period October 2019 to March 2020.
4	The proponent should follow the closure plans (progressive closure and final closure) as per KMMC Rules.	<b>Will be Complied</b> AVPPL will follow the closure plans (progressive closure and final closures) as per Kerala Minor Minerals Concession (KMMC) Rules and Mine Closure Plan in the Modified Approved Mining Plan (Enclosed as <b>Annexure 2</b> ).  The closure procedure (progressive closure and final closures) shall be documented prior to and during the closure of the mine.
General Conditions		
1	A separate environmental management and monitoring cell with qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.	<b>Complied</b> A separate Environmental Management and Monitoring Cell (EMMC) with qualified personnel has been set up by AVPPL. The cell is under the control of the Head of Department (HoD), Environment who reports directly to the Chief Executive Officer (CEO), AVPPL. The details of the constitution of EMMC was submitted along with HYCR for the period April 2019 to September 2019.
2	Suitable avenue trees should be planted along either side of the	<b>Being Complied</b> There is already existing plantation along the tar



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Building Stone Quarry Project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District		

**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period April 2021 to September 2021**

S. No.	Conditions	Compliance Status as on September 30, 2021
	tarred road and open parking areas, if any, including of approach road and internal roads.	<p>road. AVPPL have planted avenue trees at suitable locations like buffer zone, etc. for greenbelt development.</p>  <p align="center"><b>Avenue Plantation</b></p>
3	Sprinklers shall be installed and used in the project site to contain dust emissions.	<p><b>Being Complied</b></p> <p>Regular water sprinkling through water tankers is being carried out on haul roads and other dust prone areas such as loading and unloading of minerals.</p>

<b>adani</b>	<b>Adani Vizhinjam Port Private Limited (AVPPL)</b>	<b>From: April 2021 To: September 2021</b>
<b>Building Stone Quarry Project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District</b>		

<b>Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period April 2021 to September 2021</b>		
<b>S. No.</b>	<b>Conditions</b>	<b>Compliance Status as on September 30, 2021</b>
		 <p><b>Water Sprinkling through Tankers</b></p>
4	Eco-restoration including the mine closure plan shall be done at the own cost of the project proponent	<p><b>Will be Complied</b></p> <p>Eco-restoration including Mine Closure Plan is provided in the Modified Approved Mining Plan (Enclosed as <b>Annexure 2</b>). The same shall be implemented during the closure at the cost of AVPPL.</p>
5	In view of the deep pits left after the excavation, stacking at maximum top level should be carried out.	<p><b>Not Applicable</b></p> <p>Stacking of materials is not being carried out as all the produced materials are used for Breakwater Construction at Vizhinjam Port and being transported directly to the Port site and not stacked at the quarry site.</p> <p>As per the mine closure plan the pit will be utilized for storing of water as a rainwater harvesting method and will also be induced to sustain the groundwater table. As per the post mining land use, an area of 0.9540 Ha will be used for water pond for storage of water.</p>
6	Corporate Environment Responsibility agreed upon by the proponent should be implemented.	<p><b>Being Complied</b></p> <p>AVPPL is coordinating with the Local Self Government regarding approval of the proposed CER plan with expense heads under specific activities in line with MoEF&amp;CC Office Memorandum (OM) F.No.22-65/2017-IA.III dated 01.05.2018.</p> <p>AVPPL had prepared a budget plan and have submitted the same to the Nagaroor Gram</p>



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<b>Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period April 2021 to September 2021</b>		
<b>S. No.</b>	<b>Conditions</b>	<b>Compliance Status as on September 30, 2021</b>
		<p>Panchayat seeking their confirmation and go ahead for the proposed CER (Proposed plan was submitted along with HYCR for the period October 2019 to March 2020). Correspondence to the President of the Nagaroor Gram Panchayat was submitted along with HYCR for the period April 2019 to September 2019.</p> <p>Considering the requirements of the community and on discussions with the local panchayat, AVPPL has implemented CER activities in the surrounding areas of the quarry site. During the compliance period, following activities have been taken up as a part of CER:</p> <p>AVPPL is supplying drinking water to the local people in the vicinity of the project site. Work was awarded to a local contractor to supply water through tankers.</p> <p>Considering the impact of the COVID-19 pandemic, as a part of CER, AVPPL provided medical support for COVID First Line Treatment Center in Nagaroor Panchayath in terms of Beds (50 Nos.) and Antigen Kits (1000 Nos) on 20.05.2021.</p>  <p style="text-align: center;"><b>COVID Beds</b></p> <p>Govt. Upper Primary School (UPS) Vanchiyoor is the only school in Karavaram Grama Panchayath with about 350 students studying. Many of whom are economically backward and they are using public buses for transportation. The school Parents Teachers Association (PTA) decided to</p>


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		<p>buy a bus and to collect contributions from the local people. As a part of CER, AVPPL contributed an amount of Rs. 1 Lakh towards acquiring a school bus for the children of Govt. UPS, Vanchiyoore on 16.06.2021.</p>  <p><b>Handing over of Rs. 1 Lakh DD to Govt. UPS, Vanchiyoore PTA Members</b></p>  <p><b>School Bus</b></p> <p>Much like the previous year, AVPPL had distributed Onam Gift Kit as a part of CER initiative to BPL families surrounding Kadavilla project area in Nagaroor panchayat. The Onam Gift Kit (which included various groceries and</p>

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<b>Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period April 2021 to September 2021</b>		
<b>S. No.</b>	<b>Conditions</b>	<b>Compliance Status as on September 30, 2021</b>
		<p>provisions) were sourced from VIZ Mart (an initiative supported by Adani foundation) and the same were distributed on 19.08.2021.</p>  <p style="text-align: center;"><b>Distribution of Onam Kits</b></p>
7	The project proponent shall comply the conditions stipulated by the statutory authorities concerned.	<p><b>Being Complied</b> AVPPL is complying with all applicable conditions stipulated by respective competent statutory authorities.</p>
8	Tarring /multiple options on the access roads shall be undertaken so as to reduce dust pollution during movement of vehicle.	<p><b>Complied</b> AVPPL has developed a tar road of around 0.9 km from the quarry project site gate to Kadavilla Junction (which is connected to SH46 and onto NH66) for movement of vehicles; thereby reducing the dust pollution.</p>  <p style="text-align: center;"><b>Tar Road at Project Site</b></p>




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9	Overburden materials should be managed within the site and used for reclamation of mine pit as per mine closure plan / specific conditions	<p><b>Being Complied</b></p> <p>As such, the quarry had been mined earlier by another party and since this is already an open mine, there was no top soil or overburden available in the quarry; all the produced materials are being used for Breakwater Construction at Vizhinjam Port.</p> <p>However, due to certain geological disturbances in the formation, some overburden has been found in between the rock formation after attaining 6 m on the western slope between p3 and p4 pillars. AVPPL have identified area of land in the lower portions of the quarry for storing the overburden materials along with gabion wall protection. The overburden will be managed within the site as per mine closure plan.</p>
10	Height of benches should not exceed 5 m, and width should not be less than 5 m, if there is no mention in the mining plan/specific condition.	<p><b>Being Complied</b></p> <p>As per the Modified Approved Mining Plan (Enclosed as <b>Annexure 2</b>), bench height and width need to be maintained at maximum of 6.0 m also a 45° pit slope will be maintained; same is being adhered to.</p>
11	Ground level should be fixed in individual cases separately	<p><b>Being Complied</b></p> <p>For every bench, ground level is fixed in MSL as individual cases separately. Surface plan with MSL levels is provided in the Modified Approved Mining Plan (Enclosed as <b>Annexure 2</b>).</p>
12	No mining operations should be carried out at places having a slope greater than 45.	<p><b>Being Complied</b></p> <p>No mining operations are being carried out at places having a slope greater than a 45 degrees angle.</p>
13	Acoustic enclosures should have been provided to reduce sound amplifications in addition to the provisions of green belt and hollow brick envelop for crushers so that the noise level is kept within prescribed standards given by CPCB/KSPCB. This condition is applicable only in such cases if a crusher is adjacent to the quarry	<p><b>Not Applicable</b></p> <p>There is no crusher adjacent to the quarry and the same is not proposed.</p>

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<b>Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period April 2021 to September 2021</b>		
<b>S. No.</b>	<b>Conditions</b>	<b>Compliance Status as on September 30, 2021</b>
14	The workers on the site should be provided with the required protective equipment such as ear muffs, helmet, etc.	<p><b>Being Complied</b></p> <p>All employees are provided with relevant Personal Protective Equipment (PPEs) like Helmets, Shoes, Fluorescent Reflective Jackets, etc.</p>  <p><b>Employees with PPEs</b></p>
15	Garland drains with clarifiers to be provided in the lower slopes around the core area to channelize storm water.	<p><b>Being Complied</b></p> <p>Mining operations are being carried out in the top level during the compliance period. However, garland drainage/garland canals have been developed in the lower slopes to channelize storm water.</p> <p>A siltation pond of appropriate size is being planned to be created by constructing a check dam (up to 10m X 1.5m size) at the bottom of the quarry area to prevent run-off of water and flow of sediments. The water so collected will be utilized for watering the mine area, roads, greenbelt development, etc.</p>

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		 <p style="text-align: center;"><b>Garland Drain</b></p>
16	The transportation of minerals should be done in covered trucks to contain dust emissions. The proponent should plant trees at least 5 'times of: the loss: that has been occurred while clearing the land for the project. SEAC should assess the number of trees in each project site before the issuance of EC so as to ensure the promptness in, planting.	<p><b>Being Complied</b></p> <p>The transportation of minerals in trucks is being undertaken covered with tarpaulin cover.</p>  <p style="text-align: center;"><b>Truck with Tarpaulin Cover</b></p> <p>Since this is an existing quarry which was already mined earlier, the quarry is in opened condition. There was no clearing of land for the project and no trees have been cut as there are no trees inside the lease area.</p>
17	Explosives should be stored in magazines in isolated place specified and approved by Explosives Department	<p><b>Being Complied</b></p> <p>AVPPL constructed 500 Kgs portable explosives magazine at an area called Chappath; which is 65 km away from the quarry location. AVPPL are transporting the explosives and detonators from Chappath to Kadavilla quarry through two authorized explosives vans for which following licenses were obtained from PESO:</p> <ul style="list-style-type: none"> <li>Explosives magazine license</li> </ul>


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Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period April 2021 to September 2021		
S. No.	Conditions	Compliance Status as on September 30, 2021
		<p>E/SE/KL/22/331(E121778) dated 13.09.2021</p> <ul style="list-style-type: none"> <li>Explosives van-1 (KL01CP2414) license E/SE/KL/25/99(E135886) dated 22.09.2021</li> <li>Explosives van-2 (KL01CP2472) license E/SE/KL/25/99(E135883) dated 22.09.2021</li> </ul> <p>Copies of the above mentioned licenses are enclosed as <b>Annexure 3</b>. Operations at Explosives Storage at Chappath will begin from October 2021.</p>
18	A minimum buffer distance of 100m from the boundary of the quarry to the nearest dwelling unit or other structures, not being any facility for mining shall be provided.	<p><b>Complied</b></p> <p>As per the Government of Kerala (GoK) State Gazette Notification G.O. (P) No. 25/2017/ID dated 22.06.2017, permit holder shall not carry on or allow to be carried on any quarrying operations at or to any points within a distance of 50 m from any residential buildings or from the nearest dwelling unit or other structures.</p> <p>Also, as per the Consent to Operate (CTO) obtained from KSPCB, quarrying activities are restricted to a distance more than 50 m from the nearby residential buildings.</p> <p>Further, DMG had communicated to SEIAA vide its letter No. 9363/M3/2018 dated 23.03.2019 (A copy of the letter was submitted along with the HYCR for the period October 2019 to March 2020) that as per Rule 40 1(i) of the KMMC Rules, the lessee is permitted to carry out mining at a distance of 50 m from the residential houses.</p> <p>As per the map prepared by the village officer, the nearest house is ~60 m from the boundary of the quarry.</p>
19	50 m buffer distance should be maintained from forest boundaries.	<p><b>Not Applicable</b></p> <p>There are no forests in the vicinity of the project site.</p>
20	Consent from Kerala State Pollution Control Board under Water and Air Act(s) should be obtained before initiating mining activity.	<p><b>Complied</b></p> <p>CTO has been obtained from Kerala State Pollution Control Board (KSPCB) vide Consent No. PCB/TVM-DO/ICO/QRY/103/2019 dated 05.03.2019 valid up to 27.02.2021. A copy of the same was submitted along with HYCR for the</p>


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		<p>period April 2019 to September 2019.</p> <p>Further, The CTO was renewed vide Consent No. PCB/TVM-DO/CHZ/ICO(R)/QRY/128/2020 dated 18.12.2020 valid up to 28.02.2024. Copy of the renewed CTO is was submitted along with HYCR for the period October 2020 to March 2021.</p>
21	All other statutory clearances should be obtained, as applicable, by project proponents from the respective competent authorities including that for blasting and storage of explosives.	<p><b>Complied</b></p> <p>AVPPL have obtained all applicable statutory clearances from the respective competent authorities. The following clearances have been obtained:</p> <ul style="list-style-type: none"> <li>• No Objection Certificate (NoC) from Trivandrum District Collector vide Letter No. B7-40269/2017 dated 30.04.2018 for Govt. land.</li> <li>• Letter of Intent from DMG vide Letter No. 9363/M3/2018 dated 04.09.2018</li> <li>• CTO has been obtained from KSPCB vide Consent No. PCB/TVM-DO/ICO/QRY/103/2019 dated 05.03.2019 valid up to 27.02.2021. Further, The CTO was renewed vide Consent No. PCB/TVM-DO/CHZ/ICO(R)/QRY/128/2020 dated 18.12.2020 valid up to 28.02.2024.</li> <li>• Purchase and Use of Explosives Approval from Petroleum &amp; Explosives Safety Organization (PESO), Ernakulam vide Letter No. E/Misc/Expl dated 27.03.2019</li> <li>• Dangerous and Offensive Trade (D&amp;O) License from Nagaroor Gram Panchayat vide License Number A2.1836\2019 dated 01.04.2019</li> <li>• NoC for Use of Explosives from District Collector, Thiruvananthapuram vide File No.DCTVM/2436/2019-A17 dated 09.05.2019</li> <li>• Approved Mining Plan by District Geologist, Trivandrum vide Letter No. 1716/DOT/ML/18 dated 20.05.2019</li> <li>• Lease Order from DMG vide Letter No. 9363/M3/2018 dated 20.05.2019</li> <li>• Lease Execution from Additional Director of Mining and Geology vide Letter No. 79/2019-20/9363/M3/2018/DMG dated 20.05.2019</li> <li>• Quarrying Lease Registration Agreement in Form H at Chirayinkeezhu Register Office</li> </ul>




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<b>Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period April 2021 to September 2021</b>		
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		<p>dated 22.05.2019</p> <ul style="list-style-type: none"> <li>Explosives magazine license E/SE/KL/22/331(E121778) dated 13.09.2021 (enclosed as <b>Annexure 3</b>).</li> <li>Explosives van-1 (KL01CP2414) license E/SE/KL/25/99(E135886) dated 22.09.2021 (enclosed as <b>Annexure 3</b>).</li> <li>Explosives van-2 (KL01CP2472) license E/SE/KL/25/99(E135883) dated 22.09.2021 (enclosed as <b>Annexure 3</b>).</li> <li>The Modified Approved Mining Plan is enclosed as <b>Annexure 2</b>.</li> </ul> <p>Copies of the above mentioned approvals were submitted along with HYCR for the period April 2019 to September 2019. Copy of the renewed CTO was submitted along with HYCR for the period October 2020 to March 2021.</p>
22	In the case of any change(s) in the scope of the project, extent quantity, process of mining technology involved or in any way affecting the environmental parameters/impacts as assessed, based on which only the E.C is issued, the project would require a fresh appraisal by this Authority, for which the proponent shall apply and get the approval of this Authority	<p><b>Complied</b></p> <p>AVPPL had submitted to SEIAA, Kerala the requirement of additional quantity of rocks for completion of Vizhinjam Port breakwater construction by 2023; indicating that the estimated quantity of rock required for the phase 1 project as 86.53 Lakh Tons and the total amount of rock that can be sourced from the operational quarries for which have obtained EC up to 2023 is only 25.17 Lakh Tons which is much below the total requirement for the project. Therefore, there is an additional requirement for completing the phase 1 of the Vizhinjam project.</p> <p>During the compliance period (April 2021 to September 2021), a total of 2.725 Lakh Tons of building stones have been extracted and a total cumulative quantity of 9.006 Lakh Tons of building stones have been extracted from inception of mining on 02.07.2019 till 30.09.2021.</p> <p>In view of the additional requirement of building stone for completion of phase 1 of the Vizhinjam project, SEIAA decided to issue EC for the extraction of a further 10.79 Lakh Tons granite</p>

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		rock for the period from 2021-22 to 2023-24 subject original EC conditions vide their order No. 1200/EC2/2018/SEIAA dated 16.11.2020 (A copy of the order was submitted along with the HYCR for the period October 2020 to March 2021). The Modified Approved Mining Plan is enclosed as <b>Annexure 2</b> .
23	The Authority reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environment (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.	<p><b>Being Complied</b></p> <p>Based on the SEIAA order No. 1200/EC2/2018/SEIAA dated 16.11.2020 (A copy of the order was submitted along with the HYCR for the period October 2020 to March 2021), as an additional precautionary safeguard measure, Authority decided to constitute a monitoring team consisting of an Expert member from SEAC (Team leader) nominated by Chairman SEAC, District Geologist and a responsible senior functionary nominated by AVPPL to monitor the functioning of the quarry.</p> <p>SEIAA, vide their order No. 1200/EC2/2018/SEIAA dated 31.03.2021 (A copy of the order was submitted along with the HYCR for the period October 2020 to March 2021), constituted the monitoring team comprising of:</p> <ol style="list-style-type: none"> <li>1. Shri. K. Krishna Panicker, Expert Member, SEAC (Team Leader)</li> <li>2. District Geologist, Thiruvananthapuram</li> <li>3. Mr. Palanivelu Kumar, AVPPL</li> </ol> <p>The team will inspect the quarry at least once 3 months and prepare an inspection report. Team will also suggest corrective measures for irregularities if any. The project proponent will provide logistic support for field inspection.</p> <p>Thereafter, in line with SEIAA letter No. 1200/EC2/2018/SEIAA dated 31.08.2021 (Enclosed as <b>Annexure 4</b>), the inspection of the monitoring team under the leadership of Shri. K. Krishna Panicker was conducted on 02.09.2021. as per Minutes of Meeting of 112<sup>th</sup> SEIAA held on 14<sup>th</sup>, 15<sup>th</sup> &amp; 16<sup>th</sup> September 2021 (Enclosed as <b>Annexure 5</b>), the Authority noted the observations and recommendation Monitoring</p>

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		<p>committee on the functioning of the quarry and decided the following:</p> <ol style="list-style-type: none"> <li>1. To forward the observations and recommendation of monitoring committee to the Project Proponent with a direction to attend all the observations within 4 months otherwise EC given will be cancelled and action will be taken for violation EC conditions.</li> <li>2. Monitoring committee led by SEAC member shall conduct a field inspection after 4 months to verify the compliance status and report to SEIAA for appropriate action.</li> <li>3. Inform the decision of SEIAA to project Proponent and SEAC for necessary follow up action.</li> </ol> <p>Awaiting the observations and recommendations of the monitoring committee.</p>
24	The stipulations by Statutory Authorities under different Acts and Notifications should be complied with, including the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and control of Pollution) act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification, 2006.	<b>Noted</b>
25	The project proponent should advertise in at least two local newspapers widely circulated in the region, one of which (both the advertisement and the newspaper) shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the State Environment Impact Assessment Authority (SEIAA) office and may also be seen on the website of the	<p><b>Complied</b></p> <p>EC for the project was issued on 01.03.2019. Advertisements, that the project has been accorded EC were published within Ten days in two widely circulated local newspapers: The Hindu (English) on 09.03.2019 and Mathrubhumi (Malayalam – vernacular language) on 10.03.2019. Also, copy of the EC is available with the SEIAA office and it is also available on the website of the Authority at <a href="http://www.seiaakerala.in">www.seiaakerala.in</a>. Screenshot of the website showing the details of the EC was submitted along with HYCR for the period October 2019 to March 2020.</p> <p>Extracts of these newspaper clippings with the</p>


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	Authority at <a href="http://www.seiaakerala.org">www.seiaakerala.org</a> . The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same signed in all pages should be forwarded to the office of this Authority as confirmation.	<p>advertisements were submitted along with HYCR for the period April 2019 to September 2019.</p> <p>Copy of the advertisements signed on all pages were submitted to SEIAA vide Letter No. AVPPL/SEIAA/2019-20/731 dated 01.04.2019 was submitted along with HYCR for the period April 2019 to September 2019.</p> <p>The copy of EC is uploaded to the company website: <a href="https://www.adaniports.com/ports-downloads?port=Vizhinjam-Port">https://www.adaniports.com/ports-downloads?port=Vizhinjam-Port</a> Screenshot of the same was submitted along with HYCR for the period April 2019 to September 2019.</p>
26	The Environmental Clearance shall be put on the website of the company by the proponent.	<p><b>Complied</b></p> <p>The copy of EC is uploaded to the company website: <a href="https://www.adaniports.com/ports-downloads?port=Vizhinjam-Port">https://www.adaniports.com/ports-downloads?port=Vizhinjam-Port</a>. Screenshot of the same was submitted along with HYCR for the period April 2019 to September 2019.</p>
27	Proponent shall submit half yearly reports in soft copy and SEIAA will upload it on the website.	<p><b>Being Complied</b></p> <p>HYCRs on the status of compliance of the stipulated clearance conditions are being submitted to all the concerned agencies. As per the Notification of Ministry of Environment and Forests &amp; Climate Change (MoEF&amp;CC) dated 26.11.2018, wherein submission of HYCRs by email/soft copy is declared acceptable, soft copy of HYCR for the period October 2020 to March 2021 has been submitted vide email dated 24.05.2021 (a copy of the email is enclosed as <b>Annexure 6</b>).</p>
28	The details of Environmental Clearance should be prominently displayed in a metallic board of 3 ft x 3 ft with green background and yellow letters of Times New Roman font of size of not less than 40. Sign board with extent of lease area and boundaries shall be depicted at the entrance of the quarry, visible to the public	<p><b>Complied</b></p> <p>The details of EC have been displayed at the site next to the entrance of the quarry, visible to the public.</p>


<b>adani</b>	<b>Adani Vizhinjam Port Private Limited (AVPPL)</b>	<b>From: April 2021 To: September 2021</b>
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<b>S. No.</b>	<b>Conditions</b>	<b>Compliance Status as on September 30, 2021</b>
		 <p><b>EC Details Displayed on Board at Site</b></p>
29	The proponent should provide notarized affidavit (indicating the number and date of Environmental Clearance proceedings) that all the conditions stipulated in the EC shall be scrupulously followed.	<b>Complied</b> AVPPL have submitted Notarized Affidavit dated 03.04.2019 to SEIAA stating that all the conditions stipulated in the EC shall be scrupulously followed. Copy of the affidavit and the cover letter vide No. AVPPL/SEIAA/2019-20/731 dated 01.04.2019 have been submitted along with HYCR for the period April 2019 to September 2019.
30	No change in mining technology and scope of working should be made without prior approval of the SEIAA, No further expansion or modifications in the mine shall be carried out without prior approval of the SEIAA, as applicable	<b>Noted for Compliance</b>
31	The Project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any mining operations. Necessary	<b>Not Applicable</b> There are no natural water courses and/or water resources of first order streams in and around the mine lease area.




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	safeguard measures to protect the first order streams, if any, originating from the mine lease shall be taken.	
32	The top soil, if any, shall temporarily be stored at earmarked site(s) only for the topsoil shall be used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only. The maximum height of the dumps shall not exceed 8m and width 20m and overall slope of the dumps shall be maintained to. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dump. The entire excavated area shall be backfilled. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining.	<p><b>Being Complied</b></p> <p>As such, the quarry had been mined earlier by another party and since this is already an open mine, there was no top soil or overburden available in the quarry; all the produced materials are all being used for Breakwater Construction at Vizhinjam Port.</p> <p>However, due to certain geological disturbances in the formation, some overburden has been found in between the rock formation after attaining 6 m on the western slope between p3 and p4 pillars. AVPPL have identified area of land in the lower portions of the quarry for storing the overburden materials along with gabion wall protection. The overburden will be managed within the site as per mine closure plan.</p> <p>It will be ensured that the maximum height of the dumps shall not exceed dimensions specified and overall slope of the dumps shall be maintained to 37.5 degrees. The overburden dumps will be vegetated with suitable native species and monitoring and management of the area shall be done until the vegetation becomes self-sustaining.</p>
33	Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps to prevent run off of water and flow of sediments directly into the river and other water bodies: 'The water so-collected should be utilized for watering the mine area, roads, green belt development. etc. The drains shall be regularly desilted particularly after monsoon and maintained properly.	<p><b>Will be Complied</b></p> <p>The quarry has been mined earlier by other parties and is an already open mine and hence there is no top soil or overburden available in the quarry. Also, there are no mineral dumps since all the produced materials are used for Breakwater Construction at Vizhinjam Port. Therefore, catch drains for prevention of run-off is not required at the project site.</p> <p>However, siltation pond of appropriate size will be created by constructing a check dam (up to 10m X 1.5m size) at the bottom of the quarry area to prevent run-off of water and flow of sediments. The water so collected will be utilized for</p>

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		watering the mine area, roads, greenbelt development, etc.  The drains will be regularly desilted particularly after monsoon and maintained properly.																											
34	Effective safeguard measures such as- regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels. 'of PM 10, and PM 2.5, such as haul Road, loading and unloading points and transfer points— it shall 'be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard	<b>Being Complied</b> Regular water sprinkling through water tankers on haul road and other dust prone areas such as loading and unloading of minerals is being carried out.  Environment Monitoring at the site has been carried out by NABL accredited laboratory; M/s. Standards Environmental & Analytical Laboratories. Summary of the Ambient Air Quality Monitoring (AAQM) during the compliance period at 5 monitoring locations is mentioned below. <table><tr><th>Parameter</th><th>Unit</th><th>Max</th><th>Min</th><th>Perm. Limit</th></tr><tr><td>PM<sub>10</sub></td><td>µg/m<sup>3</sup></td><td>49.5</td><td>40.9</td><td>100</td></tr><tr><td>PM<sub>2.5</sub></td><td>µg/m<sup>3</sup></td><td>22.8</td><td>19.4</td><td>60</td></tr><tr><td>SO<sub>2</sub></td><td>µg/m<sup>3</sup></td><td>BDL</td><td>-</td><td>80</td></tr><tr><td>NO<sub>2</sub></td><td>µg/m<sup>3</sup></td><td>BDL</td><td>-</td><td>80</td></tr></table> The Ambient Air Quality Monitoring Report is enclosed as <b>Annexure 7</b> . All the monitored parameters were found within the prescribed limits.			Parameter	Unit	Max	Min	Perm. Limit	PM <sub>10</sub>	µg/m <sup>3</sup>	49.5	40.9	100	PM <sub>2.5</sub>	µg/m <sup>3</sup>	22.8	19.4	60	SO <sub>2</sub>	µg/m <sup>3</sup>	BDL	-	80	NO <sub>2</sub>	µg/m <sup>3</sup>	BDL	-	80
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35	Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained	<b>Being Complied</b> AVPPL have developed a tar road of around 0.9 km from Kadavilla Junction to the quarry project site gate for movement of vehicles; thereby reducing the dust pollution.  Also, regular water sprinkling through water tankers on haul road and other dust prone areas such as loading and unloading of minerals is being carried out.																											
36	Measures should be taken for control of noise levels below 85 dBA in the work environment.	<b>Being Complied</b> The following measures are being taken for the control of noise levels: <ul style="list-style-type: none"><li>• Drilling: The good captive silencers are being used in drilling equipment.</li><li>• Blasting: AVPPL is using NONEL method</li></ul>																											

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		<p>bottom initiation to reduce the noise of blasting.</p> <ul style="list-style-type: none"> <li>• Machineries &amp; Tippers: It is ensured that equipment's are fitted with effective silencers, mufflers, acoustic linings, or shields, as necessary.</li> <li>• It is ensured that vehicles transporting the materials follow the speed limit in order to maintain the noise level.</li> <li>• Vehicles are serviced regularly and maintained properly to avoid any unwanted generation of noise or vibration from them</li> </ul> <p>Ambient Noise is being monitored by NABL and MoEF&amp;CC accredited laboratory; M/s. Metamorphosis laboratory Private Limited as per Noise Pollution (Regulation &amp; Control) Rules, 2000 (Rules 3 (1) and 4(1)) at 5 locations. Summary of the Ambient Noise Monitoring during the compliance period at 5 monitoring locations is mentioned below:</p> <table border="1"> <thead> <tr> <th>Location</th><th>L<sub>eq</sub> Day time</th><th>L<sub>eq</sub> Night time</th></tr> </thead> <tbody> <tr> <td>Quarry Area (Project Site)</td><td>45.2</td><td>34.8</td></tr> <tr> <td>Near Operators Rest Room (North Side)</td><td>44.0</td><td>34.5</td></tr> <tr> <td>Vanchiyoar UP School (West Side)</td><td>43.3</td><td>35.5</td></tr> <tr> <td>St. Joseph of Cluny Public School (South Side)</td><td>43.6</td><td>34.9</td></tr> <tr> <td>Viswanadhapuram Shiva Temple (East Side)</td><td>42.3</td><td>34.1</td></tr> </tbody> </table> <p>The results obtained were compared with Noise Pollution (Regulation &amp; Control) Rule, 2000 (Rule 3(1) and 4(1)) and it is observed that the noise readings were within limits at all monitoring locations. The Noise Monitoring report is enclosed as <b>Annexure 8</b>.</p>	Location	L <sub>eq</sub> Day time	L <sub>eq</sub> Night time	Quarry Area (Project Site)	45.2	34.8	Near Operators Rest Room (North Side)	44.0	34.5	Vanchiyoar UP School (West Side)	43.3	35.5	St. Joseph of Cluny Public School (South Side)	43.6	34.9	Viswanadhapuram Shiva Temple (East Side)	42.3	34.1
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37	The funds earmarked for environmental protection measures and CER activate should be kept in separate account and should not be diverted for other purpose. Year	<p><b>Being Complied</b></p> <p>AVPPL has entered into a Concession Agreement with GoK for the construction and operation of Vizhinjam Port whereby it is mandated under Article 32 (copy submitted along with HYCR for the period April 2019 to September 2019) that an</p>																		


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	wise expenditure should be reported to the State Environment Impact Assessment Authority (SEIAA) office.	<p>Escrow Account has to be opened by AVPPL. All deposits have to be made into this account and all payments have to be routed through this account for the construction of the port. This account is directly under the monitoring of both the Central and State governments through the Senior Lenders.</p> <p>Therefore, it is requested that the provision of opening of separate account be absolved as there will be a direct contradiction to the Concession Agreement. As the owner of the quarry, AVPPL guarantees that the amount of Rs. 15.00 Lakhs earmarked for CER and funds earmarked for environmental protection measures will be kept as a balance in the current Escrow Account. Furthermore, as provided above the account will be monitored by the government.</p> <p>Expenditure for CER and environmental protection measures during the compliance period (April 2021 to September 2021) is enclosed as <b>Annexure 9</b>.</p>
38	The Regional Office of MOEF & CC located at Bangalore shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (S) of the Regional Office by furnishing the requisite data/information/monitoring reports.	<p><b>Will be Complied</b></p> <p>All necessary support will be extended to the Regional Office of MoEF&amp;CC located at Bangalore for the monitoring of the compliance of the stipulated conditions Office by furnishing the requisite data/information/monitoring reports.</p>
39	Any appeal against this Environmental Clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	<b>Noted</b>
40	Concealing the factual data or submission of false/fabricated data and failure to comply with	<b>Noted</b>


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	any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.	
41	The SEIAA may revoke or suspend the order, for non-implementation of any of the specific or this implementation of any of the above conditions is not satisfactory. The SEIAA reserves the right to alter/modify the above conditions or stipulate any further condition in the interest of environment protection	<p><b>Being Complied</b></p> <p>Based on the SEIAA order No. 1200/EC2/2018/SEIAA dated 16.11.2020 (A copy of the order was submitted along with the HYCR for the period October 2020 to March 2021), as an additional precautionary safeguard measure, Authority decided to constitute a monitoring team consisting of an Expert member from SEAC (Team leader) nominated by Chairman SEAC, District Geologist and a responsible senior functionary nominated by AVPPL to monitor the functioning of the quarry.</p> <p>SEIAA, vide their order No. 1200/EC2/2018/SEIAA dated 31.03.2021 (A copy of the order was submitted along with the HYCR for the period October 2020 to March 2021), constituted the monitoring team comprising of:</p> <ol style="list-style-type: none"> <li>1. Shri. K. Krishna Panicker, Expert Member, SEAC (Team Leader)</li> <li>2. District Geologist, Thiruvananthapuram</li> <li>3. Mr. Palanivelu Kumar, AVPPL</li> </ol> <p>The team will inspect the quarry at least once 3 months and prepare an inspection report. Team will also suggest corrective measures for irregularities if any. The project proponent will provide logistic support for field inspection.</p> <p>Thereafter, in line with SEIAA letter No. 1200/EC2/2018/SEIAA dated 31.08.2021 (Enclosed as <b>Annexure 4</b>), the inspection of the monitoring team under the leadership of Shri. K. Krishna Panicker was conducted on 02.09.2021, as per Minutes of Meeting of 112<sup>th</sup> SEIAA held on 14<sup>th</sup>, 15<sup>th</sup> &amp; 16<sup>th</sup> September 2021 (Enclosed as <b>Annexure 5</b>), the Authority noted the observations and recommendation Monitoring committee on the functioning of the quarry and</p>




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		<p>decided the following:</p> <ol style="list-style-type: none"> <li>1. To forward the observations and recommendation of monitoring committee to the Project Proponent with a direction to attend all the observations within 4 months otherwise EC given will be cancelled and action will be taken for violation EC conditions.</li> <li>2. Monitoring committee led by SEAC member shall conduct a field inspection after 4 months to verify the compliance status and report to SEIAA for appropriate action.</li> <li>3. Inform the decision of SEIAA to project Proponent and SEAC for necessary follow up action.</li> </ol> <p>Awaiting the observations and recommendations of the monitoring committee.</p>
42	The above conditions shall prevail notwithstanding anything to the contrary, in consistent, or simplified, contained in any other permit, license on consent given by any other authority for the same project.	<b>Noted</b>
43	The Environmental Clearance will be subject to the final order of the courts in any pending litigation related to the land or project, in any court of law.	<b>Noted</b>
44	The mining operation shall be restricted to above ground water table and it should not intersect ground water table	<p><b>Complied</b></p> <p>Based on observations made in and around the quarry area, it was found that the general ground level in the area is 32 m above MSL and the general groundwater table is 8 m below the general ground level i.e. 24 m above MSL. During monsoons the ground water table will rise by 2-3 m. The lease area is situated on an isolated hillock where the top most working level is about 106 m above MSL and the lowest working level is 70 m above MSL. The total depth will be 36 m. Therefore, mining operations will be restricted to workings at a higher level at the quarry and will not touch the ground water table.</p>

	<b>Adani Vizhinjam Port Private Limited (AVPPL)</b>	<b>From: April 2021 To: September 2021</b>
<b>Building Stone Quarry Project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District</b>		

<b>Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period April 2021 to September 2021</b>		
<b>S. No.</b>	<b>Conditions</b>	<b>Compliance Status as on September 30, 2021</b>
45	All vehicles used for transportation and within the mines shall have 'PUC' certificate from authorized pollution taking centre. Washing of all vehicles shall be inside the lease area	<p><b>Complied</b></p> <p>It is ensured that all vehicles used for transportation are having valid Pollution Under Control (PuC) certificate from authorized center.</p>  <p style="text-align: center;"><b>PuC Certificate</b></p>
46	Project proponent should obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water and ground water for the project	<p><b>Not Applicable</b></p> <p>AVPPL are not withdrawing the surface water or ground water from the project area for any purposes.</p>
47	Regular monitoring of flow rates and water quality upstream and downstream of the springs and perennial	<p><b>Not Applicable</b></p> <p>There are no springs and perennial nallahs flowing upstream and downstream of the mine lease area as there are no water courses and/or</p>

	Adani Vizhinjam Port Private Limited (AVPPL)	From: April 2021 To: September 2021
Building Stone Quarry Project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District		

**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1200/EC2/2018/SEIAA dated 01.03.2019 for the Period April 2021 to September 2021**

S. No.	Conditions	Compliance Status as on September 30, 2021
	nallahs flowing in and around the mine lease area shall be carried out and reported in the six monthly reports to SEIAA	water resources of first order streams in and around the mine lease area.
48	Occupational health surveillance program of the workers should be under taken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed	<b>Being Complied</b> The medical health test checkup of the employees, workers and laborers as per Director General of Mines (DGM) prescribed statutory format are being taken up periodically by the contractor involved in the mining operations to observe any contractions due to exposure to dust and take corrective measures.

**Enclosures:**

Annexure Number	Details of Annexure
Annexure 1:	Blast Induced Ground Vibration Study Report by Anna University, Chennai
Annexure 2:	Modified Approved Mining Plan
Annexure 3:	Explosives Magazine and Van Licenses
Annexure 4:	SEIAA letter No. 1200/EC2/2018/SEIAA dated 31.08.2021
Annexure 5:	Minutes of Meeting of 112 <sup>th</sup> SEIAA
Annexure 6:	Email Submission of HYCR for the period October 2020 to March 2021
Annexure 7:	AAQM Report
Annexure 8:	Noise Monitoring Report
Annexure 9:	CER and EMP Expenditure Statements

**Annexure 1: Blast Induced Ground  
Vibration Study Report by Anna  
University, Chennai**



**Blast Induced Ground Vibration for Kadavila-1 Stone  
Quarry, Nagaroor village, Chirayinkeezh Taluk,  
Thiruvananthapuram, Kerala of  
M/s. Adani Vizhinjam Port Private Limited**



**Submitted**



**Adani Vizhinjam Port Private Limited  
(AVPPL)**

**To  
Adani Vizhinjam Port Pvt Ltd  
2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud  
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**By  
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**April, 2021**



Scientific study on Blast Induced Ground Vibration  
for Kadavila-1 Stone Quarry, Nagaroor village,  
Chirayinkeezh Taluk, Thiruvananthapuram District,  
Kerala

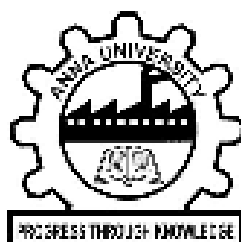


M/s. Adani Vizhinjam Port Private Limited

Submitted

by

Dr. P. Balamadeswaran Department  
of Mining Engineering



College of Engineering Guindy  
Anna University Chennai

**Scientific Study on**  
**Blast Induced Ground Vibration for Kadavila-1 Stone Quarry,**  
**Nagaroor village, Chirayinkeezh Taluk, Thiruvananthapuram**  
**District, Kerala of M/s. Adani Vizhinjam Port Private Limited**

**ACKNOWLEDGEMENTS**

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We are very much thankful to Shri. **Rajesh Kumar Jha**, Chief Executive Officer & Managing Director, Shri. **Vaddi Venkataramana**, Associate General Manager (Techno Commercial), Shri. **Biju Thomas Mathew**, Senior Officer (Techno Commercial) and Shri. **Palanivelu Kumar**, Mines Manager, Shri **N. Saravanan**, Asst Mine Manager, Shri. **G. Selvakumaresh**, Mine Foreman, Shri. **S. Madasamy**, Mining Mate of M/s. Adani Vizhinjam Port Pvt Ltd for their support during the blast vibration monitoring and for the help rendered in collecting the field data.

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Special thanks are due to Shri. S. Muthubharathi, Shri. S. Muthusankaranarayanan, Shri. E. Raghu, final year students of B.E. Mining Engineering, Anna University, Chennai for helping in carrying out the vibration monitoring in the field.

We express our sincere gratitude to Anna University and its officials for permitting us to take up the work.

**(Dr. P. BALAMADESWARAN)**  
*Assistant Professor*

## **CERTIFICATION**

Certified that this project report (No: AU/CEG/MN/1034/2020-2021) titled "Scientific Study on Blast Induced Ground Vibration for Kadavila-1 Stone Quarry, Nagaroor village, Chirayinkeezh Taluk, Thiruvananthapuram, Kerala of M/s. Adani Vizhinjam Port Private Limited" is the bonafide work of Department of Mining Engineering, Anna University carried out under my supervision. I hereby affirm, to the best of knowledge and belief, based on the inspections, observations, field trials and upon the equations developed, that this Scientific Study on Blast Induced Ground Vibration for Kadavila-1 Stone Quarry, Nagaroor village, Chirayinkeezh Taluk, Thiruvananthapuram, Kerala of M/s. Adani Vizhinjam Port Private Limited is completed and operable. The project was completed in accordance with the statutory requirements of act, regulations made thereunder and other provisions as recommended by the regulatory bodies.

**(Dr. P. BALAMADESWARAN)**  
**Consultant**

**Scientific Study on**  
**Blast Induced Ground Vibration for Kadavila-1 Stone Quarry,**  
**Nagaroor village, Chirayinkeezh Taluk, Thiruvananthapuram**  
**District, Kerala of M/s. Adani Vizhinjam Port Private Limited**

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**Scientific Study on**  
**Blast Induced Ground Vibration for Kadavila-1 Stone Quarry,**  
**Nagaroor village, Chirayinkeezh Taluk, Thiruvananthapuram**  
**District, Kerala of M/s. Adani Vizhinjam Port Private Limited**

## **EXECUTIVE SUMMARY**

The scientific investigation is aimed at assessing the influence of blasting, principally the ground vibrations and noise levels in the Kadavila-1 Stone Quarry of M/s. Adani Vizhinjam Port Private Limited, Nagaroor village, Chirayinkeezh Taluk, Thiruvananthapuram District, Kerala on the residential and other buildings of the neighbouring villages.

### **OBJECTIVES**

- Study the existing blasting, its design and its influence on the surroundings in respect of blast induced ground vibrations.
- Design of trial blasts which will
  - restrict blast induced ground vibrations to levels that are tolerable on the residential and other civil structures not belonging to the quarry owner.
  - restrict generation of fly-rock and their throw to eliminate adverse effect on the residents and agricultural lands of the Nagaroor (Kadavila) village.
- Carry out at least 10 controlled trial blasts and monitor blast induced ground vibrations at least in 25 points and study the distance to which flying fragments are produced.
- Submit the report including suggesting suitable controlled blasting technique(s) including maximum explosive charge per delay in the Kadavila-1 Stone Quarry that will limit the blast induced ground vibrations to permissible levels and also suggesting suitable methodology for carrying out regular drilling, controlled blasting operations in the quarry and the appropriate safety measures to be taken to guard against blast induced vibrations and fly-rock.



## FIELD INVESTIGATIONS

The Kadavila-1 Stone Quarry is drilling 33 mm diameter holes with Jack hammer drilling machines and blasting with the cap-sensitive Emulsion explosive cartridges of 25 mm diameter. The mine management is presently blasting three to five rows of holes with NONELs having in-hole delay of 250 ms & surface delays of 17/25 ms to mitigate adverse impacts such as air blast, fly rock and ground vibration. The instantaneous electrical detonators are being used for initiating the blasting circuit prepared with NONEL based detonators.

In order to carry out the controlled blasting operations in the Kadavila-1 Stone Quarry approaching towards surrounding villages, the quarry management intended to get the matter scientifically investigated for adopting properly designed controlled blasting techniques to restrict the blast induced ground vibrations to less than the permissible levels the structures in question can tolerate without damage.

The author of this report have carried out ground vibration monitoring of **10 Nos. of controlled trial blasts** with FIVE numbers of seismographs by locating them at different locations in the surface and sensitive buildings located nearer to the Kadavila-1 Stone Quarry at various distances (in the villages as well as inside the quarry) from the blasting site (a total recordings of **47** and the instruments triggered only at 36 stations). These trial blasts were carried out during the period from 16.03.2021 to 17.03.2021.

## RESULTS AND DISCUSSIONS

Ten trial blasts were carried out 16.03.2021 to 17.03.2021 and blast vibrations were monitored using five seismographs located at various distances. The minimum and maximum charge per delay varied from 1.07 to 2.17 kg. A maximum of 80 holes were drilled with jack hammer drilling equipment with a maximum number of holes per delay of six. In all the 10 trial blasts, ground vibrations were monitored at 47 locations around the blasting sites and neighbouring village. Out of the total 47 measurements made, vibrations were recorded by the instruments only at 36 stations. The vibrations recorded behind the blast free face were of highest magnitude. The magnitude of vibration recorded in the flank of direction of initiation was lower than those on the opposite side of the flank of blast initiation.

All the 10 blasts were carried out using NONEL shock tube detonators with an in-hole delay of 200 ms and surface delay of 25 ms. Fast attenuation of vibration was

recorded at shorter distances whereas at far-off distances the attenuation was slow and was influenced by low frequency blast wave characteristics.

The recorded dominant frequencies of vibrations were in the range of 7.5 to 256 Hz. The FFT analyses of vibration data revealed that the concentration of vibration energy was in the range of 29.30 to 170.6 Hz. However, keeping in view the minimum frequency recorded during the trial blasts, the maximum PPV structures of any type, can tolerate without damage fall within the frequency range of 8 to 25 Hz. However, to avoid confusion for the people in the field, the maximum explosive charge per delay is calculated for this quarry to restrict the peak particle velocity to 5.0 mm/s only (irrespective of the type of structure), which is more conservative and safer as shown in the Table 2.1. Further it will secure the safety of Domestic houses & structures/Residential buildings located in the Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala whose safety is also very important.

The analyses of vibration data recorded from detonation of blasts with higher amount of explosives generated higher level of vibrations at near-by-distances in comparison to the blasts which were detonated at the same bench face with lesser amount of explosives although the blast design and explosives parameters were kept identical. The explosives detonated in a delay in both the blasts were similar in weight.

The propagation equation for prediction of blast vibration have been established and are given as Equations 3. The permissible explosive weight per delay may be computed from the Equation to contain vibration within safe limits for distances of houses/structures concerned. For convenience, the permissible explosive weight per delay has been computed and is given in Table 3.22.

Based on the scientific study, it is concluded that **the blast induced ground vibrations and noise levels generated by the controlled blasting carried out in Kadavila-1 Stone Quarry was within permissible level and therefore is not affecting the residential buildings and other structures. Further, it has been observed that no flying fragments or projectiles travelled beyond 10 m from the site of blast. Hence, controlled blasting can be carried out at Kadavila-1 Stone Quarry by following the blasting parameters as recommended in the Table given herewith.**

**(Dr. P. BALAMADESWARAN)**  
**Consultant**

## SUMMARY OF SUGGESTED CONTROLLED BLAST DESIGN FOR M/S. KADAVILA-1 STONE QUARRY

Sl. No.	Parameter			Value
1.	Blast hole diameter			33 mm
2.	Burden			1.2 m
3.	Spacing			1.5 m
4.	Height of the bench			6.00 m
5.	Stemming length			Minimum 0.70 m
6.	Drilling patterns to be followed			Rectangular / Staggered
7.	Specific charge	For creating Initial (Box) Cut		0.16 to 0.17 kg/m <sup>3</sup>
		For production blasting		0.15 to 0.16 kg/m <sup>3</sup>
8.	Loading Density	Cap-sensitive Emulsion (or) Slurry Cartridges		0.26 kg/m
9.	Average explosive Quantity/hole	Cap-sensitive Emulsion (or) Slurry Cartridges		0.50 kg
10.	Maximum explosive charge per drillhole during production blasting	Cap-sensitive Emulsion (or) Slurry Cartridges	125 g	0.625 to 0.688 kg
11.	Detonators recommended			NONEL based detonators of 17/25 ms surface delay with an in-hole delay of 250 ms
12.	Type of explosive recommended			Emulsion (or) slurry cartridge type (ø=25 mm)
13.	Initiation system recommended			Inverse initiation
14.	Method of connecting detonator			Series
15.	Maximum charge per delay			As stated in <b>Table 3.22</b> based on the distance of the blasting site from the structure and the type of structure to be protected

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\*\*\*\*\*

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.0 GENERAL**

In modern mining era, the blasting technique is one of the most adopted techniques for rock breakage and fragmentation due to its economical and efficient aspects. However, the use of explosives for the blasting operation is limited by statutory as it may have a severe impact on the surrounding environment such as vibration, noise and dust. Especially, a ground vibration induced by blasting has to be paid much attention in the mining operation as it may give an obvious impact on the surrounding facilities and buildings.

Many researches established safe level for blasting criteria, the ground vibration level is characterized by using three parameters; duration, amplitude (peak particle velocity: PPV) and frequency. Current studies on the blast-induced ground vibration focus on two parameters amplitude (PPV) and frequency that suggested by Directorate General of Mines Safety (DGMS) when the concerned subject is structure. Hence, the control of PPV and dominant frequency are very important in order to design an appropriate blasting standard and minimize its environmental impacts.

#### **1.1 BLAST INDUCED GROUND VIBRATIONS - BACKGROUND**

Globally, blasting is the principal method of rock breaking in mining and construction industry because of its distinct advantages like economy, efficiency, convenience, ability to achieve large production, high productivity and ability to break the hardest of the rocks.

When an explosive or a blasting agent is initiated, the chemical energy of it is converted into mechanical energy, which is used for breaking the rock. Even in a properly designed blast, only a portion of the total energy of the explosive is used for fragmenting and displacing the rock and the rest utilized in producing undesirable environmental effects like ground vibrations, fly rock, air overpressure (noise) and over-break making them an integral part of blasting. These undesirable effects cause damage to the civil, mining, defence structures and other properties in the vicinity.



With increasing mining and construction activities in areas close to human settlements, ground vibration has become a critical environmental issue as it can cause human annoyance and structural damage.

The adverse environmental effects produced by blasting cannot be totally eliminated, but effectively controlled by proper design of appropriate controlled blasting techniques. Further, optimum design of blast, based on scientific investigations relating to the explosives used, rock properties and other geological aspects, which are site specific, can also address the issues.

Some of the explosive energy (left over after rock breaking), of blasting, is transmitted to the surrounding rocks as elastic waves. As these waves travel, they displace particles in their path causing the particles to oscillate before returning to their original positions. These oscillations constitute ground vibrations. Special three dimensional seismographs are used to measure these vibrations in terms of displacement, velocity, acceleration and frequency.

The ground vibrations generated from the blast are compressive in nature and spread away from the blasting site in all directions like ripples spreading outwards when a stone is dropped in still water in a pond or tank. When these waves reach a free face, they get reflected back and get converted into tensile waves and cause breaking of rock (as rock is weak in tension). When no free face is available, they travel to a longer distance and finally get attenuated. These waves, which are not doing any useful work of breaking the rock, generate ground vibrations and cause damage to the surface structures like dams, places of worship, structures of archaeological importance, quarry slopes, residential buildings, etc. and also underground excavations. The ground vibrations have three mutually perpendicular components namely radial (**R**), transverse (**T**) and vertical (**V**).

## **1.2 Factors Influencing Blast Induced Ground Vibrations**

From the literature, it can be seen that peak particle velocity (PPV) and the frequency of the vibrations are the most important parameters over which the stability of the structures depend. Peak particle velocity is defined as the *greatest velocity with which the ground vibrates during the vibration history and the same is*

*measured in millimetres per second. Frequency is the number of cycles of the to-and-fro movement of ground particles per second.* The units for measurement of frequency are Hz. The frequency of vibrations depends on the geology of the area, the rock type, etc.

When the frequency of the vibrations is equal to the natural frequency of the structures, maximum damage occurs to the structure. The range of natural frequency of surface civil structures is given in **Table 1.0**

**Table 1.0 Natural frequency of surface civil structures (after Central Mining and Fuel Research Institute (CMFRI), Council for Scientific and Industrial Research, Govt. of India Laboratory (Report 1991)**

Type of Structure	Natural Frequency, Hz
Single storey brick structures	12-14
Double storey brick structures	8 - 10
Concrete Structures	9 - 16

In addition, blast induced ground vibrations are dependent on many more factors like type of rock and its properties, geological parameters, maximum charge per delay, strength of the explosive, distance of the structure from the blasting site, time delay between holes and rows, choking at the toe of the bench, priming sequence, sequence of blast hole detonation, spacing between holes and burden, angle of drill holes, stemming depth and type, charge length and diameter, confinement, blast geometry, total charge, etc. Amongst them, type of rock and its properties, the charge per delay and the distance of the blasting site from the structures are the most important ones. To keep the ground vibrations within desired levels, a clear understanding of the causes or factors, which influence generation, and propagation of ground vibration is essential.

### 1.3 Permissible Limits of Blast Induced Ground Vibrations (PPV) for Surface Structures

The permissible levels of vibrations of various surface civil structures and other details specified by Directorate General of Mines Safety (DGMS), Dhanbad and others are given in **Tables 1.2 to 1.8**

**Table 1.2 Directorate General of Mines Safety (DGMS) suggested peak particle velocities (PPV) various types of civil structures can tolerate without damage {DGMS (Tech) (S&T) Circular No.7 of 1997} (Ministry of Labour, Govt. of India)**

Type of structure			Max. Permissible PPV, mm/s		
			Dominant excitation frequency, Hz		
			<8	8-25	> 25
(A)	Buildings / structures not belonging to the owner				
	(i)	Domestic houses/structures (kutchha brick & cement)	5	10	15
	(ii)	Industrial buildings (RCC & framed structures)	10	20	25
	(iii)	Objects of historical importance & sensitive structures	2	5	10
(B)	Buildings belonging to the owner with limited span of life				
	(i)	Domestic houses/structures(kutchha brick & cement)	10	15	25
	(ii)	Industrial buildings (RCC & framed structures)	15	25	50

Findings of some of the researchers in their investigations regarding the damages to residential structures due to blast induced ground vibrations are given in **Table 1.7**

**Table 1.3 Safe Peak Particle Velocities (PPV) Surface Structures can withstand Without Damage as per Indian Standards (IS: 6922 – 1973)**

Sl. No.	Type of strata	Maximum permissible PPV, mm/s	
		Where no monitoring is done	Where monitoring is done using suitable instruments
1.	Soils, weathered or soft rocks	50	70
2.	Hard rocks	70	100
<b>Note: (1) the values suggested above are lower than those which may be intolerable to human beings.</b> <b>(2) the suggested values are appropriate for masonry and will be conservative for concrete of <math>M_{15}</math> (<math>\sigma_c = 15</math> MPa) quality</b>			

**Table 1.4 USA standard (after Siskind, et al, 1980)**

Type of structure	Peak particle velocity, mm/s	
	Frequency (<40 Hz)	Frequency (>40 Hz)
Modern homes, dry wall interior	18.75	50
Older homes, plaster on wood lath construction	12.5	50

**Table 1.5 Australian standard 2008 (AS 2187.2)**

Type of structure	Maximum values
Historical building and monuments and building of special value	0.2 mm displacement for frequencies less than 15 Hz.
Houses and low rise residential buildings, commercial buildings not included below.	19 mm/s resultant ppv for frequency greater than 15 Hz
Commercial buildings and industrial buildings or structural of reinforced concrete or steel construction	0.2 mm maximum displacement corresponds to 12.5 mm/s ppv at 10 Hz and 6.25 mm/s at 5 Hz

**Table 1.6 German standard (after German DIN 4150, 1986)**

Type of structure	Peak particle velocity at foundation, mm/s		
	<10 Hz	10-50 Hz	50-100 Hz
Offices and industrial premises	20	20-40	40-50
Domestic houses and similar constructions	5	5-15	15-20
Buildings that do not come under the above because of their sensitivity to vibrations	3	3-8	8-10

**Table 1.7 Range of Common Residential Criteria and Effects suggested by other researchers**

Type of structure and Damage	PPV mm/s	Reference
Plaster-on-lath construction near surface mines (long term, large scale, low frequencies vibrations)	12.7	Bureau of Mines (RI 5807)
Sheetrock constructed near surface mines	19.1	Bureau of Mines (RI 8507)
Residences near surface mines lying within a distance of 92 to 1,524 m	25.0	OSM regulatory limits
Widely accepted limit for residents near construction and quarry blasting	50.8	Bureau of Mines (RI 8507)
Minor damage to average house subjected to quarry blasting vibrations	137	Bureau of Mines (656)
About 90% probability of minor damage from construction or quarry blasting. Structural damage to some houses depending on vibration source and character of the vibration	229	---
For close-in construction blasting, minor damage to nearly all houses and structural damage to some at low frequencies, major damage to most houses	501	---

It was opined (based on results of field investigations) by National Institute of Rock Mechanics (NIRM), Kolar Gold Fields, Karnataka (Ministry of Science and Technology, Govt. of India) that the maximum tolerable Peak Particle Velocities (PPV) of various frequencies the buildings of different types can tolerate without damage suggested by Directorate General of Mines Safety are very conservative and requires upward revision and suggested higher values as given in **Table 1.8**.

**Table 1.8 National Institute of Rock Mechanics (NIRM) (Ministry of Science and Technology, Govt. of India) Recommendations regarding the maximum Peak Particle Velocities (PPV) various civil structures can tolerate without damage (Anon, 2005)**

Type of structure			Maximum permissible PPV, mm/s		
			Dominant frequency, Hz		
			<20	20-50	> 50
(A)	Buildings / structures not belonging to the owner				
	(i)	Domestic houses/structures (kutchha brick & cement)	10	15	25
	(ii)	Industrial buildings (RCC & framed structures)	20	25	35
	(iii)	Objects of historical importance & sensitive structures	5	7	10
(B)	Buildings belonging to the owner with limited span of life				
	(i)	Domestic houses/structures(kutchha brick & cement)	15	25	35
	(ii)	Industrial buildings (RCC & framed structures)	55	35	50

Amongst the various norms (guidelines) discussed above, the DGMS norms are the most conservative and hence safest to protect different types of structures. Therefore, the same are adopted for the present study in deciding the maximum charge per delay for different distances of the structures from the blasting site in this report.

## 1.4 Ground Vibration Predictor Equations

For effective prediction and subsequent control of ground vibrations, rock constants which are site specific are determined for every site (by trial blasts) where blasting is to be carried out. These rock constants are used in the predictor equation (Equation 1) to calculate the maximum explosive charge per delay for a given

maximum PPV the structure in question can tolerate without damage and the distance between blasting site and the structure.

The tolerable PPV a structure can withstand (without damage) depends on the frequency of the vibrations, type of structure, material used for the construction of the structure and the type of rock (soft or hard) on which it is fixed.

For predicting ground vibrations, when both blasting and measurements are made on the surface, square root scaled distance formula (Equation 1) is used (as per the DGMS (Tech.) (S&T) circular No.7 of 1997) as it gives very reliable predictions of PPV to protect surface structures by limiting the vibrations to the tolerable levels when maximum charge per delay is restricted.

$$V = k(SD)^{-\beta} \dots\dots\dots (mm/s) \quad \dots \quad (1)$$

where,

- |               |   |  |
|---------------|---|--|
| V             | = | Peak particle velocity (PPV), mm/s       |
| SD            | = | Scaled distance, $m/\sqrt{kg}$           |
| k and $\beta$ | = | Rock constants, which are site specific. |

where, SD is calculated by equation (2)

$$SD = \frac{D}{\sqrt{W}} \quad (m/\sqrt{kg}) \quad \dots \quad (2)$$

where,

- |   |   |  |
|---|---|--|
| D | = | Distance between the blasting site and the vibration monitoring station, m |
| W | = | Maximum explosive charge per delay, kg                                     |

A linear regression analysis between PPV (on the y-axis) and scaled distance (on the x-axis) is to be carried out for the monitored data as per the DGMS guidelines; the best fit curve on log-log scale is to be drawn to determine the rock constants  $k$  and  $\beta$  for square root scaled distance formula. Linear regression analysis is a statistical tool to determine the line of best fit through a distribution of points in a graph.

## 1.5 Human Perception

Human beings are very sensitive and can detect even very low level of vibrations (as low as 0.5 mm/s) which can not cause damage to the structures. Vibration levels



lesser than the ones that cause damage to the structures could cause rattling of doors or windows. Many a times, the slamming of a door or passing of a loaded lorry by the side of the house generates more vibration than a quarry blast. However, residents become alert and inquisitive by noise and rattling of objects in the immediate surroundings due to blasting in the neighbourhood and start looking for the damages to the structures like cracks in the walls in their residence. Finding a crack that existed even before blasting activity commenced in the neighbourhood, but not noticed, people start worrying attributing the crack to blasting activity.

Dowding (1996) observed that the human sensitivity gets triggered by vibrations and air blasts and becomes inquisitive and suspicious about them from a blasting activity in the vicinity reaching the structure and resulting in some form of damage to it. The tolerance and reactions of humans to vibrations vary from person to person, the nature of the work he/she is doing, the environment in which they are present at the time of blast, etc. Blast induced ground vibrations may result in annoyance and interference with work proficiency.

## **1.6 SCOPE OF THE WORK**

The management of Kadavila-1 Stone Quarry located at Nagaroor Village, Chirayinkeezh Taluk, Thiruvananthapuram District, Kerala of **M/s. Adani Vizhinjam Port Private Limited, Thiruvananthapuram** has requested the Department of Mining Engineering, Anna University, Chennai to carryout scientific investigation into the influence of ground vibrations due to blasting being carried out in the Kadavila-1 Stone Quarry on the residential buildings and other civil structures of the nearest village, not belonging to the quarry owner.

Based on this, the field investigation has been carried out from 16.03.2021 to 17.03.2021. During the field investigation, ten number of trial blasts were carried out at various locations of the mine with varying designs and charging patterns. The blasts were monitored using five vibration monitoring seismographs which are capable of recording vibrations in all the three directions along with noise/air overpressure. Based on the analysis of the above trial blasts, the following report was prepared and submitted.

## **1.7 OBJECTIVES**

The objectives of the study are as follows

- Site visit and collection of data.
- Study the existing blasting, its design and its influence on the surroundings in respect of blast induced ground vibrations
- Design of trial blasts which will
  - restrict blast induced ground vibrations to levels that are tolerable on the residential and other civil structures not belonging to the quarry owner.
  - restrict generation of fly-rock and their throw to eliminate adverse effect on the residents and agricultural lands of the Nagaroor (Kadavila) village.
- Carry out at least 10 controlled trial blasts and monitor blast induced ground vibrations at least in 25 points under the supervision of the author of this report and their team. Similarly, study the distance to which flying fragments are produced.
- Develop a scaled distance equation for the site and determine the site constants which are site specific.
- Fine tune the blast design, if required, which will restrict the blast induced ground vibrations to the levels tolerable to the said structures, and control the fly-rock to minimise their effect on the residents, and people working in the agricultural lands.
- Submit the report including suggesting suitable methodology for carrying out regular drilling, controlled blasting operations in the quarry and also appropriate safety measures to be taken to guard against blast induced vibrations and fly-rock.

## **1.8 BLAST VIBRATION MONITORING INSTRUMENTATION**

Blast induced ground vibrations and air over pressure (noise) are monitored with three dimensional Seismographs. During the field investigations, the blast induced ground vibrations were monitored using two numbers of NOMIS and three numbers of INSTANTEL seismographs.

### 1.8.1 NOMIS Mini SuperGraph

NOMIS Mini SuperGraph instrument (shown in Figure 1.0) from NOMIS seismograph, Inc., Birmingham, Alabama, U.S.A. are used for monitoring ground vibrations and air overpressure. It is very light, portable and user-friendly instrument for ease of operation in the field. The instrument has tri-axial transducer to record the blast induced ground vibrations in all three directions viz. R, T, V and a microphone to measure and record the air over pressure levels. The instrument can be operated from mains and rechargeable battery.

The Vibration Monitoring System basically consists of

- Transducers for recording ground vibrations and a microphone for measuring air overpressure that convert physical motion or pressure to an electrical current, which is transmitted through a cable followed by an amplifying system. The vibration events are recorded on to the system.



**Figure 1.0 NOMIS Seismograph**

The software provided with the instrument works on windows operating system. The software provides for copying, viewing, analyzing and printing the data. The software is also capable of performing advanced analysis of waveforms, etc. for effective analysis of the ground vibrations. The instrument is to be properly fixed (Coupled) to the ground. Some of the salient features of NOMIS Seismograph are given in Table 1.9.

**Table 1.9 Salient features of NOMIS Seismograph**

S.No.	Parameter	Values
<b>SEISMIC</b>		
1.	Range	0-254 mm/s
2.	Accuracy	+/- 3%
3.	Frequency Response	2- 400 Hz (1 Hz optional)
<b>SOUND</b>		
1.	Range	92-148 dB
2.	Accuracy	+/- 0.1dB at 30 Hz and 127 Hz
3.	Frequency Response	2- 400 Hz
<b>WAVEFORM RECORDED DATA</b>		
1.	Record Modes	Waveform and Manual
2.	Seismic trigger range	0.19- 254 mm/s, no trigger, manual Lower Levels Optional
3.	Sound trigger range	92- 148 dB, no trigger (other levels optional)
<b>PHYSICAL SPECIFICATIONS</b>		
1.	Weight	1.9 kg
2.	Battery	6 Volt, gel type rechargeable, 14 days duration
3.	Display-LCD	8 lines x 21 characters with backlight
4.	Pc Interface	RS-232 & additional 15 pin auxiliary connector

### 1.8.2 Instantel DS-077 Minimate & Blastmate

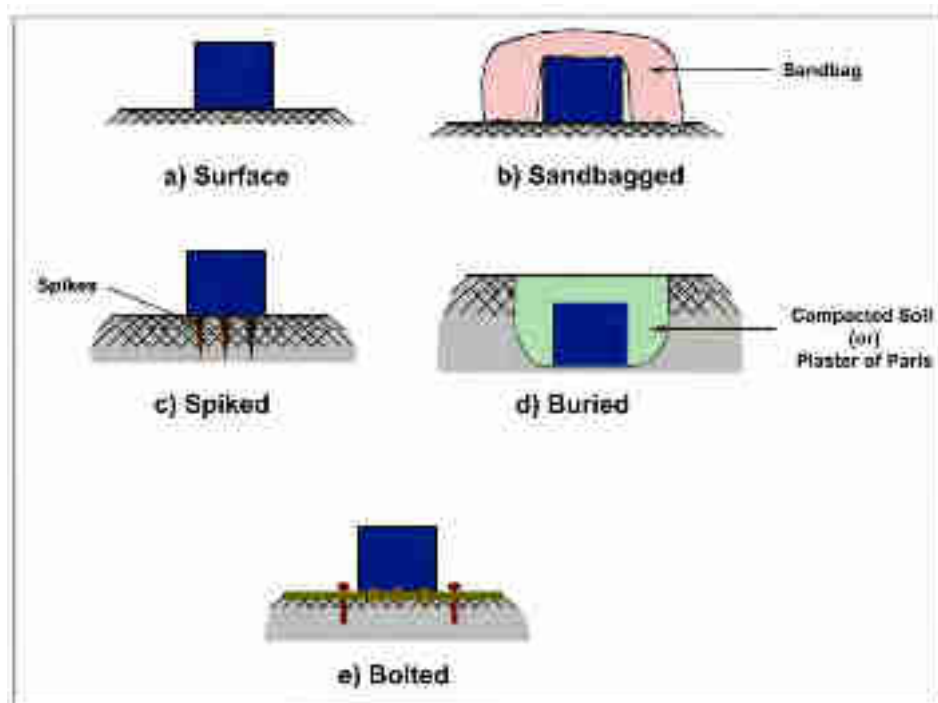
Instruments of Instantel, Canada (Figure 1.1) were also used for monitoring ground vibrations. The instrument can be operated with power from the rechargeable battery. It is very light, portable and user-friendly instrument for ease of operation in the field. The instrument has tri-axial transducer (seismograph) to record the blast induced ground vibration in all three directions viz. radial (R), transverse (T) & vertical (V) directions and a microphone to measure the air over pressure levels. Minimate is a PC compatible computer-based system with inbuilt memory. The seismograph can measure the PPV up to 127 mm/s, frequency in the range of 2 - 250 Hz and air over pressure in the range of 100 - 142 dB. For effective recording of the ground vibrations the instrument is properly coupled to the ground either by spiking or grouting or bolting.

### 1.8.3 Transducer Mounting

Monitoring of ground vibration is to be carried out after properly mounting (coupling) the transducer (Geophone) with the ground to receive and transmit the actual magnitude of the vibrations at that site. There are five methods of mounting the transducer on the ground as shown in Figure 1.2. In the first, the transducer is placed on a horizontal surface without any device to hold it (Figure 1.2 a).



**Figure 1.1 INSTANTEL Vibration Monitoring Instruments**



**Figure 1.2. Five Common Methods of Transducer Mounting**

The second one is also mounted in the same way but a loosely packed sandbag is placed over it so that all sides of the bag are directly in contact with ground (Figure 3b). In the third, the transducer is spiked into the ground (relatively loose) firmly, with the three spikes which are screwed to the transducer, by pressing into the ground

such that the base of the transducer is in direct contact with the ground (Figure 3c). In the fourth method, it is connected to the ground by completely burying it in soil or rock by making an excavation slightly bigger in size than that of the transducer and the soil compacted firmly around and over the transducer (Figure 3d). The same can be achieved by using 'Plaster of paris' also. In the fifth method the transducer is bolted to the surface (floor or walls of a structure) to facilitate recording all the vibrations to which the surface is subjected to (Figure 3e).

## **1.9 CONTROLLED BLASTING**

As stated earlier, when an explosive charge is blasted in a shot hole, in addition to doing the useful work of breaking rock and displacing it, it also produces adverse environmental effects like ground vibrations, over-break (back break), fly-rock, air-over pressure (noise) and air pollution with gasses and dust. Some of these adverse effects cause damage to the structures in the vicinity and can cause injury to the people. Blasting by eliminating and / or controlling these adverse effects is termed as controlled blasting.

The blast induced ground vibrations get transmitted away from the blast in non-discriminating manner resulting in crushing and fracturing of the rock in the vicinity. This may pose a problem when blasting in the vicinity of the perimeter of a pit or a trench or civil, mining or defence structure. Hence, for the safety of the excavation and nearby structures, creation of new fractures and widening of the existing cracks due to the blasting are to be minimised, by generating less vibrations or preventing the vibrations from reaching the structure. The techniques to achieve this include

- Use of low strength explosives (explosives having less velocity of detonation).
- Reduced charge concentration by using less density explosives in small diameter drillholes.
- Reducing the quantity of explosive blasted at each moment of time by adopting delay blasting technique.
- Selecting optimum delay interval between two successive shots or groups of shots.
- Optimising the blast design parameters, viz. spacing, burden, length of the hole, charge factor, etc.



- Use of small diameter explosive charges (cartridges) in a large diameter holes (de-coupled charges).
- Use of air bags in the shot holes.
- Decking of explosives.
- Creating artificial cracks or discontinuity planes between the blasting site and the structures to be protected to limit the propagation of the radial cracks and transmission of shock waves.

### **1.9.1 Controlled Blasting Techniques**

As on date, many blasting techniques are available to control the adverse effects of blasts. However, the selection of suitable technique primarily depends on the adverse parameter(s) of the blasting to be controlled. Some of the common techniques are (i) limiting the maximum charge per delay; (ii) line drilling; (iii) pre-splitting; (iv) cushion or smooth blasting; (v) air decking; (vi) muffling. Out of these, the first and sixth techniques, i.e. restricting the explosive quantity per delay and muffling with old tyres would be adopted for designing the controlled blasting technique in the Kadavila-1 Stone Quarry to protect the residential structures in the surrounding villages.

## **1.10 ADVERSE EFFECTS OF BLASTING**

### **1.10.1 Abatement of Ground Vibrations by Controlled Blasting**

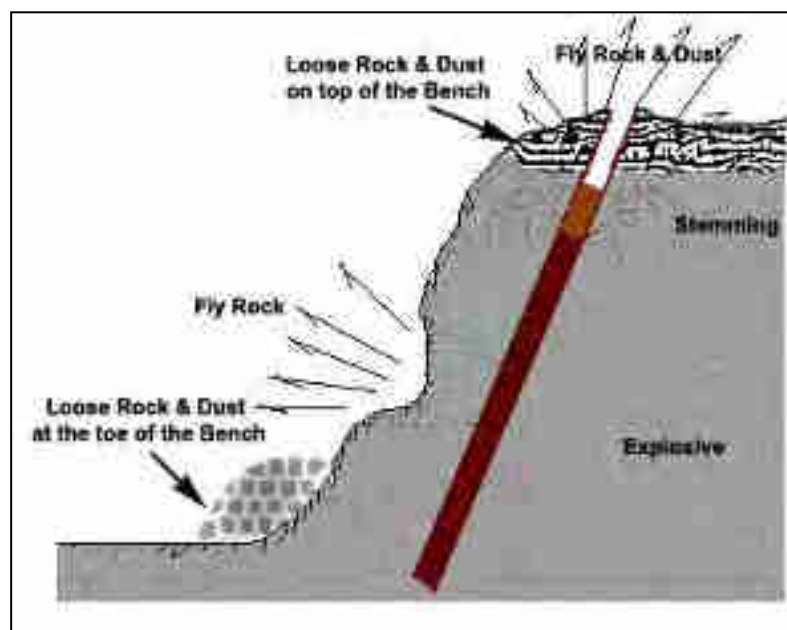
The control measures for blast induced ground vibrations are:

- Design the blasts appropriate to the site and implement the design scrupulously.
- Exercise good control over drill hole pattern by properly marking the shot holes on the floor of the bench prior to drilling, so that the designed spacing, burden and inclination are achieved.
- Provide maximum relief [by creating free face(s)] to ensure free movement of the rock with appropriate charge factor.
- If no additional free face is available, a properly designed initial cut pattern is to be implemented.
- Select and use appropriate explosives and accessories suitable for the ground conditions prevailing at the site.
- Select the appropriate charge factor (specific charge).

- Select the maximum charges per delay based on the distance of the structure to be protected from the blasting site.
- Select the appropriate delay interval between holes in the same row and rows of the holes.
- Deck the charges in a blast hole.

### 1.10.2 Fly Rock

When blasting is carried out, the rock gets fragmented and the fragmented material is moved away from the bench and gets piled up as fragmented mass to enable loading by an excavator. In addition to this desirable displacement of broken fragments, some stone pieces travel to certain distance away from the face resulting in scatter of the blasted muck pile and a few of them also project to a greater distance as shown in **Figure 1.3**. This undesirable projection of stones is termed as 'fly rock'.



**Figure 1.3 Fly-rock Generation**

Fly rock is a serious environmental hazard and is often a cause of fatalities and /or serious injuries to the people, cattle, damage to the equipment, buildings and other property. Damage due to fly rock from blasting is one of the main causes of strained relations between the mine management and the people residing, working or passing by in the vicinity of blasting operations. This assumes prominence in mines having small leasehold area (when the danger zone falls beyond the leasehold area) and when the quarry is shallow with reference to the surroundings. These hazards

become serious as the blasting rounds become bigger with larger diameter boreholes, where fly rock of large sizes travel long distances. Fly rock is caused by improper blast design. The important parameters, which cause fly rock problem, are inadequate confinement of the explosive charge, high charge factor, decreased spacing and burden, overcharging, inaccurate drilling, inadequate stemming, faulty delay timing including not using delay detonators in multi-row blasting, improper initiation sequence, overlapping of delays, blast hole diameter, bench height, inclination of holes, charge distribution in holes, loose rock lumps lying on the top of bench or along slope, geological conditions like highly fractured and weathered rock and of course, human errors like - carelessness and improper supervision. In addition, secondary blasting is also a major source of fly rock and hence is to be avoided, wherever possible, or at least minimised by proper primary blast design (considering the above stated parameters) using delay detonators in conjunction with inverse initiation.

### **1.10.3 Control of fly-rock**

Fly rock can be controlled by judicious selection of blast parameters mentioned above based on experience and calculations using certain empirical formulae developed from the site investigations. The fly rocks produced during the blasting can be controlled by adopting the following measures:

- Proper blast design and its implementation.
- Careful inspection of site before laying out blast holes and deciding the drilling pattern to be adopted based on the bench geometry.
- Drilling in accordance with the requisite blast design.
- Blast hole charging (using optimum charge factor).
- Maintaining the adequate stemming column.
- Use of proper stemming material (small pieces of stones with sharp edges are to be removed from the stemming material to eliminate the possibility of insulation of the detonator lead wires getting damaged or snapping of the lead wires and ultimately resulting in misfires).
- Imparting adequate training to the blasting crew.

In addition to the above, withdrawing all persons, cattle and traffic from the entire area falling **within a radius of 500 meters from the place of firing (hereinafter referred to as the danger zone)** as per **Reg. 188 (2)(b) of MMR 2019** and **DGMS Technical circular No. 2 of 2003**, and positioning of guards (sentries) at all probable entrances into the blasting zone is very essential to prevent inadvertent entry of persons, cattle and traffic.

#### **1.10.4 Air Blast/Noise**

When blasting is done, a loud noise is heard which is known as air blast. Air blast, however, is not simply the sound that is heard. Air blast is an increased pressure wave consisting of high frequency sound that is audible (from 20 Hz to 20 kHz) and low frequency sound or concussion (less than 20 Hz) that is sub-audible and cannot be heard. Although air blast seldom causes structural damage but sudden loud noise causes psychological fear in the nearby inhabitants and in some cases even breakage of window panes have been reported (Persson et al., 1994), if any building is present within a short distance from the blasting site. Air blast is influenced by type and amount of explosive, adequacy and type of material for stemming, direction of blast and meteorological conditions. The main cause of noise is the energy released in open air by the initiation system and inadequate stemming column, burden etc.

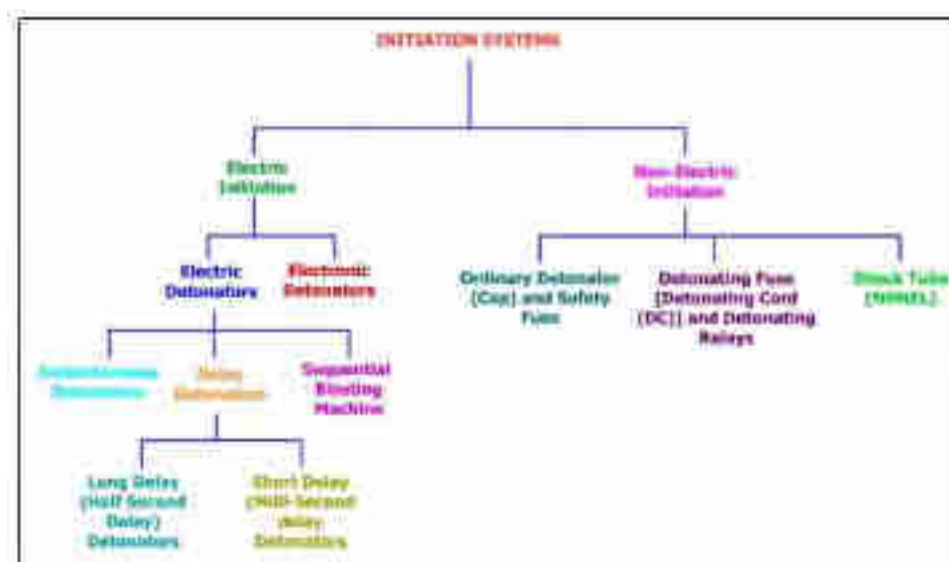
Air blasts are produced either by the direct action of the explosion products from the unconfined explosive (like, detonating cord) in air or by over charging of explosive in a shot hole. The waves produced by the effect of blasting increases the air pressure from ambient pressure to peak and drops to negative (i.e., below ambient pressure) slowly. Its travel thereafter is governed by air temperature, wind direction & speed, and the presence of obstructions in the form of buildings, vegetation, and ground contour. Hence, blasting is to be avoided when the wind is blowing towards a critical area, which influences the air blast propagation. Similarly, blasting early in the morning and late in the evening is to be avoided, as there will be temperature inversions in the atmosphere during these periods of the day. Noise production is more with detonating cord and hence resorting to electric delay detonation reduces noise. However, United States Bureau of Mines (USBM) has correlated the damage due to air over-pressure. The recommended values are given below:

**Table 1.10 United States Bureau of Mines (USBM) Values withstand Damage due to Air Over-pressure (Noise)**

Over-pressure (dB)	Over-pressure (KPa)	Air Blast Effects
177	14	All windows break
170	6	Most windows break
150	0.63	Some windows break
140	0.20	Some large plate glass windows may break, desk and windows rattle
136	0.13	USBM interim limit for allowable air blast
126	0.05	Complaints likely

## 1.11 INITIATION SYSTEMS

There are a number of initiation techniques which can be used for supplying necessary energy to a column of explosive and thereby initiate the detonation process. The classification of initiation system is given in **Figure 1.4**



**Figure 1.4 Blast initiation systems**

Here, cap and safety fuse initiation is not recommended due to the difficulty in counting the number of shots during the firing of more number of holes in a single round creating unsafe situation.

Detonating fuse (DC) initiation system is also not recommended in this case because of its inability to provide inverse initiation (true bottom initiation). In addition, it produces more noise and increased possibility of misfires.

Shock tube initiation system can be used for better results and improved safety but it is more expensive.

Among the above, the **NONEL based initiation system** is having advantages of initiation systems are:

- As opposed to fuse initiation, the time of detonation is always under control.
- No damage is done to the stemming column.
- Delay blasting can be effectively carried out.
- True bottom initiation ensuring effective utilization of explosive energy thereby eliminating the stemming rejection and minimizing the flyrock travelling to large distances.
- No surface noises.
- Occurrence of misfires in the blasting can be minimised.
- Systems are cheaper and safe.

#### **1.11.1 Shock Tube (NONEL)**

The role of NONEL shock tube initiation system is the latest and advanced system in quarry blasting. The main component of a non-electric initiation system is shock tube that is a hollow plastic tube made with advanced materials designed to withstand field conditions. The inner walls of the tube are coated with high explosive of 14 to 20 mg/m length (**Figure 1.5**). With the help of non-electric millisecond delay detonators for down the hole initiation, two or three explosive decks in the same drill hole can be detonated by different delays. This reduces the maximum charge per delay thus controlling ground vibrations and can be very effectively used for carrying out controlled blasting operations. Use of NTD (Noiseless trunk line surface delay system) on the surface hook up, in place of detonating cord significantly reduces air blast/noise in view of the non-destructive nature of the tube. NTD or TLD (Trunk line delay) is a non-electric millisecond delay detonator for surface initiation of down line detonators. Combination of DTH and NTD give hole-by-hole initiation as well as sufficient 'burning front' thereby eliminating cut offs and misfires. Shock tube NONEL



system provides a high level of safety against initiation by static electricity, stray electrical currents and radio frequency transmissions.

#### **1.11.2 Advantages of NONELs**

- Noiseless, true bottom initiation, down-hole delays, simplified tie-in patterns, no limit on number of holes, reduction in air blasts/ground vibration, safe to use in extraneous electricity environments.

#### **1.11.3 Disadvantages of NONELs**

- Lack of firing circuit testing facility before firing (only visual examination is possible).
- Expensive compared to detonating cord and electric delay detonators.



**Figure 1.5 Non- Electric Shock Tube Initiation Systems**

## **CHAPTER 2.0**

### **BLASTING PRACTICES IN THE QUARRY**

## **2.0 DETAILS OF THE SITE**

### **2.1 Company Profile**

The Adani Group is one of India's leading business houses based at Ahmadabad – Gujarat, founded in 1988. Adani has grown to become a global integrated infrastructure player with businesses in key industry verticals – Resources, in coal mining and trading; Logistics, which is spread across ports, logistics, shipping and rail; Energy, with renewable, thermal, solar power generation and transmission businesses and Agro commodities and ancillary industries. The integrated model is well adapted to the infrastructure challenges of the emerging economies.

Adani Vizhinjam Port Private Limited (AVPPL) is company belongs to Adani groups, having their Registered office at Ahmedabad – Gujarat, and the local office at 2nd Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram - 695014. The said company is in various infrastructural and construction activities, they have been awarded by the Government of Kerala for the development of Vizhijam port at Thiruvananthapuram, which is a National Developmental Project / Activity and is also a prestigious Sea Port for Kerala State. Hence, M/s. AVPPL is carrying out the stone quarrying operations in Sy. No. 555/2 of Nagaroor village (Kadavila), Chirayinkeezh Taluk, Thiruvananthapuram District over an area of 3.6630 Ha to facilitate the building stone material as the raw material for the development of the breakwater construction project.

### **2.2 Quarry Details**

The present scientific study is in response to the request made by the management of M/s. Kadavila-1 Stone Quarry to investigate into the influence of blasting with emulsion explosives in their quarry relating to ground vibrations on the residential and other buildings of Kadavila village located around the quarry. The study is also aimed at investigating into the generation of the fly-rock, due to blasting and other mining activities of the quarry on the neighbourhood. Accordingly, the author of this report has carried out a preliminary survey followed by **10 number of controlled trial blasts** during **16.03.2021 to 17.03.2021** and prepared this report.

Figure 2.1 depict the Google map of the quarry area indicating the nearby surface structures and Figure 2.2 shows the surface plan of the leasehold area and locations of the nearest settlement and villages from the quarry lease area.



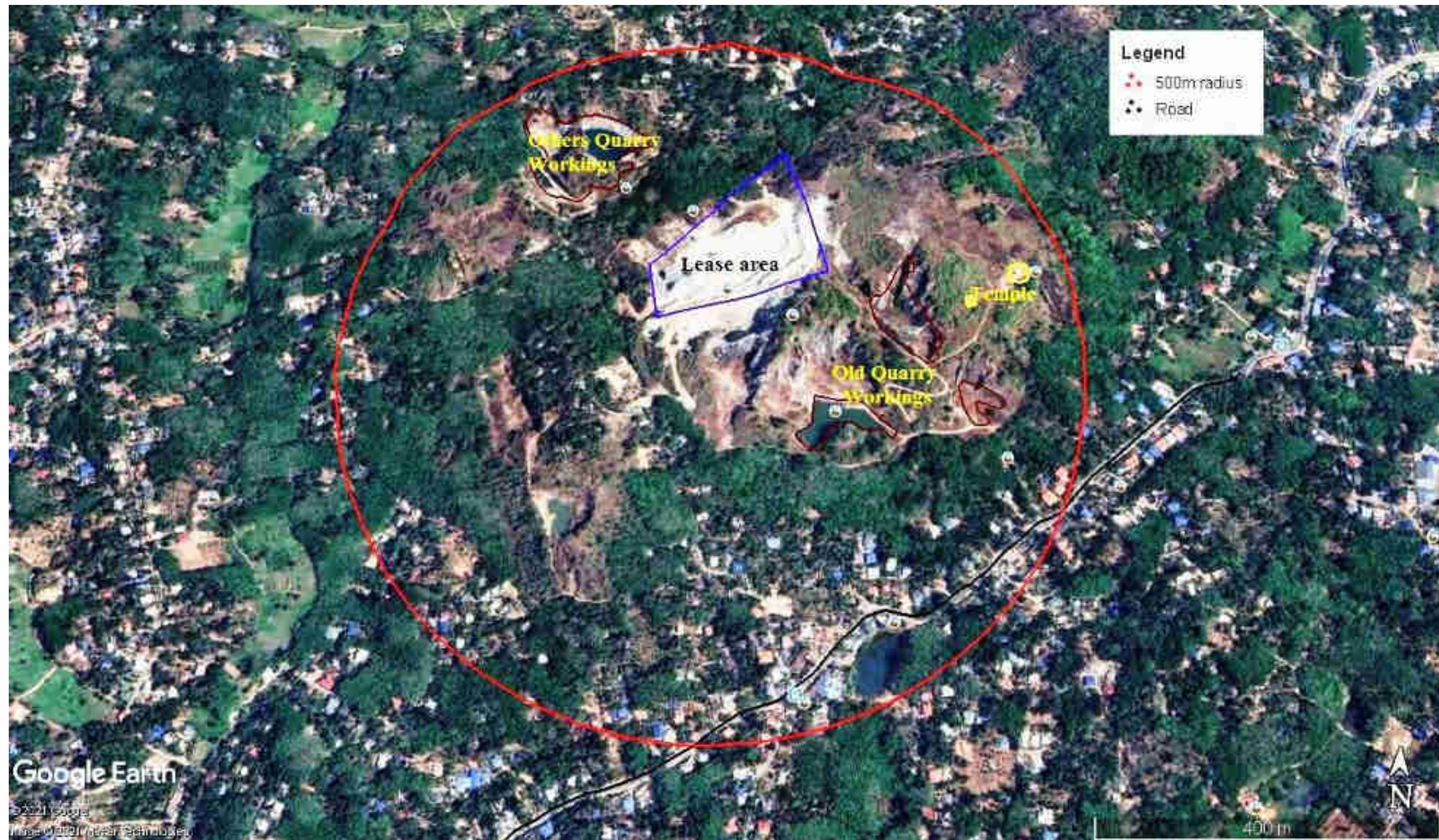


Figure 2.1 Shows the location of M/s. Kadavila-1 Stone Quarry in Nagaroor village, Chirayinkeezh Taluk, Thiruvananthapuram District, Kerala and its surrounding settlement



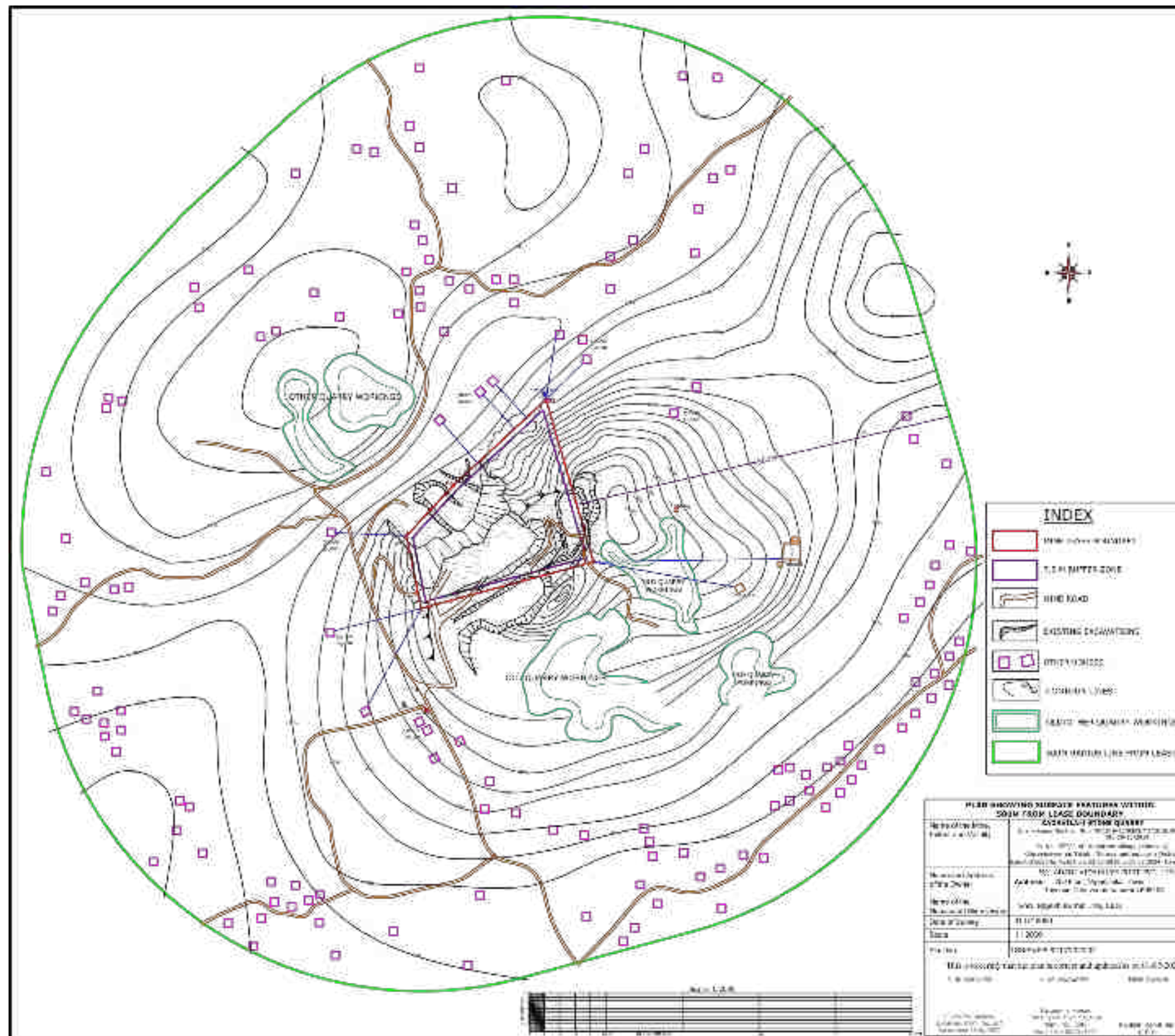


Figure 2.2 Shows the Surface Plan of M/s. Kadavila-1 Stone Quarry in Nagaroor village

The said quarry is located in Kadavila at a distance of 1.20 km towards southwest of Nagaroor village and lies towards north of Kadavila Bus stop at a distance of 0.50 km approximately. This lease area is approachable by all-weather road/s up to the up to Kadavila bus stop, thereafter a kutchra road towards north will leads to area.

The area is located between the geographical coordinates, **latitudes of 08°43' 42.88" N to 08°33' 51.74" N and longitudes of 76°50' 15.26" E to 76° 50' 23.24" E** and the total leasehold area of the mine is **3.6630 Ha (9.051 acres)** in Survey No. 555/2 (Government Land) of **Nagaroor village (Kadavila), Chirayinkeezh Taluk** of Thiruvananthapuram District, Kerala state. The Quarry is located at a distance of 35 km (by road) from Thiruvananthapuram which is the district head quarter and state's capital and at a distance of 13.0 km (by road) from Chirayinkeezh which is the Taluk head quarter, where all the infrastructural facilities are available. The nearest airport is at Thiruvananthapuram at a distance of 35.0 km and sea port at Kollam which is at a distance of 50.0 km. The nearest railhead on Broad gauge is Chirayinkeezh.

### **2.2.1 Geology of the area and properties of strata**

Most of the quarry area is exposed by Charnockite (commercially known as Granite), only towards the north of the quarry area part is covered by topsoil with the thickness varying from 0.75 m to 1.00 m. The overburden is mainly topsoil, intercalated waste and mining rejects. Out of geological reserves of 5.196 million tonnes, only 1.778 million tonnes of reserves can be exploited / mineable, while the balance of 3.417 million tonnes of reserves is getting blocked which cannot be mined due to the boundary and practical constraints. The geological parameters of the ore body as follows:

Strike	: NW - SE with local variation of 15°– 20° on either side
Dip	: 70° - 80° dipping north
Strike length	: 250 m
Width of deposit	: 150-180m
Depth of deposit	: 50m



### **2.2.2 Method of Quarrying**

Based on the mode and method so adopted and taking into the consideration of geological parameters, the quarry pit is designed such that the height of the bench is kept about 6.0 m maximum, and the width is also kept 6.0 m, maintaining 45° pit slope. The haul roads are properly laid and frequently wetted to suppress the dust being produced from the surface (Figure 2.3).



**Figure 2.3 Benches and Haul road maintenance in the Quarry Face**

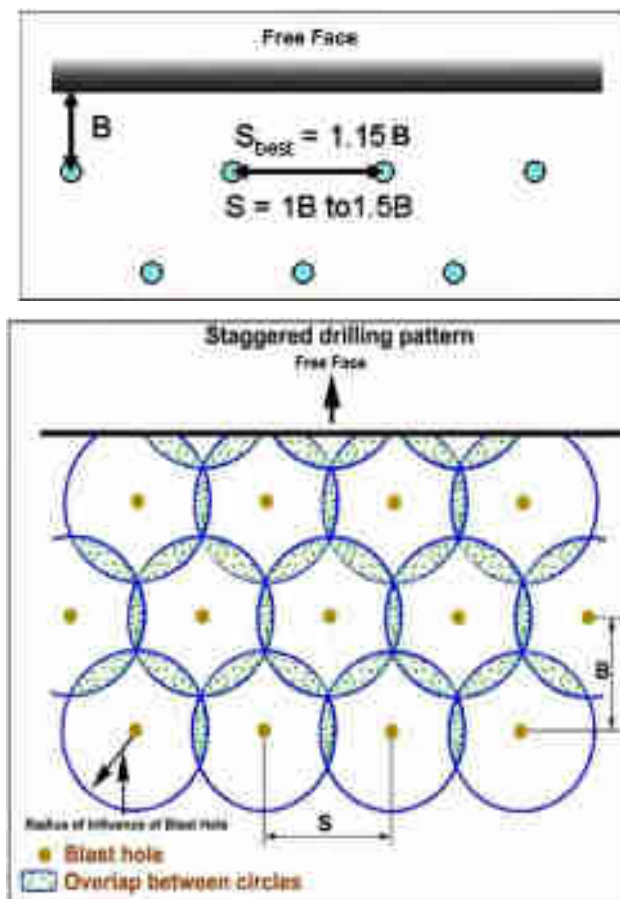
Mining operation commenced from higher elevation to the lower elevation, benches developed and advanced in south and west direction laterally. Initially, the height of the highwall bench will be reduced, when it comes to the lower levels, benches will take the circular shapes and pit will be formed. The Mining operation was controlled and supervised by Statutory persons like Mine Manager, Assistant Mine Manager, Mine Foreman, Mining Mate Cum Blaster, whose certificate issued by the Director General of Mines Safety, Dhanbad.

## **2.3 EXISTING BLASTING PRACTICES**

The nature of the rock in the quarry has been found to be hard to medium hard in nature, possessing higher compressive strength and hence it requires drilling and

blasting operations to dislodge / loosen the material from the main rock mass to facilitate subsequent loading and transportation operations effectively.

The quarry is being worked systematically by constructing the benches with a maximum height of 6.0 m. Taking into consideration the parameters such as production requirement, required degree of fragmentation, type and capacity of excavator used, and environmental constraints, the **drill hole diameter of 33 mm** is being drilled using Jack hammer drilling machines. Based on the strength of the rock, the blasting pattern with a **burden** of 1.2 m and the **spacing** of 1.5 m are being maintained in the **row-by-row staggered patterns** (Fig. 2.4). The **hole depth** of 2.4 m for the above blastholes is maintained consistently for all the blasts. In the present case, vertical or inclined holes are used based on the bench conditions. If inclined hole drilling is adopted, the holes should be inclined at an angle of **15 to 20°** (more or less parallel to the inclined face of the bench) to the vertical and **inclined towards the free face** of the bench.



**Figure 2.4 Staggered Pattern of Blast Holes**

In the present site, a **minimum stemming length** of **0.70 m** is used at the collar of the blasthole. The crushed angular rock of **2 to 4 mm (about 10% of blasthole diameter)** is used instead of fine drill cuttings to prevent premature venting of explosive gases. Keeping atleast two free faces during the current blasting practices in the Kadavila-1 stone quarry, a **charge factor** of **0.15 to 0.16 kg/m<sup>3</sup>** is adopted for ensuring average charge quantity of 0.500 kg per hole. Accordingly, the cap-sensitive **Emulsion explosive** cartridges of **25 mm diameter** are used to charge the holes in **three to five** rows for ensuring effective fragmentation of rock and to minimise the fly-rock in the quarry. Maximum numbers of holes are being blasted at a time in a round are generally limited to 50 to 80 with Non-Electrical detonators (NONEL) with surface delay of 17/25 ms and an in-hole delay of 250 ms to mitigate adverse impacts such as air blast, fly rock and ground vibration. The instantaneous electrical detonators are being used for initiating the blasting circuit prepared with NONEL based detonators.

After completion of drilling, charging, stemming and hooking up by connecting the trunk-lines of NONEL shock tubes, the place would be ready for blasting (Figure 2.5 and 2.6). All blasting operations are carried out only during the day time (between sunrise and sunset) and under the personal supervision of the Assistant Mines Manager. However, it is ensured that cattle, stray dogs, human beings and traffic on the village road **within a distance of 500 m from the blasting site** (which is termed as blasting zone) are cleared away for the safety purposes. Similarly, the Mining Mate cum Blaster and his assistants are moved to a safe place and the **sentries with red flags and blowing whistles were kept in all the directions along the periphery of the blasting zone** on either side of the road within the blasting zone preventing any unauthorized entry of human beings or cattle or traffic into the blasting zone. After taking **the final clearance** from all sentries and the **final confirmation** from the Assistant Mines Manager, the exploder key is inserted into the exploder and the button is pressed for the firing.

After the completion of the blasting, the place is inspected for misfires, if any. **If no misfires are identified, all clear signal is given** and subsequently mucking (loading of the blasted rock) can be started.



**Figure 2.5 Type of explosives used**



(a)



**Figure 2.6 Drilling and charging of blast holes**

The summary of the blast design is given in **Table 2.1**

**Table 2.1 Summary of the Blast Design being adopted in M/s. Kadavila-1 Stone Quarry**

Sl. No.	Parameter			Value
1.	Blast hole diameter			33 mm
2.	Burden			1.2 m
3.	Spacing			1.5 m
4.	Height of the bench			6.00 m
5.	Stemming length			Minimum 0.70 m
6.	Drilling pattern being followed			Staggered
7.	Specific charge	For production blasting		0.15 to 0.16 kg/m <sup>3</sup>
8.	Average explosive Quantity/hole	Emulsion cartridge		0.50 kg
9.	Maximum explosive charge per drillhole used during production blasting	Emulsion cartridge	125 g	0.625 to 0.688 kg
10.	Detonators used			NONEL based detonators of 17/25 ms surface delay with an in-hole delay of 250 ms
11.	Type of explosive used			Cap-sensitive type Emulsion cartridges (ø=25 mm)
12.	Method of initiation system			IED/MSDD
13.	Method of connecting detonator			Series

**Blasting shall be recognised as the most critical operation in mining and hence shall be carried out by maintaining highest standards of safety and reliability.** Emphasis shall always be placed in creating a work-culture where it is to be emphasized that safety is the responsibility of all personnel working at the site. **Hence, all these operations of drilling and blasting are being carried out under the direct supervision of qualified and experienced Assistant Mines Manager, Mining Mate cum Blaster in Kadavila-1 stone quarry.**



## CHAPTER 3.0

### MONITORING AND ANALYSIS OF EXPERIMENTAL BLASTS

In response to the request made by the management of M/s. Kadavila-1 Stone Quarry to investigate into the influence of blasting with emulsion explosives in their quarry relating to ground vibrations on the residential and other buildings of Kadavila village located around the quarry, **10 number of controlled experimental blasts** were carried out during **16.03.2021 to 17.03.2021**. This scientific study is also aimed at investigating into the generation of the fly-rock and airblast (noise) due to blasting activities of the quarry on the neighbourhood.

Accordingly, five numbers of latest version of blast monitoring instruments (Two NOMIS and Three-Dimensional Seismographs of INSTANTEL make) have been used by the Anna University research team for monitoring blast induced ground vibrations in M/s. Kadavila-1 Stone Quarry.

After carrying out detailed site examination and discussion had with the management, **vibration levels** during the above **10 experimental blasts** were measured at the residential buildings, and other structures in the vicinity. The details of the blast parameters, peak particle velocities, their vectorial sum and the corresponding frequencies measured at the monitoring stations (**47 observations**) and other details of the blasts are given in **Table 3.1**. Regression curve has been drawn to develop the predictor equations for the site. From the predictor equation, site constants for M/s. Kadavila-1 Stone Quarry were determined. This enabled the blasting operations to be designed to maintain the permissible levels of peak particle velocity (blast induced ground vibrations) at any structure within the recommended level. The maximum explosive charge to be used per delay at each site to ensure no risk for the check dam, residential houses and other surrounding structures have been calculated using the **predictor equation with 95% confidence (Equation No. 3)** developed for various distance of the of structures from the blasting site.

**Table 3.1 Details of the 10 Trial Blasts Carried out at Kadavila-1 Stone Quarry and the Blast Induced Ground Vibrations Recorded**

Blast No.	Date	Location of Monitoring Site	Time	No of Holes	Average Depth of the holes	Average Burden & Spacing	Total charge./ Blast	Maximum Charge / delay	Volume of Rock Broken	Charge factor	Distance between the Blasting and Monitoring Site	Vibration measurement recorded						Vectorial Sum	Air Overpressure
												Longitudinal		Transverse		Vertical			
				Peak Particle Velocity	Frequency	Peak Particle Velocity	Frequency	Peak Particle Velocity	Frequency	mm/s	dB								
No.	m	m	kg	kg	m³	kg/m³	m	mm/s	Hz	mm/s	Hz	mm/s	Hz	mm/s	dB				
1	16.03.2021	S1 8°43'39.00" N 76°50'15.00"E	11.03 am	63	2.4	1.2,1.5	43.375	2.16875	265.356	0.1635	213	Not Triggered							
		S2 8°43'44.17"N 76°50'19.87"E	11.03 am	63	2.4	1.2,1.5	43.375	2.16875	265.356	0.1635	62	3.429	170.60	3.429	128.00	3.429	128.0	4.12	118.2
		S3 8°43'48.03"N 76°50'12.81"E	11.03 am	63	2.4	1.2,1.5	43.375	2.16875	265.356	0.1635	190	Not Triggered							
		S5 8°43'41.81"N 76°50'17.47"E	11.03 am	63	2.4	1.2,1.5	43.375	2.16875	265.356	0.1635	105	1.14	7.8	2.79	7.6	0.445	8.0	2.92	116.9
2	16.03.2021	S1 8°43'39.00" N 76°50'15.00"E	11.08 am	30	2.4	1.2,1.5	18.75	1.25	126.36	0.1483	297	Not Triggered							
		S2 8°43'44.17"N 76°50'19.87"E	11.08 am	30	2.4	1.2,1.5	18.75	1.25	126.36	0.1483	85	1.016	256.00	1.143	128.00	1.397	128.0	2.07	122.4
		S3 8°43'48.03"N 76°50'12.81"E	11.08 am	30	2.4	1.2,1.5	18.75	1.25	125.36	0.1483	253	Not Triggered							
		S5 8°43'41.81"N 76°50'17.47"E	11.08 am	30	2.4	1.2,1.5	18.75	1.25	126.36	0.1483	184	2.10	7.8	2.16	7.5	2.54	8.0	3.41	114

3	16.03.2021	S1 8°43'39.00" N 76°50'15.00"E	11.11 am	80	2.4	1.2,1.5	50	1.25	336.96	0.1483	267	Not Triggered							
		S2 8°43'44.17"N 76°50'19.87"E	11.11 am	80	2.4	1.2,1.5	50	1.25	336.96	0.1483	47	5.334	170.60	3.302	170.60	4.064	128.0	5.58	118.8
		S3 8°43'48.03"N 76°50'12.81"E	11.11 am	80	2.4	1.2,1.5	50	1.25	336.96	0.1483	264	Not Triggered							
		S5 8°43'41.81"N 76°50'17.47"E	11.11 am	80	2.4	1.2,1.5	50	1.25	336.96	0.1483	152	1.86	24	2.1	24	2.67	22	2.70	100
4	16.03.2021	S1 8°43'39.00" N 76°50'15.00"E	02.43 pm	30	2.4	1.2,1.5	18.75	1.33928	126.36	0.1484	136	0.381	0.0	0.245	0.0	0.254	0.0	0.832	91.5
		S2 8°43'44.17"N 76°50'19.87"E	02.43 pm	30	2.4	1.2,1.5	18.75	1.33928	126.36	0.1484	120	1.905	128.00	2.540	128.00	5.588	128.0	5.87	111.2
		S3 8°43'45.27"N 76°50'31.27"E	02.43 pm	30	2.4	1.2,1.5	18.75	1.33928	126.36	0.1484	465	0.572	8.1	0.889	7.8	0.508	8.0	0.968	100
		S4 8°43'41.81"N 76°50'17.47"E	02.43 pm	30	2.4	1.2,1.5	18.75	1.33928	126.36	0.1484	60	Not Triggered							
		S5 8°43'52.19"N 76°50'18.62"E	02.43 pm	30	2.4	1.2,1.5	18.75	1.33928	126.36	0.1484	282	1.52	7.7	2.48	7.5	0.953	8.0	2.81	112
5	16.03.2021	S1 8°43'39.00" N 76°50'15.00"E	02.45 pm	24	2.4	1.2,1.5	15	1.25	101.088	0.1484	296	0.889	204.80	0.254	68.30	1.143	29.30	1.47	112
		S2 8°43'44.17"N 76°50'19.87"E	02.45 pm	24	2.4	1.2,1.5	15	1.25	101.088	0.1484	102	4.064	73.10	4.572	128.00	7.366	102.4	7.52	114
		S3 8°43'45.27"N 76°50'31.27"E	02.45 pm	24	2.4	1.2,1.5	15	1.25	101.088	0.1484	359	0.254	8.0	0.381	7.8	0.191	8.0	0.397	106
		S4 8°43'41.81"N 76°50'17.47"E	02.45 pm	24	2.4	1.2,1.5	15	1.25	101.088	0.1484	185	Not Triggered							
		S5 8°43'52.19"N 76°50'18.62"E	02.45 pm	24	2.4	1.2,1.5	15	1.25	101.088	0.1484	151	0.191	7.7	0.381	7.5	0.191	7.8	0.429	109.5

6	17.03.2021	S1 8°43'41.81"N 76°50'17.47"E	10.55 am	60	2.4	1.2,1.5	37.5	1.875	252.72	0.1484	80	8.509	170.60	5.842	128.00	3.175	73.10	9.8	112.3
		S2 8°43'44.17"N 76°50'19.87"E	10.55 am	60	2.4	1.2,1.5	37.5	1.875	257.72	0.1484	95	1.524	170.60	2.032	256.00	3.302	170.6	3.41	116.4
		S3 8°43'38.74"N 76°50'16.72"E	10.55 am	60	2.4	1.2,1.5	37.5	1.875	257.72	0.1484	174	1.97	7.7	1.84	7.8	1.27	8.0	2.11	100
		S4 8°43'48.03"N 76°50'12.81"E	10.55 am	60	2.4	1.2,1.5	37.5	1.875	252.72	0.1484	170	0.635	8.2	0.508	7.7	0.572	7.8	0.778	112.6
		S5 8°43'47.04"N 76°50'12.20"E	10.55 am	60	2.4	1.2,1.5	37.5	1.875	252.72	0.1484	165	0.572	7.8	0.635	7.6	0.318	8.0	0.683	114
7	17.03.2021	S1 8°43'41.81"N 76°50'17.47"E	10.56 am	50	2.4	1.2,1.5	31.25	1.736	210.60	0.1484	75	7.747	170.60	10.16	170.60	5.969	128.0	11.09	116.4
		S2 8°43'44.17"N 76°50'19.87"E	10.56 am	50	2.4	1.2,1.5	31.25	1.736	210.60	0.1484	125	1.651	51.20	1.778	170.60	2.032	128.0	2.51	114.8
		S3 8°43'38.74"N 76°50'16.72"E	10.56 am	50	2.4	1.2,1.5	31.25	1.736	210.60	0.1484	157	1.46	7.7	2.10	7.8	1.14	8.0	2.24	100
		S4 8°43'48.03"N 76°50'12.81"E	10.56 am	50	2.4	1.2,1.5	31.25	1.736	210.60	0.1484	160	0.953	8.2	0.953	7.7	0.699	7.8	1.17	112
		S5 8°43'47.04"N 76°50'12.20"E	10.56 am	50	2.4	1.2,1.5	31.25	1.736	210.60	0.1484	154	1.71	7.8	1.14	7.6	0.572	8.0	1.89	109.5
8	17.03.2021	S1 8°43'41.81"N 76°50'17.47"E	2.37 pm	30	2.4	1.2,1.5	18.75	1.339	126.36	0.1484	105	5.207	170.60	4.826	102.40	2.667	128.0	6.12	109.9
		S2 8°43'44.17"N 76°50'19.87"E	2.37 pm	30	2.4	1.2,1.5	18.75	1.339	126.36	0.1484	68	1.651	56.80	1.270	128.00	2.032	51.20	2.3	118.5
		S3 8°43'38.33"N 76°50'16.63"E	2.37 pm	30	2.4	1.2,1.5	18.75	1.339	126.36	0.1484	218	<b>Not Triggered</b>							
		S4 8°43'48.03"N 76°50'12.81"E	2.37 pm	30	2.4	1.2,1.5	18.75	1.339	126.36	0.1484	182	1.08	8.2	0.826	7.7	0.889	7.8	1.40	115.6

		S5 8°43'53.22"N 76°50'22.62"E	2.37 pm	30	2.4	1.2,1.5	18.75	1.339	126.36	0.1484	282	1.27	7.7	0.635	7.6	1.59	7.8	1.68	100
9	17.03.2021	S1 8°43'41.81"N 76°50'17.47"E	2.39 pm	24	2.4	1.2,1.5	15	1.071	101.088	0.1484	186	3.302	170.60	2.794	256.0	1.413	170.6	3.47	104.2
		S2 8°43'44.17"N 76°50'19.87"E	2.39 pm	24	2.4	1.2,1.5	15	1.071	101.088	0.1484	91	0.762	36.50	1.016	256.00	1.270	42.60	1.75	112.3
		S3 8°43'38.33"N 76°50'16.63"E	2.39 pm	24	2.4	1.2,1.5	15	1.071	101.088	0.1484	293	Not Triggered							
		S4 8°43'48.03"N 76°50'12.81"E	2.39 pm	24	2.4	1.2,1.5	15	1.071	101.088	0.1484	205	0.317	8.2	0.317	7.7	0.317	7.8	0.524	116.9
		S5 8°43'53.22"N 76°50'22.62"E	2.39 pm	24	2.4	1.2,1.5	15	1.071	101.088	0.1484	209	0.889	7.7	0.826	7.6	0.572	7.8	1.00	109.5
10	17.03.2021	S1 8°43'41.81"N 76°50'17.47"E	2.46 pm	25	2.4	1.2,1.5	15.625	1.116	105.3	0.1484	146	2.54	170.60	2.54	256.0	1.397	170.6	3.4	115.2
		S2 8°43'44.17"N 76°50'19.87"E	2.46 pm	25	2.4	1.2,1.5	15.625	1.116	105.3	0.1484	46	1.270	22.20	1.651	256.00	1.778	170.6	2.29	117.6
		S3 8°43'38.33"N 76°50'16.63"E	2.46 pm	25	2.4	1.2,1.5	15.625	1.116	105.3	0.1484	259	Not Triggered							
		S4 8°43'48.03"N 76°50'12.81"E	2.46 pm	25	2.4	1.2,1.5	15.625	1.116	105.3	0.1484	245	0.191	8.2	0.191	7.7	0.127	7.8	0.206	109.5
		S5 8°43'53.22"N 76°50'22.62"E	2.46 pm	25	2.4	1.2,1.5	15.625	1.116	105.3	0.1484	243	0.254	7.7	0.191	7.6	0.254	7.8	0.318	109.5



### 3.1 Trial Blast Details

The details of the trial blasts along with the measured blast induced ground vibrations and blasting pattern are reported in the following paragraphs. From the adopted blasting pattern and charging practices during the aforesaid experimental blasts, maximum charge per delay and predictor equation were determined for the present site.

**Blast No: 1:** The first trial blast was conducted on 16<sup>th</sup> March, 2021 and the adopted blasting pattern and details are given in the Table 3.2 and 3.3. The Figure 3.1 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.2

**Table 3.2 Co-ordinates of Blast & Instrument Locations**

Sl. No	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise (dB)	Type of structure/ Permissible limit
1	Blast Location (B1)			8°43'45.19"	76°50'18.17"	---		
2	VMS_1 Location	11772	213	8°43'39.00"	76°50'15.00"	Not Triggered		
3	VMS_2 Location	20484	62	8°43'44.17"	76°50'19.88"	4.12 Within permissible limit	118.2	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	190	8°43'48.033"	76°50'12.81"	Not Triggered		
6	VMS_5 Location	4687	105	8°43'41.81"	76°50'17.47"	2.92 Within permissible limit	116.9	Belonging to the owner, maximum value is 15 mm/s

**Table 3.3 Details of Blast Parameters**

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	63	0.688	2.168	43.375

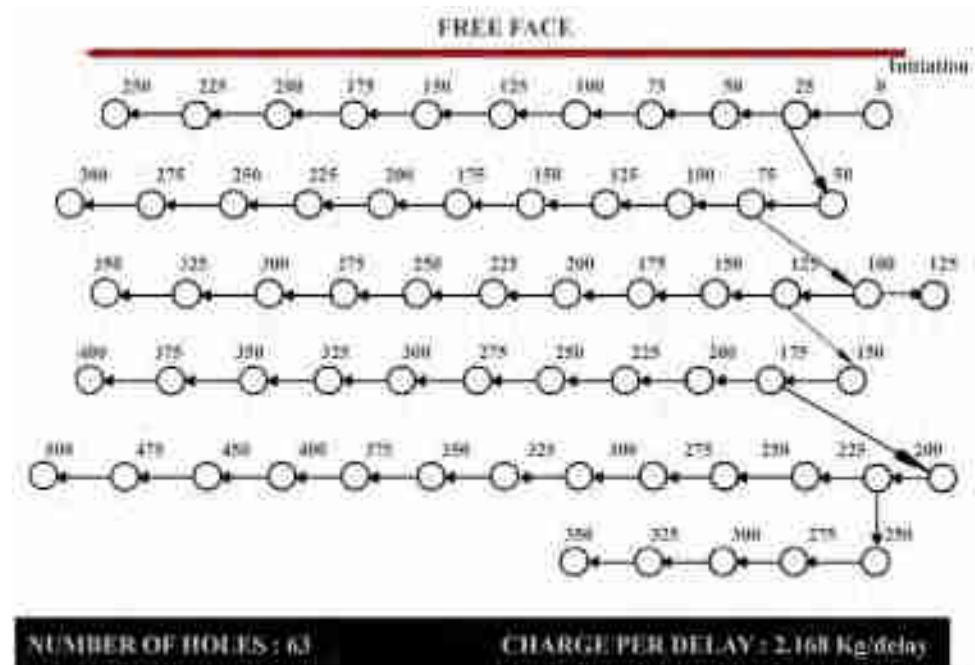


Figure 3.1 Schematic diagram of adopted blasting pattern for the blast 1

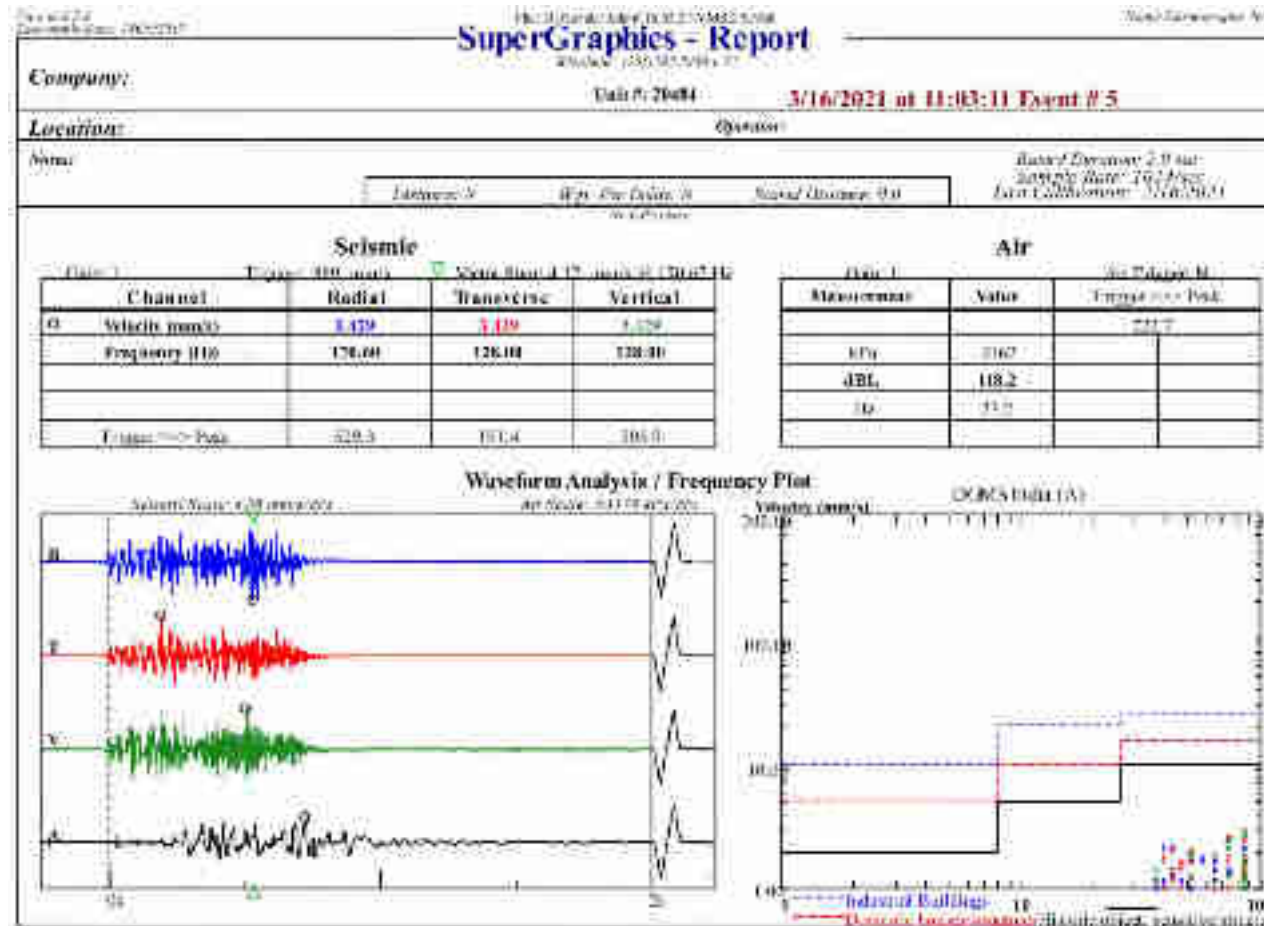
### Post Blast Observations

During the post blast observations, the following conditions were identified:

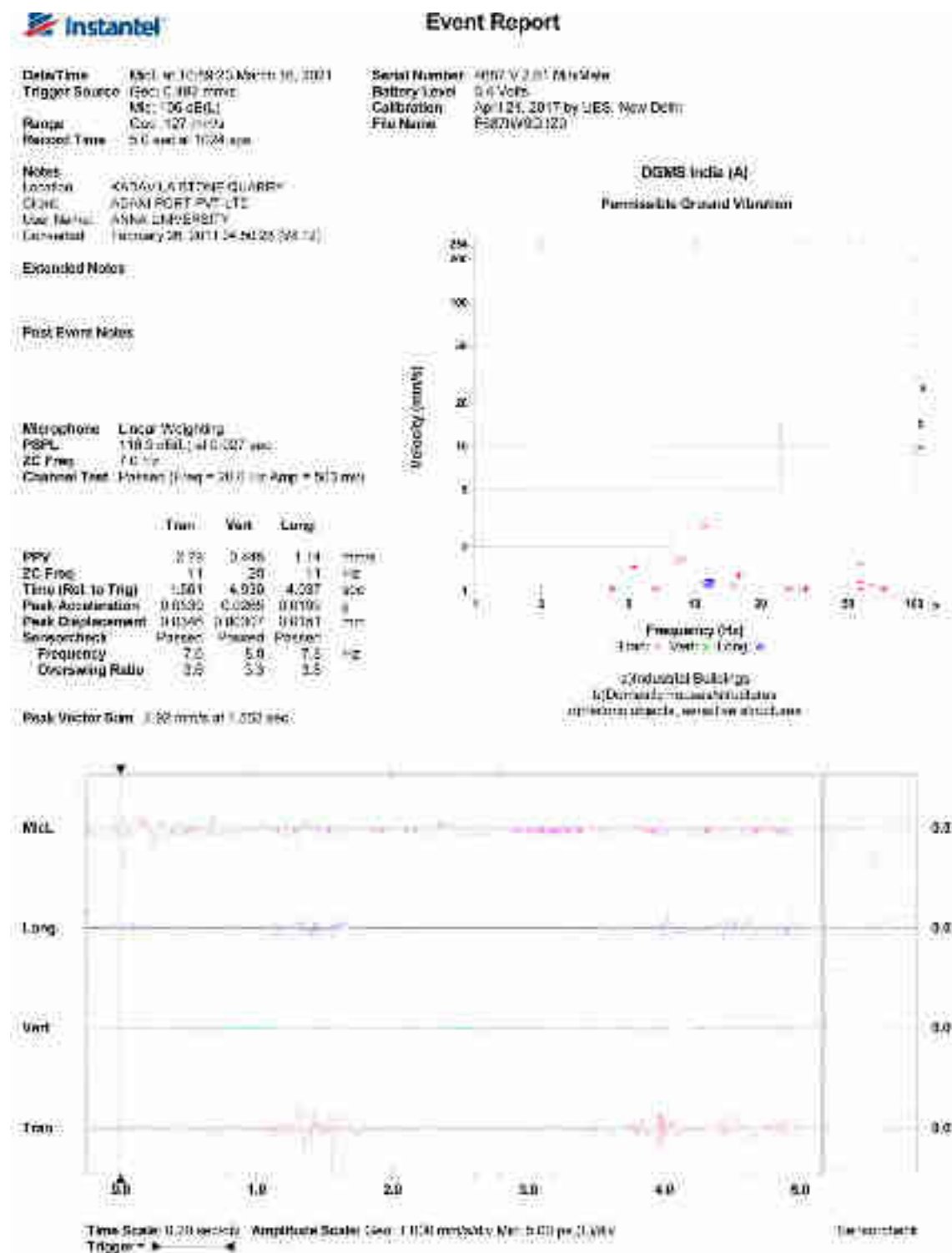
- No backbreak was observed.
- Muckpile was loose.
- The throw of the blast has been around 10-15 m which is considered to be normal.
- A drop of about 0.5 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 10 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored by the mine management was well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.2 & 3.3.**

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## VMS\_2 Location : EVENT REPORT



## VMS\_5 Location : EVENT REPORT





**Figure 3.2 Imagery shows the location blast site 1 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry**



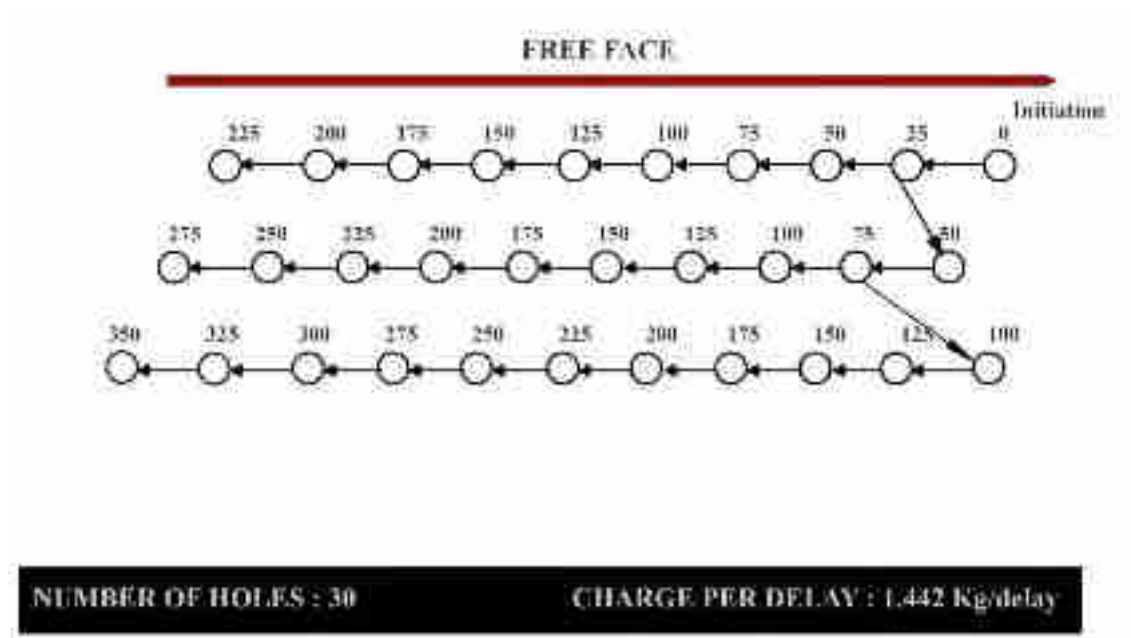
**Blast No 2:** The second blast was conducted on 16<sup>th</sup> March, 2021 and the adopted blasting pattern and details are given in the Table 3.4 and 3.5. The Figure 3.3 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.4

**Table 3.4 Co-ordinates of Blast & Instrument Locations**

Sl. No	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise (dB)	Type of structure/ Permissible limit
1	Blast Location (B2)			8°43'46.73"	76°50'20.89"	---		
2	VMS_1 Location	11772	297	8°43'39.00"	76°50'15.00"	Not Triggered		
3	VMS_2 Location	20484	85	8°43'44.17"	76°50'19.88"	2.07 Within permissible limit	112.4	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	253	8°43'48.033"	76°50'12.81"	Not Triggered		
5	VMS_5 Location	4687	184	8°43'41.81"	76°50'17.47"	3.41 Within permissible limit	114	Belonging to the owner, maximum value is 15 mm/s

**Table 3.5 Co-ordinates of Details of Blast Parameters**

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	30	0.625	1.25	18.75



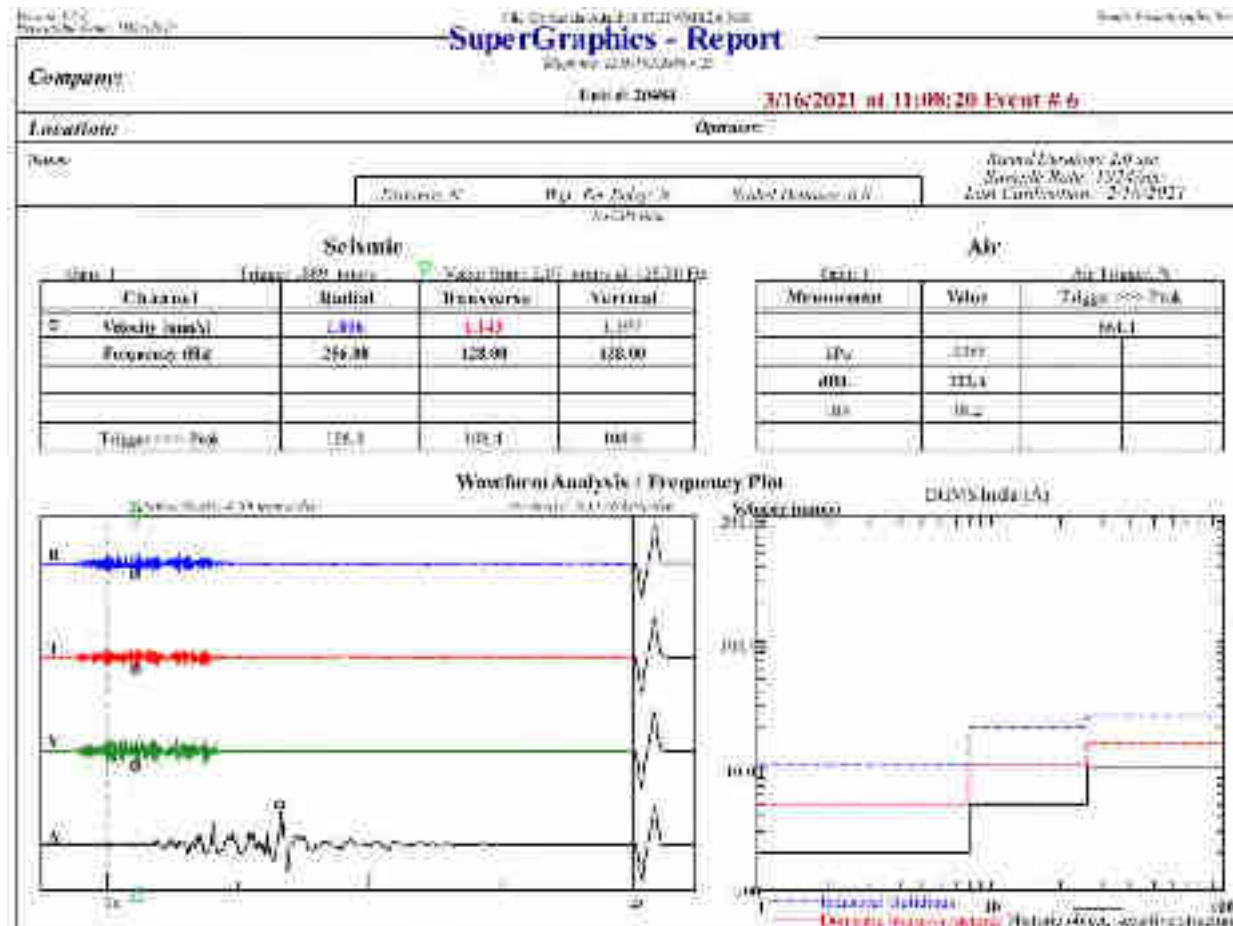
**Figure 3.3 Schematic diagram of adopted blasting pattern for the blast 2**

### Post Blast Observations

During the post blast observations, the following conditions were identified:

- No backbreak was observed.
- Muckpile was found to be loosen.
- The throw of the blast has been around 10-12 m which is considered to be normal.
- A drop of about 1m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 12 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring house was well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.4 & 3.5.**

## VMS\_2 Location : EVENT REPORT



## VMS\_5 Location : EVENT REPORT

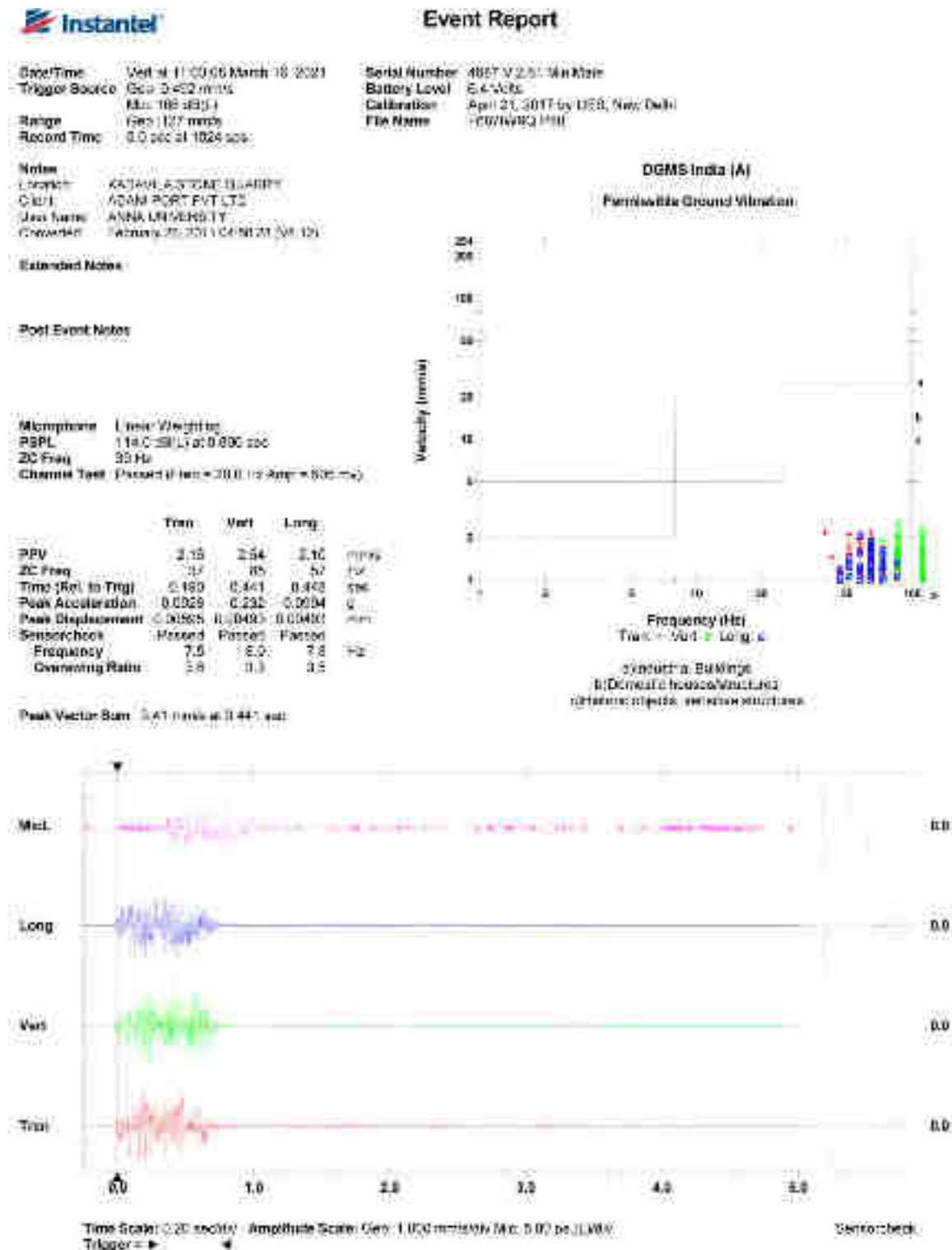




Figure 3.4 Imagery shows the location blast site 2 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry



**Blast No 3:** The third blast was conducted on 16<sup>th</sup> March, 2021 and the adopted blasting pattern and details are given in the Table 3.6 and 3.7. The Figure 3.5 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.6

**Table 3.6 Co-ordinates of Blast & Instrument Locations**

Sl. No	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise (dB)	Type of structure/ Permissible limit
1	Blast Location (B3)			8°43'45.46"	76°50'20.86"	---		
2	VMS_1 Location	11772	267	8°43'39.00"	76°50'15.00"	Not Triggered		
3	VMS_2 Location	20484	47	8°43'44.17"	76°50'19.88"	5.58 Within permissible limit	118.8	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	264	8°43'48.033 "	76°50'12.81"	Not Triggered		
5	VMS_5 Location	4687	152	8°43'41.81"	76°50'17.47"	2.7 Within permissible limit	100	Belonging to the owner, maximum value is 15 mm/s

**Table 3.7 Details of Blast Parameters**

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	80	0.625	2.174	50



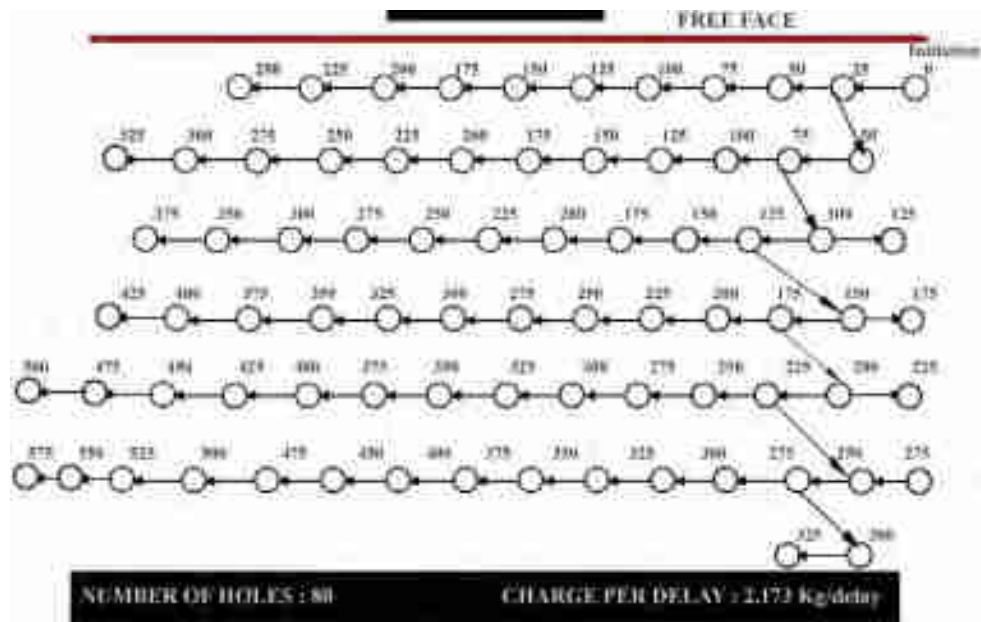


Figure 3.5 Schematic diagram of adopted blasting pattern for the blast 3

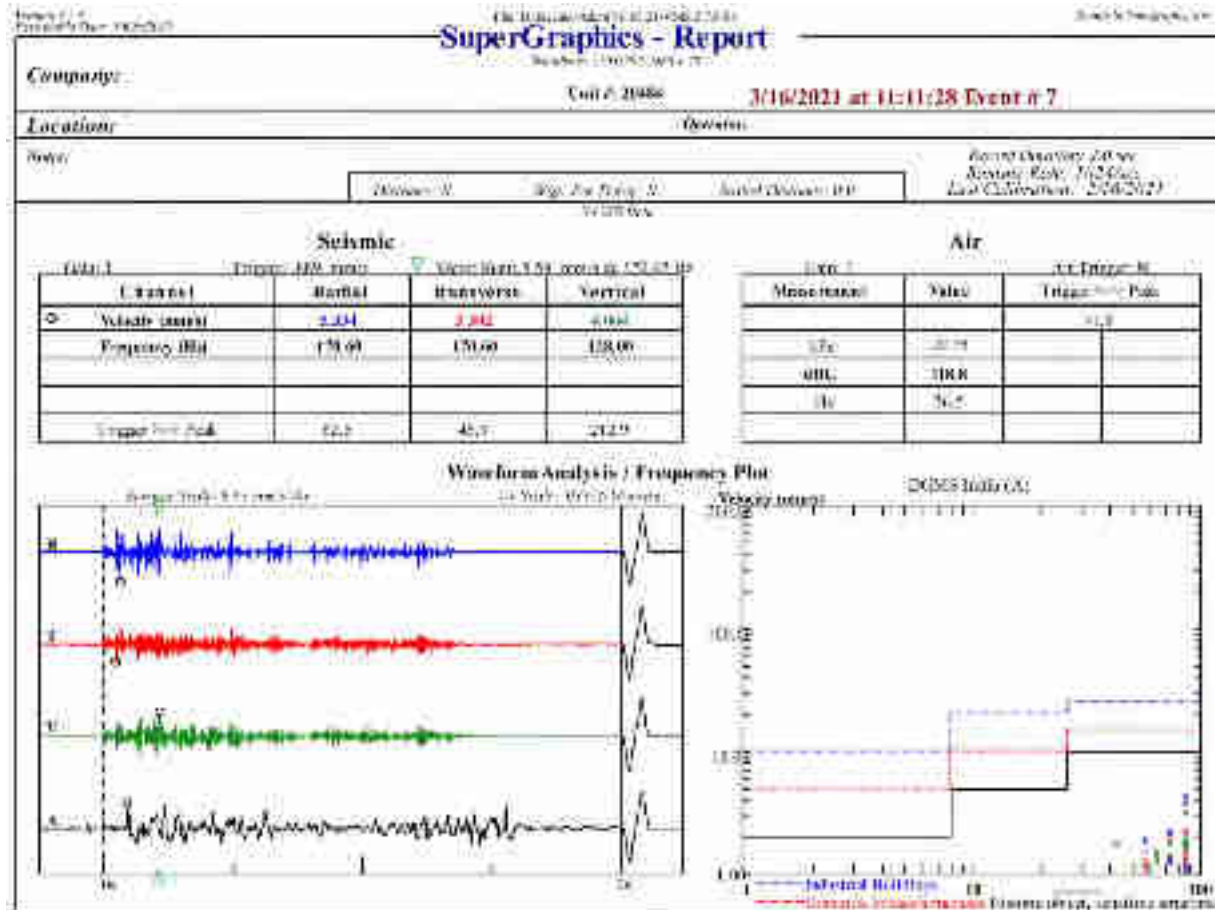
### Post Blast Observations

During the post blast observations, the following conditions were identified:

- No backbreak was observed.
- Muckpile was found to be adequately loosen.
- The throw of the blast has been around 12-15 m which is considered to be normal.
- A drop of about 1m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 10 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring house was well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.6 & 3.7.**

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## VMS\_2 Location : EVENT REPORT



## VMS\_5 Location : EVENT REPORT



### Event Report

Date/Time: Tue Jul 11 11:39:45 AM 2023  
 Trigger Source: Geo: 0.480 mm/s  
 Range: Geo: 105 m/s  
 Record Time: 5.0 sec at 1024 sps

Serial Number: 4657 V2.81 ME4Male  
 Battery Level: 6.4 Volts  
 Calibration: Apr 21 2017 by LEE, New Data  
 File Name: 140717VMS380

#### Notes

Location: KADAVILA STONE QUARRY  
 Client: ADANI PORT PVT LTD  
 User Name: ANNA UNIVERSITY  
 Completed: February 25, 2023 (14:50:00) (VMS\_5)

#### Extended Notes

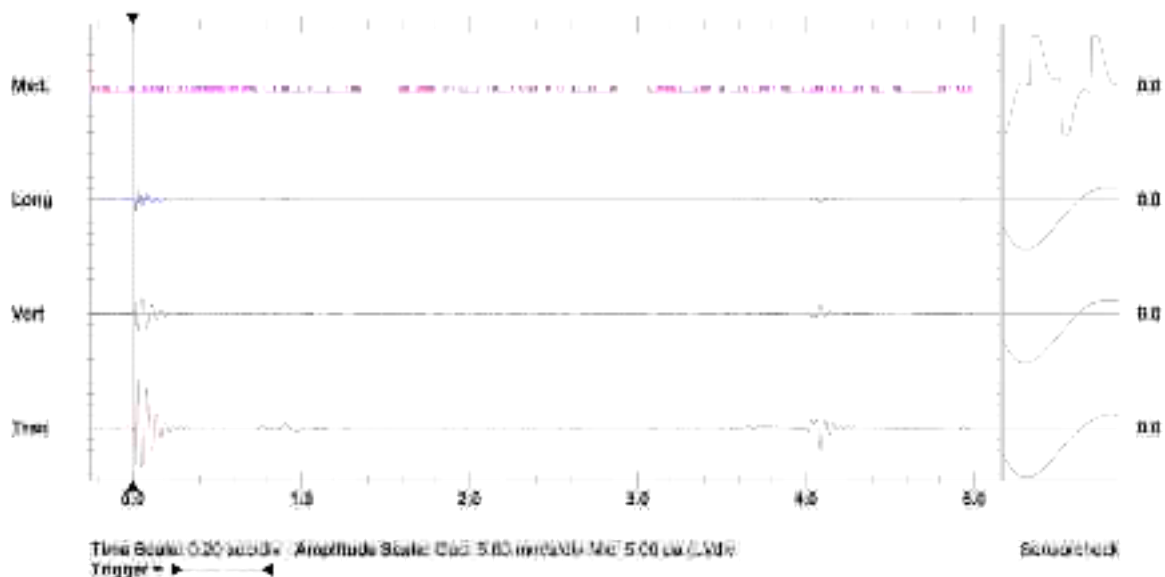
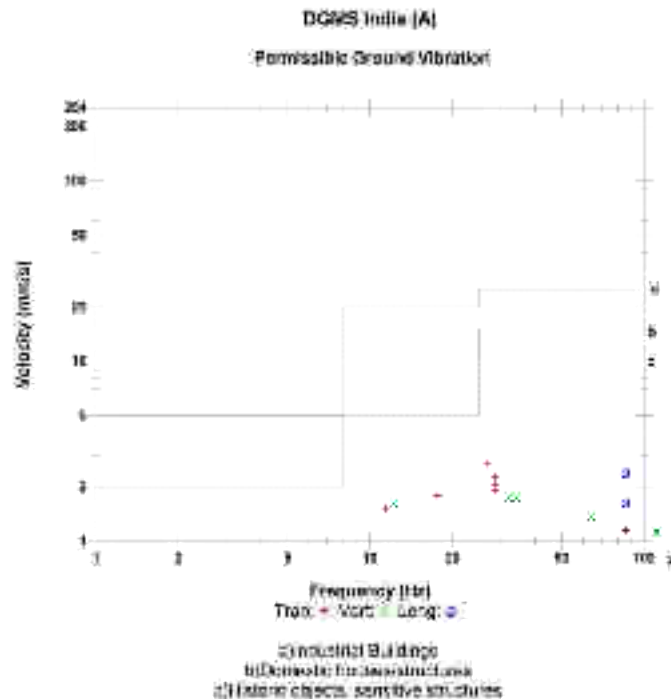
#### Post-Event Notes

Microphone: Linear Weighting  
 RSPL: 100.0 dB (L) at 0.001 sec  
 ZC Freq: NA  
 Channel Test: Passed (Freq = 20.0 Hz, Amp = 200 mV)

	Trans	Vert	Long	
RPV	2.10	2.07	1.56	mm/s
ZC Freq	24	22	24	Hz
Time (Rel. to Trgt)	0.002	0.000	0.028	sec
Peak Acceleration	0.464	0.365	0.242	g
Peak Displacement	0.154	0.0705	0.0330	mm
Seisaccheck	Passed	Passed	Passed	
Frequency	0.2	0.8	0.7	Hz
Overwing Ratio	2.5	2.3	3.3	

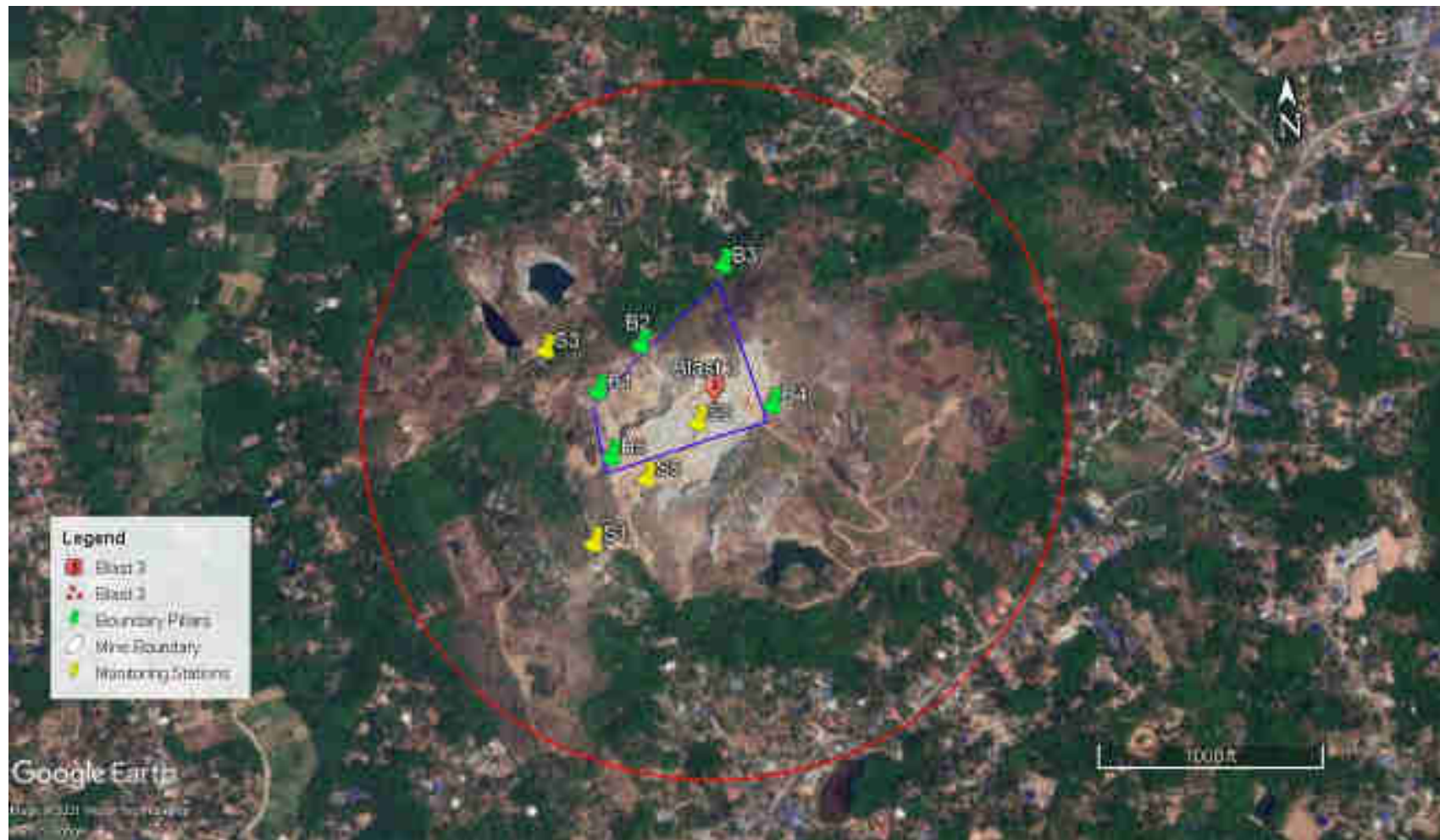
Peak Vector Sum: 3.7 mm/s at 0.002 sec

N/A: Not Applicable



Product: February 23, 2023 (VMS\_5)

Format: 2023/02/23 11:39:45 Instantel, and location of VMS\_5 (VMS\_5)



**Figure 3.6 Imagery shows the location blast site 3 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry**

**Blast No 4:** The fourth blast was conducted on 16<sup>th</sup> March, 2021 and the adopted blasting pattern and details are given in the Table 3.8 and 3.9. The Figure 3.7 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.8

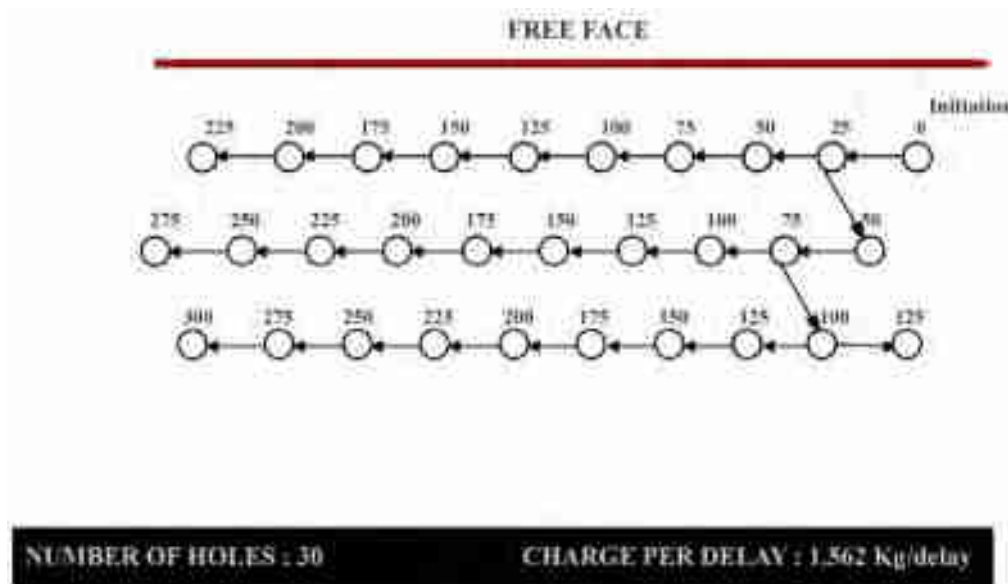
**Table 3.8 Co-ordinates of Blast & Instrument Locations**

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise (dB)	Type of structure/ Permissible limit
1	Blast Location (B4)			8°43'43.29"	76°50'16.16"	---		
2	VMS_1 Location	11772	136	8°43'39.00"	76°50'15.00"	0.832 Within permissible limit	91.5	Not belonging to the owner, maximum value is 5 mm/s
3	VMS_2 Location	20484	120	8°43'44.17"	76°50'19.88"	5.87 Within permissible limit	111.2	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	465	8°43'45.28"	76°50'31.27"	0.968 Within permissible limit	100	Not belonging to the owner, maximum value is 5 mm/s
5	VMS_4 Location	4688	60	8°43'41.81"	76°50'17.47"	Not Triggered		
6	VMS_5 Location	4687	282	8°43'52.19"	76°50'18.62"	2.81 Within permissible limit	112	Not belonging to the owner, maximum value is 5 mm/s

**Table 3.9 Details of Blast Parameters**

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	30	0.625	1.339	18.75





**Figure 3.7 Schematic diagram of adopted blasting pattern for the blast 4**

### Post Blast Observations

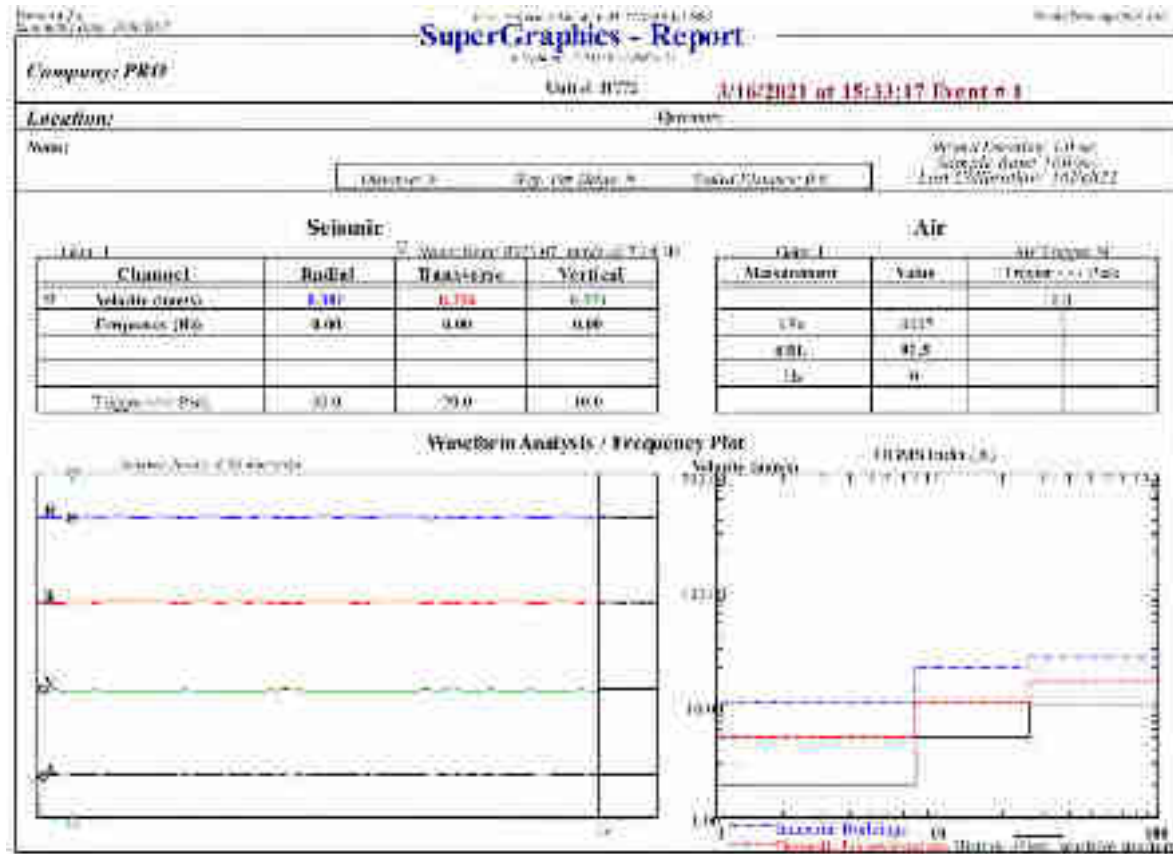
During the post blast observations, the following conditions were identified:

- Backbreak was observed of about 0.5 – 1.0 m.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 15 m which is considered to be normal.
- A drop of about 0.5 to 0.75 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 15 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring village was well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.8 & 3.9.**

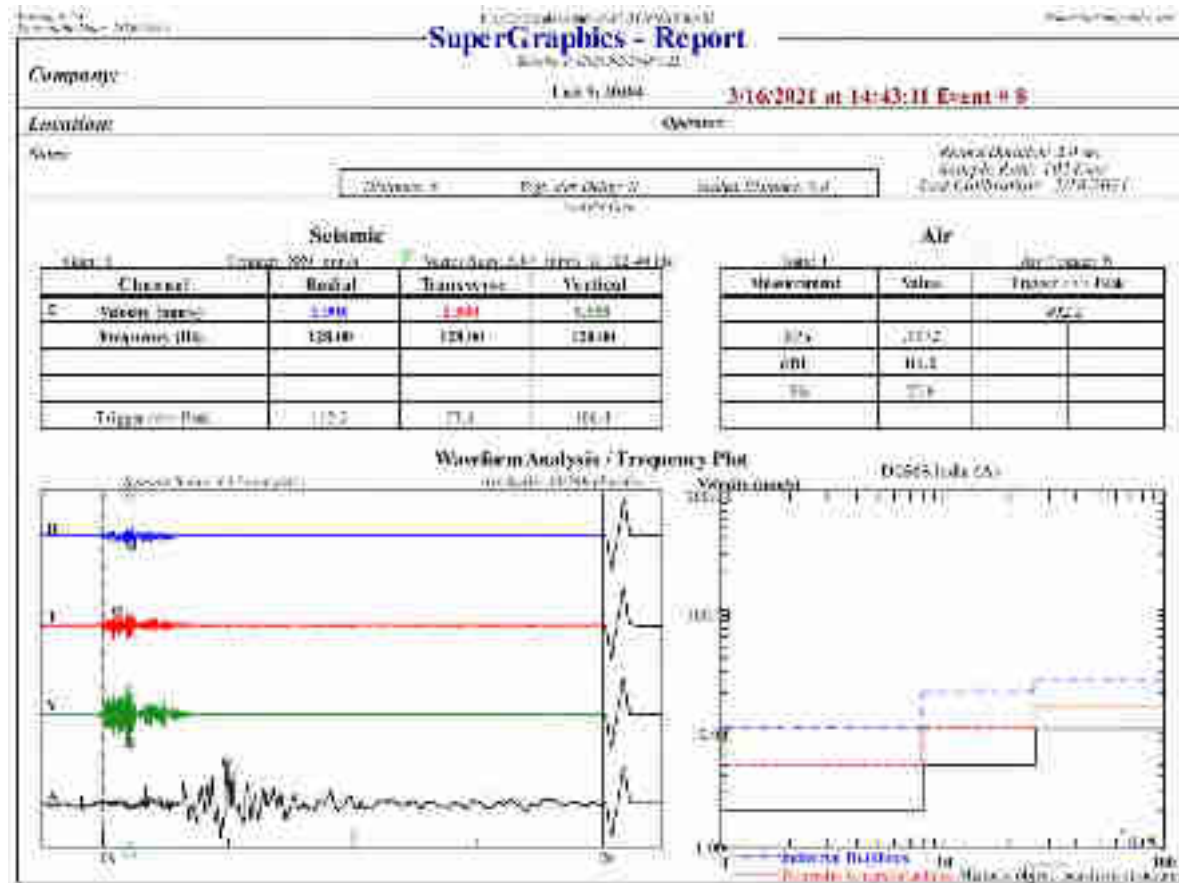




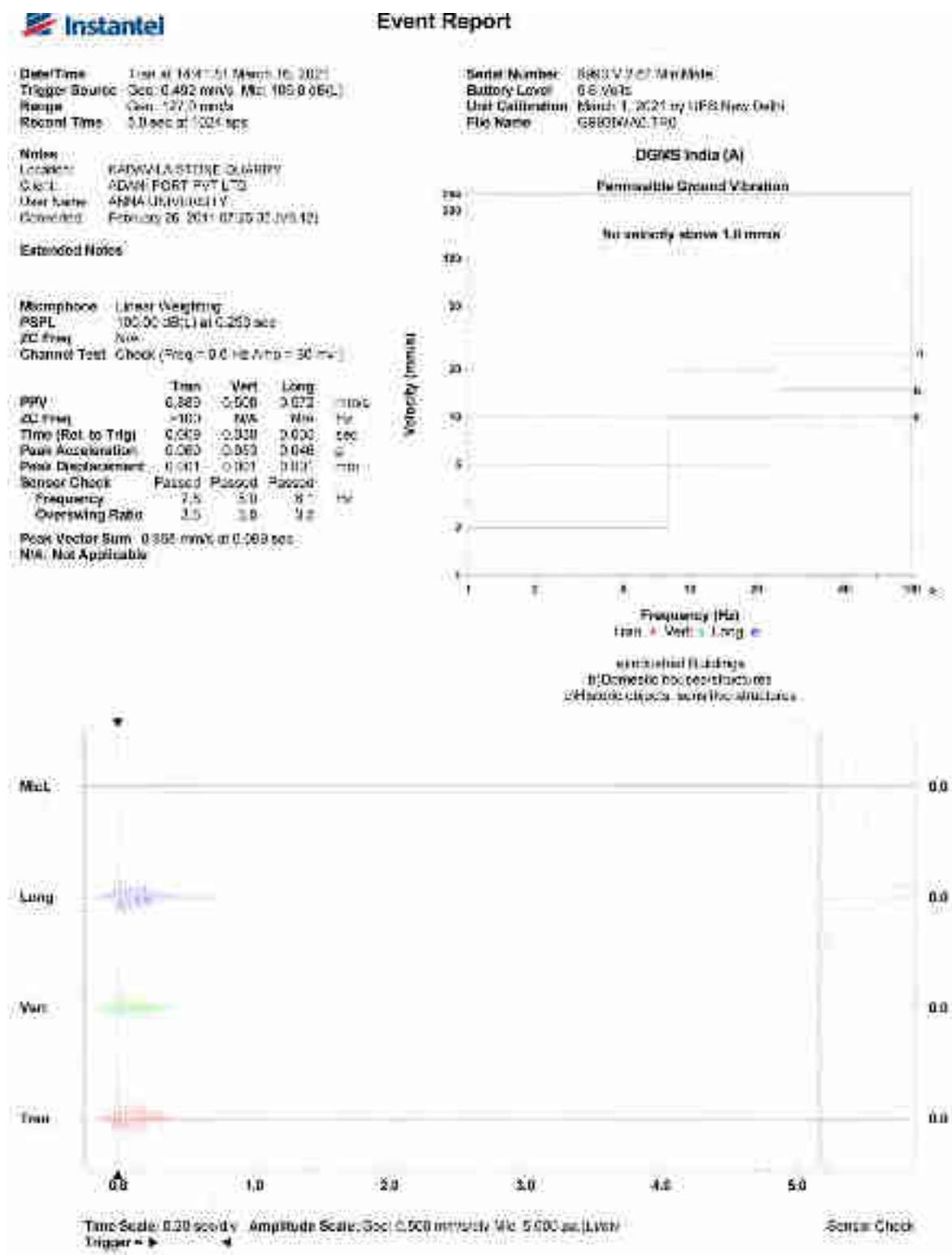
## VMS\_1 Location : EVENT REPORT



## VMS\_2 Location : EVENT REPORT

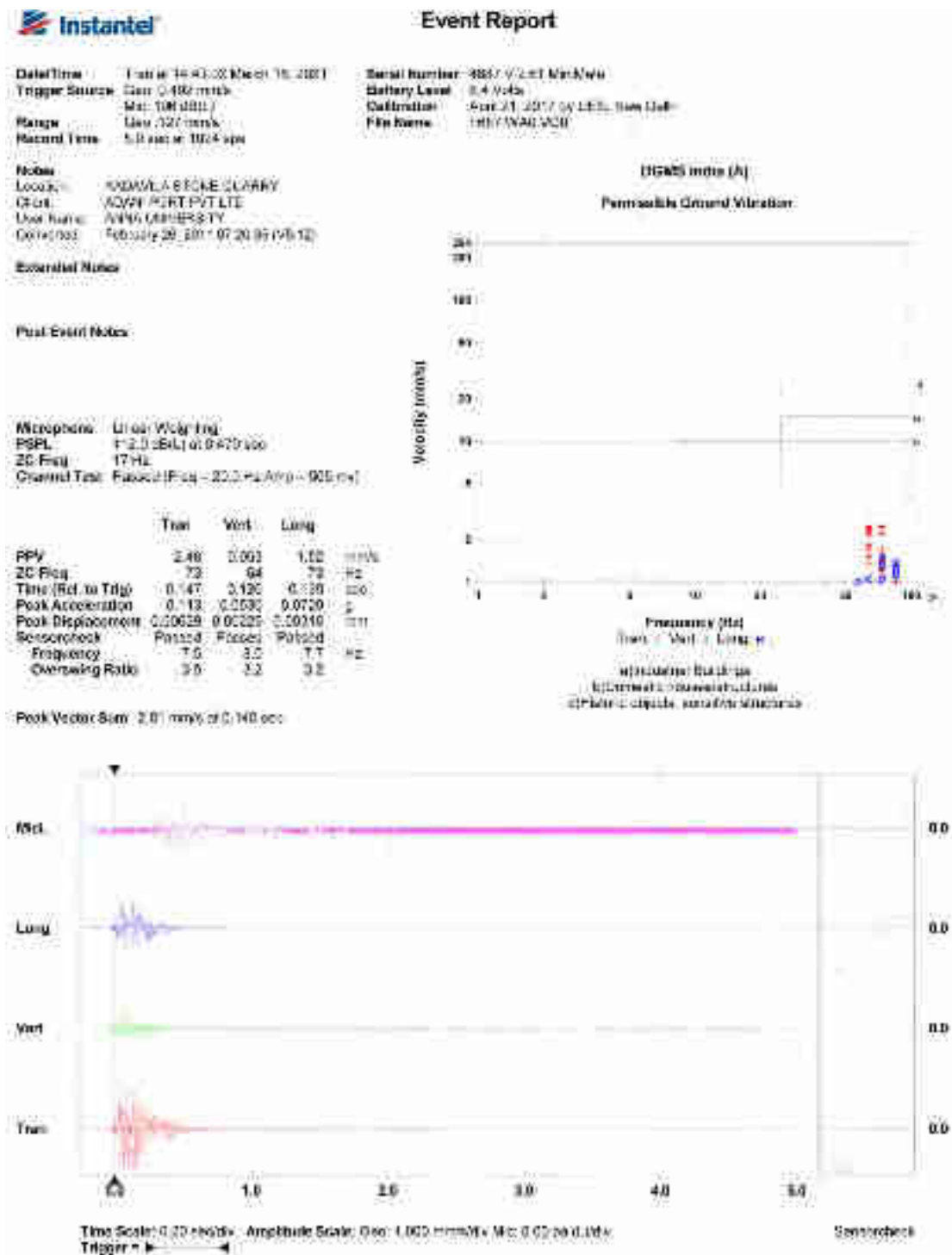


### VMS\_3 Location : EVENT REPORT



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## VMS\_5 Location : EVENT REPORT





**Figure 3.8 Imagery shows the location blast site 4 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry**



**Blast No 5:** The fifth blast was conducted on 16<sup>th</sup> March, 2021 and the adopted blasting pattern and details are given in the Table 3.10 and 3.11. The Figure 3.9 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.10

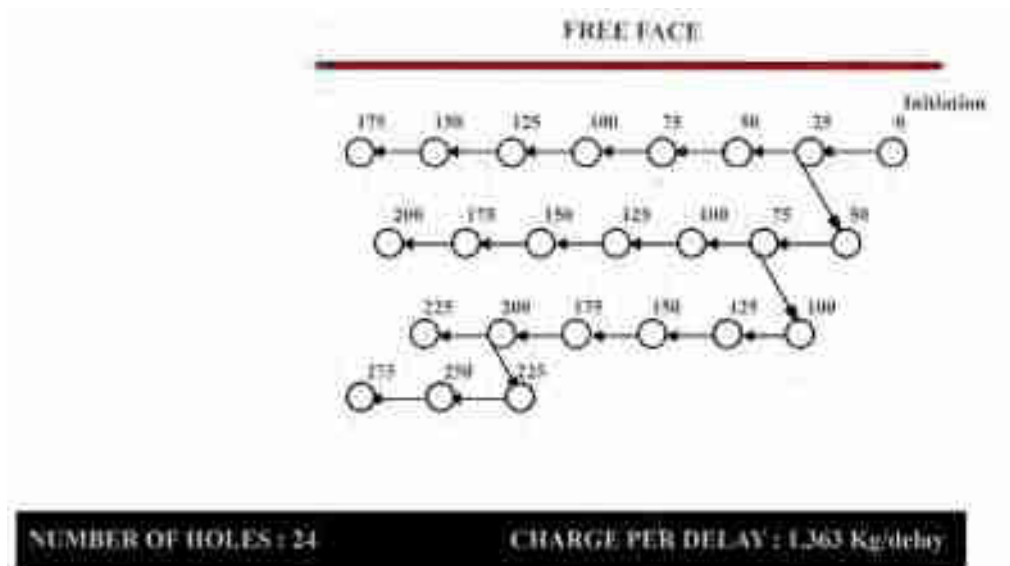
**Table 3.10 Co-ordinates of Blast & Instrument Locations**

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise (dB)	Type of structure/ Permissible limit
1	Blast Location (B4)			8°43'47.55"	76°50'19.50"	---		
2	VMS_1 Location	11772	296	8°43'39.00"	76°50'15.00"	1.47 Within permissible limit	112	Belonging to the owner, maximum value is 15 mm/s
3	VMS_2 Location	20484	102	8°43'44.17"	76°50'19.88"	7.52 Within permissible limit	114	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	359	8°43'45.28"	76°50'31.27"	0.397 Within permissible limit	106	Not belonging to the owner, maximum value is 5 mm/s
5	VMS_4 Location	4688	185	8°43'41.81"	76°50'17.47"	Not Triggered		
6	VMS_5 Location	4687	151	8°43'52.19"	76°50'18.62"	0.429 Within permissible limit	109.5	Not belonging to the owner, maximum value is 5 mm/s

**Table 3.11 Details of Blast Parameters**

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	24	0.625	1.25	15





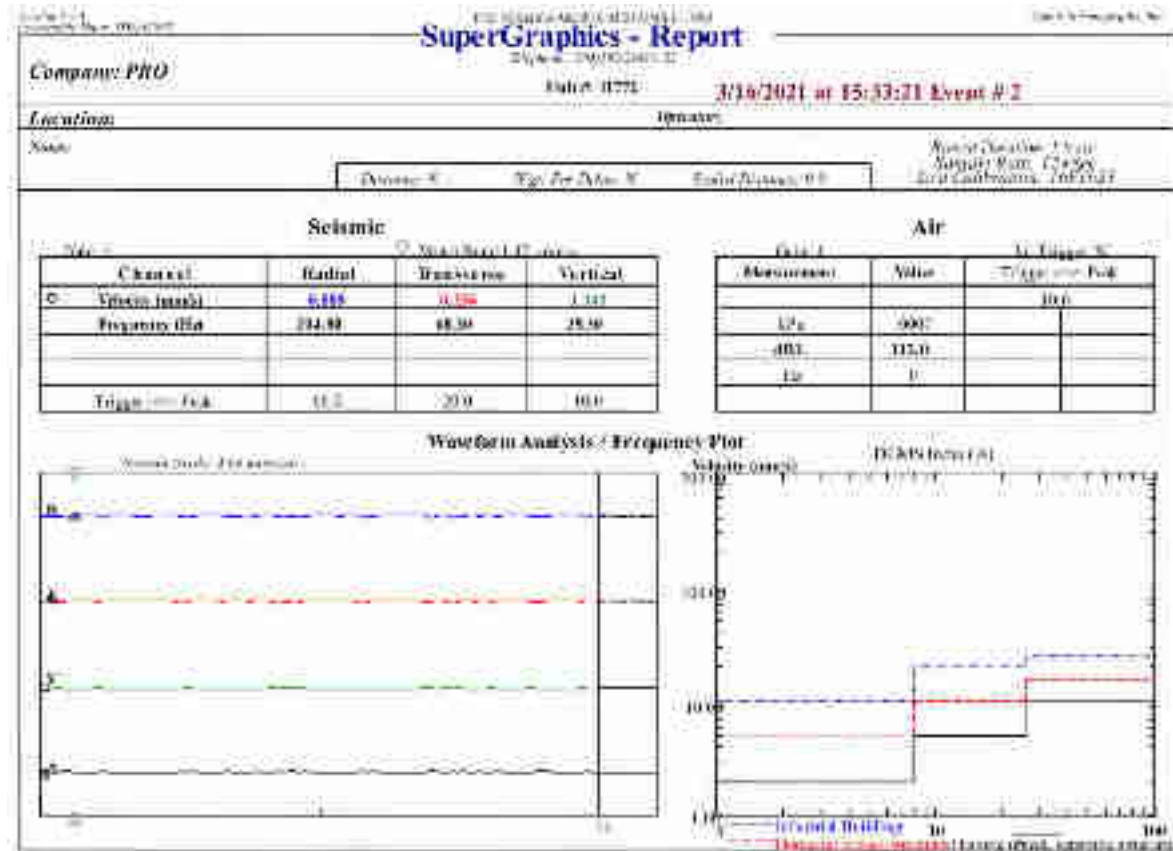
**Figure 3.9 Schematic diagram of adopted blasting pattern for the blast 5**

### Post Blast Observations

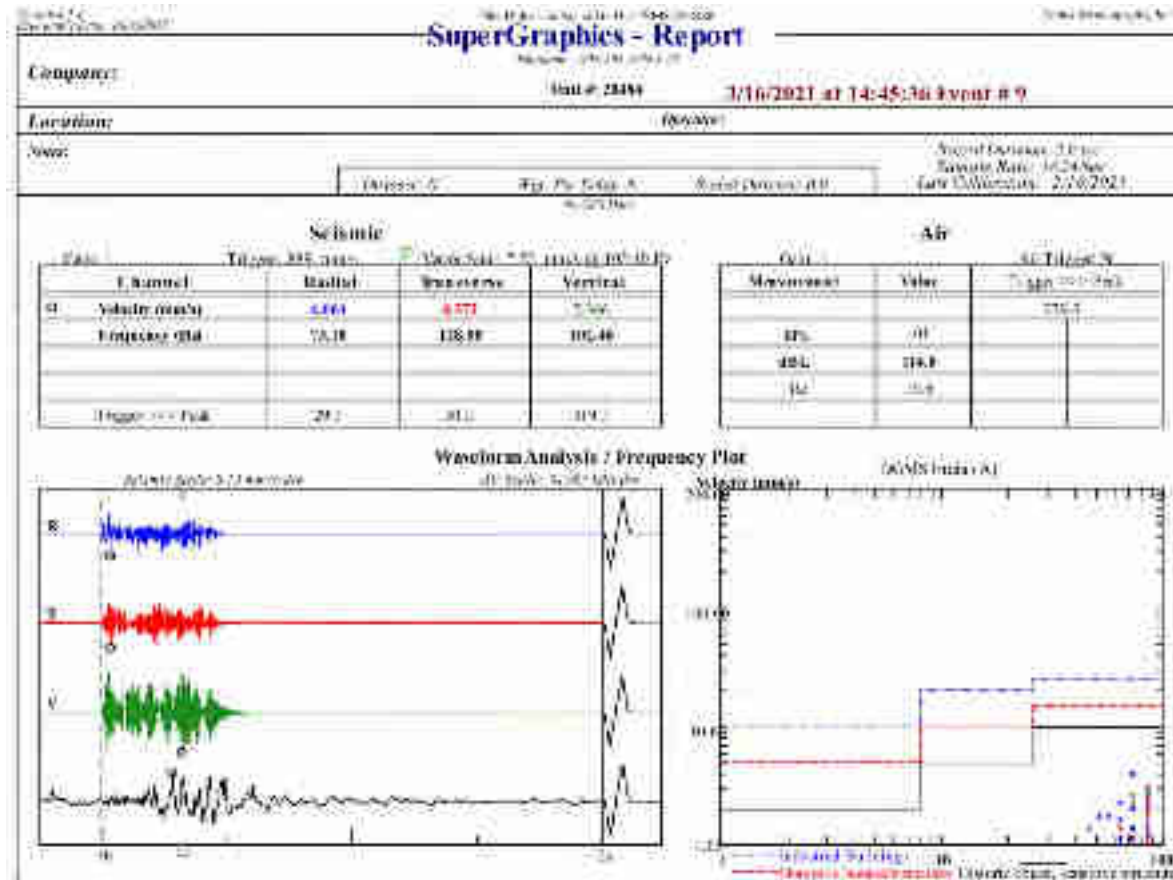
During the post blast observations, the following conditions were identified:

- No Backbreak was observed.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 10 m which is considered to be normal.
- A drop of about 0.75 to 1 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 12 to 15 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring village was well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.10 & 3.11.**

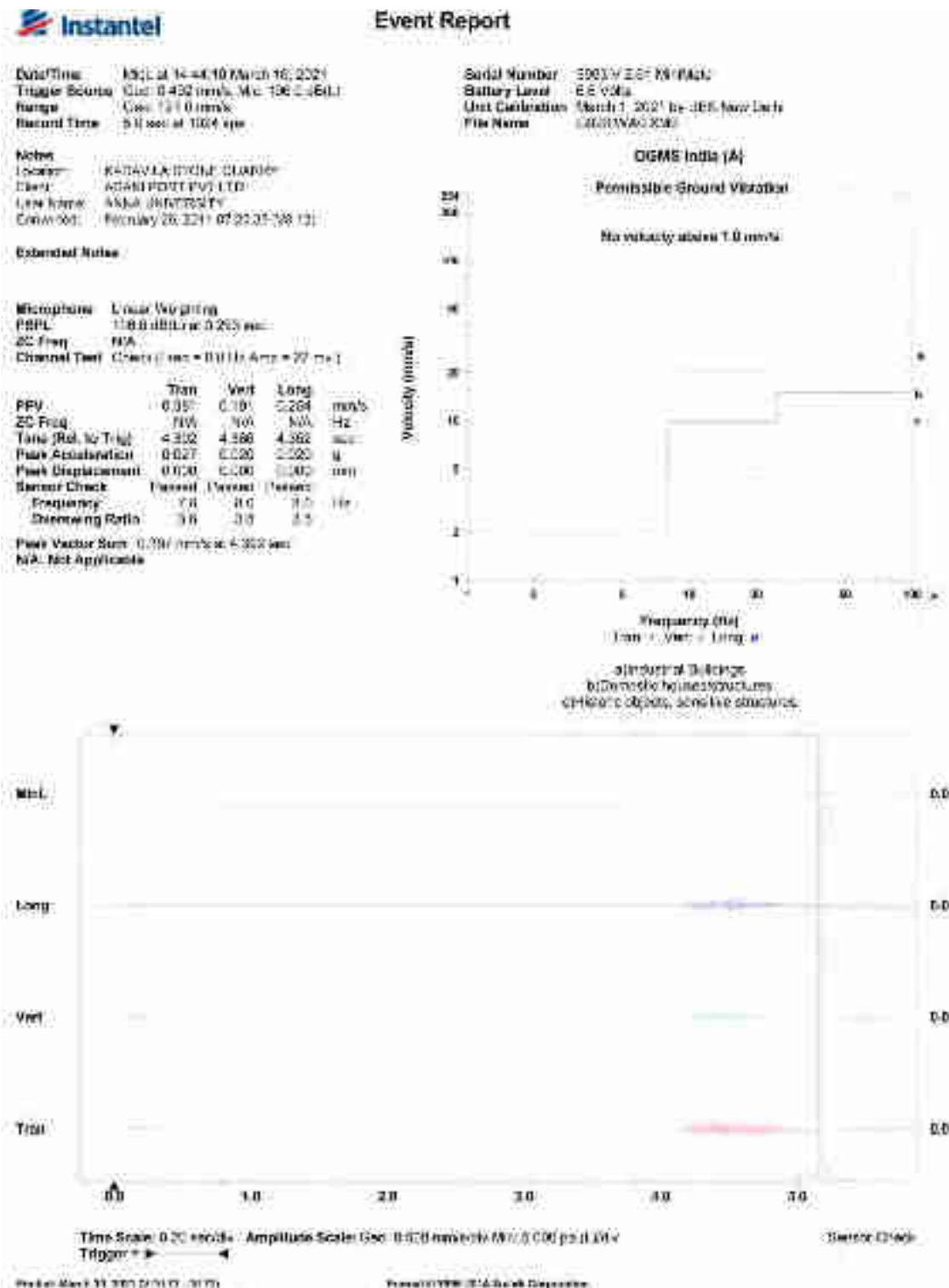
### VMS\_1 Location : EVENT REPORT



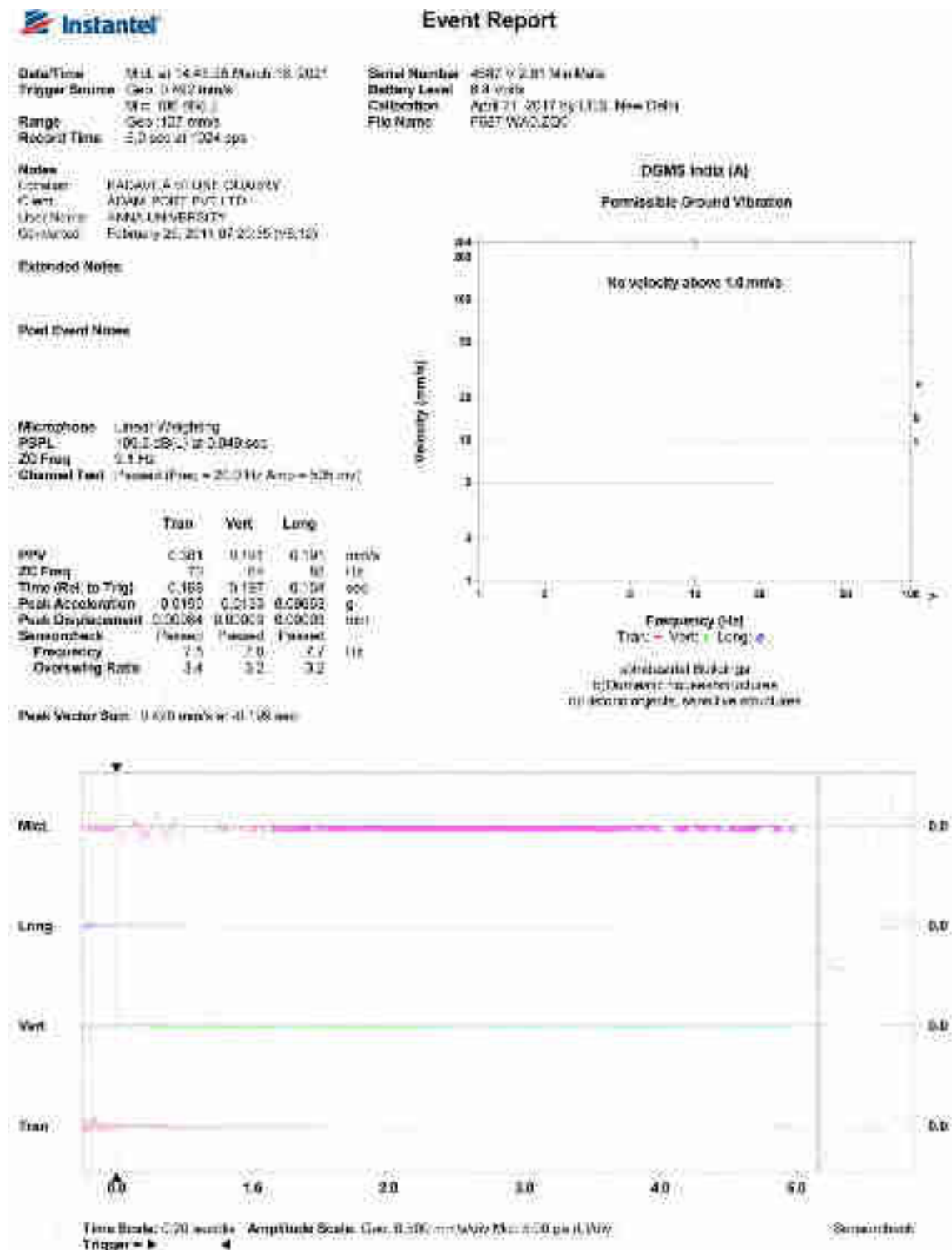
### VMS\_2 Location : EVENT REPORT



### VMS\_3 Location : EVENT REPORT



## VMS\_5 Location : EVENT REPORT







**Figure 3.10 Imagery shows the location blast site 5 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry**

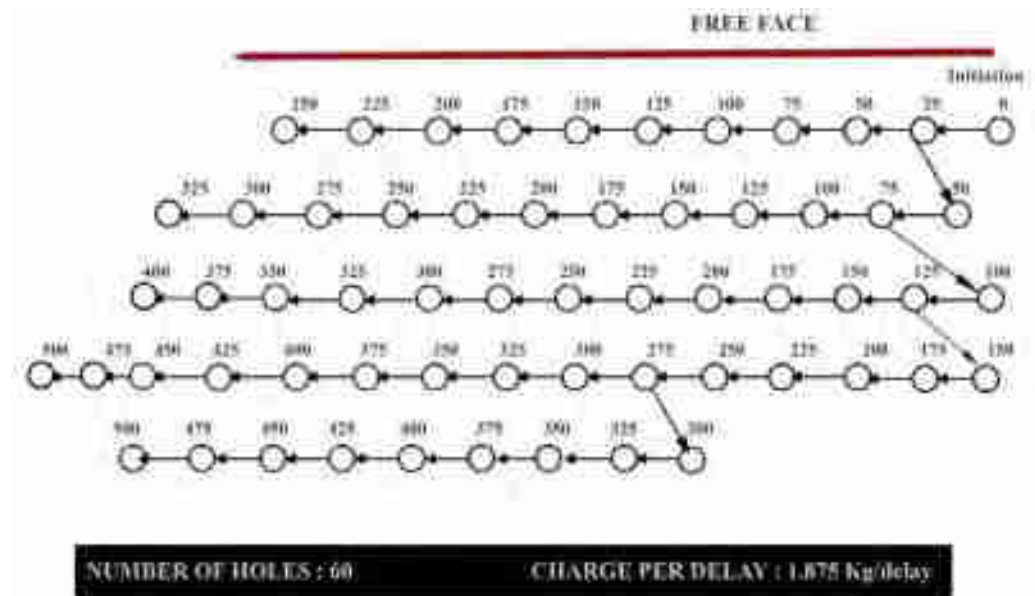
**Blast No 6:** The sixth blast was conducted on 17<sup>th</sup> March, 2021 and the adopted blasting pattern and details are given in the Table 3.12 and 3.13. The Figure 3.11 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.12

**Table 3.12 Co-ordinates of Blast & Instrument Locations**

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise (dB)	Type of structure/ Permissible limit
1	Blast Location (B4)			8°43'44.44"	76°50'16.85"	---		
2	VMS_1 Location	11772	80	8°43'41.81"	76°50'17.47"	9.8 Within permissible limit	112.3	Belonging to the owner, maximum value is 15 mm/s
3	VMS_2 Location	20484	95	8°43'44.17"	76°50'19.88"	3.41 Within permissible limit	116.4	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	174	8°43'38.74"	76°50'16.72"	2.11 Within permissible limit	100	Not belonging to the owner, maximum value is 5 mm/s
5	VMS_4 Location	4688	170	8°43'48.033 "	76°50'12.81"	0.778 Within permissible limit	112.6	Not belonging to the owner, maximum value is 5 mm/s
6	VMS_5 Location	4687	165	8°43'47.04"	76°50'12.20"	0.683 Within permissible limit	114	Not belonging to the owner, maximum value is 5 mm/s

**Table 3.13 Details of Blast Parameters**

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	60	0.625	1.875	37.5



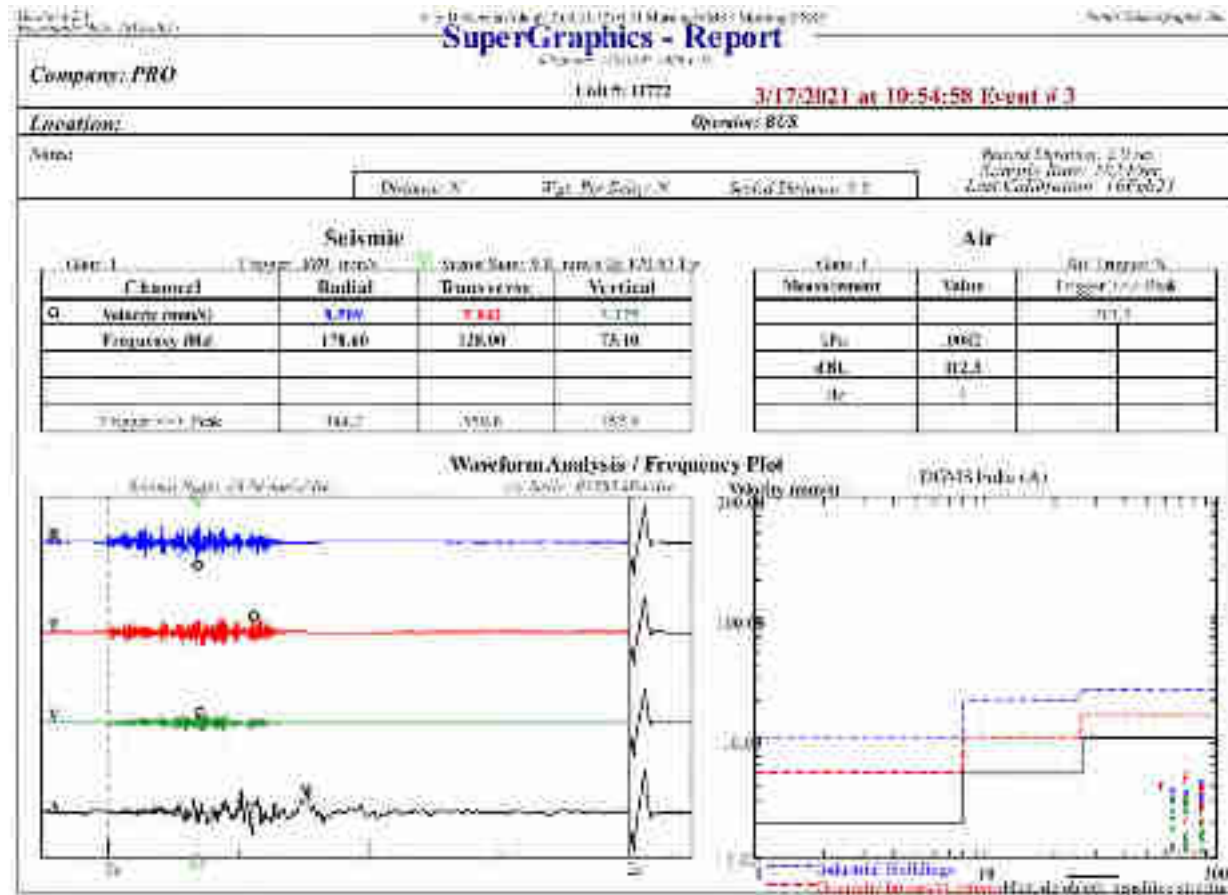
**Figure 3.11 Schematic diagram of adopted blasting pattern for the blast 6**

### Post Blast Observations

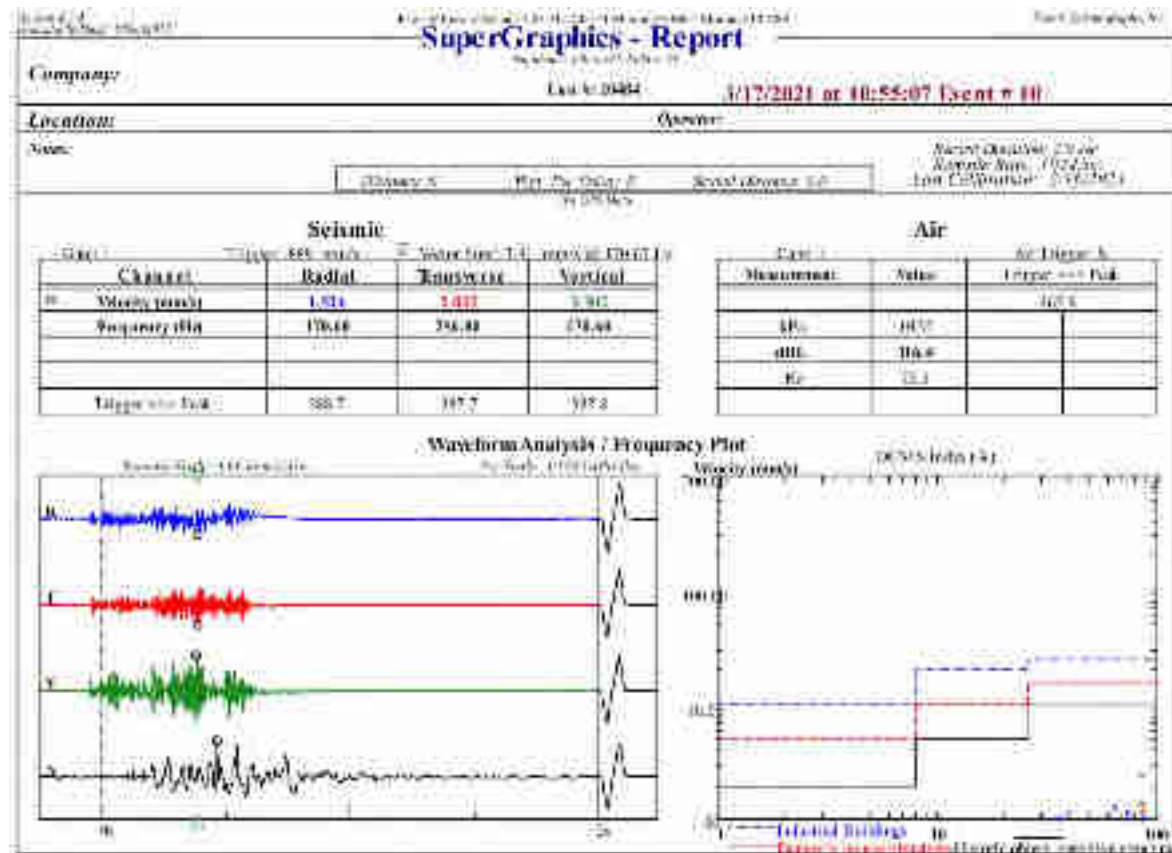
During the post blast observations, the following conditions were identified:

- No Backbreak was observed.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 10 to 12 m which is considered to be normal.
- A drop of about 0.75 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 10 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring houses were well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.12 & 3.13.**

## VMS\_1 Location : EVENT REPORT

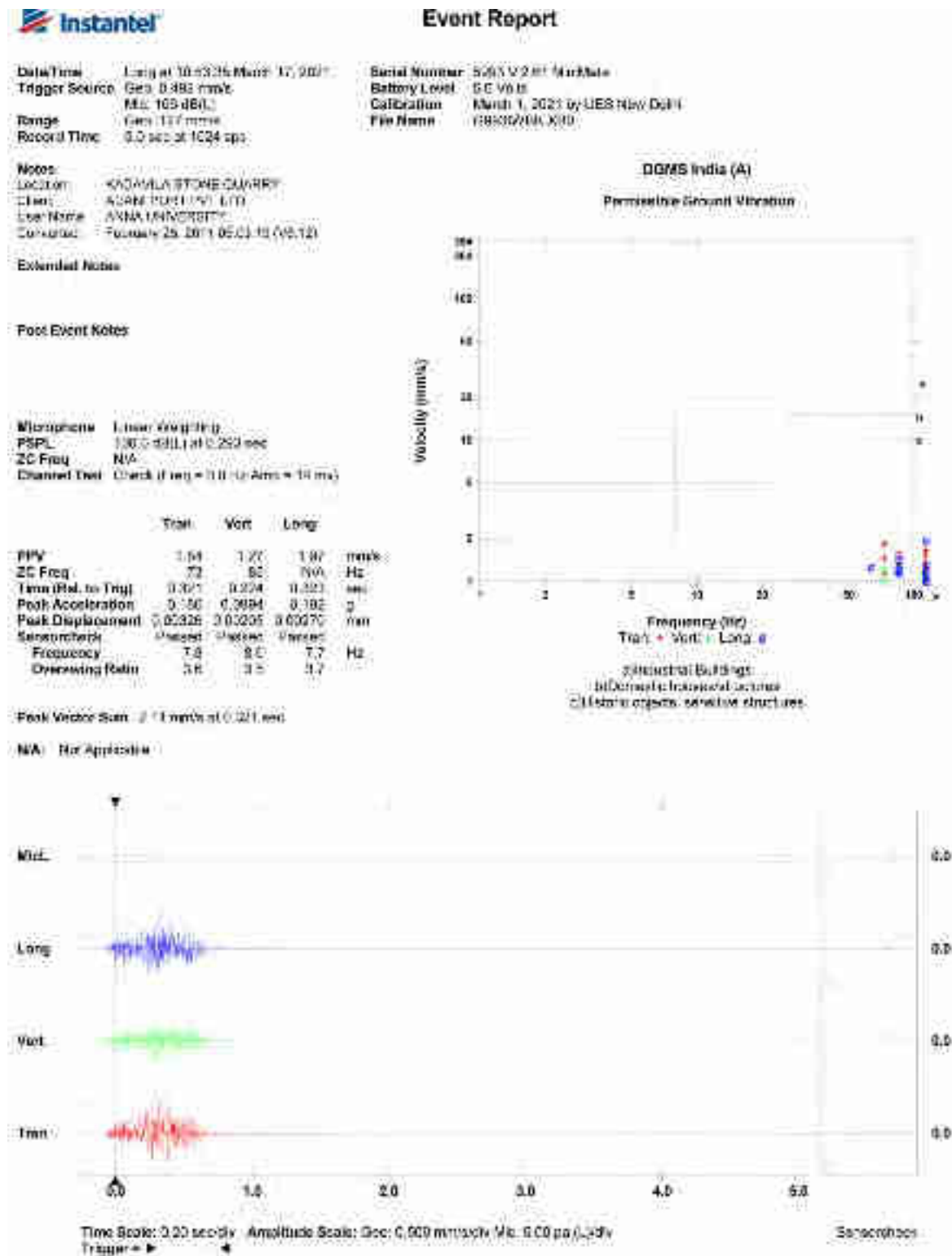


## VMS\_2 Location : EVENT REPORT





### VMS\_3 Location : EVENT REPORT



## VMS\_4 Location : EVENT REPORT



### Event Report

Date/Time: 2011-03-14 05:49:58 March 17, 2011  
 Trigger Source: Geo: 0.402 mm/s  
 Range: Geo: 100 dB/L  
 Record Time: Geo: 1.27 mm/s  
 Record Time: 3.0 sec at 1.024 sps

Serial Number: 4688-V-2.0 MiniMap  
 Battery Level: 5.5 Vdc  
 Calibration: April 20, 2010 by MES, How Delhi  
 File Name: F83027000.DMD

Notes:  
 Location: KADAVILA-1 STONE QUARRY  
 Client: ADANI PORT PVT LTD  
 User Name: ANNA UNIVERSITY  
 Created: February 26, 2011 02:02:21 (VMS)

#### Extended Notes

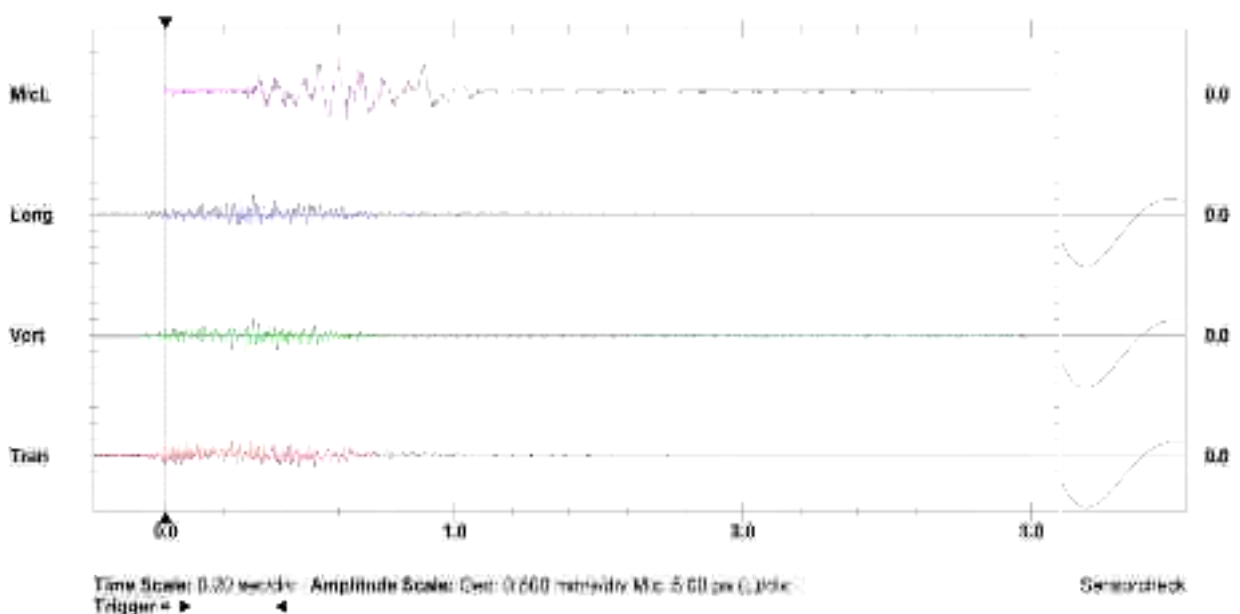
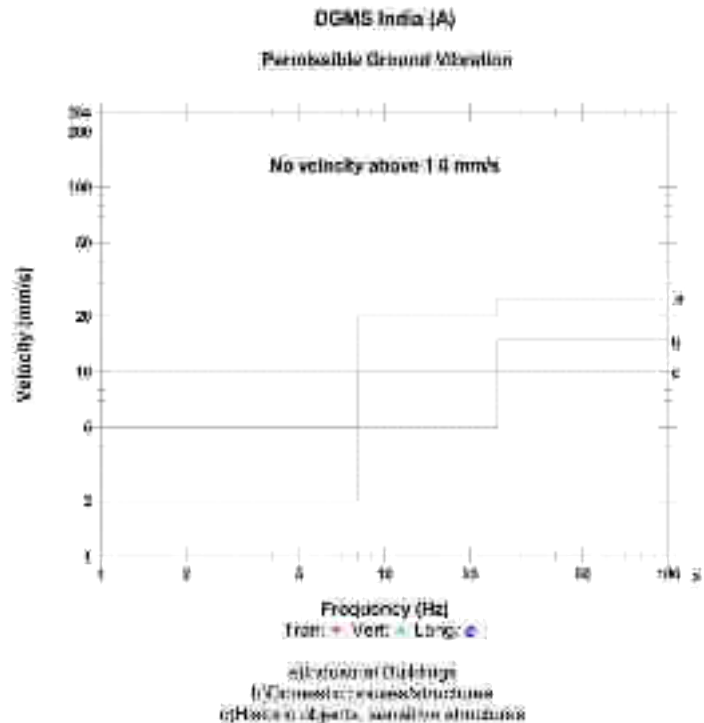
#### Post Event Notes

Microphone: Linear Weighting  
 FSPL: 112.6 dB/L at 0.08 sec  
 ZC Freq: 14 Hz  
 Channel Test: Passed (Freq = 20.0 Hz Amp = 490 mm/s)

	Trans	Vert	Long	
RPV	0.008	0.072	0.026	mm/s
ZC Freq	55	N/A	55	Hz
Time (Ref. to Eng)	0.298	0.309	0.309	sec
Peak Acceleration	0.0285	0.0484	0.0331	g
Peak Displacement	0.00127	0.00396	0.00112	cm
Bitstream Check	Passed	Passed	Passed	
Frequency	7.7	7.8	8.3	Hz
Overwing Ratio	3.4	3.6	3.3	

Peak Vector Sum: 0.075 mm/s at 0.309 sec

N/A: Not Applicable



Printed: February 21, 2011 (7:43:18.02)

Format Copyright: 2008-2010 Instantel Corporation of VMS (VMS Corporation)

## VMS\_5 Location : EVENT REPORT

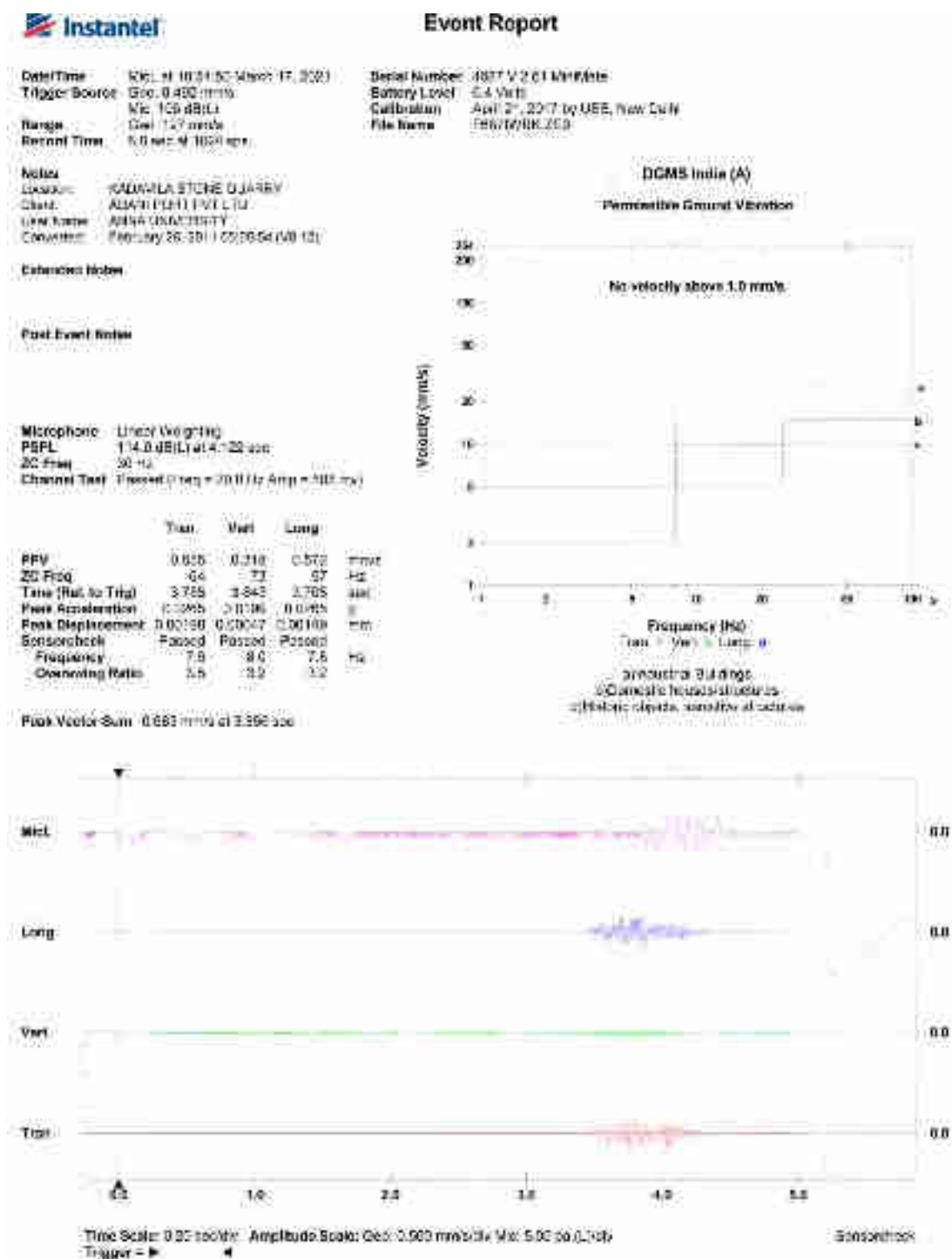




Figure 3.12 Imagery shows the location blast site 6 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry

**Blast No 7:** The seventh blast was conducted on 17<sup>th</sup> March, 2021 and the adopted blasting pattern and details are given in the Table 3.14 and 3.15. The Figure 3.13 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.14

**Table 3.14 Co-ordinates of Blast & Instrument Locations**

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise (dB)	Type of structure/ Permissible limit
1	Blast Location (B4)			8°43'43.82"	76°50'15.93"	---		
2	VMS_1 Location	11772	75	8°43'41.81"	76°50'17.47"	11.09 Within permissible limit	116.4	Belonging to the owner, maximum value is 15 mm/s
3	VMS_2 Location	20484	125	8°43'44.17"	76°50'19.88"	2.51 Within permissible limit	114.8	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	157	8°43'38.74"	76°50'16.72"	2.24 Within permissible limit	100	Not belonging to the owner, maximum value is 5 mm/s
5	VMS_4 Location	4688	160	8°43'48.033"	76°50'12.81"	1.17 Within permissible limit	112	Belonging to the owner, maximum value is 15 mm/s
6	VMS_5 Location	4687	154	8°43'47.04"	76°50'12.20"	1.89 Within permissible limit	109.5	Not belonging to the owner, maximum value is 5 mm/s

**Table 3.15 Details of Blast Parameters**

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	50	0.625	1.736	31.25



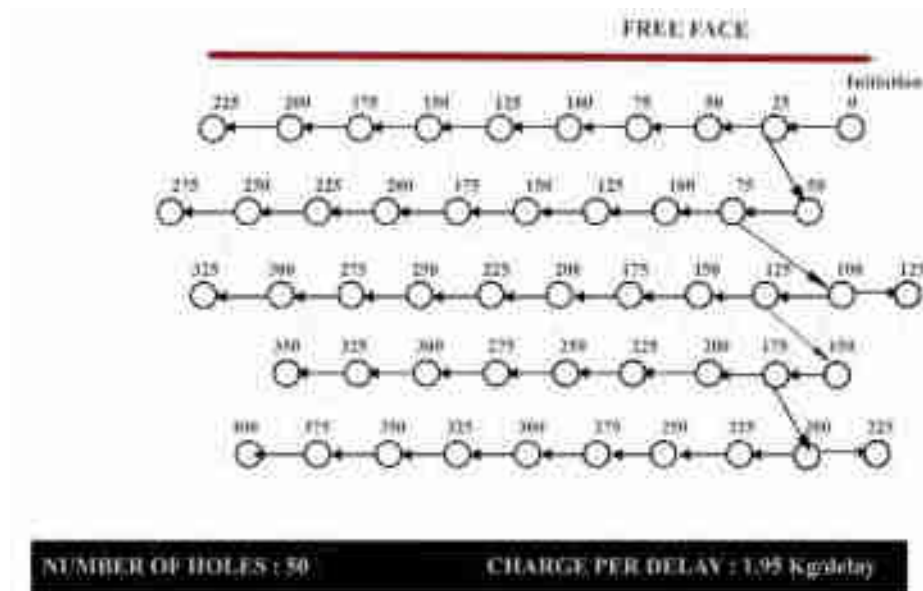


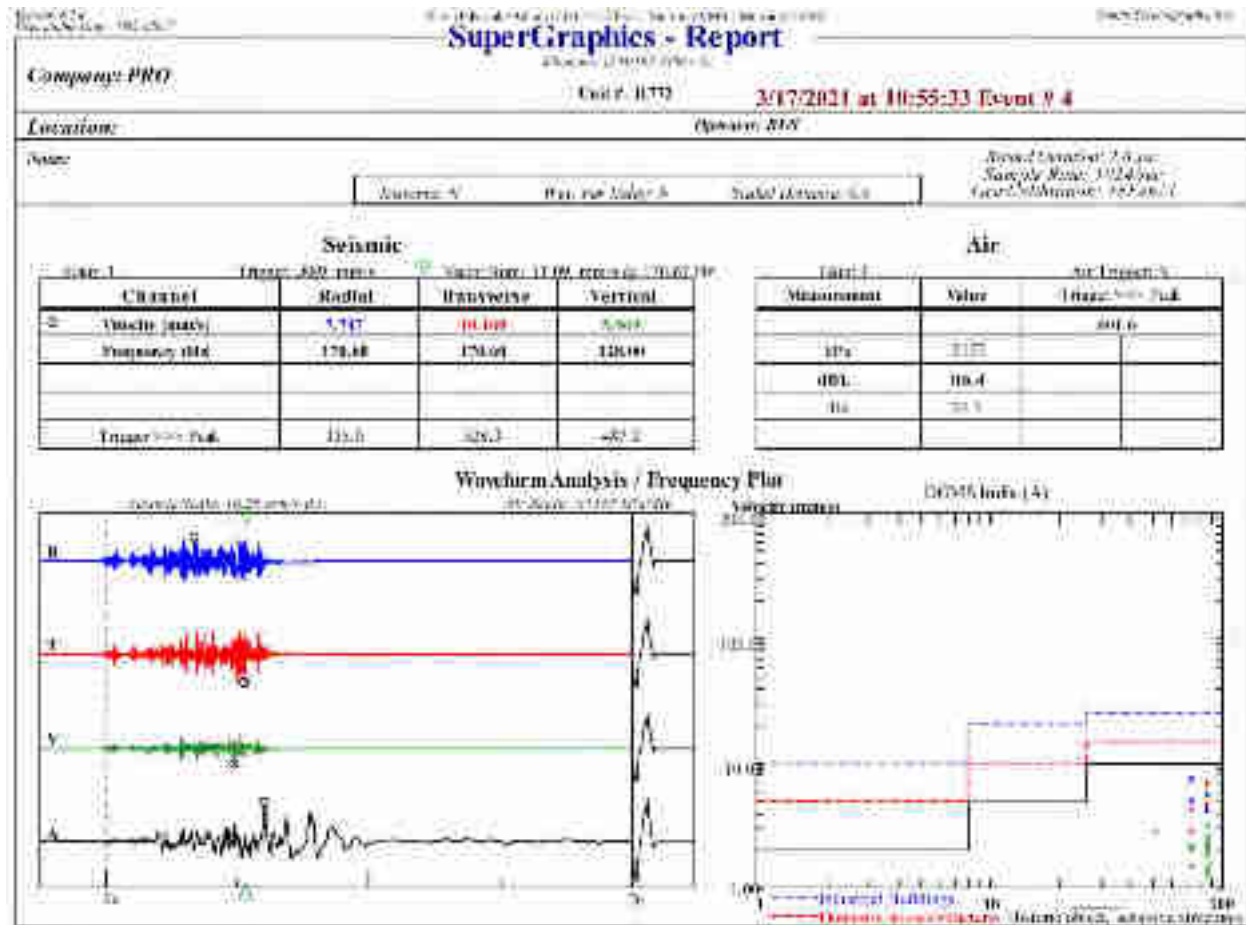
Figure 3.13 Schematic diagram of adopted blasting pattern for the blast 7

### Post Blast Observations

During the post blast observations, the following conditions were identified:

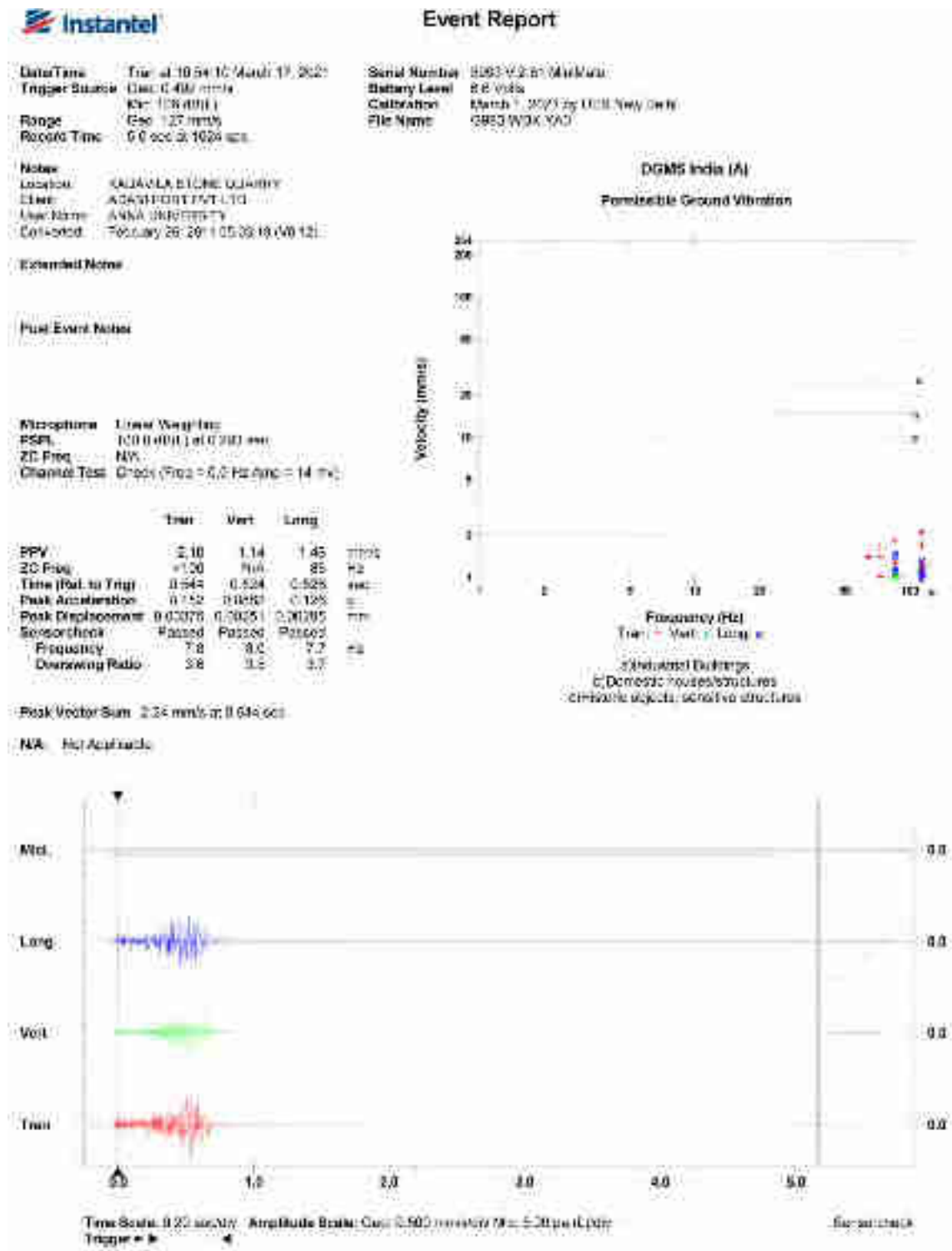
- Backbreak was observed of about 0.5 m.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 15 m which is considered to be normal.
- A drop of about 0.50 to 0.75 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 15 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring houses were well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.14 & 3.15.**

## VMS\_1 Location : EVENT REPORT

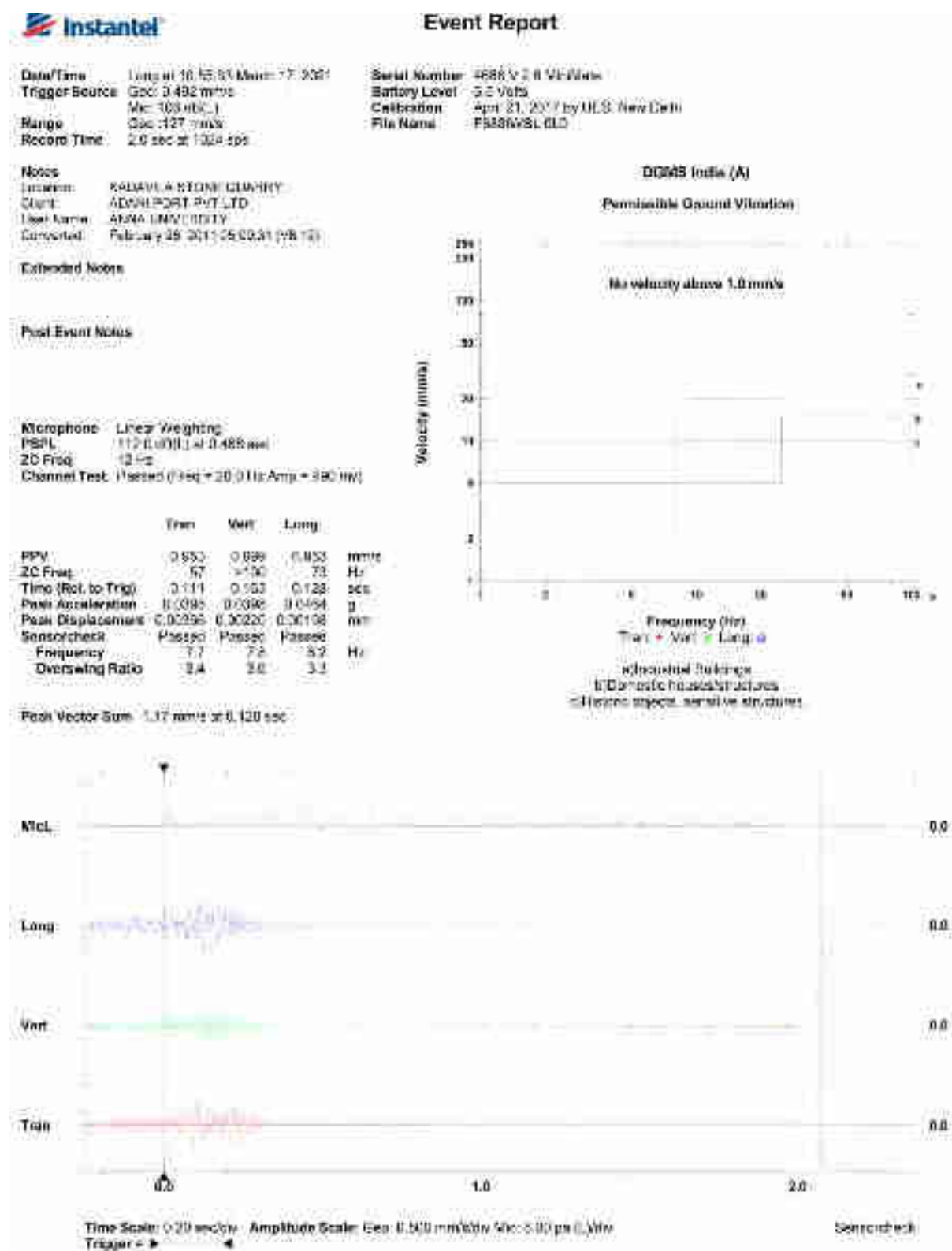




### VMS\_3 Location : EVENT REPORT

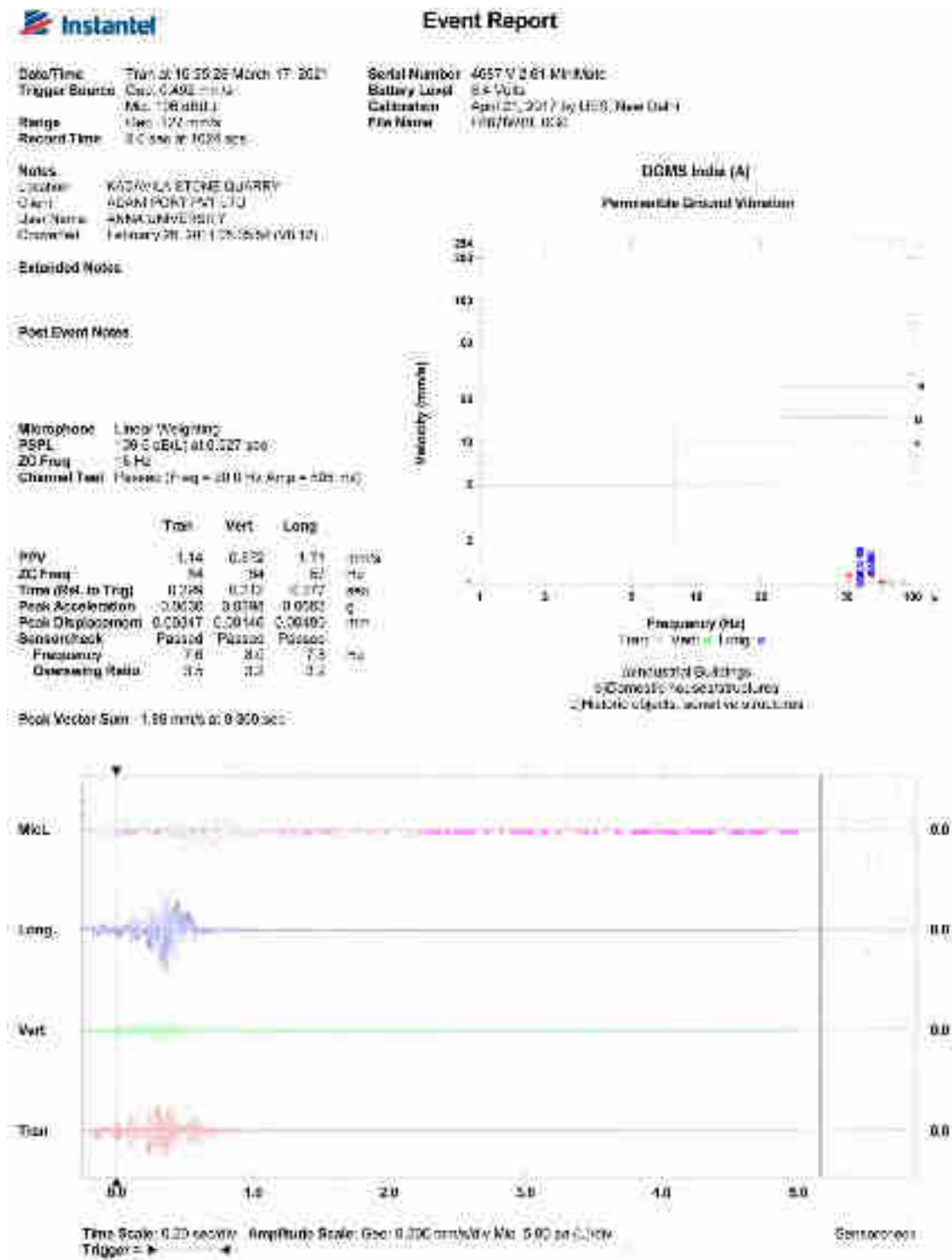


## VMS\_4 Location : EVENT REPORT





## VMS\_5 Location : EVENT REPORT



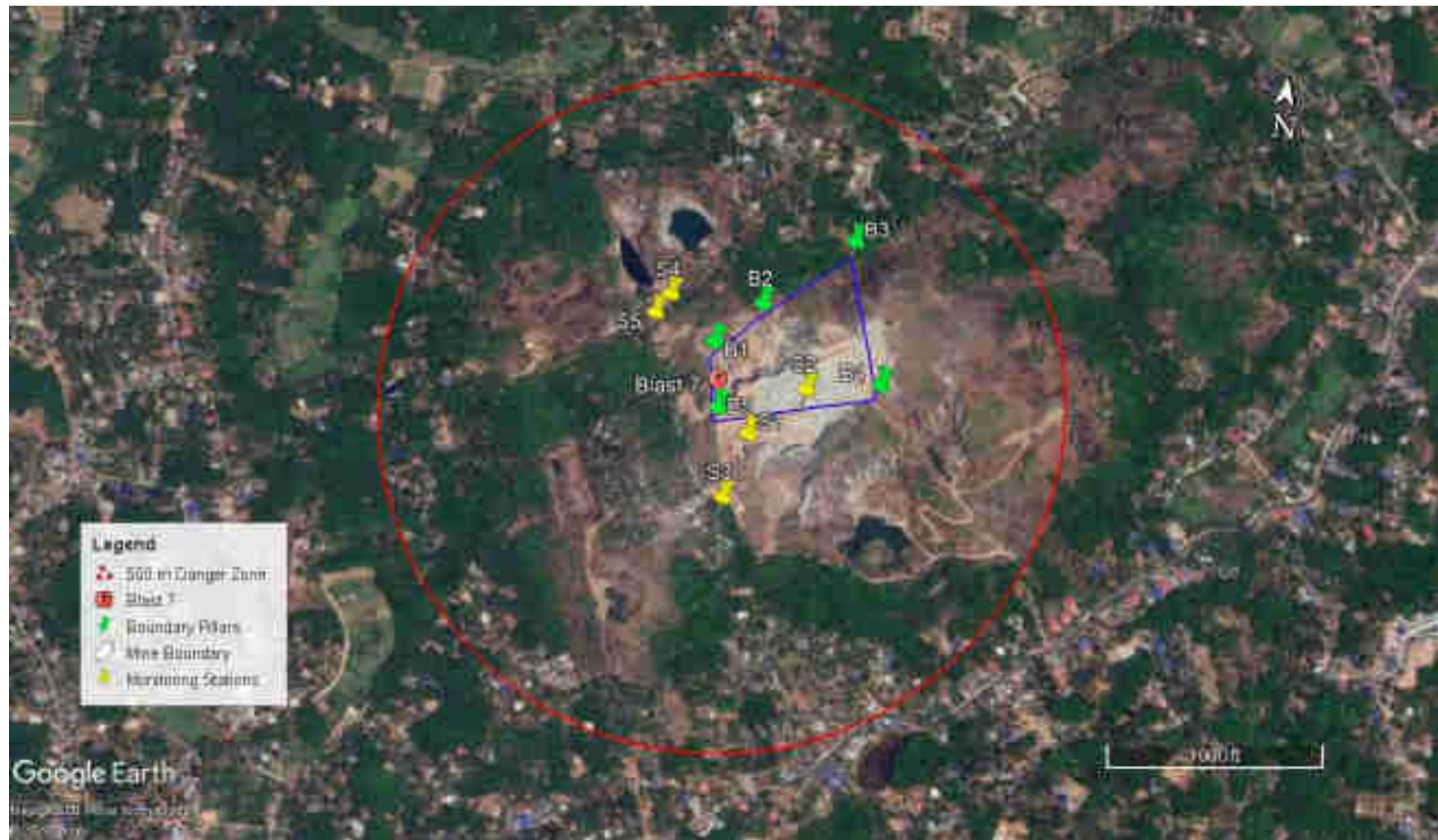


Figure 3.14 Imagery shows the location blast site 7 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry

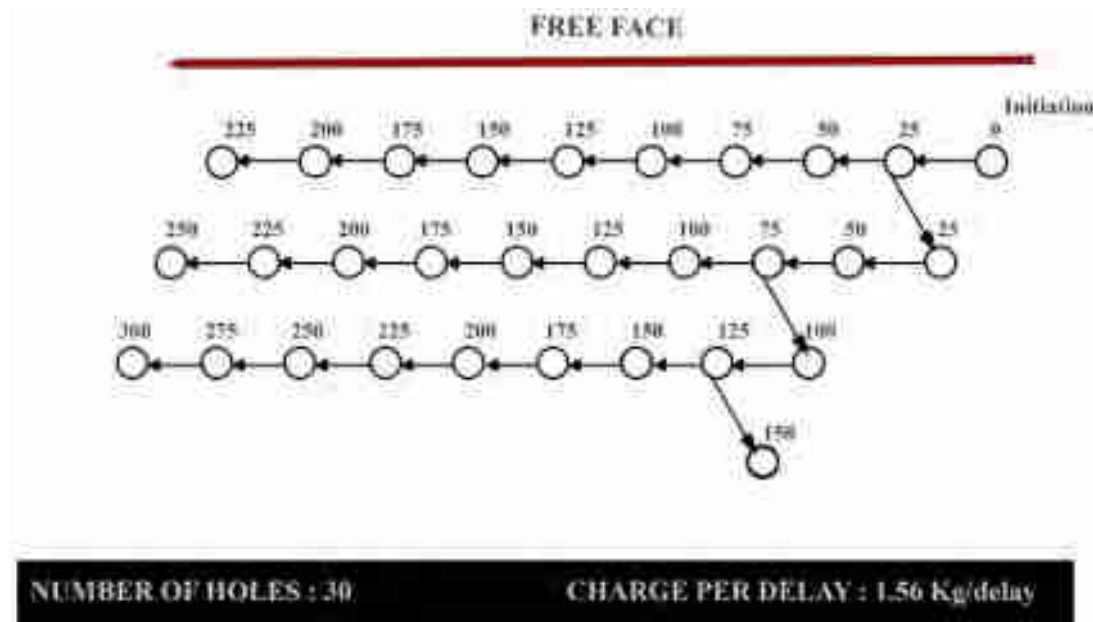
**Blast No 8:** The eighth blast was conducted on 17<sup>th</sup> March, 2021 and the adopted blasting pattern and details are given in the Table 3.16 and 3.17. The Figure 3.15 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.16

**Table 3.16 Co-ordinates of Blast & Instrument Locations**

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise (dB)	Type of structure/ Permissible limit
1	Blast Location (B4)			8°43'45.29"	76°50'17.95"	---		
2	VMS_1 Location	11772	105	8°43'41.81"	76°50'17.47"	6.12 Within permissible limit	109.9	Belonging to the owner, maximum value is 15 mm/s
3	VMS_2 Location	20484	68	8°43'44.17"	76°50'19.88"	2.3 Within permissible limit	118.5	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	218	8°43'38.33"	76°50'16.16"	Not Triggered		
5	VMS_4 Location	4688	182	8°43'48.033"	76°50'12.81"	1.40 Within permissible limit	115.6	Not belonging to the owner, maximum value is 5 mm/s
6	VMS_5 Location	4687	282	8°43'53.22"	76°50'22.62"	1.68 Within permissible limit	100	Not belonging to the owner, maximum value is 5 mm/s

**Table 3.17 Details of Blast Parameters**

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.50	2.4	30	0.625	1.339	18.75



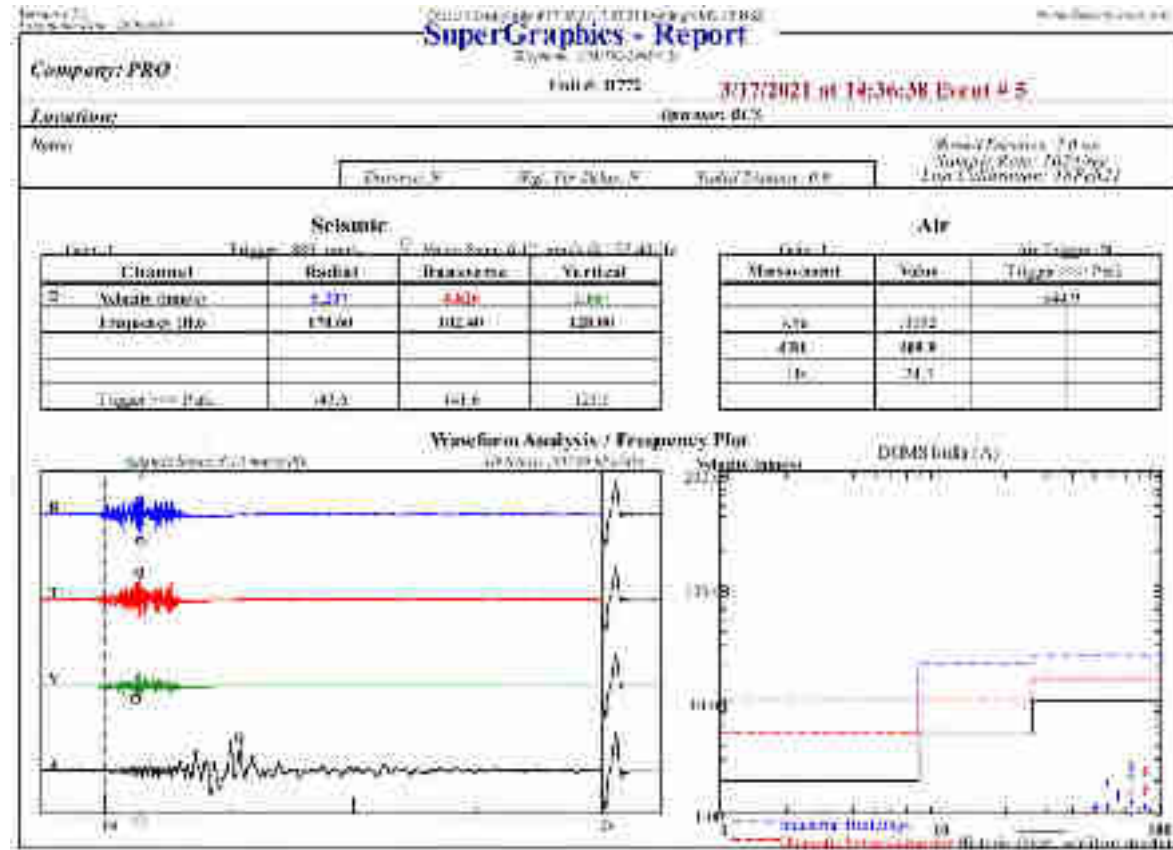
**Figure 3.15 Schematic diagram of adopted blasting pattern for the blast 8**

### Post Blast Observations

During the post blast observations, the following conditions were identified:

- No Backbreak was observed.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 10 m which is considered to be normal.
- A drop of about 0.75 to 1.0 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 10 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring houses were well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.16 & 3.17.**

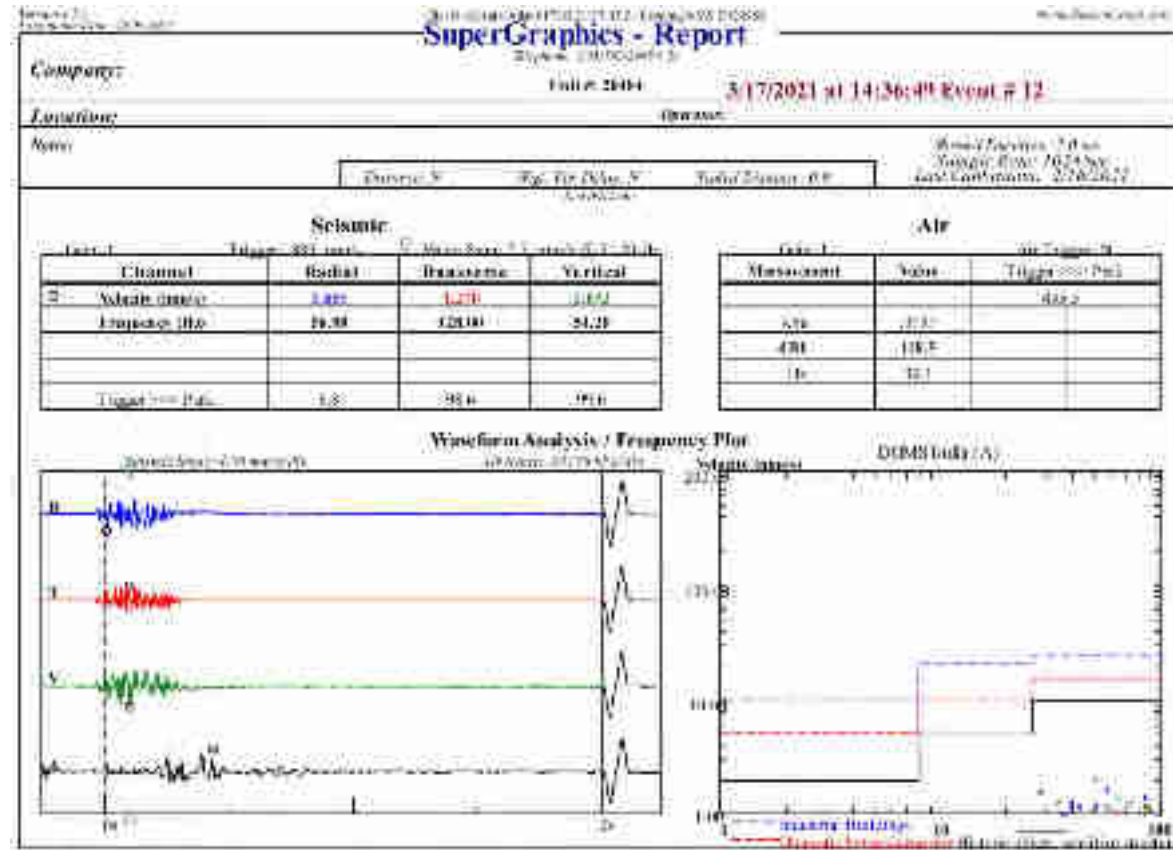
## VMS\_1 Location : EVENT REPORT



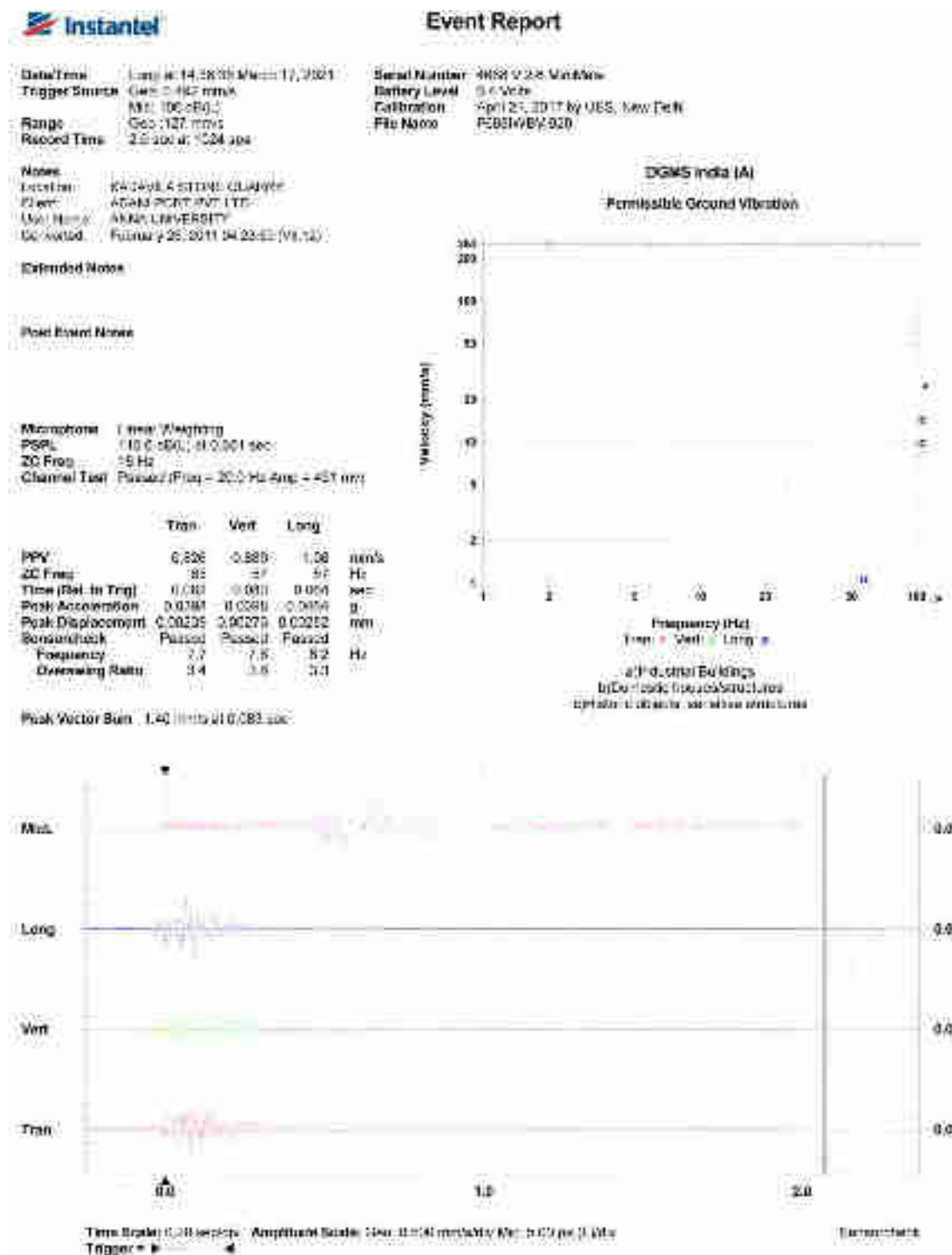




## VMS\_2 Location : EVENT REPORT

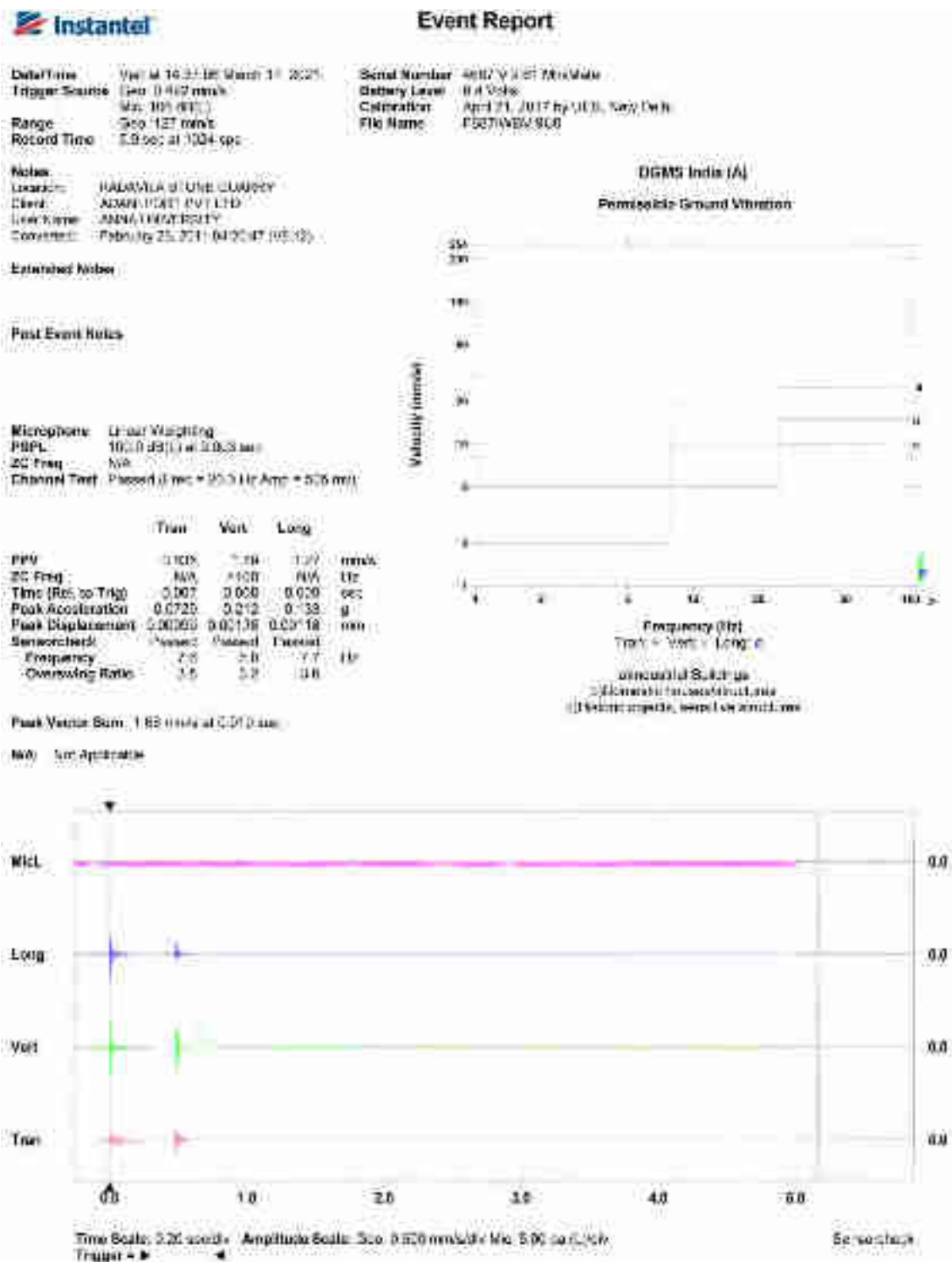


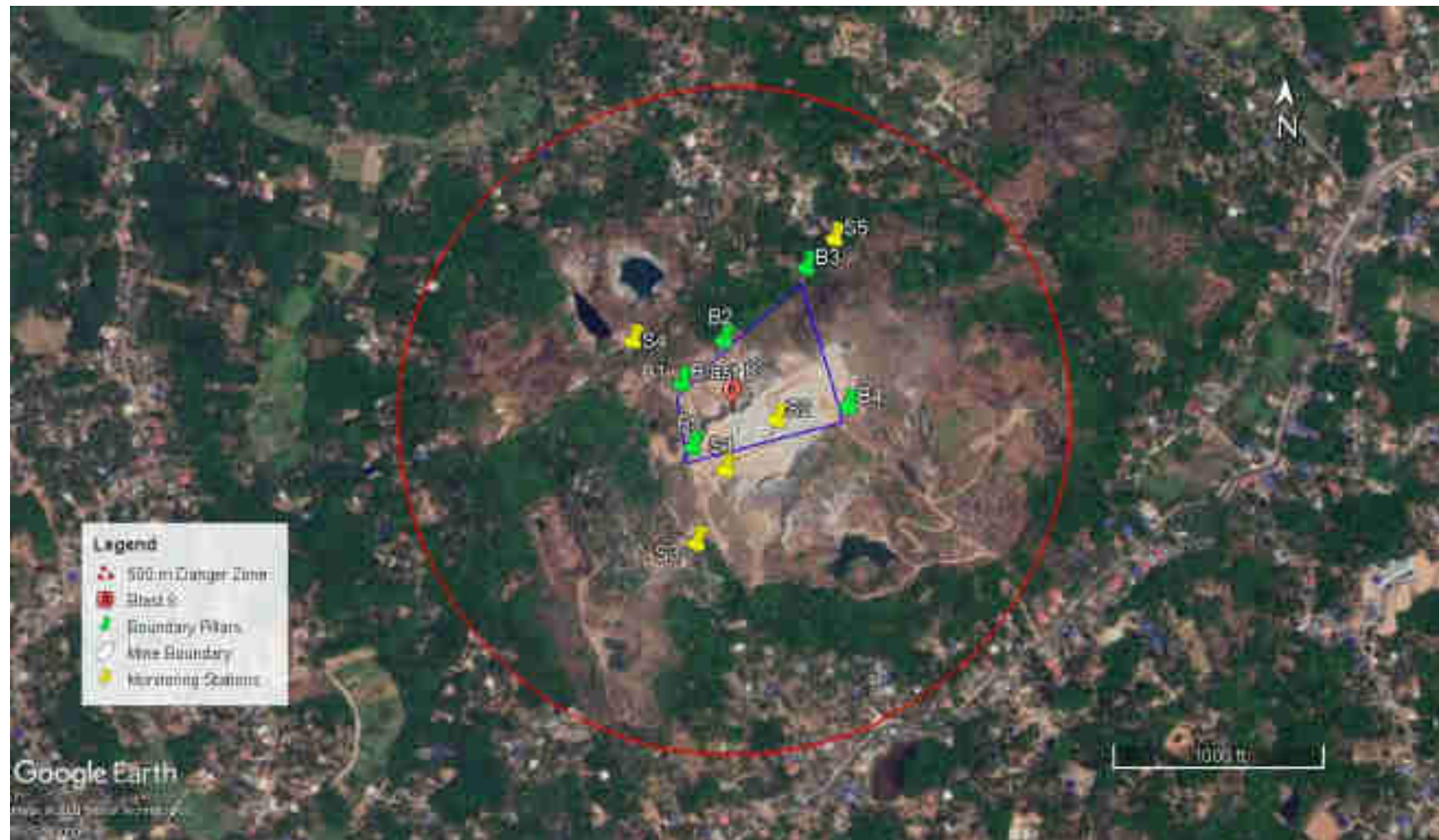
## VMS\_4 Location : EVENT REPORT



village,  
nited

## VMS\_5 Location : EVENT REPORT





**Figure 3.16 Imagery shows the location blast site 8 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry**

**Blast No 9:** The ninth blast was conducted on 17<sup>th</sup> March, 2021 and the adopted blasting pattern and details are given in the Table 3.18 and 3.19. The Figure 3.17 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.18

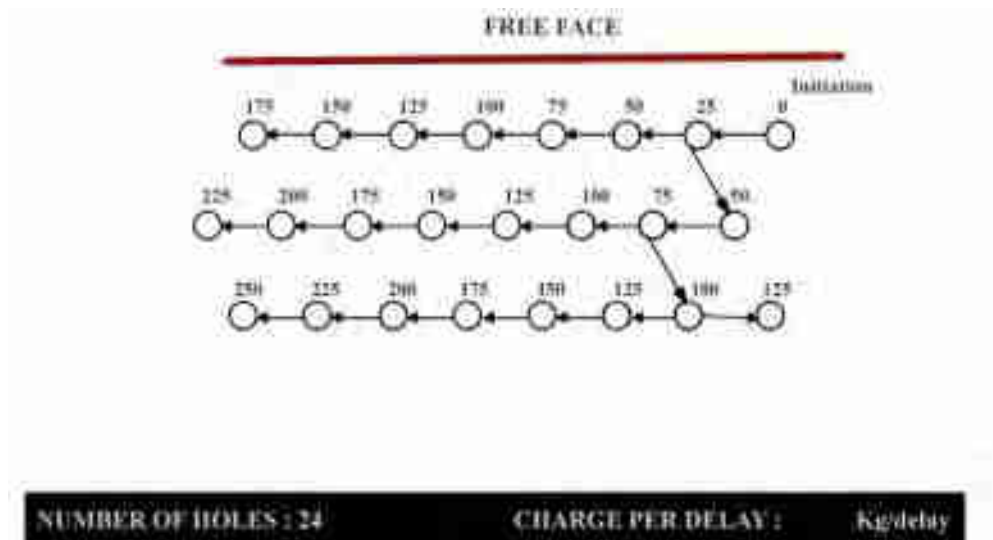
**Table 3.18 Co-ordinates of Blast & Instrument Locations**

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise (dB)	Type of structure/ Permissible limit
1	Blast Location (B4)			8°43'47.24"	76°50'19.47"	---		
2	VMS_1 Location	11772	186	8°43'41.81"	76°50'17.47"	3.47 Within permissible limit	104.2	Belonging to the owner, maximum value is 15 mm/s
3	VMS_2 Location	20484	91	8°43'44.17"	76°50'19.88"	1.75 Within permissible limit	112.3	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	293	8°43'38.33"	76°50'16.16"	Not Triggered		
5	VMS_4 Location	4688	205	8°43'48.033"	76°50'12.81"	0.524 Within permissible limit	116.9	Not belonging to the owner, maximum value is 5 mm/s
6	VMS_5 Location	4687	209	8°43'53.22"	76°50'22.62"	1.00 Within permissible limit	109.5	Not belonging to the owner, maximum value is 5 mm/s

**Table 3.19 Details of Blast Parameters**

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	24	0.625	1.0714	15





**Figure 3.17 Schematic diagram of adopted blasting pattern for the blast 9**

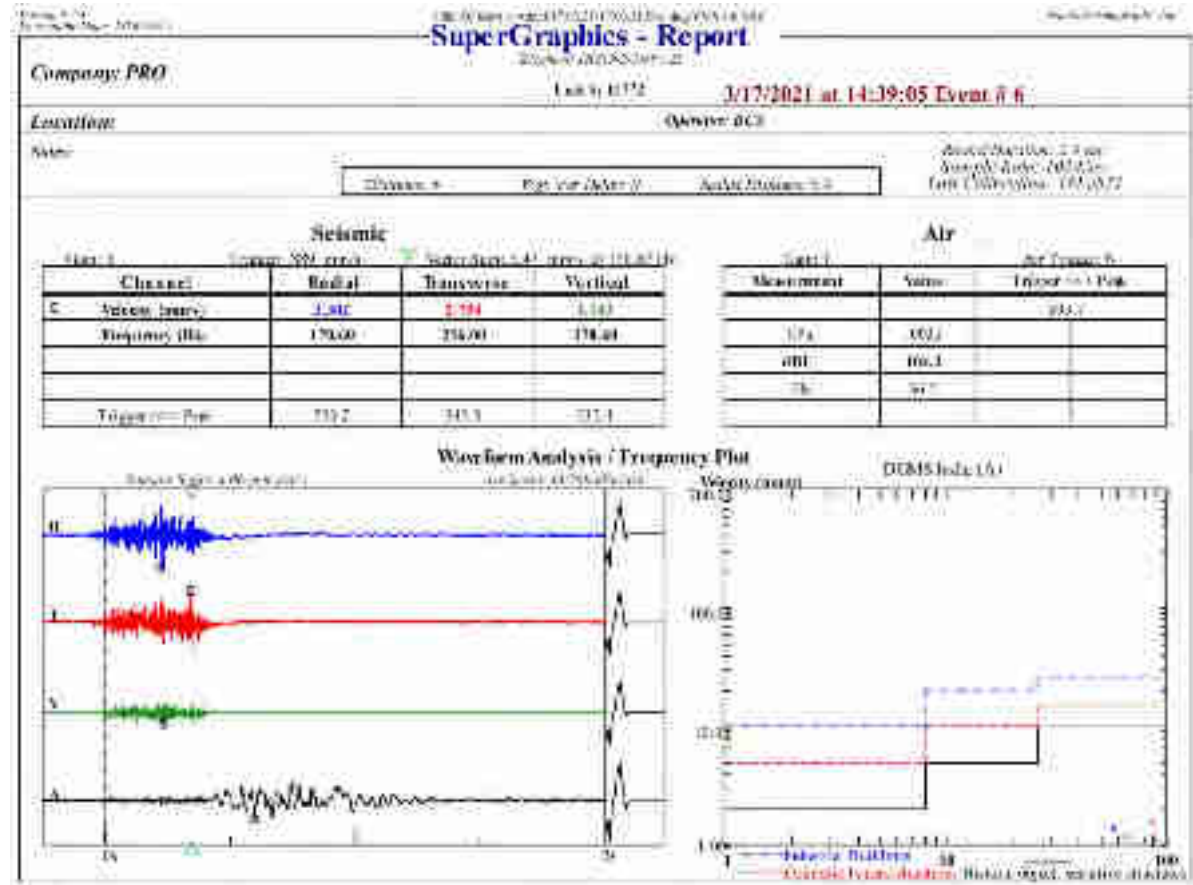
### Post Blast Observations

During the post blast observations, the following conditions were identified:

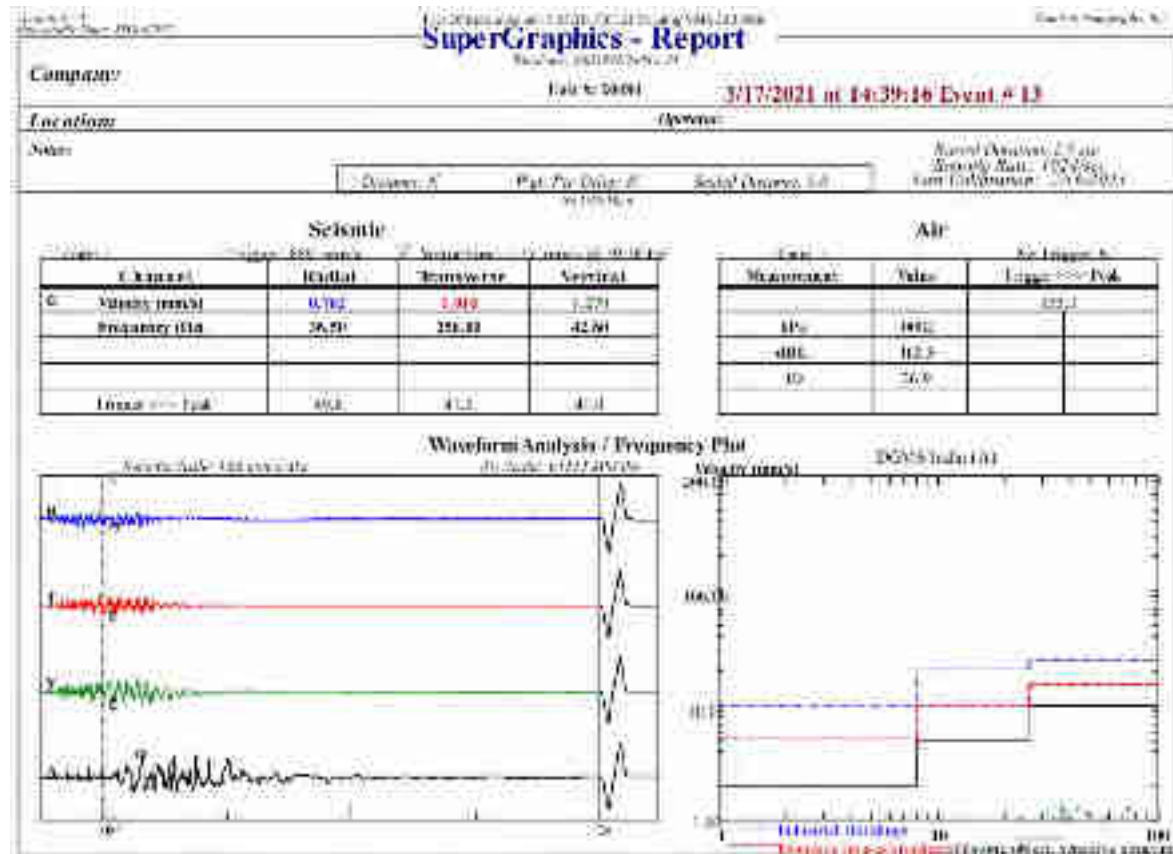
- No Backbreak was observed.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 8 to 10 m which is considered to be normal.
- A drop of about 0.50 to 1.0 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 10 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring houses were well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.18 & 3.19.**



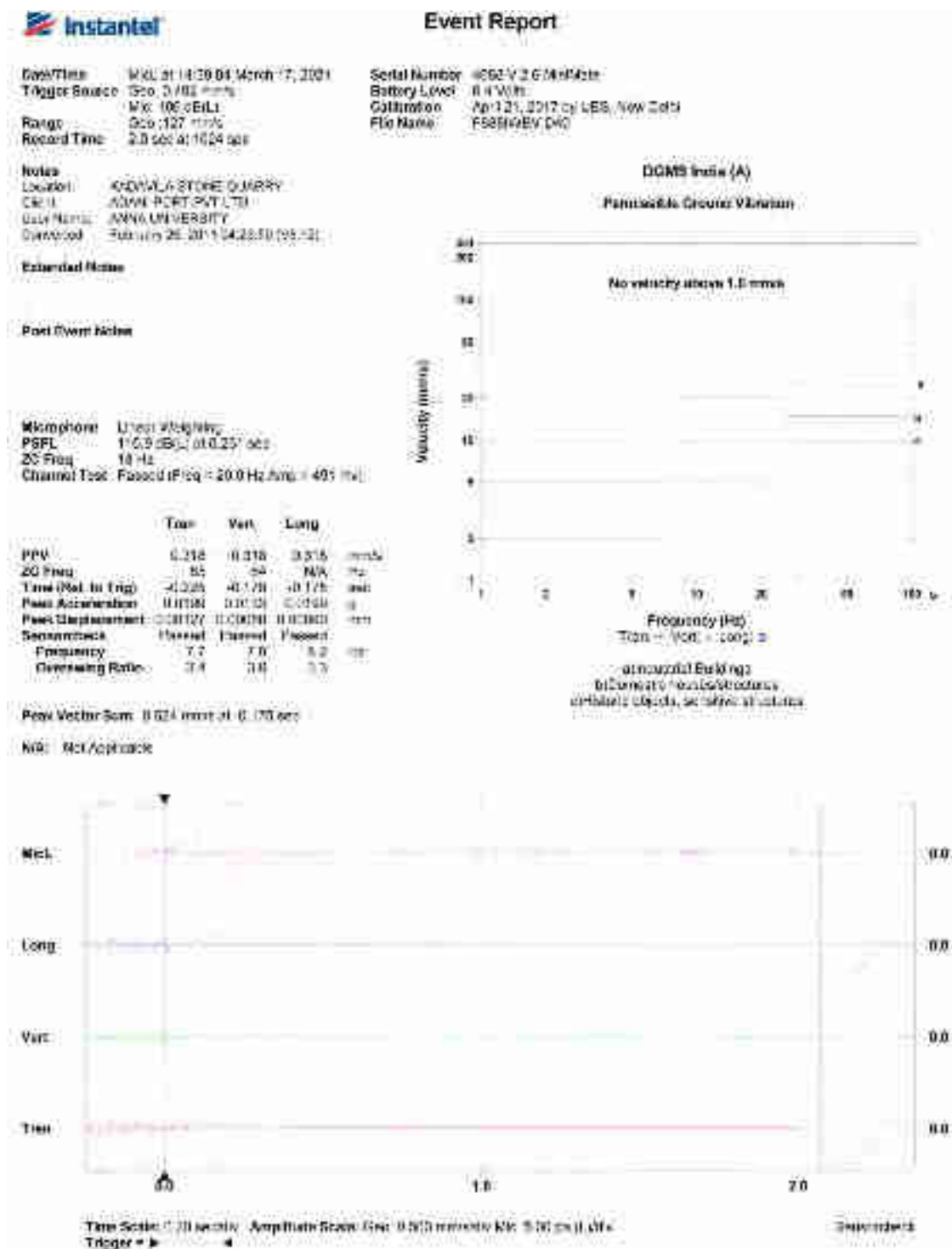
## VMS\_1 Location : EVENT REPORT



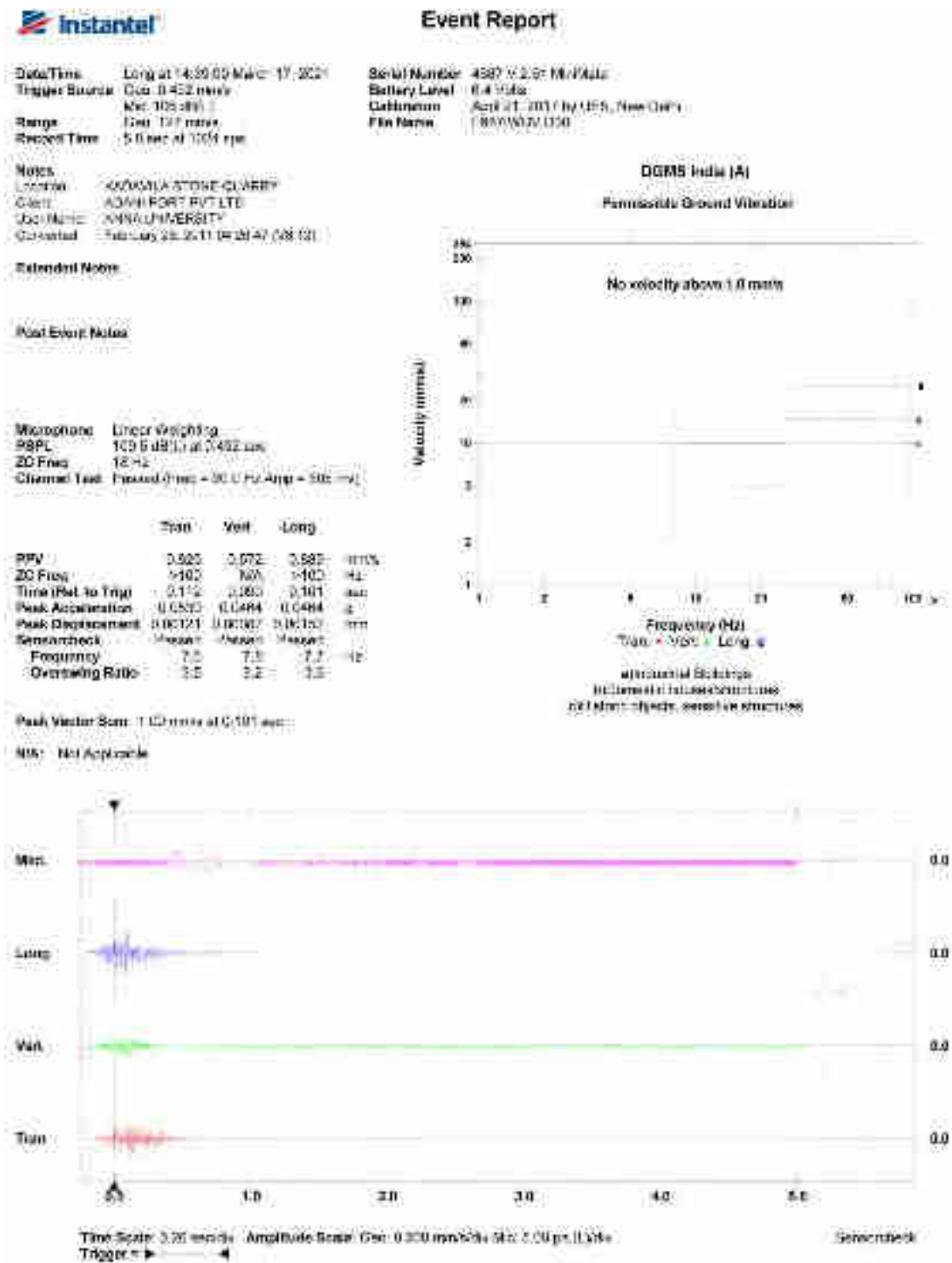
## VMS\_2 Location : EVENT REPORT



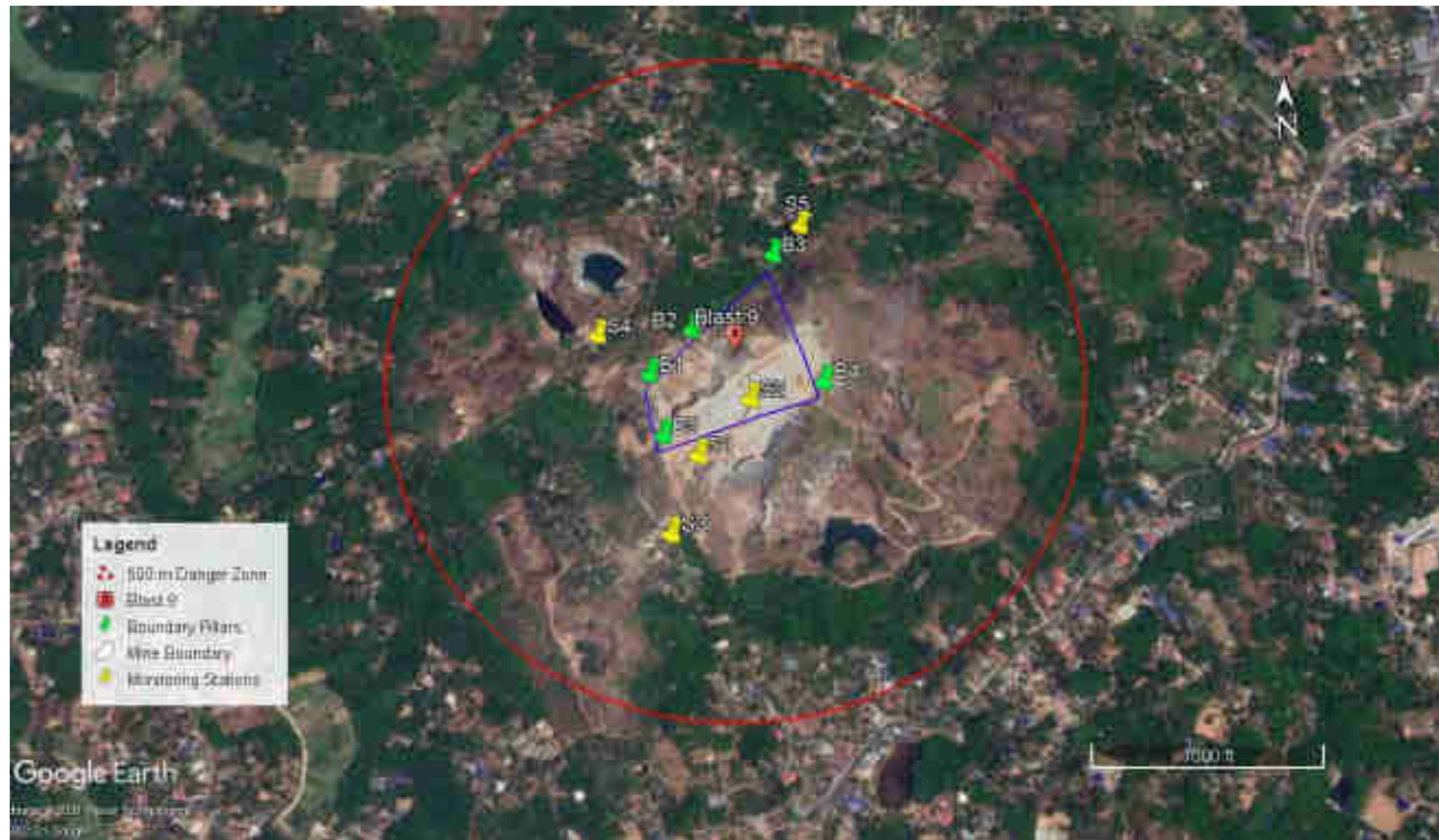
## VMS\_4 Location : EVENT REPORT



## VMS\_5 Location : EVENT REPORT







**Figure 3.18 Imagery shows the location blast site 9 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry**

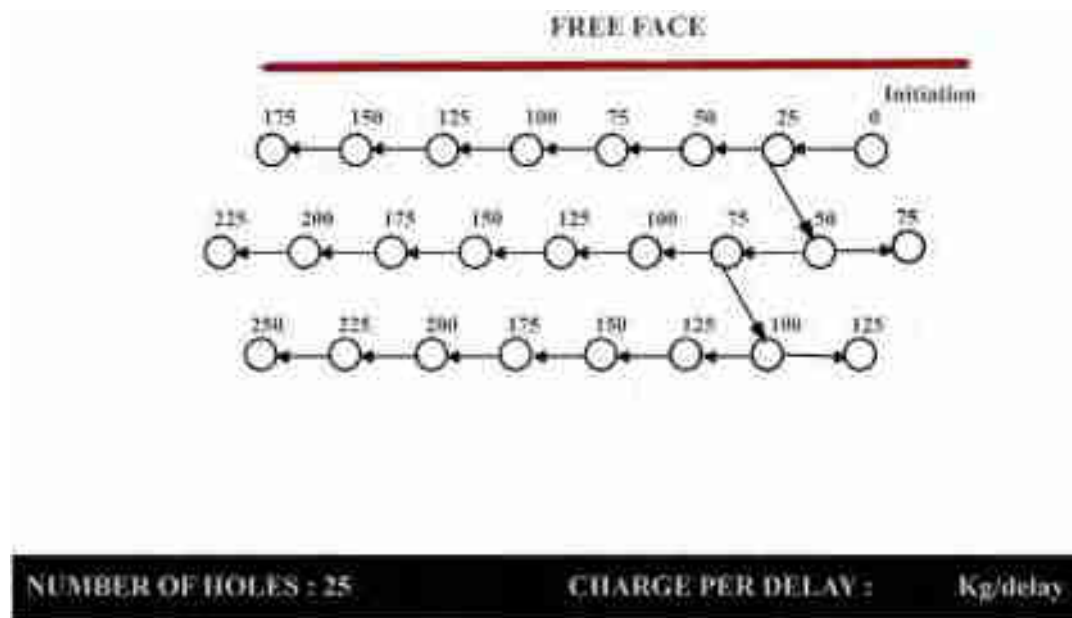
**Blast No 10:** The tenth blast was conducted on 17<sup>th</sup> March, 2021 and the adopted blasting pattern and details are given in the Table 3.20 and 3.21. The Figure 3.19 depicts the blasting pattern and location of blasting site and monitoring station is provided in the Figure 3.20

**Table 3.20 Co-ordinates of Blast & Instrument Locations**

Sl. No.	Location	Serial of Instrument	Distance (m)	Latitude (N)	Longitude (E)	PPV (mm/s)	Noise (dB)	Type of structure/ Permissible limit
1	Blast Location (B4)			8°43'45.74"	76°50'20.27"	---		
2	VMS_1 Location	11772	146	8°43'41.81"	76°50'17.47"	3.4 Within permissible limit	115.2	Belonging to the owner, maximum value is 15 mm/s
3	VMS_2 Location	20484	46	8°43'44.17"	76°50'19.88"	2.29 Within permissible limit	117.6	Belonging to the owner, maximum value is 15 mm/s
4	VMS_3 Location	5993	259	8°43'38.33"	76°50'16.16"	Not Triggered		
5	VMS_4 Location	4688	245	8°43'48.03 3"	76°50'12.81"	0.206 Within permissible limit	109.5	Not belonging to the owner, maximum value is 5 mm/s
6	VMS_5 Location	4687	243	8°43'53.22"	76°50'22.62"	0.318 Within permissible limit	109.5	Not belonging to the owner, maximum value is 5 mm/s

**Table 3.21 Details of Blast Parameters**

Average Burden (m)	Average Spacing (m)	Average Hole Depth (m)	No. of holes (Nos.)	Maximum Charge per Hole (kg)	Maximum Charge per Delay (kg)	Total quantity of Explosives used (kg)
1.2	1.5	2.4	25	0.625	1.1161	15.625



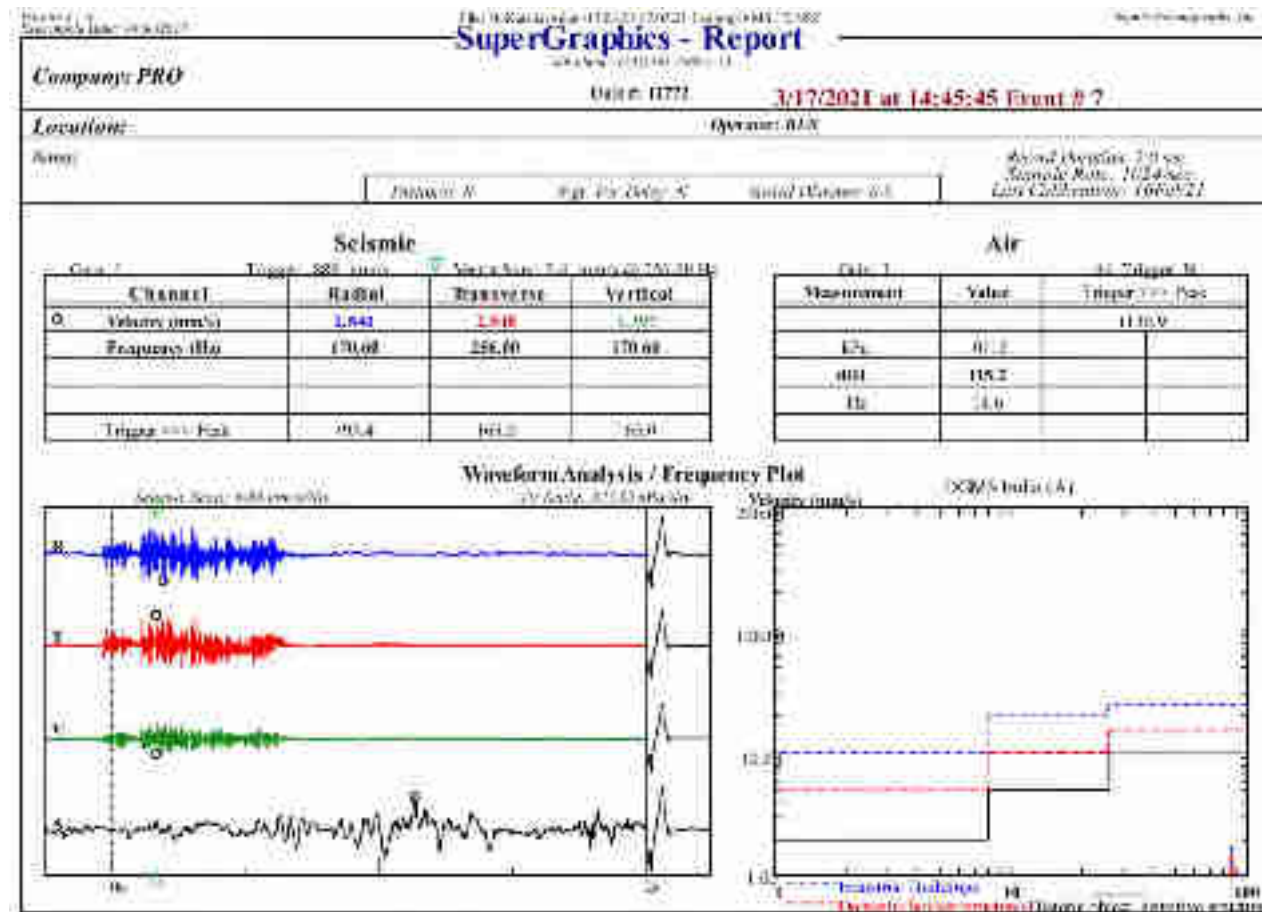
**Figure 3.19 Schematic diagram of adopted blasting pattern for the blast 10**

### Post Blast Observations

During the post blast observations, the following conditions were identified:

- No Backbreak was observed.
- Muckpile was found to be adequately fragmented.
- The throw of the blast has been around 10 m which is considered to be normal.
- A drop of about 0.50 to 1.0 m from the top surface of bench has been found at the rear side of the blasted muck pile.
- No fly rock has travelled beyond 10 to 15 m from the blast.
- No misfires have occurred.
- The ground vibrations level monitored in the Neighbouring houses were well within permissible level.
- Few big sized boulders have been found on the blasted muck pile.
- Summary of the field data related to the above blast is given in **Table 3.18 & 3.19.**

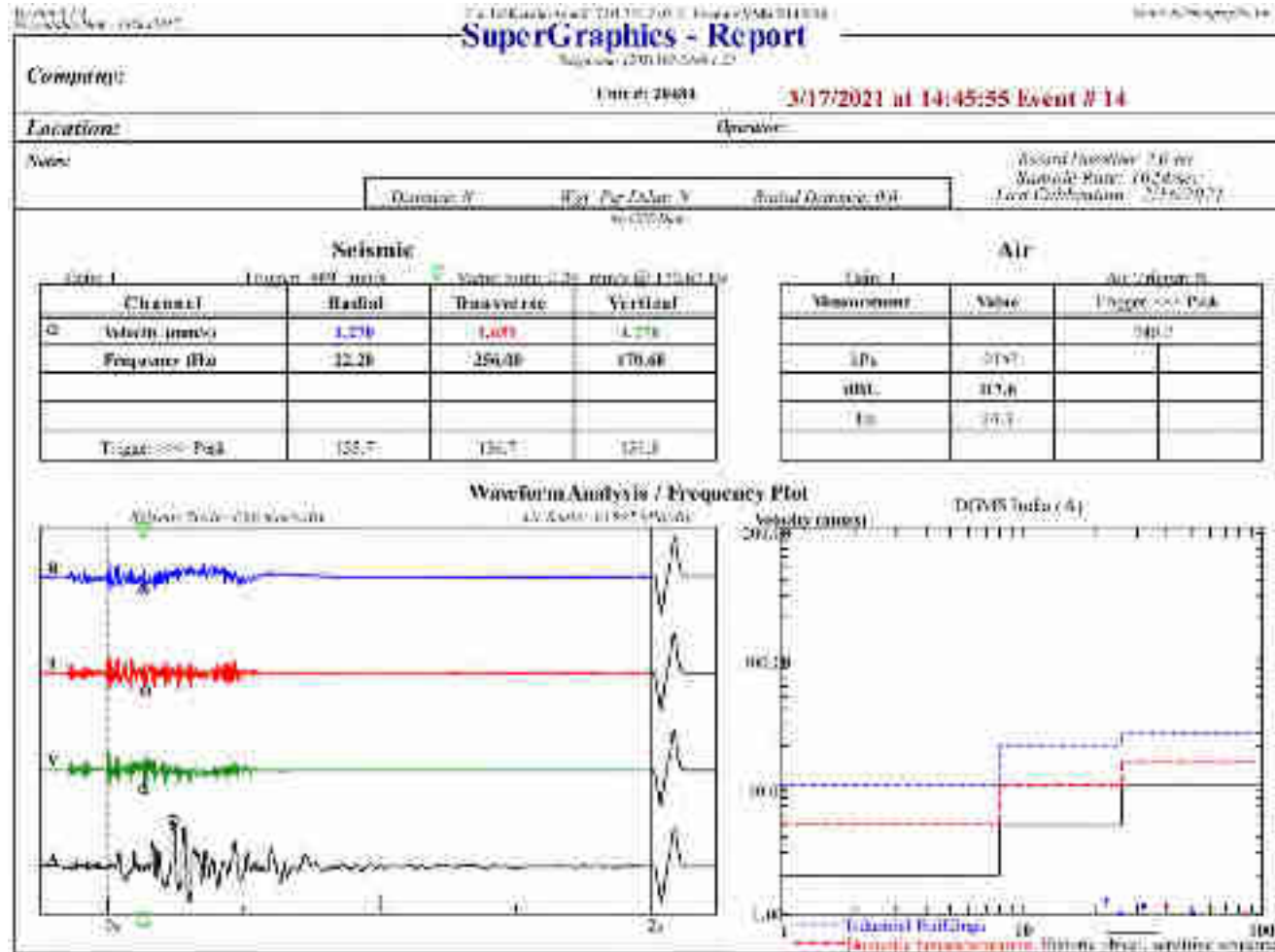
## VMS\_1 Location : EVENT REPORT





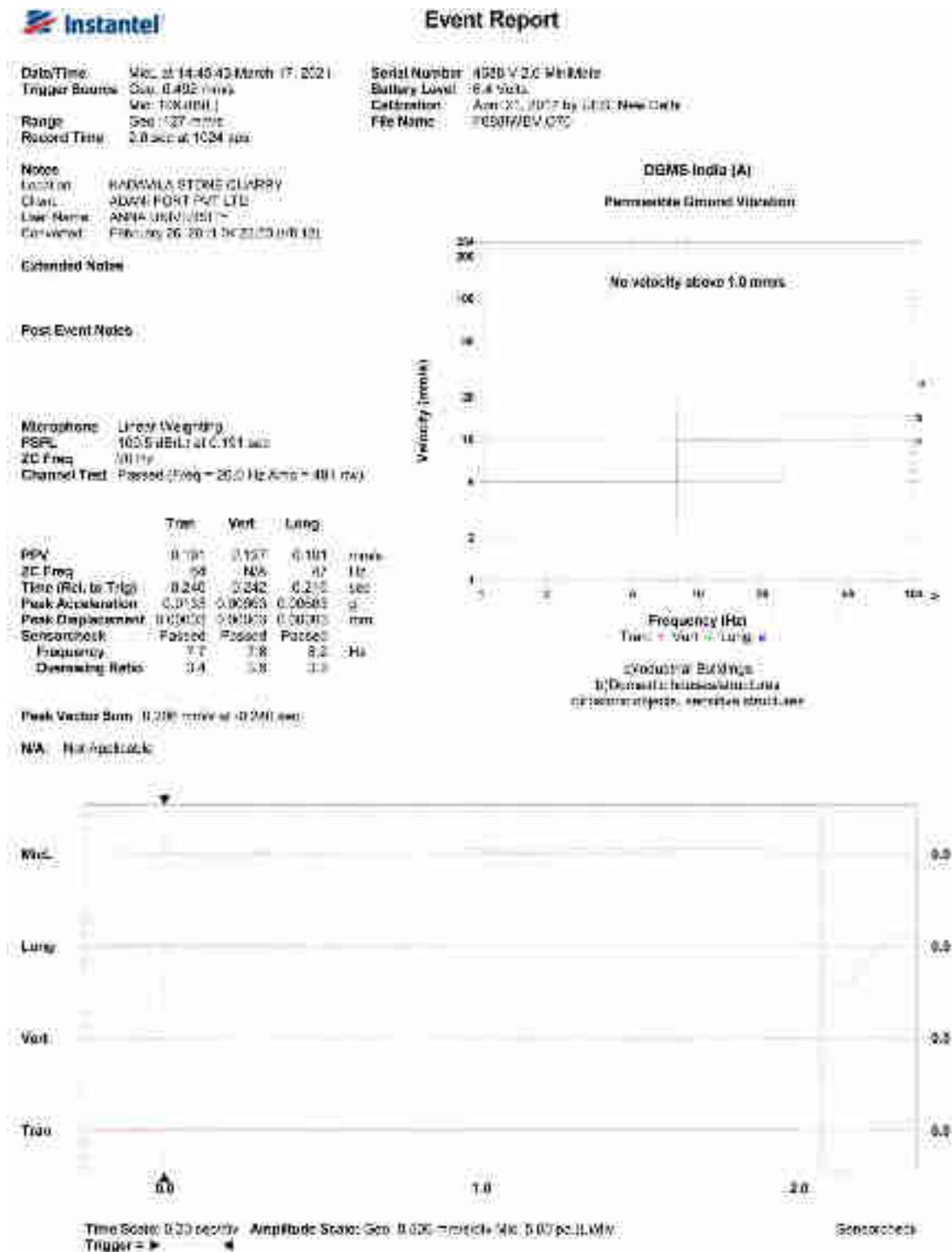


## VMS\_2 Location : EVENT REPORT

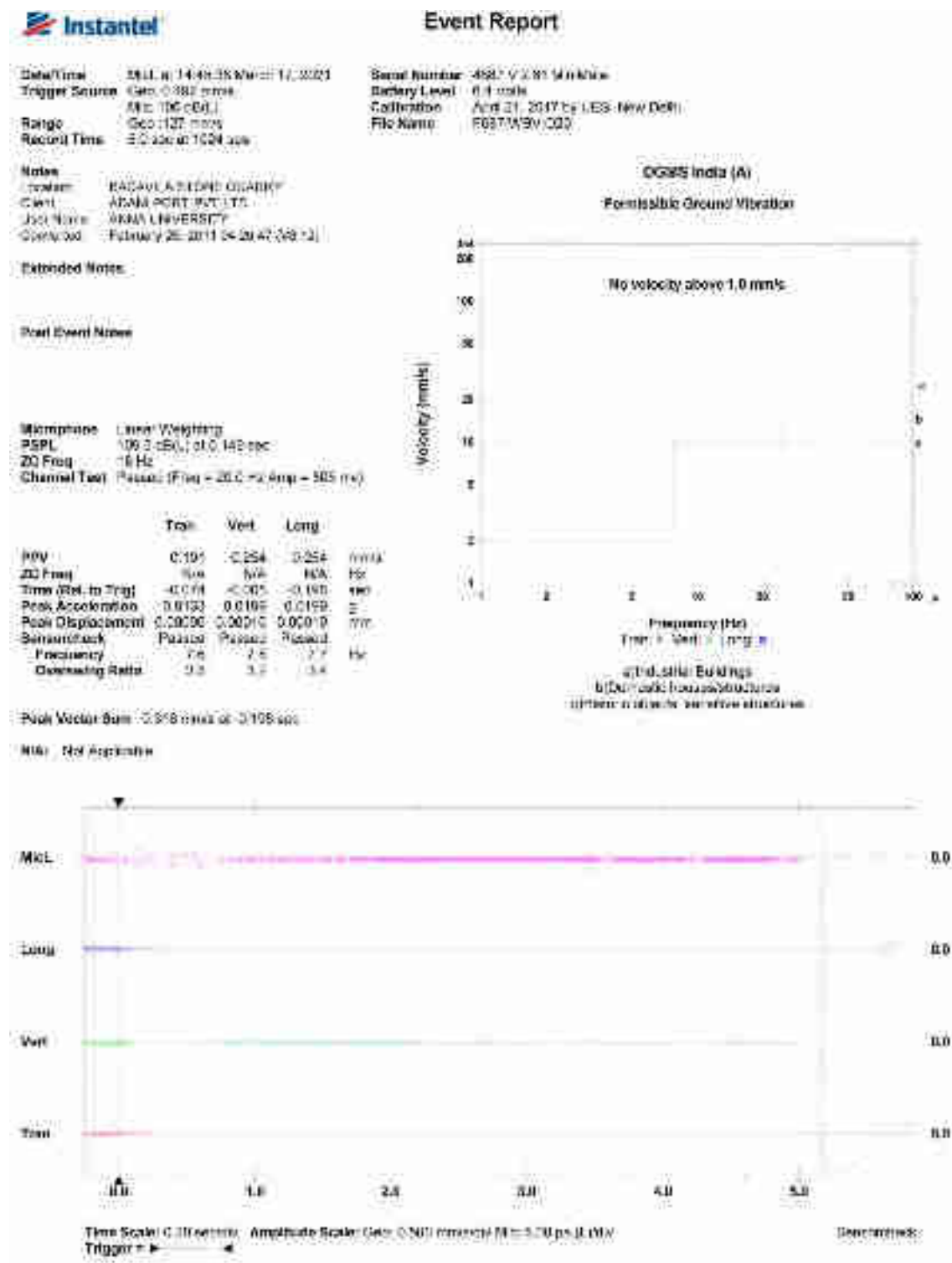




## VMS\_4 Location : EVENT REPORT



## VMS\_5 Location : EVENT REPORT





**Figure 3.20 Imagery shows the location blast site 10 and its corresponding monitoring stations of M/s. Kadavila-1 Stone Quarry**

## 3.2 Blast Vibration Monitoring

To minimise generation of blast induced ground vibrations and thereby their adverse effects on the residential buildings, and other structures, the blast vibration predictor equation for the quarry area has been developed by determining the field constants (which are site specific) by monitoring ground vibrations during all **10 trial blasts** in M/s. Kadavila-1 Stone Quarry. This monitoring was carried out by five numbers of seismographs of INSTANTEL (3 Nos.) and NOMIS (2 Nos.) make by locating them at different locations and distances from the blasting site.

Based on the parameters like the maximum explosive charge per delay, measured peak particle velocities (PPV), distances of each of the blasting sites to the monitoring stations of that particular blast, predictor equations for the site have been developed using regression analysis. This predictor equation was used to calculate the maximum (safe) explosive charge per delay by substituting the distance of the blasting site from the nearest residential structures.

Blast design for the trial blasts was based on the information collected from the site, the empirical relations normally used for blast design and the current practices prevailing in the quarry. Results of the trial blasts, rock type, height of the bench, existence of structures to be protected from blast vibrations like the residential structures of the village, etc. have been taken into account, in this report, while designing the future blasts for M/s. Kadavila-1 Stone Quarry.

### 3.2.1 Tolerable PPV Levels of the Residential Buildings and other structures of Nagaroor village (Kadavila village)

The guidelines by DGMS and others (given in **Section No. 1.3**) specify the tolerable PPV levels surface civil structures of various types can tolerate at different frequencies. Amongst them, DGMS recommends the least (most conservative and therefore safe) permissible peak particle velocities to which different types of structures should be subjected to, for ensuring their safety. Hence, these standards are considered for blast design in this report.

The **minimum and maximum blast vibration frequencies** recorded during the trial blasts ranged between **7.5 to 256 Hz** respectively. Keeping in view the minimum

frequency recorded during the trial blasts, the maximum PPV, structures of any type, can tolerate without damage fall within the frequency range of **8 to 25 Hz** recommended by DGMS in the **Table 1.2** and the same are given in the **Table 3.22**. Based on the DGMS recommendations, it is indicated in the **Table 3.22 (A)** that the tolerable PPVs measured at the foundation level of the structures are **10 mm/s for the domestic houses/structures made up of kutchha brick and cement** and **20 mm/s for the Industrial buildings (RCC & framed structures)** not belonging to the quarry management and **5 mm/s for other structures of historical importance like dam and bridges** if located within the vicinity of the quarry.

However, to avoid confusion for the people in the field, the maximum explosive charge per delay is calculated for this quarry to restrict the peak particle velocity to 5.0 mm/s only (irrespective of the type of structure), which is more conservative and safer as shown in the Table 3.22 (B). Further it will secure the safety of Domestic houses & structures/Residential buildings located in the Kadavila village whose safety is also very important.

**Table 3.22 Permissible Maximum PPV for Residential buildings and other civil structures for blast induced ground vibration frequencies ranging between 8 to 25 Hz**

Type of structure		Max. Permissible PPV, mm/s with Dominant excitation frequency in the range of 8-25 Hz
<b>(A) Buildings / structures not belonging to the owner</b>		
(i)	Domestic houses/structures (kutchha brick & cement), Residential & other Buildings of Vaniyamkulam village	<b>10</b>
(ii)	Industrial buildings (RCC & framed structures)	<b>20</b>
(iii)	Sensitive structures like Dam & Bridges in the Surrounding villages	<b>5</b>
<b>(B) Maximum PPV considered for calculation of Max. Charge per Delay</b>		
	For all types of structure of Nagaroor village	<b>5</b>



### 3.3 Development of Predictor Equation

The vibration data generated during the trial blasts was analysed and a regression curve for the same at **95%** degree of confidence level has been drawn and indicated in **Figure 3.21**. The **95%** degree of confidence level was chosen because this is the minimum level at which all the measured data points were lying below this line (level). Based on the regression analysis, the predictor equation for the area has been developed and given in Equation 3.

$$V = 1026 * (SD)^{(-1.01)} \quad \dots \quad (3)$$

where,

$V$	=	Peak particle velocity (PPV), mm/s
$SD$	=	Scaled distance, $m/\sqrt{kg}$
$k$ and $\beta$	=	Rock constants, which are site specific and

$SD$  is calculated by equation (2).

$$SD = \frac{D}{\sqrt{W}} \quad (m/\sqrt{kg})$$

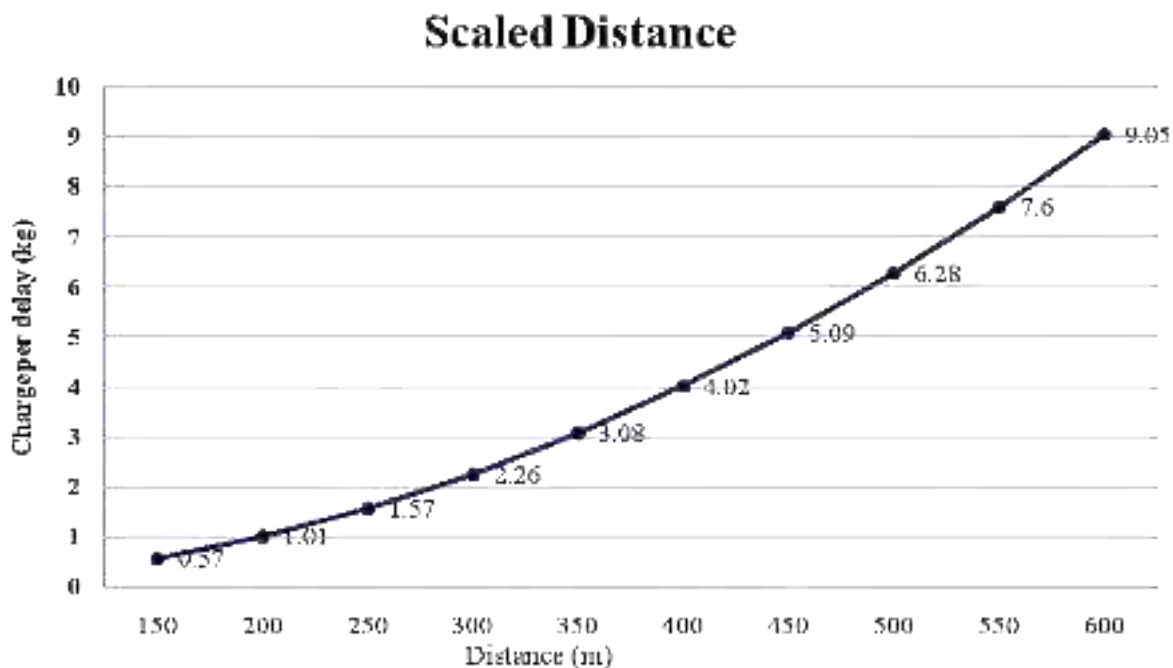
where,

$D$	=	Distance between the blasting site and the vibration monitoring station, m
$W$	=	Maximum explosive charge per delay, kg.

Accordingly, the safe (maximum) explosive charge per delay to be used and the maximum number of drill holes to be charges with same delay number for various distances of the blasting site from the structures like residential buildings and other structures in the Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala to restrict the PPV to a maximum of 5.0 mm/s **with 95% confidence** are calculated using the predictor **equation (3)** developed for the site. **Table 3.23** gives the recommended maximum explosive charge per delay and the maximum number of drillholes to be charges with same delay number in M/s. Kadavila-1 Stone Quarry. Similarly, **Figure 3.21** depicts the maximum explosive charge recommended per delay.

**Table 3.23 Maximum explosive charge recommended per delay for various distances of the blasting site to the structure to be protected like Residential buildings and other structures to restrict the blast vibrations (Peak Particle Velocity) to a maximum of 5 mm/s with 95% confidence level**

Predictor Equation: $V = 1026 * (SD)^{(-1.01)}$		
Sl. No.	Shortest distance between the nearest structure to be protected to the blasting site, m	Maximum permissible explosive charge per delay, kg (rounded off to the nearest kg)
1	150	0.57
2	200	1.01
3	250	1.57
4	300	2.26
5	350	3.08
6	400	4.02
7	450	5.09
8	500	6.28
9	550	7.60
10	600	9.05



**Figure 3.21 Relationship between maximum charge per delay and distance between the blasting site and the structure to be protected to restrict the blast induced ground vibrations (PPV) to a maximum of 5 mm/s**

### 3.4 Results and Discussions

Ten trial blasts were carried out 16.03.2021 to 17.03.2021 and blast vibrations were monitored using five seismographs located at various distances. The minimum and maximum charge per delay varied from 1.07 to 2.17 kg. A maximum of 80 holes were drilled with jack hammer drilling equipment with a maximum number of holes per delay of six. In all the 10 trial blasts, ground vibrations were monitored at 47 locations around the blasting sites and neighbouring village. Out of the total 47 measurements made, vibrations were recorded by the instruments only at 36 stations. The vibrations recorded behind the blast free face were of highest magnitude. The magnitude of vibration recorded in the flank of direction of initiation was lower than those on the opposite side of the flank of blast initiation.

The maximum vibration recorded was 0.968 mm/s with associated dominant peak frequency range of 8.1 at a distance of 465 m from the site of blasting where the total explosive detonated in the blasting round was 18.75 kg and explosives weight per delay was 1.33 kg. Further, the maximum vibration of 0.397 mm/s was recorded at a distance of 359 m with associated dominant peak frequency range of 8 Hz from the blasting site where the total explosive detonated in the blasting round was 15 kg and the corresponding explosives weight per delay was 1.25 kg.

All the 10 blasts were carried out using NONEL shock tube detonators with an in-hole delay of 200 ms and surface delay of 25 ms. Fast attenuation of vibration was recorded at shorter distances whereas at far-off distances the attenuation was slow and was influenced by low frequency blast wave characteristics.

The recorded dominant frequencies of vibrations were in the range of 7.5 to 256 Hz. The FFT analyses of vibration data revealed that the concentration of vibration energy was in the range of 29.30 to 170.6 Hz. However, keeping in view the minimum frequency recorded during the trial blasts, the maximum PPV structures of any type, can tolerate without damage fall within the frequency range of 8 to 25 Hz. However, to avoid confusion for the people in the field, the maximum explosive charge per delay is calculated for this quarry to restrict the peak particle velocity to 5.0 mm/s only (irrespective of the type of structure), which is more conservative and safer as shown in the Table 3.22. Further it will secure the safety of Domestic

houses & structures/Residential buildings located in the Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala whose safety is also very important.

Similarly, the maximum level of air over-pressure monitored at a distance of 205 m in the neighbouring village as 116.9 dB(L). All the recorded data were well within the threshold level of air over pressure/noise as per USBM standard {136 dB(L)} and hence it will not cause any damage to the windows etc. of the houses/structures of the concerned village. Further, there was no ejection of flyrocks in any of these blasts.

The analyses of vibration data recorded from detonation of blasts with higher amount of explosives generated higher level of vibrations at near-by-distances in comparison to the blasts which were detonated at the same bench face with lesser amount of explosives although the blast design and explosives parameters were kept identical. The explosives detonated in a delay in both the blasts were similar in weight.

The propagation equation for prediction of blast vibration have been established and are given as Equations 3. The permissible explosive weight per delay may be computed from the Equation to contain vibration within safe limits for distances of houses/structures concerned. For convenience, the permissible explosive weight per delay has been computed and is given in Table 3.23.

## CHAPTER 4

### CONCLUSIONS AND RECOMMENDATIONS

#### 4.0 Conclusions and Recommendations

The Anna University team have conducted scientific study to evaluate damage potential of the blast induced ground vibration and air overpressure induced by blasting operations at Kadavila-1 Stone Quarry located in the Nagaroor village. Altogether 10 experimental blast rounds were conducted in Kadavila-1 Stone Quarry. Comprehensive vibration monitoring was carried out during the blasting experiment. In all the 10 trial blasts, ground vibrations were monitored at 47 locations around the blasting sites and neighboring village which includes domestic houses and other prominent structures of the village such as the houses are not belonging to the owner of mine management.

It is observed that the blast induced ground vibration and air overpressure (noise) monitored at the locations such as houses (which are not belonging to the mine management) beyond a distance of 130 m from the blasting site remained **less than 3.00 mm/s and 116.9 dB(L) against recommended safe values of 5.0 mm/s and 134 dB(L)** respectively. Ground vibration beyond a distance of 300 m decayed to less than 1.0 mm/s in majority of the cases observed. Therefore, it may be concluded that observed blast induced ground vibration values are safe and well within the permissible limit as per recommendations of Directorate General of Mine Safety (DGMS).

Based on the scientific study, it is concluded that **the blast induced ground vibrations and noise levels generated by the controlled blasting carried out in Kadavila-1 Stone Quarry was within permissible level and therefore is not affecting the residential buildings and other structures. Further, it has been observed that no flying fragments or projectiles travelled beyond 10 m from the site of blast. Hence, controlled blasting can be carried out at Kadavila-1 Stone Quarry by following the blasting parameters as recommended in the Table No. 4.1.**



Here, it is recommended that the permissible explosive weight per delay may be computed from the Equation to contain vibration within safe limits for distances of houses/structures concerned. Hence, the maximum charge per delay shall not exceed the value specified in **Table 3.22** corresponding to the distance between the blasting site and the residential building or any sensitive structure.

Further, it is recommended to continue the present method of fragmenting the oversized rocks using Rock breakers and wherever possible, to adopt muffling using old tyres / old conveyor belts in the blasting operation which will not only minimize the flyrock generation as well as condense the noise generation considerably.

However, it may be noted that the recommendations of this report are site specific and can be effectively implemented only in M/s. Kadavila-1 Stone Quarry and not to the quarries outside the study area.

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**Table 4.1 Summary of suggested Controlled Blast Design for M/s. Kadavila-1 Stone Quarry**

Sl. No.	Parameter			Value
1.	Blast hole diameter			33 mm
2.	Burden			1.2 m
3.	Spacing			1.5 m
4.	Height of the bench			6.00 m
5.	Stemming length			Minimum 0.70 m
6.	Drilling patterns to be followed			Rectangular / Staggered
7.	Specific charge	For creating Initial (Box) Cut		0.16 to 0.17 kg/m <sup>3</sup>
		For production blasting		0.15 to 0.16 kg/m <sup>3</sup>
8.	Loading Density	Cap-sensitive Emulsion (or) Slurry Cartridges		0.26 kg/m
9.	Average explosive Quantity/hole	Cap-sensitive Emulsion (or) Slurry Cartridges		0.50 kg
10	Maximum explosive charge per drillhole during production blasting	Cap-sensitive Emulsion (or) Slurry Cartridges	125 g	0.625 to 0.688 kg
11	Detonators recommended			NONEL based detonators of 17/25 ms surface delay with an in-hole delay of 250 ms
12	Type of explosive recommended			Emulsion (or) slurry cartridge type (ø=25 mm)
13	Initiation system recommended			Inverse initiation
14	Method of connecting detonator			Series
15	Maximum charge per delay			As stated in <b>Table 3.22</b> based on the distance of the blasting site from the structure and the type of structure to be protected

## REFERENCES

1. Anon, (2019). Metalliferrous Mines Regulations 2019, Ministry of Labour & Employment, Govt. of India.
2. Anon, (1991). CMRI Report of Investigation, GAP/V/II, April, 1983 – December, 1987, CMRI, Dhanbad.
3. Anon, (1997). Technical Circulars of No. 7 of 1997 issued by Directorate General of Mines Safety, Govt. of India.
4. Anon, (1997). IS 4081 – 1986, Indian Standard Safety code for Blasting and related Drilling Operations.
5. Anon, (2001). IS 14881 : 2001, Indian Standard Method of Blast Vibration Monitoring – Guidelines.
6. Anon, (2005). Role of Blasting Design Parameters on Ground Vibration and Correlation of Vibration Level to Blasting damage to Surface Structures, Report of Coal S & T Project carried out by national Institute of Rock Mechanics, Western Coal Fields Ltd. And The Singareni Collieries Co. Ltd.
7. Dhar, B.B., Pal Roy, P. and Singh, R.B. (1993). Optimum blasting for Indian geo-mining conditions – suggestive standard and guidelines, CMRI Publication, India, p 40.
8. Dowding, Charles H., (1996), Construction Vibration, Prentice-Hall Inc, New Jersey, 620p.
9. Persson, P.; Holmberg, R. and Lee, J., (1994), Rock Blasting and Explosives Engineering, CRC Press, 551p.
10. Siskind, D. E., (1980), Structure response and damage produced by ground vibration from surface mine blasting, USBM, Washington, 74p.

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## **DISCLAIMER**

The scientific investigation presented in this report was carried out by Department of Mining Engineering, Anna University, Chennai. The findings were based on **10 Nos. of trial blasts** carried out with **33 mm diameter holes** to a maximum **depth** of **2.4 m** using cap-sensitive **Emulsion explosive** cartridges of **25 mm diameter** along with **NONEL**. Blast design for Kadavila-1 Stone Quarry. given in this report is based on the scientific investigations including the results of the trial blasts.

The Department of Mining Engineering, Anna University, Chennai is not responsible for the results produced, if there is any change in the conditions like – increase in strength of the explosives used, using more explosive charge per delay than recommended in **Table – 3.23** of this report, adopting faulty initiation sequence, not following the recommendations of this report etc.

The **Department of Mining Engineering, Anna University, Chennai is no way responsible for proper implementation of the recommendations of this report, as the day-to-day activities in the mine are neither under its control nor possible for it to control.**

**In view of the above, neither the authors of this report nor the Department of Mining Engineering, Anna University assume any liability with respect to any claims, damages or losses which may result from the implementation of the conclusions and recommendations / results of this report.** This report is only for the guidance of quarry management and the Kadavila-1 Stone Quarry management has to decide on all other safety and operational aspects of the actual blasting operation for the Kadavila-1 Stone Quarry. It is also the responsibility of the management to take all statutory and other additional safety precautions and measures while carrying out the blasting as the same have not been stated in this report.

**(Dr. P. BALAMADESWARAN)**  
**Consultant**

## **ANNEXURE – I**

### **DGMS Technical (S & T) Circular No. 7 of 1997**

Sub:     Damage of structures due to blast induced ground vibrations in the mining areas.

#### **1.     Introduction**

In response to increase demand for coal and other minerals, a number of large mechanised opencast mines have come into operation. Some of these opencast workings are located near surface structure like residential buildings, schools, commercial shops, hutments with large number of inhabitants etc. Whenever blasting is done in these opencast mines, ground vibrations are generated outward from the blast area and cause damage to surrounding surface structures. The vibrations radiating from the blast holes while passing through surface structures, induce vibrations on the structures causing resonance. The components of ground motion can affect the structures through compression and tension and also through vertical and horizontal shearing effects. Blast induced ground vibrations create socioeconomic problems for the mine managements as well as the people residing in vicinity of these mines. As only 20-30 % of energy of commercial explosives used in the mines is utilized for fragmenting the rock, the rest of energy is transmitted through the earth in the form of ground vibrations resulting in damage to the surrounding structures.

#### **2.0     Damager Criteria**

The peak particle velocity has so far been considered as the best criteria for evaluating blast vibrations in terms of its potential to cause damage. The extensive studies on the problems have established that the frequency of the waves is also equally important factor to consider the effect of damage. The blasting damage is generally classified into following four categories:

<b>Sl. No.</b>	<b>Category</b>	<b>Description of damage</b>
i.	No appreciable damage	No formation of noticeable cracks.
ii.	Threshold damage	Formation of fine cracks, fall of plaster, opening & lengthening of old cracks, loosening of joints, dislodging of loose objects etc.
iii.	Minor damage	Superficial not affecting the strength of structure(s). Hair line cracks in masonry around openings near partition, broken windows. Fall of loose mortar etc.
iv.	Major damage	Formation of several large cracks, serious weakening of structures, shifting of foundation, fall of masonry, ruptures of opening vaults etc.



### **3.0 Natural Frequencies**

Elements of building construction such as sprung floors, stud partition walls, ceiling and windows can all react as mass-spring systems; each with its own natural frequencies of about 4-24 Hz (low frequencies) Ground vibrations at these frequencies amplified by the structures increase the risk of damage. When the low frequency ground vibration coincides with the natural frequency of the structure resonance is originated. The resonance is a state in which the structure absorbs most energy progressively becoming deformed with time, until plastic deformation occurs. Therefore even the low peak particle velocity of ground vibrations at natural frequency of structure is more harmful to the structure. Natural frequencies of brick and concrete structure generally vary from 8-16 Hz.

### **4.0 Structural response**

All structures develop cracks from natural causes like periodic changes in humidity, temperature and wind velocity. Changes in soil moisture cause foundation cracks. The width of old cracks change seasonally and number of cracks increase with the time. This damage is independent of damage caused by blasting.

The cracking location and the wall material have an influence on the particle velocity at which cracking begins. If the entire structure is not inspected thoroughly, there may be chances of biased opinion on the type of cracks. Thus it is important to place transducer properly for the correct assessment of damage.

In the mud houses, number of cracks develop before blasting and these cracks widened and extended with the passage of time. These cracks are further widened and get extended due to blast induced ground vibrations. Concrete structures vibrate for longer duration than brick and mud structures. Concrete walls have free top and show no cracks at vibration levels for which mud and brick walls can damage. Cracks develop in concrete walls with large vibration level. Cracks in brick- structures can be observed in junction of walls, roof and at window corners. Brick walls with clay mortar and cement- sand mortar behave in same fashion. Steel structures can sustain more vibration level.

The magnitude of vibrations on structures is much more than on the ground. Duration of vibration in structure is also longer than, that of ground vibration. Multi-storied buildings are more sensitive to blast vibration than the single-storied buildings.

To predict the extent of damage and to take preventive measures, it is necessary to measure ground vibrations due to blasting. Studies on structural response of ground

vibration in the structures of different constructions within the mining areas under Indian condition are limited and therefore such study should be carried out to ascertain the degree of damages for improvement and standardization of damage criteria under Indian conditions.

## **5.0 Measurement of blast induced vibrations**

### **5.1 Instrumentation**

The instrument selected for monitoring blast induced ground vibration shall be simple, light, compact, easily portable, battery operated, digital form output, triggering by geophone etc. Triaxial transducers for recording blast vibration shall have a liner frequency up to 500 Hz and capable of recording particle velocity up to 100 mm/s.

### **5.2 Methodology**

The transducers shall be placed near the structure on the solid undisturbed ground and should be placed well in contact with the ground. For structural response, the transducers shall be placed horizontally over the wall, floors and ceiling. A minimum of 15 points of observations corresponding to a minimum of 10 blasts shall be made for better prediction with a high index of determination.

### **5.3 Predictor Equation**

The least means square method of regression analysis shall be used to interpret the data. The square root scale distance shall be used for analysis and interpretation of data when blasting is done on surface and measurements are taken on the surface, or the blasting is done underground and measurements are taken underground. On the other hand, if blasting is done on the surface and the measurements taken underground the cube root scaled distance shall be used.

## **6.0 Guidelines on experimental blasting**

### **6.1 Factors**

Major factors affecting particle velocity of ground vibration are type and amount of explosive charge used, distance from the charge to the point of observation (surface structures), geological, structural and physical properties of the rock that transmits the vibrations, height of structures and blast geometry. Use of safe charge/delay, in hole delay with non- electric initiation systems. Proper burden, inclined holes in conformity with slope of bench, deck charge, air deck, sequential blasting, clearing off loose pieces of rocks from the blast site and proper stemming of holes bring reduction in blast induced ground vibrations. Controlled blasting methods in conjunction with effective muffling of holes will control ground vibrations and also arrest fly rock.

## **6.2 Plan**

A plan showing structures belonging to the to the owner and not belonging to the owner in different prominent shades should be prepared. The plan shall incorporate details of construction of the structures in a tabular form. Plan should also show 50 m., 100m, 200 m and 300 m zones from the structures, the place of experimental study and the limit upto the which blasting is proposed to continue.

## **6.3 Study/ observations**

In a particular mining area with built-up structures where deep hole blasting is to be introduced for the first time, experimental blasting shall be carried out by any research/ academic institute much before the structures fall within the blasting danger zone. The type of instruments, the methodology and predictor norm as recommended in para 5.0 shall be followed in measurement of blast induced vibrations. Based on the study, the safe charges for different zones shall be determined and recommendations made in the report. In a cluster of buildings of different types existing close to each other, the charge for the buildings/ structures requiring greater protection against damage shall be assessed and recommended.

## **6.4 Structural response**

During the study the response of the structures assuming different natural frequencies should be calculated and plotted on a figure. Software with the different programmes are available now for the said plot and should be used for convenience.

## **6.5 Monitoring**

In order to ensure effective control over the vibration and related damages there is a need for regular inhouse monitoring and the managements should train the blasting personnel during the experimental study and start observations on their own during the regular blasting operations.

## **7.0 Recommended permissible standards of blast induced ground vibrations:**

### **7.1 Technical considerations**

Permissible standards for different type of structures have been arrived at considering the importance of building and structures. The buildings of historical importance and multi-storied structures are likely to get damaged with low level of vibration and therefore permissible standards are to be lowest. Similarly buildings not belonging to the owner but with mud/brick in cement construction and others with good construction (RCC and framed structures) should also be protected but higher permissible standards than that of the level

fixed for first category has been allowed. The buildings belonging to the owner of the mine are constructed for a limited period generally equal to the life of the project. The management accept that these buildings constructed within the mining area are likely to suffer some damages during the extraction of minerals, but the damages should be repairable. Therefore, slightly higher permissible levels of vibrations have been allowed in such cases.

## 7.2 Permissible standards

Depending on the type of structures and the dominant excitation, the peak particle velocity (ppv) on the ground adjacent to the structure shall not exceed the values given below in the table.

**Table: A1 Permissible Peak Particle Velocity (ppv) at the foundation level of structures in Mining Areas in mm/s**

Type of structure			Dominant excitation frequency, Hz		
			<8 Hz	8-25 Hz	> 25 Hz
(A)	Buildings / structures not belonging to the owner				
	(i)	Domestic houses/structures (kutchha brick & cement)	5	10	15
	(ii)	Industrial buildings (RCC & framed structures)	10	20	25
	(iii)	Objects of historical importance & sensitive structures	2	5	10
(B)	Buildings belonging to the owner with limited span of life				
	(i)	Domestic houses/structures(kutchha brick & cement)	10	15	25
	(ii)	Industrial buildings (RCC & framed structures)	15	25	50

In view of the complexities of the problems I hope you all would take adequate measures as recommended above to ensure that the blasts near surface structures are carried out with utmost care and precautions. The blast induced ground vibration should be within the permissible limits as specified above.

## **ANNEXURE – II**

### **PROCEDURE FOR DEALING WITH MISFIRES**

#### **Abstract of Regulation No. 167 of Metalliferrous Mines Regulations 1961 on Misfires:**

- (1) When shots are fired electrically, no person shall re-enter or be permitted to re-enter the place of blasting until 5 minutes after firing of the shots and the source of electricity has been disconnected from the cable.
- (2) In the event of a misfire, the entrance or entrances to the place shall be barricaded or fenced so as to prevent inadvertent access; and no work other than that of locating or relieving the misfire shall be done therein until the misfire has been located and relieved. The place of the misfire shall be marked with a red flag.
- (3) In the event of a misfire, the tamping may be sludged out with compressed air or water under pressure. The hole shall thereafter be re-primed and fired.
- (5) Except where the misfire is due to faulty cable or a faulty connection, and the shot is fired as soon as practicable after the defect is remedied, or where a shot has been re-primed and fired under sub-regulation (3) another shot shall be fired in a relieving hole which shall be so placed and drilled in such a direction that at no point shall it be nearer than 30 centimetres from the misfired hole. The new hole shall be bored in the presence of a blaster, preferably the same person who fired the shot.
- (7) If a misfired hole is not dislodged by a relieving shot, the procedure laid down in sub-regulation (5) and (6) shall be repeated. A misfired hole which cannot be dealt with in the manner so prescribed shall be securely plugged with a wooden plug; and no person other than a blaster or a mining official or a person authorised for the purpose shall remove or attempt to remove such plug.
- (8) When a misfired shot is not found, or when a misfired shot is not relieved or re-blasted, the blaster shall, before leaving the mine, give information of the failure to such official as may relieve or take over charge from him. He shall also record, in a bound page book kept for the purpose, a report on every misfire, whether suspected, and whether relieved or not relieved. It shall be the responsibility of the relieving blaster or official also to sign the report and later to record in the said book the action taken for relieving the misfired shot hole.
- (9) The blaster of the next shifts shall locate and re-blast the misfired hole, but if after a thorough examination of the place where the misfire was reported to have occurred, the blaster or other competent person holding a Manager's or Foreman's certificate appointed for the purpose by the Manager, is satisfied that no misfire had actually occurred, they may permit drilling in the place.



## **ANNEXURE - III**

### **DGMS Technical (S & T) Circular No. 1 of 1995**

#### **Sub: Danger due to lightning/storm during blasting operation in mines**

Recently, three accidents took place due to premature blasting by lightning when persons were killed/injured/escaped while they were in the process of charging explosives/connecting detonators etc. These accidents occurred as mentioned below:

1. While 9 deep holes and a number of secondary holes were being charged to be connected in series and fired, a lightning discharge due to thunderstorm caused premature firing of the deep holes, killed three persons and inflicted serious bodily injuries to one.
2. While a Blaster was carrying 100 primed cartridge of explosives with electric detonators in a card-board box on his shoulder, the cartridges exploded suddenly resulting in instant death of the Blaster.
3. While a Blaster and his helpers were about to take shelter after charging of the holes, suddenly there was a lightning/thunder-storm resulting in premature blast of the holes. Persons escaped unhurt.

Accidents due to above causes continue to occur despite very clear safety precautions laid down while granting permission under Reg. 106(2) (b) of MMR 1961 and Reg. 98 of CMR 1957 and also Circulars issued by DGMS recommending additional precautions to prevent such accidents. These precautions in brief are given below:

1. Shots shall not be fired except during the hours of daylight or until adequate artificial light is provided; all holes charged on any one day shall be fired on the same day as far as practicable.
2. As far as practicable, shotfiring shall be carried out either between shifts or during the rest interval or at the end of work for the day.

During the approach and progress of an electric storm, the following precautions shall be taken:

- (a) Neither explosives nor detonators shall be handled;
- (b) If charging operations have been commenced, the work shall be discontinued until the storm has passed;
- (c) If the blast is to be fired electrically, all exposed wires shall be coiled up and, if possible, placed in the mouth of the holes or kept covered by something other than a metal plate,
- (d) All wires shall be removed from contact with the steel rails of a haulage track, so as to prevent the charge being exploded prematurely by a local strike of the lightning;
- (e) If the firing circuit has been set up before the thunderstorm came on, the persons at the site should withdraw at the earliest and the blast should be fired off immediately;
- (f) All persons shall be withdrawn from the danger zone.

## **ANNEXURE – IV**

### **Procedure for Warning and Withdrawing of Persons from the Blasting Zone**

1. The Quarry management should employ persons possessing statutory qualifications of Blaster's Certificate from Directorate General of Mines Safety (DGMS) to handle and use explosives. The Blaster will be in-charge of receipt, transport, use and return of unused explosives and accessories.
2. All blast site employees shall follow the instructions of the Blaster and they shall use and adhere to every precaution to ensure employee safety including, but not limited to, visual and audible warning signals, flags, etc.
3. The Blaster should possess the Exploder Key with him during the entire process of charging and firing and he should not hand over it to any other unauthorised person.
4. All shots will be fired by the Blaster himself.
5. The blaster shall keep an accurate, up-to-date record of explosives and blasting accessories used in each blast and shall keep an accurate running inventory of all explosives and blasting accessories in his custody.
6. The Quarry management will maintain an inventory of the explosives and accessories received, issued, used and returned in a bound paged notebook kept for the purpose. A competent person will be in-charge of these operations.
7. The storage and handling of explosives will be in accordance with the provisions of Explosive Rules.
8. No explosives or accessories shall be abandoned.
9. Smoking, firearms, sparks, open flame or heat producing devices (including cell phones and battery operated watches) will be prohibited where explosives are being stored, handled, transported or used.
10. Electric Detonators shall never be pulled, stretched, kinked, twisted, mashed or abused in any way which could cause the tube to break or otherwise malfunction.
11. Electric detonator connections and splices shall be competent and positive in accordance with the manufacturer's recommendations.
12. No blast will be fired if any person is present in the vicinity of the blasting area. If any person is present or any operations are being carried out, steps will be taken to withdraw such persons or suspend above operations completely.
13. The Quarry management will establish a code of blasting signals as noticed below and all blast site employees will be familiarized with them: It is obligatory on the part of every employer and other person in the blasting zone to adhere to the code and keep away from the blasting zone during the blasting operations.

- contain audible pre-blast and all clear signals
- contain an emergency method for guards, flagmen, or authorized employees to signal “do not fire”, and
- prohibit sounding of the all clear signal until the blaster has checked the blast site for misfires. The following table that would meet these requirements.

Signal	Meaning
WARNING SIGNAL	A one minute series of long hooter / siren / blasts 5 minutes prior to blast signal.
BLAST SIGNAL	A series of short hooter / siren / blasts one minute prior to the shot.
ALL CLEAR SIGNAL	A prolonged hooter / siren / blast following the inspection of blast area.

14. Blasting flags (red flags) shall be displayed around the blasting zone before blasting to facilitate clearing of all persons from the blasting zone.
15. Flagmen will be safely stationed on all sides of the blasting area so as to stop any inadvertent entry.
16. In the event of any misfires, the blaster will determine the suitable method(s) to detect misfires and take preparatory steps (e.g., noting obvious indications of misfire, or other appropriate means). Misfires shall be handled in accordance with the requirements of Metalliferous Mines Regulations - 1961 (given in **Annexure-II**).
17. All lines shall be carefully traced and a search made for unexploded charges before giving all clear signals.
18. No drilling, or loading shall be permitted until all misfires have been cleared.
19. The safety zone of 500 m is to be maintained at the time of blasting
20. All blasting operations will be conducted between sun rise and sun set (during the daylight hours) and preferably during a specific period of time like 12.00 noon to 3.00 p.m.

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## **ANNEXURE - V**



**The monitoring instrument (S5) is located at the distance of 282 m from the blasting site (B8)**



**The monitoring instrument (S5) is located at the distance of 282 m from the blasting site (B4)**





**The monitoring instrument (S3) is located at the distance of 174 m from the blasting site (B6)**



**The vibration monitoring station (S1) is located at the distance of 297 m from the blasting site (B2)**





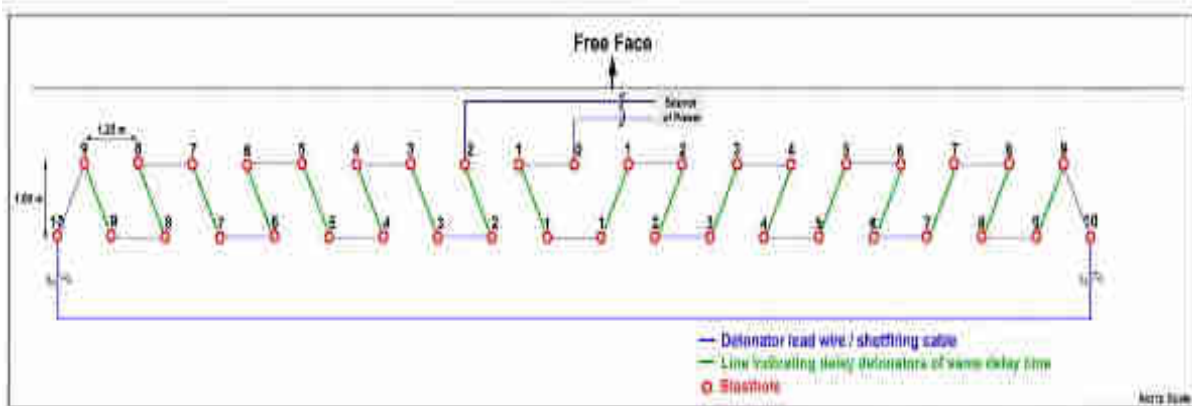
**The monitoring instrument (S3) is located at the distance of 465 m from the blasting site (B4)**



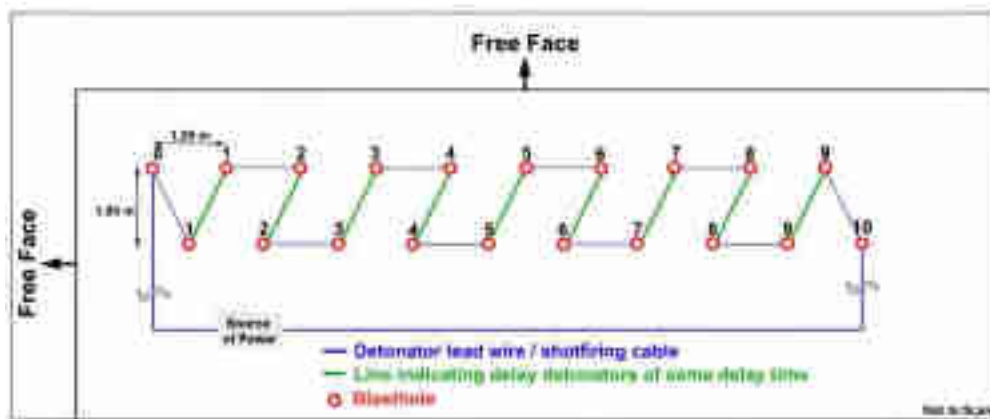
**The vibration monitoring station inside the Temple near to Kadavila-1 Stone Quarry**

## ANNEXURE - VI

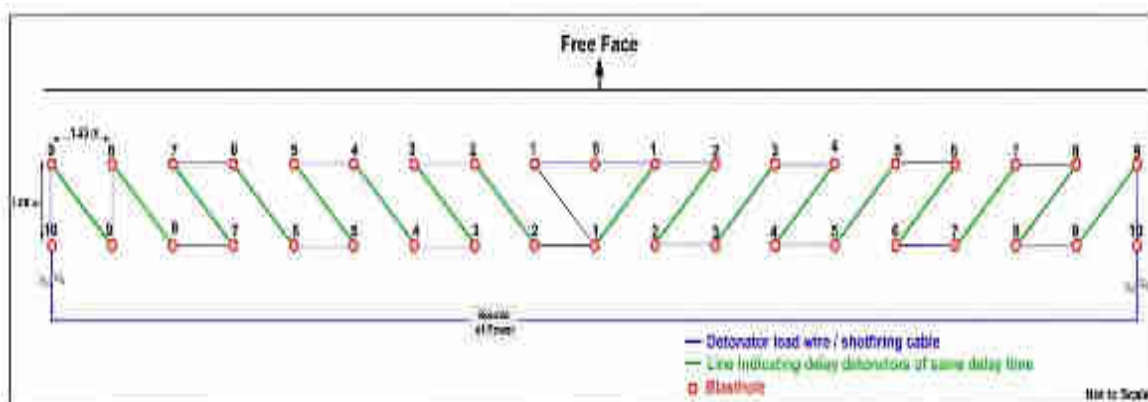
### Suggested Blasthole Patterns & Initiation Sequences



Multi row Staggered blasthole pattern with 'V' initiation sequence for benches with SINGLE free face



Multi row staggered blasthole pattern with 'V' initiation sequence for benches with TWO free face



Multi row Square/rectangular blasthole pattern and initiation sequence for benches with ONE free face

## **Annexure 2: Modified Approved Mining Plan**

No. 2436/DOT/ML/2020

Department of Mining & Geology  
District Office, Thiruvananthapuram,  
Kesavadasapuram, Pattom Palace P. O.,  
Thiruvananthapuram 695004,  
Phone 0471-2442055  
eMail: geo.thi.dmg@kerala.gov.in

Dated:16/11/2020.

From

**The Senior Geologist  
Thiruvananthapuram**

To

**M/s Adani Vizhinjam Port Private Limited,  
2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud,  
Thiruvananthapuram District -695 014. \*  
(Registered Office at: Adani House, Near Mithakhali Six Roads,  
Navrangpura, Ahmedabad, Gujrat State-380 009)  
Represented by its Chief Executive Officer, Shri. Rajesh Kumar Jha)**

Sir,

Sub:- Approval of Modified Mining Plan – Granite Building Stone quarry  
in Block No.37, Re-survey Nos.555/2 (Govt. Land ) Nagaroor  
Village, Chirayinkeezhu Taluk, Thiruvananthapuram District-reg.

Ref:- 1. Kerala Minor Mineral Concession Rules 2015.  
2. Your application dated 09/11/2020.

\*\*\*

The modified mining plan for the Granite Building Stone quarry of M/s AdaniVizhinjam Port Private Limited, 2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram District -695 014 (Registered Office at: Adani House, Near Mithakhali Six Roads, Navrangpura, Ahmedabad, Gujrat State-380 009) (Represented by its Chief Executive Officer, Shri. Rajesh Kumar Jha) in Block No. 37, Re-survey No. 555/2 (Govt. Land ) Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala for an extent of 3.6630 Hectares is hereby approved vide the powers delegated to the District geologist for the approval of mining plan for the minor minerals issued under Rule 56 of Kerala Minor Mineral Concession Rules 2015, with the following conditions:-

- 1) That you will follow the prescribed Rules & Regulations of Central Government and State Government issued from time to time in regard to mining.
- 2) That you will follow the Mines Safety Rules & Regulations.

- 3) That you will store the mining waste in the earmarked location/ dumping yard only.
- 4) As specified in the plan.
- 5) That you will carry out the plantation as committed in the plan.
- 6) That provision shall be made for the housing facility for the labour with all basic infrastructure facilities including safe drinking water, toilets etc., within the site.
- 7) That mining in accordance with this modified plan shall be commence only after obtaining necessary clearance from SEIAA, and revision of lease order by the Director of Mining & Geology.
- 8) That the yearly production shall be restricted to (1) 2020-21 (October 2020-March 2021): 1,50,000 MT (2) 2021-22 : 5,00,000 MT (3) 2022-23: 4,20,000 MT (4) 2023-24 : 8,750 MT and if any deviation is required the same shall be intimated in advance.
- 9) If any information or data furnished by the proponent and included in this plan is found erroneous or fake, the approval of this mining plan stands invalid.
- 10) That the applicant is bound to satisfy the dues if any detected during the proposed survey to be conducted by the Taluk Surveyor as committed by the lessee in this plan (Annexure 18).

**Yours faithfully,**

*[Signature]*  
16/10/20

**Senior Geologist**





# **Modification in the approved mining plan & modified approved mining plan**

*including Progressive Mine Closure plan*

*Prepared under Rule 56 (2) & 58 of  
Kerala Minor Mineral Concession Rule - 2015*

*for the Building Stone Quarry*

Situated in Re - Sy. Block No. 37, Re - Sy No. 555/2  
**(Govt. Land)** of Nagaroor village, Chirayinkeezh Taluk,  
Thiruvananthapuram District - Kerala State.

**Type of Land : Government Land.**

**EXTENT : 3.6630HA**

**M/s. ADANI VIZHINJAM PORT PVT. LTD.,**

**2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud**

**THIRUVANANTHAPURAM - KERALA**

PREPARED BY
KANTHARAJ. K.
RQP / GOA / 130 / 2000 / A
METAMORPHOSIS
# 200, 2 <sup>nd</sup> Floor, 40 <sup>th</sup> Main, 1 <sup>ST</sup> Cross, Behind Silk Board, BTM Layout, 2 <sup>nd</sup> Stage, Kuvempu Nagar, Bangalore - 560 068 Ph : +91 80 2678 3006 Mob. +91 9448384321

**GEOLOGIST**  
**DISTRICT OFFICE**  
**DEPT. OF MINES & GEOLOGY**  
**THIRUVANANTHAPURAM**



# CERTIFICATES



## CERTIFICATE

1. This is to certify that the modification in the approved Mining Plan & modified mining plan including Progressive Mine Closure Plan of Building Stone quarry situated at Re - Sy. Block No. 37, Re - Sy No. 555/2 (Govt. Land) Nagaroor village, Chirayinkeezh Taluk of Thiruvananthapuram District - Kerala state, extends over an area of 3.6630 Ha, of M/s. **Adani Vizhinjam Port Pvt. Ltd.**, has prepared under Rule 56 (2) & 58 of KMMCRR 2015 by Mr. KANTHARAJ K

This is to request the Department of Mining and Geology, to make any further correspondence regarding any correction of the Mining Plan with the said recognized person at his address below:

<b>KANTHARAJ K</b>
<b>METAMORPHOSIS</b>
<b>Head Office</b>
<b>"PRAKRUTHI BHAVAN"</b> # 200, 1 <sup>st</sup> & 2 <sup>nd</sup> Floor, 40 <sup>TH</sup> Main, 1 <sup>ST</sup> Cross, Behind Silk Board, BTM Layout, 2 <sup>nd</sup> Stage, Bangalore - 560 058
9180 26783006
-91 94483 84321

We hereby undertake that all modifications / updating as made in the said Mining plan by the said recognized person be deemed to have been made with our knowledge and consent and shall be acceptable on us and binding in all respects.





2. It is certified that the **Progressive Mine Closure Plan** (in the approved mining plan & modified mining plan) of Building Stone quarry situated at Re - Sy. Block No. 37, Re - Sy No. 555/2 (Govt. Land) in Nagaroor village, Chirayinkeezh Taluk of Thiruvananthapuram District - Kerala state, extends over an area of **3.6630 Ha.** of M/s. **Adani Vizhinjam Port Pvt. Ltd.**, Complies all statutory rules, regulations, orders made by the Central or State Government, Statutory Organizations, Court etc., which have been taken into consideration and wherever any specific permission is required the lessee will approach the concerned authorities. The Information furnished in the **Progressive Mine Closure Plan** is true and correct to the best our knowledge and records.
3. The provision of **Mines Act, Rules and Regulations** made there under have been observed in the modified in the approved Mining Plan of Building Stone quarry situated at Re - Sy. Block No. 37, Re - Sy No. 555/2 (Govt. Land) in Nagaroor village, Chirayinkeezh Taluk of Thiruvananthapuram District - Kerala state, extends over an area of **3.6630 Ha.** of M/s. **Adani Vizhinjam Port Pvt. Ltd.**, where specific permissions are required, the applicant will approach Director General of Mines Safety, and further the Standards prescribed by DGMS in respect of Miners Health will be strictly implemented.

For ADANI VIZHINJAM PORT PVT. LTD.

DATE: 05/11/2020

PLACE: THIRUVANANTHAPURAM



RAJESH KUMAR JHA

Authorized signatory



## CERTIFICATE

This is to certify that, the provision of KMMCR 2015, have been observed in preparation of the modification in the approved Mining Plan & modified mining plan of Building Stone quarry situated in Re - Sy. Block No. 37, Re - Sy No. 555/2 (Govt. Land) of Nagareor village, Chirayinkeezh Taluk of Thiruvananthapuram District - Kerala state at extends over an area of **3.6630 Ha**, of M/s. Adani Vizhinjam Port Pvt. Ltd., wherever the specific permissions are required, the applicant will approach the concerned authorities of Department of Mining and Geology.

The information furnished in the modified mining plan is true and correct to the best of my knowledge.

Date : 05/11/2020

Place : Bangalore.

*Kantharaj K*  
5/11/2020

KANTHARAJ K

RQP / GOA / 130 / 2000 / A.





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# TEXT



**MODIFICATION IN THE APPROVED MINING PLAN / QUARRYING PLAN AND  
APPROVED MODIFIED MINING PLAN OF "BUILDING STONE QUARRY" OF  
M/s. ADANI VIZHINJAM PORT PRIVATE LIMITED**

**situated at Re - Sy. Block No. 37, Re - Sy No. 555/2 (Govt. Land) in Nagaroor village,  
Chiravinkeezh Taluk of Thiruvananthapuram District - Kerala state, extends over an  
area of 3.6630 Ha. (Prepared under Rule 56 (2) & 58 of KMMCR 2015)**

**INTRODUCTION.**

The Adani Group is one of India's leading business houses based at Ahmadabad - Gujarat, founded in 1988. Adani has grown to become a global integrated infrastructure player with businesses in key industry verticals - Resources, in coal mining and trading; Logistics, which is spread across ports, logistics, shipping and rail; Energy, with renewable, thermal power generation and transmission businesses and Agro commodities and ancillary industries. The integrated model is well adapted to the infrastructure challenges of the emerging economies.

Adani Ports and Special Economic Zone Limited (APSEZ) is promoted by Adani Group, which is one of India's largest business conglomerates. The US\$ 11 bn Group has interests across resources.

90% of India's international trade is through its ports, where Adani represent 24% of the country's port capacity and handle 15% of the country's seaborne cargo. Adani ports' footprint is spread across the Indian coastline with ports at 16 different locations. Adani have ports at Mundra, Dahej, Tuna (in Tekra), Hazira and Mormugao, on the west coast; Dhamra and Visakhapatnam on the east coast; and Kattupalli and Ennore on the southern coast of India. Now container transshipment terminal is also upcoming Vizhinjam port in Thiruvananthapuram, Kerala.

Adani Vizhinjam Port Pvt, Ltd., (AVPPL) is company belongs to Adani groups, having their Registered office at Ahmedabad - Gujarat, and the local office at 2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram - 695014. The said company is a private limited company register under Companies Act, 2013 on 27<sup>th</sup> July 2015. A copy of the incorporation certificate is enclosed as Annexure No. 1.



KANTHARAJ K  
RQP / GOA / 130 / 2000 / A



Further a copy of the MOA & AOA is enclosed as Annexure No.2. Mr. Rajesh Jha is the Chief Executive officer (CEO) and authorized signatory of the said quarry for all the operations. A copy of the board of resolution passed by the company is enclosed as Annexure No. 3. A copy of the photo ID and address proof of the authorized signatory is enclosed as Annexure No. 4

Since the entire quarry area is falling under Government / Paramboke land, NOC has been obtained from the District collector. A copy of the NOC received from the District Collector along with the lease sketch is enclosed as Annexure No. 5

The company is in various infrastructural and construction activities, they have been awarded by the Government for the development of Vizhjam port at Thiruvananthapuram, which is a national developmental activity. A copy of the same is enclosed as Annexure No. 6.

In view of the above, for the development of the port, Building stone material is one of the major raw material. So the company applied for the grant of quarry lease for the same. There after Department of Mining and Geology, Government of Kerala granted the lease for extraction of the Building stone Material. A copy of the lease deed is enclosed as Annexure No. 7.

The mining / quarry plan was prepared for a maximum production of 5,12,000 tonnes per year (during the third year of the plan period) and the same was approved by the District Office, Department of Mining and Geology, Thiruvananthapuram, vide their office letter No. 1714 / DOT / ML / 2018 dated 25.09.2018, a copy of the approval letter of the mining plan is enclosed as Annexure No. 8.

Further Company has obtained the Environmental Clearance from SELAA for said quarry over a production not exceeding 7,00,000 tonnes for two years (as per the condition No. 14 of Environmental Clearance), a copy of the Environment Clearance is enclosed as Annexure No. 9. And also stated that if further mining may be considered based on the requirement and Environmental assessment.

In view of the above, the approved mining plan of the quarry undergone modification accordingly for two years under Rule 56 (2) & 58 of KMMCR 2015 and approval was obtained for the same. A copy of the modified mining plan approval letter is enclosed as Annexure No. 10.



*As per the condition laid down in the Environmental Clearance vide condition No. 14, further mining may be considered based on the requirement and Environmental assessment. Since the development of port is deferred, now again the approved mining plan and the approved modified mining plan needs to be modified for three years (i.e from 2020 - 21 to 2022 - 23).*

**Note :**

*Considering the said modification, only the relevant chapters / paragraphs (such reserves, Production Programme, Conceptual, Environment and Progressive mine closure). Plans / drawings (like Surface plan, Production plan, production section, conceptual plan and Progressive mine closure plan) are modified accordingly, while the unchanged is retained as it is. Where ever the modification's paragraphs / chapters are indicated in italic and underlined.*

A Block map showing the above said area duly signed by the village officer is enclosed as Plate No. 3 & Survey maps showing the said lease (lease sketch) duly signed by the village officer is enclosed as Plate No. 4. The said area is marked on the google image and enclosed as Plate No. 5.

**1.0 GENERAL :**

**a) Name and Address of the Lessee:**

Name of the applicant	Adani Vizhinjam Port Pvt, Ltd., Represented by Mr. Rajesh Kumar Jha Chief Executive Officer, (CEO)
Address	2 <sup>nd</sup> Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram
District	Thiruvananthapuram
State	Kerala
Phone	—
Fax	nil
Email	<a href="mailto:kadavilalundl@gmail.com">kadavilalundl@gmail.com</a>
Mobile	+91 9099005722

Mr. Rajesh Kumar Jha is the chief executive officer (CEO) and authorized signing authority for the operation of the said quarry. To this effect board of resolution was passed and a copy of the same is enclosed as Annexure No. 3. Further a copy of the photo ID and address proof of the Authorized signatory is enclosed as Annexure No. 4.



- b) **Status of the Applicant** : Private Limited Company.
- c) **Mineral(s) which is / are included in the ~~prospecting~~ license (for Fresh grant):**  
Charnockite as Building Stone Material
- d) **Mineral(s) which is / are included in the / are included in the letter of Intent / Lease deed:**  
Charnockite as Building stone Material.
- e) **Mineral(s) which is the applicant / lessee intends to mine:**  
Charnockite as Building stone Material.
- f) **Name of the Recognized Person preparing Mining Plan:**

<b>Name</b>	<b>KANTHARAJ K</b>
<b>Address</b>	<b>METAMORPHOSIS</b>
	<b>Head Office</b>
	# 200, 2 <sup>nd</sup> Floor, 40 <sup>th</sup> Main, 1 <sup>st</sup> Cross, Behind Silk Board, BTM Layout, 2 <sup>nd</sup> Stage, Kuvempu Nagar, Bangalore - 560 068
<b>Phone &amp; Fax</b>	19180 26783006
<b>Mobile</b>	+91 94483 84321
<b>E-mail</b>	kantharajk@metamorphosis-india.com
<b>Registration No.</b>	RQP / GOA / 130 / 2000 / A
<b>Valid up to</b>	5 <sup>th</sup> October 2022

A copy of RQP certificate is enclosed as **Annexure No. 11**.



## 2.0 LOCATION AND ACCESSIBILITY:

### a) Lease details :

The said proposed quarry area falls in the Re - Sy. Block No. 37, Re - Sy No 555/2 (Govt. Land) extends over an area of 3.6630 Ha of Nagaroor village (Kadavila), Chirayinkeezh Taluk of Thiruvananthapuram District - Kerala state. The said area lies towards southwest of Nagaroor village at a distance of 1.20 kms and lies towards north of Kadavila Bus stop at a distance of 0.50 kms approximately (distances are aerial distance). This lease area is approachable by all-weather road/s up to the up to Kadavila bus stop, thereafter a kutchra road towards north will leads to area.

Thiruvananthapuram is the district head quarter and state's capital too, which is at a distance of 35.0 kms (by road) towards south of quarry area & Chirayinkeezh is the Taluk head quarter which is at a distance of 13.0 kms towards southwest, where all the infrastructural facilities are available. The nearest airport is at Thiruvananthapuram at a distance of 40.0 km and sea port at Kollam which is at a distance of 50.0 kms. The nearest railhead on Broad-gauge is Chirayinkeezh which is at distance of 9.0 kms.

### Toposheet No. with Latitude & Longitude of all corner boundary points / pillars:

This area falls under the Survey of India's Topomap No. 58 / D / 13 & 58 / D / 14. Since the topomaps of Kerala are restricted the same are not available. The said quarry area falls between the geographical co-ordinates i.e

Latitude	08°43' 42.88" N to 08°43' 51.74" N
Longitude	76°50' 15.26" E to 76°50' 23.24" E

Totally, there are 5 corner pillars, where all the latitude and longitude are recorded and the same are furnished below:

Boundary Pillar	Latitude : N			Longitude : E		
	D	M	S	D	M	S
1	08	43	45.98	76	50	15.26
2	08	43	48.12	76	50	17.27
3	08	43	51.74	76	50	21.24
4	08	43	44.83	76	50	23.24
5	08	43	42.88	76	50	15.87



However the Latitude and Longitude so recorded of all the corner boundary pillar is also depicted on the Surface Plan enclosed as **Plate No. 6** and the area is marked on the google satellite image and enclosed as **Plate No. 5**.

**Name of the Mine** : Charnockite as Building Stone Quarry  
**Date of Grant of Lease & Period / Expiry Date** : Lease is a fresh grant, granted and executed on 23/05/2019 to 21/05/2024 for a period of five (5) years.  
**Name of the Lease holder** : Adani Vizhinjam Port Pvt. Ltd.,  
 Mr. Rajesh Kumar Jaa- Authorized signatory.  
**Address** : 2<sup>nd</sup> Floor, Vipanchika Tower,  
 Thycaud, Thiruvananthapuram..  
**District** : Thiruvananthapuram  
**State** : Kerala  
**Phone** : 0471 2772121  
**Fax** : nil  
**Email** : [kadavilaland1@gmail.com](mailto:kadavilaland1@gmail.com)  
**Mobile** : +91-9099005722

**b) Details of applied / lease area with location map (fresh area / mine)**

Forest		Non Forest	
Forest ( Specify)	Area in Ha		Area in Ha
	--	1. Waste Land	
	--	2. Grazing land	
	--	3. Agricultural land	
	--	4. Others specify - Govt. land	3.6630
<b>Total</b>	--	<b>Total</b>	<b>3.6630</b>

**Total lease area / applied area** : 3.6630 Ha

**District & State** : **Thiruvananthapuram and Kerala**  
**Taluk** : Chirayinkeezh **Village** : Nagaroor

**Existence of road railway line, if any nearby approximate distance:**

Public road connecting between Alancode - Nagaroor lies towards south of the quarry area which is at a distance of 0.50 kms, Main central road (MC Road) connecting between Tivandrum to Kottayam lies towards east of the quarry area which is at a distance of 6.50 kms and the National Highway connecting between Thiruvananthapuram to Kochi lies



towards west of the quarry at a distance of 9.20 kms. The nearest railway line and station on Broad-gauge is Chirayinkeezh which is at distance of 9.0 kms.

- c) Attach a general location map showing area and access routes. It is preferred that the area be marked on a Survey of India Topographical map or a Cadastral map or Forest map as the case may be. However, if none is of these available the area may be shown on an administrative map.

The said area is demarked on the key plan showing the location and surrounding features up to 5.0 kms radius is enclosed as Plate No. 1, the location of the said area is marked on the Kerala political map and enclosed as Plate No. 2. The applied area is marked on the Block map enclosed as Plate No. 3, a survey map / sketch showing the applied area issued by the Thasildar is enclosed as Plate No. 4. Further the said quarry area is shown on the Google satellite image enclosed as Plate No. 5.

### 3.0 DETAILS OF APPROVED MINING PLAN / SCHEME OF MINING (if any):

#### 3.1 Date and reference of earlier approved MP / SOM

The mining / quarry plan was prepared for the maximum production of 5,12,000 tonnes per year (during the third year of the plan period) and the same was approved by the District Office, Department of Mining and Geology, Thiruvananthapuram, vide their office letter No. 1716 / DOT / ML / 2018 dated 26.09.2018. a copy of the approval of the mining plan is enclosed as Annexure No. 8.

#### 3.2 Details of last modifications if any (for the previous approved period) of approved MP / SOM, indicating date of approval, reason for modification.

Based on the EC condition No. 14, the approved mining plan undergone modification for two years prepared under Rule 56 (2) & 58 of KMMCR 2015 and approval was obtained for the same. A copy of the approval letter is enclosed as Annexure No. 10.

#### 3.3 Give reason of earlier approved proposal (if any) in respect of exploration, excavation, reclamation etc.,

NOT APPLICABLE

- i) Exploration : NOT APPLICABLE



## ii) Mine Development & Exploitation

Subsequent to the commencement of the quarry, Building Stone was excavated below table shows the proposed and achieved during the last modified approved mining plan period.

<u>Year</u>	<u>ROM</u>					<u>Waste</u>
	<u>Proposed</u>	<u>As per KOMPASS (Sales)</u>	<u>Excess loaded</u>	<u>Achieved, (rounded to next figure)</u>	<u>Buffer zone working</u>	
1st Year - 2019 - 20	3,99,375	1,91,115.89	23,059.11	2,14,166	11,093	Considered as production hence not calculated.
2nd Year 2020 - 21	3,60,625	2,73,224.78	—	(a/a) 2,73,225	—	
Total	7,00,000	4,64,340.67	23,059.11	(a/a) 4,87,391	11,093	

Total production during the year 2019 - 20 including buffer zone working is 2,25,259 tonnes. (a/a) indicates till 31/10/2020. Figures are rounded to near figures.

The report from KOMPASS for the year 2019 - 20 and 2020 - 21 (till Oct 2020) is enclosed as Annexure No. 12 & 13 respectively.

## iii) Balance reserves:

: As on 01/11/2020

<u>Category</u>	<u>Insitu reserves</u>			<u>Unit : in tonnes</u>
	<u>R O M</u>			<u>Waste Rock</u>
	<u>Total</u>	<u>Extracted</u>	<u>Balance</u>	
<u>Mineable reserves</u>	<u>17,78,750</u>	<u>4,87,391</u>	<u>§§ 17,91,359</u>	<u>Considered as a production.</u>
<u>Blocked reserves</u>	<u>34,17,500</u>	<u>11,093</u>	<u>34,06,407</u>	
<u>Geological reserves</u>	<u>51,96,250</u>	<u>4,98,484</u>	<u>46,97,766</u>	

Note : Geological Reserves = Mineable Reserves + Blocked Reserves

§§ indicates, the balance reserves arrived, after deducting the extracted quantity (as per the KOMPASS) from the reserves estimated at the time of preparation of mining plan.

The balance reserves are arrived after deducting the extracted quantity from the Reserves. Further, the Geological plan and the Geological Cross sections are updated as on 01/11/2020. The details are furnished in foregoing paragraph Reserves and resources (page No. 16):





- |      |                                    |   |                 |
|------|------------------------------------|---|-----------------|
| (iv) | Land Reclamation & Rehabilitation. | : | NOT APPLICABLE  |
| v)   | Waste Management.                  | : | NOT APPLICABLE. |
| vi)  | Plantation.                        | : | NOT APPLICABLE  |

During the year 2019 - 20, 100 saplings has been planted covering an area of 0.1000 ha, within the safety / buffer area of 7.50 m mainly the local species have been planted.



**PHOTOGRAPHS SHOWING THE PLANTING THE SAPLINGS.**

**3.4 Give status of compliance of violations pointed out by DMG.**

*M/s. Adani Vizhinjam Port Pvt. Ltd., are in receipt of the notices issued by DMG, in connection with mining in buffer zone and excess loaded tonnage, the demand notice of the same area enclosed as Annexure No. 14 & 15 respectively.*

*In view of the receipt of the demand notice, M/s. Adani Vizhinjam Port Pvt. Ltd., has paid the said dues / fees and cleared the entire dues. A copy of the fee paid receipt along with the covering letter for buffer zone and excess loaded tonnage are enclosed as Annexure No. 16 & 17 respectively.*

*Further, we hereby state that, if any excess quantities estimates by DMG or any department within the buffer zone company will pay the fee / fine as imposed by the DMG, to this extent we are herewith enclosing an affidavit as Annexure No. 18.*

**3.5 Indicate and give details of any suspension / closure / prohibitory order issued by any government agency under any rule of court of law.**

NOT APPLICABLE





## PART - A

### 1.0 GEOLOGY AND EXPLORATION.

- a) Briefly describe the topography, drainage pattern, vegetation, climatic, rainfall data of the area applied / mining lease area:

#### Topography :

The said proposed area occupies the isolated hillock lies toward north of Kadavilla trending NW - SE. The highest elevation is about 110 m above MSI, towards southeast of the quarry area (near BP 4) and the lowest elevation is 40 m above MSI, towards northwest of the proposed area (near BP 1 & 2). The lease area is generally sloppy towards northwest & southeast. The slope is moderate to steep.

#### Drainage pattern :

There are no any perennial water course / water bodies / streams / nallahs within the quarry area. The storm water passes through the minor water courses and gets confluence with the adjacent nallah. Apart from this the water source in this area is mainly storm water. Entire storm water flows through the garland drains provided all around the quarry pit and same will be collected in settling pond. The drainage pattern in this region is parallel to sub parallel.

**Vegetation :** Most of the quarry area is broken up, the broken up area is devoid of any vegetation, the area which remained as unbroken and surrounding the lease is covered by sparsely vegetated.

**Climatic :** The climate of the area is typical of Western Ghats region. It receives high rainfall and exhibits temperature variations with moderate summer and moderate winter. Meteorological data for the following climatic are under progress

- |                |                      |
|----------------|----------------------|
| 1. Temperature | 2. Relative Humidity |
| 3. Rainfall    |                      |

#### Temperature :

The temperature normally ranges from 28° C to 32° C on the plains but drops to about 20°C in the highlands. The Highlands of Kerala, enjoys a cool and invigorating climate the year-round. Owing to its diversity in geographical features, the climatic condition in Kerala is diverse.





**Relative humidity :**

In general the relative humidity in the area is observed to be high due to its proximity to the sea. During the summer it varies from 36 to 93, during monsoon it varies from 22 to 90 (some time up to 100) and during the winter it varies 80 to 90.

**Rainfall :**

Generally there are two monsoons in Kerala, the onset monsoon is known as Southwest Monsoon which commence from June and ends in September. The second monsoon is known as Northeast Monsoon and also known as Reverse monsoon which commence from October and ends in November. The average rainfall for the last ten years is around 3,000 mm annually.

**b) Brief description of Regional Geology with reference to location of lease / applied area:**

Kerala State, bounded by north latitudes  $8^{\circ} 17' 30''$  and  $12^{\circ} 47' 40''$  and east longitudes  $74^{\circ} 51' 57''$  and  $77^{\circ} 24' 47''$  covers an area of 38,864 sq km and is located in the southwestern part of the Indian Peninsular shield. This linear strip of land is bounded by the Western Ghats on the east and the Arabian Sea on the west.

The state is divisible into four broad physiographic units. They are:

- (i) the low-level coastal strip fringing the Lakshadweep sea,
- (ii) the landforms marked by laterite cappings between altitudes of 30m and 200 m,
- (iii) the foot hills of Western Ghats ranging in altitude from 200 to 600 m and
- (iv) the steeply rising Western Ghat hill ranges with altitudes reaching upto 2500 m. of the total area, 35,955 sq km area is constituted by hard rock crystallines and the rest by soft sediments. The crystalline comprise charnockite, gneiss, granite, metasediments, gabbro and dolerite to mention the major ones. The sedimentaries occur mostly in the coastal areas. mineral deposits of clay, bauxite, rare earth sands, glass sand, iron ore, limestone, gold, graphite, chrysoberyl etc. are known to occur in the state.

The geology of Kerala kindled the interest of even the earliest workers in the field. Buchanan in 1800 coined the term "laterite" after a study of the quarries near Angadipuram in the erstwhile Malabar. General Cullen (1840 - 60) discovered graphite occurrence in Travancore and was the earliest to study the sedimentary formations around Kollam. In the later part of the 19th Century, Bruce Foote, (1883) and William King, (1875, 1878, 1882) of the Geological Survey of India (GSI) took traverses across the State and recorded their findings on geology

and mineral resources. In 1907, a Geology Department was formed in Travancore for systematic survey of minerals. Chacko (1922) and Masillamani (1914) made significant contributions to the geology of Kerala.

Geologically, Kerala is occupied by Precambrian crystallines, acid to ultra basic intrusive of Archaean to Proterozoic age, Tertiary (Mio-Pliocene) sedimentary rocks and Quaternary sediments of fluvial and marine origin. Both the crystallines and the Tertiary sediments have been extensively lateritised. Based on the detailed studies by GSI during the last three decades, the following stratigraphic sequence has been suggested.

Quaternary (Q)		Pebble bed
		Kadappuram Formation(marine)
		Periyar Formation(fluvial)
		Viyyam Formation(fluvio-marine)
		Guruvayur Formation (Palaeo-marine)
		Laterite
Mio-Pliocene (Tertiary/Tt)		Warkalli Formation(Sandstone and clay with lignite intercalations)
		Quilim Formation (Fossiliferous limestone and calcareous marl).
Mesozoic		Gabbro / Dolerite dykes
P R O T E R O Z O I C	Younger granites (550-390ma)	Alkali granites, granite, granophyres and other acid Intrusive.
	Charnockites(younger) (550Ma)	Massive charnockite, incipient charnockite, Cordierite charnockite.
	Ultrabasic/basics(Younger) (700-600Ma)	Perinthattanorthosite, Kartikulam gabbro, Adakkathodu gabbro, Begur diorite
	Basic Intrusives (2100-1600Ma)	Agali- Anakkatti dykes
	Migmatite/gneiss/older granitoid(PGC II) (Pmb)(2500-2200Ma)	Garnet- biotite- gneiss with associated migmatites, quartz-feldspathic gneiss, hornblende gneiss, hornblende- biotite gneiss, quartz- mica gneiss
	Vengad (APtv) Group	Quartz-mica schist and quartzite, conglomerate





A R C H A E A N	Charnockite (older) (Ac) 2600Ma	Mafic granulite, pyroxene granulite, Banded magnetite quartzite and gneissic charnockite
	Khondalite Group (Ak)	Quartzite, mafic granulite, calc-granulite garnet-biotite- sillimanite-cordierite gneiss, garnet-biotitegneiss, leptynite
	Peninsular Gneissic Complex (PGC) (Ap) (3000Ma)	Foliated granite, hornblende gneiss, pink granite gneiss, biotite gneiss.
	Layerd ultrabasic - basic Complex (3100- 3000Ma)	Peridotite, dunite, pyroxenite, anorthosite
	Wynad Schist Complex (Aw) (3200Ma)	Talc- tremolite schist, kalsite quartzite, amphibolite, calc granulite, quartz sericite schist, kyanite quartzite, garnet - sillimanite gneiss/ schist, magnetite quartzite, kyanite mica schist.

Base not recognized

**Source:** Geological Survey Of India, Miscellaneous Publication No. 30, Geology And mineral Resources Of The States Of India Part IX – Kerala – May 2005.

c) **Detailed description of geology of the lease area such as shape, size of the mineral / ore deposit.**

Most of the quarry area is exposed by Charnokite (commonly known as Granite), only towards the north of the quarry area part is covered by topsoil with the thickness varying from 0.75m to 1.00 m.

The geological parameters / features of the ore body as obtained from the field mapping and exploration studies reveal the following.

<b>General strike</b>	:	NW - SE with local variation of $15^{\circ}$ - $20^{\circ}$ on either side.
<b>Dip</b>	:	$70^{\circ}$ - $80^{\circ}$ dipping northerly.
<b>Length of the ore body</b>	:	250mts.
<b>Width of the ore body</b>	:	150 - 180mts.
<b>Depth of the ore body</b>	:	50 mts.



A geological map showing the different litho units is mapped and enclosed as **Plate No. 7**. And the cross section showing the disposition of the different litho units are marked and enclosed as **Plate No. 8**.

**Overburden :** The overburden is mainly topsoil, intercalated waste and mining loss.



PHOTOGRAPH SHOWING THE OUTCROP OF CHARNOKITE

d) (i) Name of the prospecting agency : In House

(ii)	Address	2 <sup>nd</sup> Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram..
	District	Thiruvananthapuram
	State	Kerala
	Phone	0471 2772121
	Fax	nil
(iii)	Email	<a href="mailto:kadavilalandi@gmail.com">kadavilalandi@gmail.com</a>
	Mobile	+91 9099005722





**c) Details of prospecting / Exploration already carried out;**

- i) Number of pits and trenches indicating dimension, spacing etc along and across the strike / foliation with reference to geological plan;
- ii) Number of Boreholes indicating dimensions, spacing inclination, collar level, depth etc with standard borehole logs duly marking on geological plan / section.
- iii) Details of samples analysis indicating type of sample (surface / subsurface from pit / Trenches / boreholes etc)
- iv) Expenditure incurred in various prospecting operations;

No explorations in the form of boreholes / pits / trenches are carried out. More over this quarry area was worked formerly by some party / company way back in 2007 and the broken up area is about 2.14 Ha which is fully exposed by Charnokite / Building stone. More over the material is continued along the strike.

Since the quarry lease area is exposed by Charnokite / Building stone outcrop with thin layer of soil. Charnokite is a type of Granite which is a plutonic igneous rock of coarse to fine grained nature, formed by molten magma. Charnokite, petrologically connotation refers to the group name of a family of deep seated rocks. Hence the exploration is not required and the depth will extend beyond 50.00 mts.

- f) The surface plan of the lease area may be prepared on a scale of 1 : 1000 or 1 : 2000 with contour intervals of maximum of 10 m depending upon the topography and size of the are duly marked by grid lines showing all features.

Recent survey was carried out on 01/11/2020, Latest Surface plan of the lease area has been prepared on 1 : 1000 scale showing all the surface features with 5.0 mts contour interval is enclosed as Plate No. 6.

- g) For preparation of geological plan, surface plan prepared on a scale of 1 : 1000 or 1 : 2000 scale specified under para 1.0 (f) of Part A of the format may be taken as the base plan.

Latest Geological plan of the lease area has been prepared on 1 : 1000 scale showing all the geological attitudes such as dip, strike and so on considering the latest surface plan prepared and updated as on 01/11/2020 as a base plan is enclosed as Plate No. 7.





- h) Geological sections may be prepared on natural scale of Geological plan at suitable interval across the lease area from boundary to boundary.

Geological cross sections are prepared on 1:1000 scale from boundary to boundary, showing the disposition of the various lithounits, structural features and etc, is enclosed as Plate No. 8.

- i) Broadly indicate the future programme of exploration with due justification (duly marking on Geological plan year wise location in different colours) taking into consideration the future tentative excavation programme planned in next five years as in table below:

The said quarry area was worked formerly and Charnockite (building stone material) is exposed in entire area and it can be seen up to 40 mts above from the general ground level. Charnokite is a type of Granite which is a plutonic igneous rock of coarse to fine grained nature, formed by molten magma. Charnokite, petrologically connotation refers to the group name of a family of deep seated rocks. Hence the exploration is not required and the depth will extend beyond 50.00 mts.

j) Reserves and Resources:

The balance reserves has been established after recasting the Geology with the latest updated Geological plan and Geological cross section with a fresh survey conducted on 01/07/2020, accordingly reserves are furnished in tabular form in below table:

<u>Category</u>	<u>In situ reserves</u>	<u>Unit : in tonnes</u>
	<u>ROM</u>	<u>Waste Rock</u>
	<u>Total</u>	<u>Considered</u>
<u>Mineable reserves</u>	<u>12,91,359</u>	<u>as a</u>
<u>Blocked reserves</u>	<u>34,06,407</u>	<u>production.</u>
<u>Geological reserves</u>	<u>46,97,766</u>	

Note : Geological Reserves = Mineable Reserves + Blocked Reserves

Of the above Geological (balance) reserves of 4.697 million tonnes, only 1.291 million tonnes of reserves can be exploited / mineable while the balance of 3.406 million tonnes of reserves is getting blocked which cannot be mined due to the boundary and practical constraints. Hence for all practical purpose (for production and future planning) only Mineable reserves are considered.

Below table shows the Level wise / bench wise Insitu reserves (Mineable)

As on 01<sup>st</sup> Nov 2020

<u>Bench levels</u>	<u>R O M</u>	<u>Unit : tonnes</u>
		<u>Waste Rock</u>
94	23,125.00	Considered as production hence not established
88	37,500.00	
82	52,500.00	
76	43,750.00	
70	1,26,250.00	
64	1,54,375.00	
58	1,55,000.00	
52	1,59,375.00	
46	1,48,125.00	
40	1,32,609.00	
34	1,43,125.00	
28	1,15,625.00	
<b>Total</b>	<b>12,91,359.00</b>	<b>--</b>

Below table shows the Section wise Insitu reserves (Mineable) :

As on 01<sup>st</sup> Nov 2020

<u>Between Cross section</u>	<u>R O M</u>	<u>Unit : tonnes</u>
		<u>Waste Rock</u>
E : 2050 to E : 2100	99,375.00	Considered as production hence not established
E : 2100 to E : 2150	2,56,250.00	
E : 2150 to E : 2200	3,74,375.00	
E : 2200 to E : 2250	3,95,654.00	
E : 2250 to E : 2300	1,71,930.00	
<b>Total</b>	<b>12,91,359.00</b>	<b>--</b>

NOTE : Above figures are rounded to nearest decimal.

The details calculations of section wise / bench wise areas, volume, tonnages are enclosed as  
Annexure No. 19.





## Method of Estimation

The estimation of ore reserves is made by conventional parallel cross section method using geological cross section. The geological cross sections are prepared at a regular interval of 50 m across the strike of the ore body. The area of individual litho units in each and every cross section is calculated separately. The volume between the cross section is arrived on the basis of the average the area of parallel cross section i.e.  $((S1 + S2) / 2)$  and multiplying sectional interval. And tonnage is arrived by multiplying by its bulk density.

**Note: Following are the parameters considered for reserve estimation:**

Category of ore	Bulk density	Recovery %
Granite	2.50	100.00
Waste rock	-	-

## 2.0 MINING

### A. OPENCAST MINING

- a) Describe briefly the existing as well as proposed method for excavation with all design parameters indicating on plans / sections.

#### Quarrying / Mining

Formerly, this quarry was in operation, it was being worked with conventional open cast method. Based on the mode and method so adopted and taking into the consideration of geological parameters, the quarry pit is designed such that the height of the bench is kept about 6.0 mts max., and the width is also kept 6.0 mts, maintaining 45° pit slope.

Mining operation will be commenced from higher elevation to the lower elevation, benches will be developed and it will be advance in south and west direction laterally. More so this area was worked earlier by some other party, where there is a high wall benches, so initially the height of the high-wall bench will be reduced, when it comes to the lower levels, benches will take the circular shapes and pit will be formed. The Mining operation will be controlled and supervised by Statutory persons like Mine Manager / Asst Mine Manager, Mine Foreman, Mining Mate Cum Blaster certificate Holder issued by the Director General of Mines Safety, Dhanbad.



### Drilling, Blasting and its parameters :

The nature of the rock is mainly hard to medium hard in nature hence drilling and blasting is required to dislodge / loosen the material from the main rock mass. The broad blasting parameters are determined for the blasting pattern and blast design, which are as follows:

- The Drilling pattern will be decided by the Certificate Holders / competent personnel and the blasting hole area is marked on the ground by certificate Holders.
- Since the bench height needs to be maintained at 6.0 m, Blast hole will be, preferably by deep hole where the diameter is normally 115 mm and the depth of the hole is 6.5 m including sub drilling. Considering the safety aspect, the blast will be carried out in two phases i.e, 3.00 m each phase.
- Blasting pattern is generally square or rectangle or staggered. The Burden and Spacing will be decided as per the requirements of the size of the boulders, generally the burden ranging from 2.00 to 2.50 meters and spacing of 2.50 to 3.00 meters.
- Usually single / double row of holes is blasted along free face to achieve optimum powder factor, best fragmentation and minimized adverse impacts on account of blasting.
- Maximum numbers of holes will be blasted at a time in a round are generally limited to 20 with non – electrical detonators (NONEL) to mitigate adverse impacts such as air blast, fly rock and ground vibration. The Ignition will be the Non Conventional and Eco Friendly method by NONEL (Non Electric Detonators).
- The 6 Meter hole will be blasted in two phases of 3.0 mts each one after the other, by inserting one Namel at bottom and another one is at the middle of the hole, so the hole will be blasted two times one after the other with delay of 17 Milli Seconds. The first 3 Meters at the bottom will be blasted first and the middle one next will get blast a gap of 17 Milli Seconds. The blast delay from hole to hole will be 17 Milli Second and 42 Milli Second from row to row. A schematic of drilling and blasting pattern is shown in the foregoing page :

After drilling the certificate Holder prepare the Blasting Data Sheet incorporating the Burden, Spacing, Depth, Conversion Factor, Expected Yield, Powder factor, Booster consumption in Kgs and Percentage, Column charges in Kgs and Percentages, Charge per Delay, Time of Blasting and other Parameters as per the field and after the Blasting the Noise level, Fly rock distance, Vibration limit will be recorded in the



Blasting Data Sheet. Different Parameters and get approval from the Head of Mining Operation.

- Nitrate mixture types of explosives are used for blasting with 20 to 25 percent, proportion of primer / booster cartridges and rest as column charge. About 20 - 25kgs of explosives are loaded in 115 mm diameter holes. And powder factor ranging between 5 to 6 tons per kgs of explosives is achieved.
- Subsequent to the drilling and blasting, the material so fragmented / loosens from the rock mass, the boulders so generated subsequent to the blasting, will be broken with the help of the rock breakers. There after the material is loaded into trucks / tippers of 20 tonnes capacity with the help of the excavator. The loaded material is transported to the Vizhinjam Port.

#### PRECAUTION TAKEN WHILE BLASTING

1. Siren will given three Times before the Blasting and Hooter announcement will be made before the Blasting
2. 8 persons will be sent to different locations with Red flag as a sign of caution of blasting.
3. After getting the confirmation from 8 persons through Mobil or Walketalkie (wireless) the ignition will be given.
4. One Time siren will be given after the Blasting.
5. The 8 persons will be called back to the Quarry and get the feedback about the Blasting.

#### SCHEMATIC SHOWING THE BLAST HOLE PATTERN

O-17Ms-O-17Ms-O-17Ms-O-17Ms-O-17Ms-O-17Ms-O-17Ms-O-17Ms-O - second row

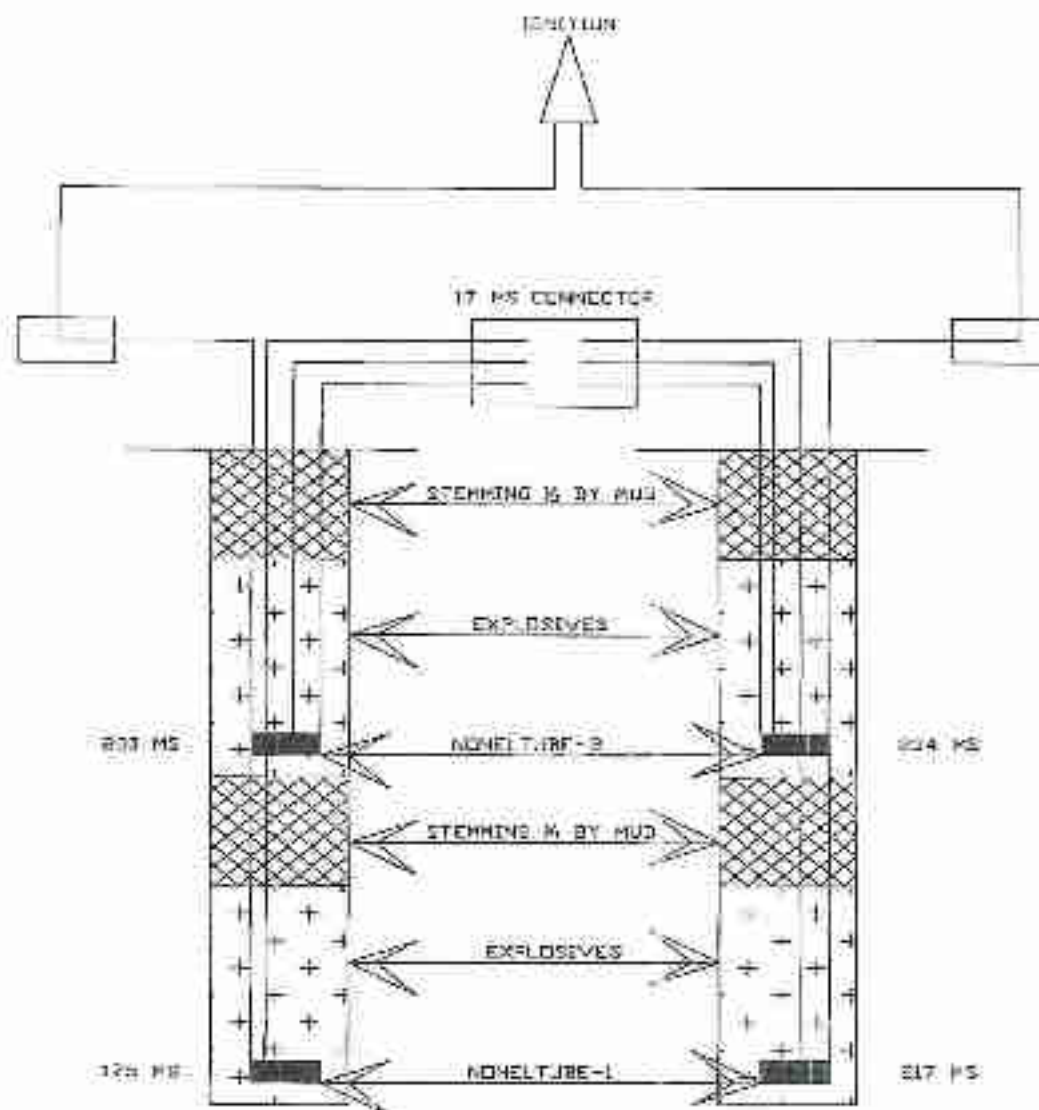
630	586	552	518	484	467	433	399	365	42Ms
603	569	535	501	467	450	416	382	348	

O-17Ms-O-17Ms-O-17Ms-O-17Ms-O-17Ms-O-17Ms-O-17Ms-O-17Ms-O x - first row

34	68	102	136	170	204	238	272	306
17	31	85	119	153	187	220	255	289

Free Face





### ADVANTAGES OF NONEL

1. The Nonel is used in rainy season because it is Non Electric Detonator.
2. It is bottom ignition.
3. The Noise is less.
4. Fly Rock is less.
5. Vibration is less.
6. Fragmentation is good.
7. It is Eco friendly method of Blasting.

### Safety and Precautions:

Before onset of monsoon, drains are cut along toe of the quarry faces to divert the surface run off. Garland drain is provided at the quarry top to regulate monsoon water and direct the



same to the settling ponds / quarry pit to contain the quarry wash off and to avoid the same joining to the adjoining surface water bodies / water courses. It also helps to avert eventual collapses and damages to the quarry faces.

The pit will be fenced by barbed wire, such that no habitats can enter the pit. And watch and ward is provided round the clock.

b) **Indicate year – wise tentative Excavation in Cubic meter indicating development, ROM, pit wise as in table below:**

I. **In situ tentative excavation.**

Below table shows the proposed Year wise Production & Development quantities:

<u>Unit in Tonnes</u>		
<u>Year</u>	<u>ROM</u>	<u>Waste</u>
1 <sup>st</sup> year - 2019 - 20	Elapsed	Considered as production hence not calculated
2 <sup>nd</sup> Year - 2020 - 21	@ 1,50,000	
3 <sup>rd</sup> year - 2021 - 22	5,00,000	
4 <sup>th</sup> year - 2022 - 23	4,20,000	
5 <sup>th</sup> year - 2023 - 24	8,750	
<b>Total</b>	<b>## 10,78,750</b>	

@ indicates from 01/11/2020 to 31/03/2021. Quantity extracted from April to Oct 2020 is 2,73,225 so total proposed production for the year 2020 – 21 is 4,23,225 tonnes.

$$(2,73,225 + 1,50,000 = 4,23,225)$$

## indicates that proposals are made as per the 114 minutes of SEIAA meeting. A copy of the same is enclosed as Annexure No. 28.

The year wise projection of working is marked on the Production plan and enclosed as Plate No. 9. The year wise proposed projection and its dispositions of the benches are shown on the Geological Cross Section and enclosed as Plate No. 10. The detail calculation of the area, volume & tonnage for the above said years is enclosed as Annexure No. 20.

II. **Dump re-handling (for the purpose of recovery of mineral)**

Presently there are no any dumps so as to recover the mineral.





- c) **Enclose individual year wise development plans and sections showing pit layouts, dumps, stacks of mineral rejects, if any etc in case of "A" category mines. Composite development plans showing pit layouts, dumps, stacks of mineral reject, if any, etc, and year wise sections in case of "B" category mines.**

The year wise projection of working is marked on the Production and Development plan and enclosed as Plate No. 9. The year wise proposed projection and its dispositions of the benches are shown on the Geological Cross Section and enclosed as Plate No. 10.

- d) **Describe briefly giving salient features of the proposed method of working indicating category of mine.**

By taking into the consideration of geological parameters of the building stone, the said quarry is proposed to work with conventional open cast method with bench system and mode of operation is mechanized. Based on the mode and method so adopted and considering the geological parameters the quarry pit is designed such that the height of the bench is kept about 6.00 mts max., and the width is also kept 6.00 mts, maintaining 45° pit slope.

- e) **Describe briefly the layout of mine workings, pit road layout, the layout of the faces and sites for disposal of overburden / waste along with the ground preparation prior to disposal of waste, reject etc. a reference to the plans and sections may be given.**

As far as mine working is considered, a systematic and scientific way of mining will be carried out. Based on the mode and method so adopted and taking into the consideration of geological parameters of the ore body the quarry pit is designed such that the height of the bench is kept about 6.00 mts max., and the width is also kept 6.00 mts, maintaining 45° pit slope. To win the material the benches are advanced sideward and laterally.

The waste rock in this quarry is mainly, the topsoil. Generally, in the building stone quarry about 5 - 6 % of waste will likely to generate. But in this quarry the material is consumed for development / construction of Sea port, where the waste generated is consumed for the purpose. Hence no waste is estimated.

#### **Extent of mechanization:**

*The maximum handling building stone material is 5,00,000 tonnes during the year 2021 - 22 of the modified plan period. The adequate total handling capacity of loading units will be deployed. For handling of proposed quantities of building stone, the requirement is met with a*



fleet of 20 nos. of tippers of 20 tonnes capacity each. List of Quarrying machinery deployed in the quarry along with their capacities, are shown in below table.

<u>Sr. No</u>	<u>Equipment / Machinery</u>	<u>No. of units</u>	<u>Engine H P</u>	<u>Bucket Capacity</u>
1	Excavator	4	350	2.5 M <sup>3</sup>
2	Rock breaker	3	165	8 22
3	Tippers	20	100	20 tonnes
4	Compressor	3	169	600 CFM
5	Drilling machine	4	--	--
6	Jack Hammers	5	--	--
7	Water tanker	1	130	10 0KL

- 1) **Conceptual Mine planning upto the end of lease period taking into consideration the present available reserves and resources describing the excavation, recovery of ROM, Disposal of waste, Back filling of voids, Reclamation and rehabilitation showing on a plan with few relevant sections.**

For any Mine / quarry, Preparation of Conceptual Plan amounts to, fore-seeing in totality and planning for quarrying and related activities through-out its life span, till such time all the usable mineral / ores are exhausted to the economical limits and lease area is reclaimed in the extent possible. The norms laid down by the government agencies from time to time do play important roles.

Therefore, preparation of ideal conceptual quarry plan for any quarry is difficult and such plan prepared, remains acceptable only under given circumstances. It cannot be over looked that, any such plan undergoes amendments and revisions in the course of progressive stages of exploitation.

#### Anticipated Life of Quarry :

Based on the reserves and considering the projected production target during first five year and next five years the anticipated life of the quarry will be about 5 years.

#### Excavation :

The below table shows the production for the successive blocks of five year till the conceptual period.



<u>Period of five years</u>	<u>Qty in tonnes</u> <u>Proposed</u> <u>Production</u>
<i>1<sup>st</sup> block of five years (19-20 to 23-24)</i> <i>from Nov 2020 to Mar 2021</i>	10,78,759
<i>2<sup>nd</sup> block of five years (24-25 to 28-29)</i>	2,12,600
<i>Total</i>	12,91,359

#### **Recovery of R O M:**

Subsequent to the drilling and blasting, the material so dislodged / fragmented / loosens from the rock mass, the boulders so generated, will be broken with the help of the rock breakers. There after the material is loaded into trucks / rippers of 20.0 tonnes capacity with the help of the excavator. The loaded material is transported to the port development.

#### **Disposal of waste :**

Generally, in the building stone quarry about 5 – 6 % of waste will likely to generate. But in this quarry the material is consumed for development / construction of Sea port, so the waste generated is considered as production. Hence no waste is estimated and no disposal of waste.

#### **Backfilling of voids :**

Since there is no waste generation at this quarry, no backfilling of voids.

#### **Reclamation and rehabilitation:**

At the end of the lease period / conceptual period pit extends over an area of 3.0630 ha approximately (including roads). Part of the pit i.e 0.9540 ha of area will be converted as a water pond, and the balance area 2.1095 Ha will be retained as pit.

During the year 2019 – 20, 100 saplings has been planted covering an area of 0.100 ha within the safety / buffer zone of 7.50 ms.

Further, Plantation will be carried out on the lease periphery (within the safety / buffer zone of 7.50 ms.), the proposed plantation for balance period of the modified plan period is furnished in the below table:





<u>Year</u>	<u>Area in ha</u>	<u>No. of saplings</u>
2020 - 21	0.1500	200
2021 - 22	0.1700	250
2022 - 23	0.1800	270
<b>Total</b>	<b>0.5000</b>	<b>720</b>

Over all during the balance of above said period about 720 saplings will be planted by covering an area of 0.50 ha. Mainly the local species will be planted along with the other plants such as Rain tree, Bougainville, Picus, plantation crops like Fruit bearing plants like mango tree, jack fruit tree will be planted. It is proposed to plant at the rate of 1500 saplings per hectare. Anticipated survival growth rate is about 60 - 70 %. The above measures are marked on Production plan and Conceptual / plan enclosed as Plate No. 9 & 12 respectively.

### 3.0 MINE DRAINAGE

- a) **Minimum and maximum depth of water table based on the observations from nearby wells and water bodies.**

Based on the observations made in and around the quarry area it was found that the general ground level in this area is 32 m above MSL, and the general ground water table is 8 m below the general ground level i.e 24 m above MSL. During monsoon the ground water table will raise by 2 - 3 mts.

- b) **Indicate maximum and minimum depth of workings:**

The lease area is situated on the isolated hillock where the top most working level is about 106 m above MSL, and the lowest is 28 m above MSL, total depth of quarry will be 78 mts. (though the surface plan is showing the working level is 117 m, this is of old working which is near BP No. 4 and in safety barrier, where we are not suppose to work. The working level is considered after leaving the safety barrier which is 106 m).

- c) **Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged.**

The mine is situated on the hillocks, where the ultimate workings are not going to touch the ground water table, the general water table is 24 m above MSL, and the ultimate working is 28 m above MSL. Hence no pumping of water is required.



- d) Describe regional and local drainage pattern. Also indicate annual rainfall, catchment area, and likely quantity of rain water to flow through the lease area, arrangement for arresting solid wash off.

**Drainage pattern :**

There are no any perennial water course / water bodies / streams / nallahs within the quarry area. The storm water passes through the minor water courses and gets confluence with the adjacent nallah. Apart from this the water source in this area is mainly storm water. Entire storm water flows through the garland drains provided all around the quarry pit and same will be collected in settling pond. The drainage pattern in this region is parallel to sub parallel.

**Rainfall :**

Generally there are two monsoons in Kerala, the onset monsoon is known as Southwest Monsoon which commence from June and ends in September. The second monsoon is known as Northeast Monsoon and also known as Reverse monsoon which commence from October and ends in November. The average rainfall for the last ten years is around 3,000 mm annually.

**4.0 STACKING OF MINERAL REJECT / SUBGRADE MATERIAL AND DISPOSAL OF WASTE:**

- a) Indicate briefly the nature and quantity of topsoil, overburden / waste and Mineral reject to be disposed off.

**Top Soil :**

Most of the quarry area is exposed by Charnokite, part of area towards the north of the quarry is covered by topsoil with the thickness varying from 1.00m to 1.50 m, topsoil so visualized is sparsely distributed. However during the course of quarrying of this area, the topsoil so occurs will be removed and stacked separately and it will be used for plantation purpose.

Spread area	±	1000 Sq M
Depth		1.00 mts
Bulk density		1.50

$$1,000 \times 1.0 \times 1.50 = 1,500 \text{ tonnes.}$$





- b) The proposed dumping ground within the lease area be proved for presence or absence of mineral and be outside the UPL unless simultaneous backfilling is proposed or purely temporary dumping for a short period is proposed in mineralized area with technical constraints & justification.

And

- c) Attach a note indicating the manner of disposal of waste, configuration and sequence of year wise build up of dump along with the proposals for protective measures:

Since no waste is generating at this quarry, so no dumping is proposed.

#### 5.0 USE OF MINERALS AND MINERAL REJECT:

- a) Describe briefly the requirement of end – use industry specifically in terms of physical and chemical composition:

The material produced at this quarry will be used for development / construction of Vizhinjam Port.

- b) Give brief requirement of intermediate industries involved in up-gradation of mineral before its end use.

Not applicable.

- c) Give detail requirements for other industries, captive consumption, export associated industrial use etc.

The material generated at this quarry is supplied to port development.

- d) Indicate precise physical and chemical specification stipulated by buyers:

Basically, the material produced at this quarry is used for development / construction of Vizhinjam Port. Only physical specifications are involved and the same are mentioned below:

Sl. No.	Details	specifications
1	Boulders	100 mm / 2480 mm



- e) Give detail of processes adopted to upgrade the ROM to suit the used requirement.

No process is adapted to up-grade the Building stone.

#### 6.0 PROCESSING OF ROM AND MINERAL REJECT:

- a) If processing / beneficiation of the ROM or Mineral Reject is planned to be conducted, briefly describe nature of processing / beneficiation. This may indicate size and grade of feed material and concentrate (finished marketable product), recovery etc.
- b) Give a material balance chart with flow sheet or schematic diagram of the processing procedure indicating feed, product, recovery and its gradate each stage of processing:
- c) Explain the disposal method for tailings or reject from the processing plant.
- d) Quantity and quality of tailings / reject proposed to be disposed, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their disposal and dealing of excess water from the tailings dam.
- e) Specific quantity and type of chemicals if any to be used in the processing plant.
- f) Specific quantity and type of chemicals to be stored on site / plant.
- g) Indicate quantity (cum per day) of water required for mining and processing and sources of supply of water, disposal of water and extent of recycling. Water balance chart may be given.

All the above paragraphs are not applicable as there is no processing / beneficiation plant.

#### 7.0 OTHERS : Describe the following:

- a) Site Services.

The said proposed quarry area falls in the Re - Sy. Block No. 37, Rco - Sy. No 555/2 (Govt. Land) extends over an area of 3.6630 Ha of Nagaroor village, Chirayinkeezh Taluk of Thiruvananthapuram District - Kerala state. The said area lies towards southwest of





Nagaroor village at a distance of 1.20 kms and lies towards north of Kadavila Bus stop at a distance of 0.50 kms approximately (Distances are aerial distance). This lease area is approachable by all-weather road's up to the up to Kadavila bus stop, thereafter a kutcha road will leads to area.

Thiruvananthapuram is the district head quarter and state's capital which is at a distance of 35.0 kms (by road) towards south of quarry area & Chirayinkeezh is the Taluk head quarter which is at a distance of 13.0 kms towards southwest of quarry area, where all the infrastructural facilities are available. The nearest airport is at Thiruvananthapuram at a distance of 40.0 kms and sea port at kollam which is at a distance of 50.0 kms. The nearest railhead on Broad-gauge is Chirayinkeezh which is at distance of 9.0 kms.

This area falls under the Survey of India's Topomap No. 58 / D / 13 & 58 / D / 14. Since the topomaps of Kerala are restricted the same are not available. The said quarry area falls between the geographical co-ordinates i.e

Latitude	08°43' 42.88" N to 08°33' 51.74" N
Longitude	76°50' 15.26" E to 76°50' 23.24" E

However the Latitude and Longitude so recorded of all the corner boundary pillar is depicted on the Surface Plan enclosed as **Plate No. 6** and the area is marked on the google satellite image and enclosed as **Plate No. 5**.

#### b) **Employment potential:**

About 30 people are appointed as direct employment and it generates indirect employment for few hundred people. Most of the directly employed people are skilled. The respective distribution/ numbers are follows.

<b>Highly skilled</b>	:	<b>03 nos.</b> , such as technical professionals like Quarry Manager, Quarry eng., Asst. Quarry Manager and etc.,
<b>Skilled</b>	:	<b>12 nos.</b> , under skilled category of people includes Quarry Foreman, Quarry mates, heavy earth moving machinery operators, drivers, mechanics and asst. mechanics etc.
<b>Semi skilled</b>	:	<b>08 nos.</b> include helpers, greaser's etc.
<b>Un skilled</b>	:	<b>07 nos.</b> include spotters, cleaners, attendant's etc.







#### A. Floral Diversity

**Table 1.1. List of Trees**

Sl No	Scientific Name	Vernacular / English Name	Family	Status
1.	<i>Terminalia paniculata</i>	Maruthu	Combretaceae	Indigenous / Common
2.	<i>Gilicidia sepium</i>	Gilicidia/ Poonchedi	Fabaceae	Exotic

**Table 1.2. List of Shrubs**

Sl No	Scientific Name	Vernacular / English Name	Family	Status
1.	<i>Manihot tillossima</i>	Cheem	Euphorbiaceae	Exotic
2.	<i>Chromolaena odorata</i>	Communistpacha	Asteraceae	Exotic weed
3.	<i>Hyptissuaveolens</i>	Nattapoochedi	Lamiaceae	Common
4.	<i>Melastomamalabathricum</i>	Athirani	Melastomataceae	Common

**Table 1.3. List of Herbs**

Sl No	Scientific Name	Vernacular / English Name	Family	Status
1.	<i>Leucas aspera</i>	Thunba	Lamiaceae	Common
2.	<i>Mimosa pudica</i>	Thottavadi	Mimosaceae	Exotic
3.	<i>Phyllanthus niruri</i>	Keezharnelli	Euphorbiaceae	Common

**Table 1.4. List of Climbers**

Sl No	Scientific Name	Vernacular / English Name	Family	Status
1.	<i>Calycopteris floribunda</i>	Pullanji	Combretaceae	Common
2.	<i>Acacia caesia</i>	Incha	Leguminosae	Common

**Table 1.5. List of Grass**

Sl No	Scientific Name	Vernacular / English Name	Family	Status
1.	<i>Cymbopogon citratus</i>	Inchipulhu	Poaceae	Common
2.	<i>Axonopus compressus</i>	Katapulin	Poaceae	Common

#### B. Faunal Diversity



Sl No	Scientific Name	Vernacular / English Name	Family	Status
<b>Frog</b>				
1.	<i>Pseudophilautus</i> sp.	Bush frog	—	Common
<b>Dragon Fly</b>				
2.	<i>Prodasineuraverticilis</i>	Black bambootail	Platycnemididae	Common
3.	<i>Rhyothornisvariogata</i>	Picturewing/ Onathumbi	Libellulidae	Common
<b>Birds</b>				
4.	<i>Acridotherestrictus</i>	Indian myna	Sturnidae	Common

The majority of the mined area extensively altered from its natural state through past mining activity. There is no area used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering and migration within the applied lease area. Shrubs and grasses cover the area in a scattered manner. Some trees of small height can be spotted in entire lease land. As there is no natural forest cover, the area does not contain any wild animals. Only domestic animals like goat, cow, buffalo, cat, dog etc. are observed / found in the area.







PHOTOGRAPHS SHOWING FLORA IN AND AROUND QUARRY AREA

### QUALITY OF AIR, AMBIENT NOISE LEVELS AND WATER

To know the base line values within the core and buffer zone monitoring was carried out for various environmental parameters such Air, Water, Noise and soil the location of the same is shown in below table:

Subsequent to the receipt of Environmental Clearance and commencement of quarry operation, Environmental monitoring was carried out at all the said location for all the parameters / attributes as per the conditions laid down in Environmental Clearance. Accordingly the report of the same is furnished in respective paragraphs of environmental attributes.

Sl. No.	Locations	Distance and direction wrt quarry	Environmental parameters			
CORE ZONE						
1	Quarry area	--	Air	--	Noise	Soil
BUFFER ZONE						
1	Nearest settlement Near (Kadavilla bus stop)	@ 450 mts>> SE	Air	Water	Noise	Soil
2	Nearest settlement	@ 900 mts>> W	Air	Water	Noise	---
3	Nearest settlement	@ 330 mts>> NNW	Air	Water	Noise	Soil
4	Nearest settlement (near Altharamudu bus stop)	@ 825 mts>> NNE	Air	Water	Noise	---
5	Vamanapuram river	@ 1.90 km >> SSE	--	Water	--	--



**Criteria for selection of monitoring location:**

*The monitoring location was selected as per the guidelines laid down by CPCB / MOEF & CC vide guidelines for Ambient Air Quality Monitoring vide SERIES : NAAQMS / ... / 2003 - 04. An extract from NAAQM 2003 - 04 is enclosed as Annexure No. 21.*

*They are totally, 9 individual dwellings within 200 m radius from the quarry boundary, which are scattered.*

*Further, no monitoring location was selected in individual houses within 200 m, because monitoring was carried out within the core zone, these concentration will suffice for the same.*

*A key plan showing all the above monitoring location is enclosed as Plate No. 1. Apart from this a Surface plan showing the existing environment / land use up to 500 mts from the quarry area is enclosed as Plate No. 11.*

**➤ Quality of Air:**

*Quarrying activity contributes to pollution of air due to Quarry operation, since the mode of Quarrying is mechanized heavy earth moving machineries are involved; the pollution of the air is mainly due to generation of dust and noise.*

*Subsequent to the obtaining of Environmental Clearance, quarry put into operation. Thereafter as per the laid down guidelines, air quality monitoring was carried out both in core and buffer zones during February 2020 to know the pollutant levels. The values so obtained are well within the limits. A copy of the air quality monitoring reports is enclosed as Annexure No. 22.*

**➤ Water Quality:**

*There are no perennial water courses / bodies within the leasehold area, but for the minor seasonal watercourses. Apart from this the water source to this area is mainly storm and ground water. Entire storm water flows through the minor watercourses and joins the adjoining seasonal nallah. The drainage pattern in this area is dendritic in nature.*

*Subsequent to the obtaining of Environmental Clearance, quarry put into operation. Thereafter as per the laid down guidelines, Water samples were collected both in core and buffer zones during February 2020 to know the quality of the water. The values so obtained are well within the limits. A copy of the water quality report is enclosed as Annexure No. 23.*



➤ **Ambient noise level :**

Since the quarry is mechanized the generation of the noise at this quarry is mainly by Drilling, Blasting, operation of HEMM and movement of trucks.

Subsequent to the obtaining of Environmental Clearance, quarry put into operation. Thereafter as per the laid down guidelines, Noise levels were monitored both in core and buffer zones during February 2020 to know the noise levels. A copy of the Noise Level report is enclosed as Annexure No. 24.

➤ **Soil Quality :**

Subsequent to the obtaining of Environmental Clearance, quarry put into operation. Thereafter as per the laid down guidelines, Soil samples were collected both in core and buffer zones during February 2020 to know the soil quality. A copy of the Soil quality report is enclosed as Annexure No. 25.

➤ **Human settlements :**

*They are totally 9 individual dwellings within 200 m radius from the quarry boundary, which are scattered.*

There is no any human settlement within the quarry area, but the nearest human settlement (which is in cluster) is 330 m & 700 m from the quarry area towards North and Southeast respectively. The nearest village is Nagaroor which is at a distance of 1.2 kms. There are totally 24 villages / wadas within 5.0 kms study area.

In 2011, Thiruvananthapuram district had population of 33,01,427 of which male and female were 15,81,678 and 15,69,917 respectively. There was change of 2.07 percent in the population compared to population as per 2001.

Average literacy rate of Thiruvananthapuram district in 2011 were 93.02 compared to 89.28 of 2001. Total literate in Thiruvananthapuram District were 2,785,408 of which male and female were 1,354,857 and 1,430,551 respectively. With regards to Sex Ratio in Thiruvananthapuram, it stood at 1087 per 1000 male compared to 2001 census figure of 1060.



➤ **Public building, Places of worship and monuments:**

There are no any public building, places of worship and monuments within the lease area.

➤ **Indicate any sanctuary is located in the vicinity of leasehold:**

There are no any sanctuaries located in the vicinity of the leasehold area. And there are no any sanctuary, wildlife within the buffer zone of 5.00 kms.

**8.2 Impact Assessment :** Attach an Environmental Impact Assessment Statement describing the impact of mining and beneficiation on environment on the following:

- i) Land area indicating the area likely to be degraded due to quarrying, dumping, roads, workshop, processing plant, tailing pond / dam, township etc.,

Quarry lease area is 3.6630 ha. More or less entire area is exposed by Charnockite more so, this area was worked formerly by some other party & quarry operation commenced subsequent to obtain of Environmental Clearance.

Due to Quarrying and exploitation of the Building stone material, there will be change in the ground profile in the form of pits and dumps. The detail of the land use as at present, Plan / conceptual period is shown below in tabular form:

<u>Description</u>	<u>Unit in Ha.</u>	
	<u>As on date</u>	<u>Plan / lease period</u>
Area under Quarrying	2.2400	3.0630
Roads	(part of the quarry)	
Green belt (within safety barrier)	0.1000	(16000)
Safety barrier 7.50 mts	0.5000	
Area for future use / undisturbed	0.8230	
<b>Total</b>	<b>3.6630</b>	<b>3.6630</b>

Subsequent to the Conceptual stage, this quarry will be used for various activities as per the mine closure plan, as a part of closure the activities such as water pond and etc., the details of the land use of post mine closure is given below:



<u>Sl. No.</u>	<u>Type of activities</u>	<u>Extent in Ha.</u>	<u>Post mining land use of degraded land</u>	<u>Extent in Ha.</u>
1.	Area under Quarrying	3.6630	1. Area under water pond 2. Area remained as pit	0.9540 2.1090
2.	roads		Are part of the quarry Retained as roads	
3.	Green belt (within safety barrier)	0.5999	Retained as Green belt	0.6999
	<b>Total</b>	<b>3.6630</b>	<b>Total</b>	<b>3.6630</b>

NOTE: Roads are part of the quarry area.

A conceptual plan / Post mining land use plan is enclosed as Plate No. 12.

## ii) Air quality:

Quarrying activity contributes to pollution of air due to working heavy earth moving & Quarrying machineries. To know the impacts of quality of air the parameter such as Suspended Particulate Matter (SPM), Sulphur Dioxide (SO<sub>2</sub>), oxides of Nitrogen (NO<sub>x</sub>) and Carbon monoxide (CO) monitoring is being carried out through consultant having MoEF & NABIT accredited agencies.

However may be the impact, to reduce the same, following measures are adopted.

1. Water sprinkling will be done at regular interval on haul roads, pit and etc., to avoid the emission of dust into atmosphere.
2. Wet drilling will be adopted to avoid the dust in the air atmosphere.
3. All the belt conveyors are covered such that no is entered into the atmosphere.
4. Regular maintenance of haul roads to avoid the dust generation.

A copy of the Air quality report is enclosed by Annexure No. 22.

## iii) Water Quality:

During the monsoon, there will be an impact in the form of surface runoff, wash-off where the material will be transported to the local water bodies. And also there will be an impact on the ground water due to mining activities.

Following protective measures will be adopted to maintain the water quality:

1. Garland drains are cut all along the benches prior to the monsoon to avert the water into the pit.
2. No mine working will touch the ground water.
3. Where ever the water flow is likely to join with nalas or water bodies, the check dam will be constructed.
4. Retention wall / rubble walls will be constructed to arrest any wash off / surface runoff from the quarry area.

A copy of the Water quality report is enclosed as Annexure No. 23.

**iv) Noise levels :**

Since the quarry is mechanized, the noise pollution is mainly due to the Quarrying machinery and movement of trucks and drilling and blasting activities. There will be impact in surrounding area due to the noise generation.

To reduce the impact on the noise following measures will be adopted:

1. Preventive maintenance of HEMM and Trucks
2. Controlled blasting will be carried out to avoid noise levels.
3. No employees are allowed to work without PPE's where the noise levels are more and beyond the limits.

A copy of the Noise monitoring report is enclosed as Annexure No. 24.

**v) Vibration levels (due to blasting):**

Due to drilling and blasting, following are the impacts visualized:

1. There will be disturbance of Fauna,
2. Vibration due to blasting,
3. Noise generation but as per the list enclosed.



To mitigate the above visualized impacts, following are the measures will be adopted.

1. Scientific methods will be adopted to while drilling and blasting.
2. Proper spacing and burden will be adopted,
3. Controlled blasting will be carried out to avoid noise levels and also to control the PPV.
4. NONEL technology will be adopted,



**vi) Water Regime :**

There are no perennial water courses / bodies within the quarry area. Apart from this the water source in this area is mainly storm and ground water. Entire storm water flows through the minor watercourses and joins the adjoining seasonal nallah. The drainage pattern in this area is parallel to sub parallel in nature.

Water resources in this area are Ground water and rainwater. The area receives copious amount of rainfall 3,000 – 4,000 mm annually on an average. Hence the level of water table in the open wells is shallow. Based on the observations made in and around the quarry area it was found that the general ground level in this area is 32 m above MSI, and the general ground water table is 8 m below the general ground level i.e 24 m above MSI. During monsoon the ground water table will raise by 2 – 3 mts. The bottom most working of the pit is 28 m above MSI, where quarry operation will not touch the general ground water table. The impact could be in the form of the fluctuation of the ground water table, which is insignificant.

During the monsoon, there will be an impact in the form of surface runoff, wash off where the material will be transported to the local water bodies. To avoid these following protective measures will be taken up.

1. Construction of rubble walls all along the toe of the dumps.
2. Construction of drains all along the toe of the dumps.
3. Before onset of monsoon, drains are cut along toe of the quarry faces to divert the surface run off. Garland drain is provided at the quarry top to regulate monsoon water and direct the same to the settling ponds / quarry pit to contain the quarry wash off and to avoid the same joining to the adjoining surface water bodies / water courses. It also helps to avert eventual collapses and damages to the quarry faces.

A Water drainage / Rain water harvesting plan to this effect is enclosed as **Plate No. 14**.

**vii) Acid Mine drainage :** Not applicable.

**viii) Surface Subsidence :** Not applicable.

**ix) Historical Monuments:**

No historical monuments exist within the vicinity of the quarry.



**x) Socio Economics :**

There are twenty four villages within the buffer zone of 5.00 kms radius. In which the three villages namely Nagaroor, Kadavila, Vellalore and so on. Due to this Quarrying activity, no significant adverse changes are visualized in the traditional way of life of the people residing in the villages within the buffer zone. Further people residing in the nearby villages are benefited by the direct and indirect employment opportunities created by the Quarrying activities. Quarrying activity will contribute towards economic up-liftment by way of job opportunities in the region, hence there is an increase in population of the area. Quarrying activity also boosts the ancillary industries, business and market establishments. Facilities like power linkage, water supply, communication facilities, construction of roads and statutory buildings, medical facility, vocational training provided by the lessee will augment the socio-economic status of the villagers residing nearby.

Further as a part of CFR following activities following are the proposed and the same will be continued:

Sr. No	Description	Amount in INR	Remarks
1.	Medical checkups camps like eye checkup, cancer checkup nearby villages Nagaroor, Kadavila, Vanichoor (Each year one village will be camped for special checkups and general checkup every year in all the villages)	1,00,000/-	yearly
2.	Distribution of school bag, umbrella, text and note books for primary school children at Nagaroor, Kadavila, Vanichoor village.	1,00,000/-	yearly
3.	Contribution for marriages to poor / needy people at least 4 people @ Rs. 25,000/- each	1,00,000/-	yearly
4.	Contribution for local cultural and festivals	50,000/-	yearly
5.	Distribution of ration through panchayat to the needy people during Onam / Ramzan / Christmas festival at least 50 families @ Rs. 500/- per family each festival	50,000/-	yearly
6.	Construction of washrooms / toilets for government Schools / High schools Nagaroor, Kadavila, Vanichoor village. (every year one village will be taken up)	1,50,000/-	yearly
7.	Renovation / repair of temples nearby (Sree Ayiravilly, Sree Durgadevi, Perumpally temples)	1,00,000/-	yearly
	<b>Total</b>	<b>6,50,000/-</b>	-



As a part of CER activities, management has conducted the following activities towards community welfare:

Sl. No	Description	Amount in INR
1.	Bitumen Road laid for 1.50 kms	80,00,000/-
2.	House hold material issued to 150 Beneficiaries at Covid - 19 lockdown period @ Rs. 1,000/- per Beneficiaries.	1,50,000/-
3.	Onion kit given to 175 Beneficiaries during 2020 @ Rs. 1,000/- per Beneficiaries.	1,75,000/-
4.	Drinking water supply for village people during summer season	2,72,580/-
<b>Grand Total</b>		<b>85,97,580/-</b>

Total amount spent towards CER is Eighty Five Lakh Ninety Seven Thousand Five Hundred Eighty only. A copy of the above said activities submitted to District Geologist is enclosed as Annexure No. 26.

### 8.3 Progressive Reclamation Plan:

#### 8.3.1 Mined – out Land:

Quarry lease area is 3.6630 ha. More or less entire area is exposed by Charnockite. more so this area was worked formerly by some other party & quarry operation commenced subsequent to obtain of Environmental Clearance.

Due to Quarrying and exploitation of the Building stone material, there will be change in the ground profile in the form of pits and dumps. The detail of the land use as at present, Plan / conceptual period is shown below in tabular form:

Description	As on date	Unit in Ha.
		Plan / lease period
Area under Quarrying	2.2400	3.0630
Roads	(part of the quarry)	
Green belt (within safety barrier)	0.1000	0.6000
Safety barrier 7.50 mts	0.5000	—
Area for future use / undisturbed	0.8230	—
<b>Total</b>	<b>3.6630</b>	<b>3.6630</b>

Subsequent to the Conceptual stage, this quarry will be used for various activities as per the mine closure plan. As a part of closure the activities such as water pond and etc. the details of the land use of post mine closure is given below:

<u>Sl. No.</u>	<u>Type of activities</u>	<u>Extent in Ha.</u>	<u>Post mining land use of degraded land</u>	<u>Extent in Ha.</u>
1.	Area under Quarrying	3.0630	1. Area under water pond 2. Area remained as pit	0.9540 2.1090
2.	roads		Are part of the quarry Retained as roads	
3.	Green belt (within safety barrier)	0.6000	Retained as Green belt	0.6000
	<b>Total</b>	<b>3.6630</b>	<b>Total</b>	<b>3.6630</b>

**NOTE:** Roads are part of the quarry area.

A conceptual plan / Post mining land use plan is enclosed as Plate No. 12.

### 8.3.2 Topsoil management:

More or less entire area is exposed by Building Stone Material only at places; topsoil is visualized which is sparsely distributed. The amount of topsoil exists to the thickness is just 1.00 mts (average). However during the course of quarrying of this area, the topsoil so occurs will be removed separately and will be used for plantation purpose. During the entire life of the quarry about 1,500 tonnes of topsoil is likely to generate.

As a part of the topsoil management, to know the present quality levels of the topsoil, three soil samples locations were identified i.e one in core zone and two in buffer zone namely one location is nearest human settlements at a distance of 450 mts towards SE from the quarry site and the other is at a distance of 330 mts towards NNW from quarry. Accordingly it was sample and analysed, quality report of the same is enclosed as Annexure No. 23.

**8.3.3 Tailings Dam Management :** Not applicable.

**8.3.4 Acid mine drainage, if any and its mitigative measures :** Not applicable.

**8.3.5 Surface subsidence mitigation measure through back filling the mine voids or by other means and its monitoring mechanism:**

Not applicable.





#### 8.4 Disaster Management and Risk Assessment:

Disasters might occur only due to natural calamities like earth quake, excessive rains and flooding etc. To overcome such risks, help / aid would be sought from emergency services providers like Police station, Fire station, Hospital, Ambulance services from the authorities in the vicinity of the mine site. Their contact telephone numbers and communication facilities are provided and displayed on the board at the mine office as well as mine site. Responsibility of coordinating rescue activities is entrusted to Quarry – in - Charge at the Quarry site in addition to Quarry – in Charge is also looking after statutory obligations under Mines Act, 1952.

#### 8.5 Care and Maintenance during temporary discontinuance:

Lessor proposes to work continuously, till the conceptual stage as such there is no temporary discontinuance of the mine. All required actions are timely taken and therefore, we do not foresee such discontinuation to occur, however, management is fully equipped up to overcome any such eventuality. However due to unforeseen situation, if mines happens to discontinue temporarily due to strike, lockout & any order passed by the government, court and etc, lessee shall take care of mine by fencing the pit/quarry deploying the security guards for watch and ward of the mine.

#### 8.6 Financial assurance :

(Submitted under Rule 58 of KMMCR 2015, as a component of Mining Plan)

The total area under utilization till the end of the plan Period  
Financial assurance @ Rs. 25,000/- per hectore.

3.6630 Ha X Rs. 25,000/- per hectore.      Rs.    91,575/-



The financial assurance being the sum of Rs. Ninety One Thousand Five Hundred Seventy Five only. But as per the rule 62 of KMMCR 2015, the minimum financial amount is Rs. One Lakh only.

The said Bank Guarantee for an amount of Rs. 1,00,000/- (the sum of Rs. One Lakh Only) has been submitted during the execution of the lease deed. A copy of the same is enclosed as Annexure No. 27.

However, area for the Financial Assurance is calculated as per the Rule 58 of KMMCR 2013, till the end of the Ensuing modified Mining Plan period and the details of land use considered are furnished below table

Sl. No.	Type of Land use	Area of Land in use (in Ha)			The area is considered as fully reclaimed and rehabilitated	Net area considered for calculation
		Area put on use at start of Plan	Additional Requirement during plan period	Total		
		A	B	C = (A + B)		
1	Area under Quarrying	2.2400	0.8230	3.0630		3.0630
2	roads	Part of quarry area				
3	Green belt	0.1000		0.1000	0.1000	0.1000
4	Safety barrier 7.50 m/s	0.5000		0.5000		0.5000
5	Area for future use / undisturbed	0.8230		—		—
Total		3.6630		3.6630		3.6630

A P M C P showing the below land use is enclosed as **Plate No. 13**

- 9.0 CERTIFICATES** : All the required certificates are enclosed.
- 10.0 PLATES** : All the required plates are enclosed and made the reference in the text at relevant places.
- 11.0 ANNEXURES** : All the required annexure are and made the reference in the text at relevant places.

KANTHARAJ K  
RQP / GOA / 130 / 2000 / A

16/10/20  
**GEOLOGIST**  
**DISTRICT OFFICE**  
OFF. OF MINING & GEOLOGY  
THIRUVANANTHAPURAM



# ANNEXURES







GOVERNMENT OF INDIA  
MINISTRY OF CORPORATE AFFAIRS

Registrar of Companies, Ahmedabad  
RoC Bhavan, Opp Hupal Park Society, Behind Ankur Bus Stop, Naranpura

Certificate of Incorporation

[Pursuant to sub-section (2) of section 7 of the Companies Act, 2013 and rule 8 of the Companies (Incorporation) Rules, 2014]

I hereby certify that ADANI VIZHINJAM PORT PRIVATE LIMITED is incorporated on this Twenty Seventh day of July Two Thousand Fifteen under the Companies Act, 2013 and that the company is limited by shares.

The DIN of the company is 10112006RJ015PTC033952.

Given under my hand at Ahmedabad this Twenty Seventh day of July Two Thousand Fifteen.



Rajesh Kanteshkumar Gangbani  
Assistant Registrar of Companies  
Gujarat

Mailing Address as per record available in Registrar of Companies office

ADANI VIZHINJAM PORT PRIVATE LIMITED  
Adani House, N. Milindkhali Six Roads, Naranpura,  
Ahmedabad - 380002  
Gujarat, INDIA



*Kantharaj K.*  
KANTHARAJ K.  
RCP/GOA/130/2000/A





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**MEMORANDUM  
AND  
ARTICLES OF ASSOCIATION  
OF  
ADANI VIZHINJAM PORT PRIVATE LIMITED**

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ATTACHED  
VERIFIED AND CERTIFIED  
THAT THIS IS THE TRUE COPY  
OF THE ORIGINAL



*T. R. ORIANA*  
13.5.2024

**T. R. ORIANA**  
Advocate & Notary  
Durgam Cheruvu, Kankar, K. S. Road, Kankar, K. S. Road  
Kankar, K. S. Road, Kankar, K. S. Road

*Kantharaj K.*  
**KANTHARAJ K.**  
RQF/GOAJ130/2020/A



THE COMPANIES ACT, 2013  
COMPANY LIMITED BY SHARES  
MEMORANDUM OF ASSOCIATION

OF

ADANI VIZHINJAM PORT PRIVATE LIMITED

- I. The Name of the Company is "ADANI VIZHINJAM PORT PRIVATE LIMITED".
- II. The Registered Office of the Company will be situated in the State of Gujarat.
- III. The objects for which the Company is established are:
- [A] THE OBJECTS TO BE PURSUED BY THE COMPANY ON ITS INCORPORATION ARE:

- I. To construct, develop, maintain, build, equip, hire or otherwise deal with ports, shipyard, jetties, harbours, docks, ship breaking, ship repair, ship building at any port in India or elsewhere and to carry on business of inland and sea transport including goods, passengers and mail, shippers, ship agents, ship underwriters, ship managers, tug owners, barge owners, loading brokers, freight brokers, freight contractors, stevedores, warehousemen, wharfingers and building, assembling, fitting, constructing, repairing, servicing and managing ships, seagoing vessels for inland waterways and to carry on in India and in any part of the world the business and to construct, develop, erect, build, buy, sell, give or take on lease or license, repair, remodel, demolish, develop, improve, own, equip, operate and maintain, ports and port approaches, breakwaters for protection of port or on the free shore of the port or port approaches with all such convenient moles, dials, landing places, hard jetties, floating barges or pontoons, stairs, fences, roads, railways, sidings, bridges, tunnels and approaches and widening, deepening and improving any portion of the port or port approaches, light houses, light ships, beacons, pilot boats or other appliances necessary for the safe navigation of the ports and the port approaches and to construct and establish, dry docks, shipways and boat basins and workshops to carry out repairs or overhauling of vessels, tugs, boats, machinery or appliances.



*[Signature]*

THIRU K. S. SURESH  
Managing Director  
Adani Vizhinjam Port Private Limited  
Adani Sagar Development

(D) MATTERS WHICH ARE NECESSARY FOR FURTHERANCE OF THE OBJECTS SPECIFIED IN CLAUSE (I) (A) are:-

1. To construct, improve, maintain, develop, manage, carry out or control any wharves, fuel storage tanks, fire stations, electric workshops, houses, roadways and conveniences which may seem to advance the business interest and control to or subsidise, assist or take part in the construction, improvement, maintenance, working, management, carrying out, control thereof and to maintain, overhaul, repair, fit-out, refit, improve, insure, alter, sell, exchange or let out on hire or hire purchase or charter or otherwise deal with and dispose off any of the ships and container, Roll-on and Roll-off vessels, manufacturing and processing vessels and aircrafts, helicopters, all kinds of off-shore diving rigs, platforms, storage-flooding and transport and such other facilities and other transport and conveyances or any of the engines or furnitures or equipments or stores of the ships, aircrafts or other transport and conveyances
2. To acquire, build, construct, improve, develop, give or take in exchange or on lease, rent, occupy, allow, control, maintain, operate, run, sell, dispose off carry out or later as may be necessary or convenient any leasehold or freehold lands, movable or immovable properties, including building, jetty, workshops, warehouse, stores, easement or other rights, machineries, plant, work, stock-in-trade, industrial colonies, conveniences together with all modern amenities and facilities such as housing, schools, hospitals, water supply, sanitation, townships and other facilities or properties which may seem calculated directly or indirectly to advance the Company's objects and interest either in consideration of a gross sum or a rent charged in cash or services.
3. To acquire and takeover any business or undertaking carried on, upon or in connection with / without any land or building which the Company may desire to acquire as aforesaid or become interested in and the whole or any of the assets and liabilities of such business or undertaking and to carry on the same or to dispose or remove or put an end thereto
4. To acquire, purchase, start, run, erect and maintain lands, buildings, factories, foundries, workshops, mills, cold storage plants, equipments, machineries, plants and tools, industrial undertaking of any kind, warehouses, depots, yards, wagons, branch offices, depots and show rooms for the business of the Company.
5. To form, promote, subsidise, organise and assist or aid in forming, promoting, subsidising, organising or aiding companies, syndicates and partnerships of all kinds for the purpose of acquiring and undertaking any properties and liabilities of this Company or for advancing directly the objects thereof which this Company may think expedient.
6. To acquire from and/or give to any person, firm or body corporate incorporated whether in India or elsewhere, technical information, know-how, processes, engineering, manufacturing and operating data, plans, lay outs and blue prints useful for the design, erection and operation of plant required for any of the business of Company and to acquire any grant or licenses and other rights and benefits in the foregoing matters and things.
7. To pay to promoters such remuneration and fees and otherwise recompensate them for their time and for the services rendered by them.
8. To invest any moneys of the Company not immediately required for the purpose of its business in such investments or securities as may be thought expedient including securities issued and/or guaranteed by Central or State Government, Corporations, Trusts and Financial Institutions.
9. To carry out in any part of the world all or any part of the Company's objects as principal, agent, factor, trustee, contractor either alone or in conjunction with any other Person, Firm, Association, Corporate Body, Municipality, Province, State or Government or Colony or Dependency thereof.
10. To secure or discharge any debt or obligation or of binding on the Company in such manner as may be thought fit and in particular by mortgaging, charges upon the undertaking and also or any of the assets and properties (present and future) and the uncalled capital of the Company or by the creation and issue on such terms as may be thought expedient of debentures, debenture-stock or other securities of any description or by the issue of shares credited as fully or partly paid up.



*T.H. Gnanan*

T.H. GNANAN

Secretary to the Government of Kerala  
Thiruvananthapuram  
Kerala State Secretariat





11. To purchase or otherwise acquire, sell, dispose off, concerns and undertakings, mortgages, charges, annuities for certain period or on deferred basis, patents, licences, securities, concessions, policies, bank debts and claims, any interest in real or personal property and any claims against such property or against any person or company.
12. To amalgamate, enter into partnerships or into any arrangements for sharing profits or losses, union of interests, co-operation, joint ventures or reciprocal concessions with any person or company carrying on or engaged in or about to carry on or engaged in or which can be carried on in conjunction therewith or which is capable of being conducted so as directly or indirectly to benefit the Company and to give or accept by way of consideration for any of the acts or things aforesaid or properties acquired, any shares, debentures, debenture-stock or securities that may be agreed upon and to hold and retain or sell, mortgage and deal with any shares, debentures, debenture-stock or securities so received.
13. To negotiate, enter into agreements and contracts or collaborate with foreign companies, firms and individuals for getting or supplying and procuring technical assistance, know-how in the marketing, importing and exporting of any of the products.
14. To become member of and to communicate with Chamber of Commerce and other mercantile and public bodies throughout the world and to advise on, concert, promote and support measures for the protection, advancement, growth of commerce and industry and for protection and welfare of persons engaged therein.
15. To take or hold mortgages, liens and charges, to secure the payment of the purchase price or any unpaid balance of the purchase price of any part of the Company's property of whatsoever kind sold by the Company or any money due to the Company from the purchaser and others.
16. To contract with lease holders, borrowers, lenders, annuitants and other for the establishment, accumulation, provisions and payment of sinking funds, renewal funds, redemption funds any other special funds and that either in consideration of lumpsum or of annual premium or otherwise and generally on such terms and conditions as may be arranged.
17. To undertake and execute any trust or discretion the undertaking whereof may seem desirable and the distribution amongst the beneficiaries, pensioners or other persons entitled to thereof, any income, capital, annuity or other sums of moneys or other properties whether periodically or otherwise and whether in money or in specimen in furtherance of any trust discretion or other obligation or permission.
18. To lend money, to, or provide guarantee or security on behalf of any subsidiary or group company, and guarantee obligations of any subsidiary or group company, and the payment of interest on any stocks, shares and securities of any company, firm or person in any case in which such loan, guarantee or security may be considered likely directly or indirectly to further the objects of this Company or any of its subsidiaries or group companies; and generally to give any guarantee or security whatsoever which may be deemed likely, directly or indirectly, to any person in benefit the Company or its members.
19. To train and get trained to and/or pay to training for the employees both present and future, for and in connection with the business of the Company.
20. To hold, administer, sell, realize, invest, dispose off the moneys and properties both real and personal and to carry on, sell, realize, dispose off and deal with any estate of which the Company is executor or administrator or in any trust of which the Company is the trustee or of which the Company is administrator or in an trust of which the Company is trustee or administrator, receiver, liquidator or agent.
21. To make deposit, enter into recognised bonds and otherwise give security for the execution of the offices and performance of the duties of executors, administrators and trustees, receivers, liquidators and agents.
22. To take such steps as may be necessary to give the Company the same rights and privileges in any part of the world as are possessed by local companies or partnership of a similar nature.



*T. H. ORAMA*

**T. H. ORAMA**  
 Assistant to Secretary  
 Government of Karnataka, Department of Industries  
 1st Floor, 2nd Stage, 1st Block



23. To apply for tender, purchase or otherwise acquire any contracts, sub-contracts, licences and concessions for or in relation to the objects or business herein mentioned or any of them and to execute, execute, carry out, dispose off or otherwise turn to account the same.
24. To dedicate present or otherwise dispose off either voluntarily or for value any property of the Company deemed to be of national, public or local interest to any national trust, public body, museum, corporation or authority or any trustees for or on behalf of the same or on behalf of the public.
25. To promote, assist or take part and appear or lead evidences before any commission, investigation, inquiry, trial or hearing, whether public or private, relating to matters connected with any trade, business or industry.
26. To promote co-operation, hold conferences, organise and participate in meetings, maintain bureau, carry on correspondence, arrange discussions, symposiums and debates, prepare statements, reports and articles relating to any and all matters of interest to the Company.
27. To acquire by purchase, lease, assignment or otherwise, lands, tenements, buildings, basements, rights and advantages of any kind whatsoever and to rent, mortgage and let on lease the same.
28. To subject all or any of the works, contracts from time to time and upon such terms and conditions as may be thought expedient.
29. To form, manage, join or subscribe to any syndicate, pool or cartel for the business of the Company.
30. Subject to the provisions of the Companies Act, 2013, to distribute among the members, in specie, any property of the Company or any proceeds of sale or disposal of any property in the event of winding up.
31. To enter into any arrangement with any Government or authority, supreme, municipal, local or otherwise or any persons or company that may seem conducive to the Company's objects or any of them and to obtain from any such Government, authority, person or company any rights, privileges, charters, licences and concessions which the Company may think fit and desirable to obtain and to carry out, exercise and comply therewith.
32. To apply for, promote and obtain any act, charter, order, regulation, privilege, concession, licence or authorization of any Government, State or municipality or any authority or any corporation or any Public Body which may be empowered to grant for enabling the Company to carry on its objects into effect or for extending any of powers of the Company or for affecting any modification of the Company's constitution or for any other purpose which may seem expedient and to oppose any bills, proceedings, applications which may seem calculated directly or indirectly to prejudice the Company's interest and to appropriate any of the Company's shares, debentures, debenture-stock or other securities and assets to defray the necessary costs, charges and expenses thereof.
33. To apply for purchase or otherwise acquire, use, protect and renew in any part of the world any patents, patent rights, brevets, invention, trademarks, designs, licences, copyrights, concessions and the like conferring any exclusive or non-exclusive or limited right to their use or any secret or other information as to any invention which may seem capable of being used for any of the purposes of the Company or acquisition of which may seem calculated directly or indirectly to benefit the Company and to use, exercise develop or grant licences in respect of or otherwise turn to account the property, rights or information so acquired and to expend money in experimenting upon, testing or improving any such patents, inventions or rights.
34. To establish, provide, maintain, conduct or otherwise subsidize, assist research laboratories and experimental workshops for scientific and technical researches and experiments and to undertake and carry on the scientific and technical research, experiments and tests of all kinds and to promote studies and research, both scientific and technical, investigations and invention by providing, subsidizing, endowing or assisting laboratories, workshops, libraries, the remuneration of scientific or technical professors or teachers and by providing for the award of scholarships, prizes and grant to students or otherwise and generally to encourage, promote and reward studies, researches, investigations, experiments, tests and inventions of



*T.N. DATTA*  
**T.N. DATTA**  
 Advocate at Law  
 Thiruvananthapuram District Court  
 Kerala State, India



any kind that may be considered likely to assist any of the businesses which the Company is authorized to carry on.

35. To make donations to such persons or institutions either of cash or any other assets as may be thought directly or indirectly conducive to any of Company's objects or otherwise and in particular to remunerate any person or corporation introducing business to this Company and also to subscribe, contribute or otherwise assist or guarantee money for charitable, scientific, religious or benevolent, national, public, cultural, educational or other institutions or objects or any exhibitions for any public, general or other objects.
36. To establish aid, support or fund in the establishment and support of association, institutions, funds, trusts, private or public, for the benefit of its employees or ex-employees, Directors, ex-Directors of the Company or its connections in business and for persons having dealings with the Company or the dependents, relatives or connections of such persons and in particular friendly or other benefit societies and grant pensions, allowances, gratuation and bonuses either by way of annual payment or lumpsum and to make payment towards insurance and to form and contribute to provident and other benefit funds for such persons and to provide for the welfare of Directors, ex-Directors and employees and ex-employees of the Company and the wives, widows and families of the dependents or connections of such persons by building or contributing to the building of houses, dwellings or chalets or by grant of money, pensions, allowances, bonuses or other payments and to provide or subscribe or contribute towards places of instructions and recreations, hospitals, dispensaries, holiday homes, medical and other attendance and other assistance as the Company shall think fit.
37. To refer or agree to refer any claims, demands, disputes or any other questions by or against the Company or in which the Company is interested or concerned and whether between the Company and the member or members or his or their representatives or between the Company and third parties to arbitration in India or any places outside India and to observe and perform awards made thereon and to do all acts, deeds, matters and things to carry out or enforce the awards in accordance with the provisions of India Arbitration Act.
38. To pay all preliminary expenses of any company promoted by the Company or any company in which the Company is or may contemplate being interested and preliminary expenses may include all or any part of the costs and expenses of owners of any business or property acquired by the Company.
39. To enter into joint sector arrangements with any person, body or corporate whether in India or abroad for the business of the Company.
40. To pay out of the funds of the Company, all expenses which the Company may lawfully pay with respect to the promotion, formation and registration of the Company or the issue of capital including brokerage and commission for obtaining applications for taking placing or underwriting of shares, debentures, debenture-stocks or other securities of the Company.
41. To pay for any rights or properties acquired by the Company and to pay or to remunerate any person or company for services rendered or to be rendered in placing or assisting to place or guaranteeing the placing of shares in Company's capital or any debentures, debenture stocks or other securities of the Company and/or about the formation or promotion of the company or acquisition of properties by the Company for the purpose of the Company whether by cash payment or by the allotment of shares, debentures, debenture-stocks or other securities of the Company credited as paid-up in full or in part or otherwise as the case may be.
42. To open current or fixed accounts with any bank, bankers, stock or merchants and to pay into and draw money from such accounts and to draw, make endorse, discount and execute all types of negotiable instruments.
43. To insure the whole or any part of the property and personnel of the Company either fully or partially, to protect and indemnify any part or portion thereof either on mutual principal or otherwise.
44. To employ experts to investigate and examine into conditions, value, character and circumstances of any business, concerns and undertakings having similar objects and generally of any assets, properties or rights.
45. To carry on any branch of a business whether in India or outside India which the Company is authorised to carry on by means or through the agency of any subsidiary company or

IV.





companies and to enter into any arrangement with such subsidiary company for taking the profits and bearing the losses of any business or branch so carried on or for finance any such subsidiary, guaranteeing its liabilities or to make any other arrangement which seem desirable with reference to any business or branch so carried on, including the power and provision at any time either temporarily or permanently to close any such branch of business.

46. To take part in the management, supervision, conduct and control of the business or operations of any company or undertaking having similar objects and for that purpose to appoint and remunerate the Directors, trustees, accountants or other experts, personnel or agent for any of such operations or purposes.
47. To purchase, take on lease or exchange, hire or otherwise acquire and dispose off any immovable or movable properties, real or personal of all kinds and of any rights or privileges which the Company may think necessary or convenient for the purpose of its business and either to retain the properties so acquired for the purpose of the Company's business or to turn the same to account as may seem expedient.
48. To accept as consideration for or in lieu of the whole or any part of the Company's properties either land or cash or Government security or securities guaranteed by Government or shares in joint stock companies or partly the one and partly the other and such other properties or securities as may be determined by the Company and to take back or acquire the property so disposed off by repurchasing or taking lease the same at such price and on such terms and conditions as may be agreed upon by the Company.
49. To let on lease, or license, or on hire purchase or to lend or any properties belonging to the Company and to finance for the purpose of any article or articles whether made by the Company or not by way of loans or by hire-purchase system.
50. To sell, purchase, mortgage, grant, lease and other rights over and in any other manner deal with the undertakings, properties, assets, both movable and immovable, rights, effects of the Company or any part thereof whether real or personal for such consideration as the Company may think fit and in particular for shares, debentures, debenture stock, securities of any other company whether or not having objects altogether or in part similar to those of the Company and to make advances upon the security of land and/or buildings and/or other properties movable and/or any interest therein.
51. To vest any movable or immovable properties, rights or interest acquired by or belonging to the Company in any person or company on behalf of or for the benefit of the Company and with or without any declared trust in favour of the Company.
52. To undertake and execute any contracts for works for the business of the Company.
53. To create any depreciation fund, reserve fund, sinking fund, insurance fund or any other special fund whether for depreciation or for repairing, improving, extending or maintaining any of the properties of the Company or for redemption of debentures or redeemable preference shares or any other purpose whatsoever conducive to the interest of the Company.
54. To accept, donations, gifts with such conditions, restrictions, obligations, stipulations and liabilities provided that such receipts are not derogative to any objects of the Company.
55. To alienate, transfer, gift, donate, settle any property of the Company with or without consideration to any person including any trust whether public or private, discretionary or specific either by revocable or irrevocable transfer or settlement and upon such terms and conditions as the Company may deem fit.
56. To explore, examine, investigation, test, make, experiment, obtain report, opinion of experts, certificates, analysis, surveys, plans, descriptions and information in relation to any property or right which the Company may acquire or become interested in or may propose to acquire or with the view of discovering properties or rights which company may acquire or become interested in and to engage, employ, pay fees to retain the services of and send to any part of the world agents, explorers, technical experts, engineers, lawyers and counsels.
57. To adopt such means of making known the business/activities of the Company as may seem expedient and in particular by advertising in the press by circulars, by purchase and exhibition of works of art or interest, by publications of books and periodicals and by granting prizes, rewards and donations.



58. To undertake, carry out, promote, sponsor, contribute or assist in any activity, project for rural development including any programme for promoting the social and economic welfare or or the upliftment of the people in rural areas irrespective whether the Company has any business dealings in such areas or not and to incur any expenditure or use any of the assets and facilities of the Company on any programme or project or activity or rural development and to assist execution and promotion thereof either directly or in association with any other company or person or organisation or through an independent agency or in any manner as the Company may deem fit in order to implement any of the projects or programmes or activities of rural development, to transfer without consideration or at such fair or concessional value and divert the ownership of the properties of the Company to or in favour of any public or local body, authority, Central or State Government or any public institution or trust or fund.
59. To raise or borrow money from time to time for any of the purposes and objects of the Company by receiving advances of any sum or sums with or without security upon such terms as the Directors may deem expedient and in particular by taking deposits from or open current accounts with any individual or firm including the agents of the Company, whether with or without giving the security or by mortgaging or selling or receiving advances on the sale of any lands, buildings, machineries, goods or other properties of the Company or by the issue of the debentures or debenture-stocks, perpetual or otherwise, charged upon all or any of Company's properties (both present and future) including its unutilised capital or by such other means as Directors may in their absolute discretion deem expedient.
60. Subject to the Companies Act, 2013 and rules made thereunder and directions issued by Reserve Bank of India, to borrow, raise, or secure the payment of money to or receive money and deposit as time deposit or otherwise at interest for any purpose of the Company and at such time or times and in such manner as may be thought fit and in particular by the creation and issue of the debentures or debenture-stock, bonds, shares credited as fully or partly paid up, obligations, mortgages, charges and securities of all kinds, either perpetual or otherwise either redeemable annuities in as and by way of securities for any such money so borrowed, raised or received or of any such debentures, debenture-stock, bonds, obligations, mortgage, charges and securities of all kinds, either so issued to mortgage, pledge or charge the underwriting or whole or any part of the properties, rights, assets or revenue and profits of the Company, present and future, including its unutilised capital or otherwise howsoever by trust, special assignment or otherwise or to transfer or convey the same absolutely or in trust and give the lenders powers as may seem expedient and to purchase, redeem or pay off any such securities. The Company shall not carry on business of Banking as defined by the Banking Regulation Act, 1949.
61. To promote or join in the promotion of any company or companies including subsidiary companies (wholly owned or partly owned) for the purpose of acquiring all or any of the properties, rights and liabilities of the Company or for any other purpose which may seem directly or indirectly calculated to benefit the Company and to underwrite shares and securities therein.
62. To indemnify, members, officers, Directors, agents and employees of the Company against proceedings, cost, damages, claims and demands in respect of anything done or ordered to be done by them and in the interest of the Company of any loss, damage or misfortune whatsoever which shall happen in the execution of the duties of their offices or in relation thereto.
63. Subject to the provisions of the Act, the Company shall have power to borrow any sum or sums of money for the purpose of the Company on such other terms and conditions and from such person or persons, firms, bank or any financial, industrial, institutions or any Government or Semi-Government Corporation as the Company may deem fit.
64. To provide for the welfare of Directors, employees or ex-employees of the Company and the wives, widows and families of the dependents or connections of such persons by building or contributing for the building, houses, dwelling or quarters, or by grants of money, pensions, gratuities, allowance, bonus, profit sharing bonus or bonafide or other payments or by creating and from time to time subscribing to contributing to provident and other associations, institutions, funds, profit sharing or other schemes or trust and hospitals and dispensaries, medical and other attendants, and other assistance as the Company shall think fit.





65. To undertake and/or direct all types of constructions and the maintenance of ground acquired by purchase, lease, exchange, hire or otherwise, lands, properties, buildings and estates of any tenure or any interest therein, to sell, lease let, mortgage or otherwise dispose off the same and to purchase, construct and sell or for any person free hold or lease hold lands, house properties, buildings, offices, factories, workshops, godowns, farm houses, farm and any kind of landed properties or any share/interest therein and to carry on the business of land and estate agents on commission or otherwise without commission.
66. To act as promoters and developers of lands, commercial buildings, offices or other buildings in furtherance of the objects and for the purpose to purchase, take on lease, acquire, hold, develop, prepare building sites, construct, reconstruct, repair, maintain, pull down, alter, improve, decrease, furnish, give on hire, purchase or on instalments or deal in any lands, commercial buildings, offices, works and sanitary conveniences of all kinds and to lay out roads, drainage pipes, water pipes and electric installations and to set apart lands for pleasure, gardens and recreation grounds or improve the land or any part thereof.
67. To establish, maintain and operate shipping, air transport and road transport services and all ancillary services and for these purposes as an independent undertaking to purchase, take in exchange, charter, hire, build, construct or otherwise acquire and to own, work, manage and trade with steam sailing, motor and other ships, trollers, duffers, tugs and vessels, aircraft and motor and other vehicles with all necessary and convenient equipments, engines, tools, gears, furniture and stores and to maintain, repair, fit out, refit, improve, insure, alter, sell, exchange or let out on hire or hire-purchase or charter or otherwise deal with and dispose off any of the ships, vessels, aircrafts and vehicles or any of the engines, tools, gears, furniture equipments and stores.
68. To establish the business of warehousing in all its aspects in India and elsewhere.
69. To purchase or acquire container stacking cranes, shuntle, Container Cranes, Van Movers, Trailers, Heavy Forklift Trucks, barges, Scales, Wooden Crates and Pallets, Portainers, Transainers, Saddle carriers and such other handling equipment and retain them as service in Docks, Container Freight and on roads.
70. To purchase, take on exchange or on lease or on hire, occupy, or otherwise acquire lands, warehouse, godowns and to erect, construct, build and establish Cold Storage Plants, Warehouses, godowns, Container Terminals and container freight stations or to enter into contracts with Government Bodies, to construct such container freight stations or terminals as required by them.
71. To manufacture and repair containers, to purchase or acquire on lease or otherwise containers and give them on lease or on rent.
72. To make available the warehousing facilities including cold storage facilities for stuffing and destuffing the cargo into the containers.
73. To erect/build container freight station or container terminals semi or fully automated.
74. To study, advice planning, management and administration of terminals, port operating companies; handling of general and RO/RO-LU/LO cargo, handling of bulk goods, warehousing, handling of containers, trucking of containers, collecting and disposal of oily residues, recycling of spent oil wastes.
75. To offer facilities and services for RO/RO handling such as despatch of all sizes of vessels, trailer handling, cargo lashing.
76. To offer facilities and services for port lighterage and barge transport for conventional and bulk cargo, container transport, heavy lifts and specialised transports, push boats and tug services, barge rental, storage in lighters.
77. To offer facilities and services for inland waterway transports, such as push boat, tugs and lock transports, bulk goods transports, forwarding storage.
78. To offer facilities and services for tank transportation in coast and inland waterway push boat transports of mineral and vegetable oils, chemicals and other liquids, bunkering, oily residues, ballast and tank wash water, transit storage of all types of oil.



*Dr. K. S. Narain*

SECRETARY

Ministry of Shipping, Government of India

- IV. The liability of the members is limited and this liability is limited to the amount unpaid, if any, on the shares held by them.
- V. The Authorised Share Capital of the Company is Rs. 5,00,000/- (Rupees Five Lacs Only) divided into 50,000 (Fifty Thousand) Equity Shares of Rs.10/- (Rupees Ten Only) each.

NOTARY  
T.M. OMARA  
Advocate & Notary  
Kannur District  
Kannur District  
Kannur District










*T.M. Omara*  
12/6/2018

T.M. OMARA  
Advocate & Notary  
Kannur District  
Kannur District  
Kannur District





We, the several persons, whose name and addresses are subscribed are desirous of being formed into a Company in pursuance of this Memorandum of Association and we respectively agree to take the respective number of shares in the capital of the Company set opposite our respective names:

Photo	Sr. No.	Name, Addresses, Descriptions, Occupation and Signature of the subscribers	Number of Equity Shares taken by each subscriber	Name, Address, Description and Occupation of the Common Witness
	1	For and on behalf of M/s Adani Ports and Special Economic Zone Limited (CIN L63030DL1998PLC034182) having its registered office at Adani House, Nr. Achakhal Six Roads, Navrangpura, Ahmedabad - 380009 through its authorised person vide Board Resolution passed on 1st May, 2015 Dipti Shah W/o Yogesh Shah residing at 601, Shalraj Tower, Nehru Park, Vasatpur, Ahmedabad-380015 Occupation: Service Sd/-	49,940 (Forty Nine Thousand Nine Hundred Forty only)	Common witness for all 7 subscribers, witness to subscribers who have subscribed and signed in my presence. Further, I have verified their/their identity details for their identification and satisfied myself at their identification particulars as filled in.  Hardik Sanghvi S/o. Shri. Jeshubhai Sanghvi residing at 15, Parshwanath Nagar Society, Nr. Police Chowk, Navapure One Rasta, Ahmedabad-380013, Occupation: Service Company Secretary FCS No. 7247 Sd/-
	2	Maley Mahadeva (As nominee of Adani Ports and Special Economic Zone Ltd.) S/o. Dr. Ramesh Mahadeva residing at 12-B, Gyanika Society, Opp. St. Xavier's College, Navrangpura, Ahmedabad - 380009 Occupation: Service Sd/-	10 (Ten Only)	
	3	Ravi Bhambhani (As nominee of Adani Ports and Special Economic Zone Ltd.) S/o. Shri. Srikanth Murthy Bhambhani residing at 'Anant' 23, Anantashree Bungalows Opp. Chinanthal Hotel Junction, Nr. Sabdarani, Prahladnagar, Ahmedabad-380010 Occupation: Service Sd/-	10 (Ten Only)	
	4	Azad Kumar Samant (As nominee of Adani Ports and Special Economic Zone Ltd.) S/o. Shri. Jyoti Prasad Samant residing at 84, Star Apartments, Karmaveer Jagatpura Road, Ahmedabad-380001 Occupation: Service Sd/-	10 (Ten Only)	
	5	Mangal Kumar Chanduka (As nominee of Adani Ports and Special Economic Zone Ltd.) S/o. Shri. Gishwanath Lal Chanduka residing at B-401, Panchanayik Apartments, Opp. Nehru Foundation Bungalow, Ahmedabad-380014 Occupation: Service Sd/-	10 (Ten Only)	
	6	Anish Ashokkumar Shah (As nominee of Adani Ports and Special Economic Zone Ltd.) S/o. Shri. Ashokkumar Anantlal Shah residing at B-12, Reshiv Apartments, Near Mominagar Talavdi, Mominagar, Ahmedabad-380052 Occupation: Service Sd/-	10 (Ten Only)	
	7	Kamlesh Bhagia (As nominee of Adani Ports and Special Economic Zone Ltd.) S/o. Shri. Prabhudas Bhagia residing at A-203, Samarthy Residency, Nr. R. H. Patel School, O'cebin, Kaligan, Sahamali, Ahmedabad-380019 Occupation: Service Sd/-	10 (Ten Only)	
Total:			50,000 (Fifty Thousand)	

Place: Ahmedabad

Dated: 22.07.2015



T. N. IDIANA  
Advocate & Notary

THE COMPANIES ACT, 2013  
[COMPANY LIMITED BY SHARES]

ARTICLES OF ASSOCIATION

OF

ADANI VIZHINJAM PORT PRIVATE LIMITED

PRELIMINARY AND INTERPRETATION

1. (1) The Regulations contained in Table F in Schedule I of the Companies Act, 2013 shall not apply to the Company, except in so far as the same are repeated, contained or expressly made applicable in these Articles or by the said Act.

- (2) (a) The marginal notes used in these Articles shall not affect the construction thereof.

- (b) In the interpretation of these Articles, the following expressions shall have the following meanings, unless repugnant to the subject or context:

"Act" means the Companies Act, 2013 or any statutory modification or re-enactment thereof for the time being in force and the Companies Act 1956, so far as may be applicable.

"Articles" means these articles of association of the Company or as altered from time to time.

"Board of Directors" or "Board" means collective body of Directors of the Company.

"Company" means "ADANI VIZHINJAM PORT PRIVATE LIMITED".

"Depository" means and includes a Company as defined in the Depositories Act 1996.

"Rules" means the applicable rule for the time being in force as prescribed in relevant sections of the Act.

"Seal" means Common Seal of the Company.

"Secretarial Standards" means standards provided by the Institute of Companies Secretaries of India.

"Securities" means the securities as defined in clause (h) of Section 2 of the Securities Contracts (Regulation) Act 1956.

*T.N. Chandra*

T. N. CHANDRA  
Advocate & Partner  
Thiruvananthapuram District  
Kerala State Bar Council





- (d) Words importing the singular number also include, where the context requires or admits, the plural number and vice versa.
- (e) Unless the context otherwise requires, words or expression contained in these Articles shall bear the same meaning as in the Act or the Rules, as the case may be.

#### PRIVATE COMPANY

2. The Company is a Private Company Limited by Shares within the meaning of Section 2(68) of the Act, and accordingly:
  - (a) Restricts the right to transfer its shares, in the manner and to the extent as hereinafter provided;
  - (b) Limits the number of its members to 200 [Two Hundred] but not including:
    - (i) Persons who are in the employment of the Company;
    - (ii) Persons who, having been formerly in the employment of the Company, were members of the Company while in that employment and have continued to be the members after the employment ceased; provided that where two or more persons hold one or more shares in the Company jointly, they shall, for the purpose of this Article, be treated as a single member.
  - (c) Prohibits any invitation to the public to subscribe for any securities of the Company;
  - (d) The Company is having a minimum paid up share capital of Rs. 1,00,000/- (Rupees One Lac only) or such higher amount of capital as may be prescribed.

#### SHARE CAPITAL AND VARIATION OF RIGHTS

3. Subject to the provisions of the Act and these Articles, the shares in the capital of the company shall be under the control of the Directors who may issue, allot or otherwise dispose of the same or any of them to such persons, in such proportion and on such terms and conditions and either at par or at a premium or at consideration otherwise than in cash and at such time as they may from time to time think fit. The Company may issue equity with voting rights and/or with differential rights as to dividend, voting or otherwise in accordance with the Rules and preference shares.
4. (i) Every person whose name is entered as a member in the register of members shall be entitled to receive within two months after allotment or within one month after the application for the registration of transfer or transmission or within such other period as the conditions of issue provide,

*T.M. GRANA*

**T.M. GRANA**  
 Advocate & Notary  
 District & Sessions Judge's Office  
 Kurnool State South India



such sum as may be prescribed for each certificate after the first.

- (i) Every certificate shall be under the seal and shall specify the shares to which it relates and the amount paid-up thereon.
- (ii) In respect of any share or shares held jointly by several persons, the company shall not be bound to issue more than one certificate, and delivery of a certificate for a share to one of several joint holders shall be sufficient delivery to all such holders.

5. Every holder of or subscriber to Securities of the Company shall have the option to receive security certificates or to hold the Securities with a depository. Such a person who is the beneficial owner of the Securities can at any time opt out of a Depository, if permitted, by the law, in respect of any Securities in the manner provided by the Depositories Act, 1996 and the Company shall, in the manner and within the time prescribed, issue to the beneficial owner the required Certificates for the Securities.

6. (i) If any share certificate be worn out, defaced, mutilated or torn or if there be no further space on the back for endorsement of transfer, then upon production and surrender thereof to the company, a new certificate may be issued in lieu thereof, and if any certificate is lost or destroyed then upon proof thereof to the satisfaction of the company and on execution of indemnity or such other documents as may be prescribed by the Board, a new certificate in lieu thereof shall be given. Every certificate under this Article shall be issued on payment of fees for each certificate as may be fixed by the Board.

(ii) The provisions of the foregoing article relating to issue of certificates shall mutatis mutandis apply to debentures or other securities of the company.

7. Except as required by law, no person shall be recognised by the company as holding any share upon any trust, and the company shall not be bound by, or be compelled in any way to recognise (even when having notice thereof) any equitable, contingent, future or partial interest in any share, or any interest in any fractional part of a share, or (except only as by these regulations or by law otherwise provided) any other rights in respect of any share except an absolute right to the entirety thereof in the registered holder.

8. (i) The company may exercise the powers of paying commissions conferred under the Act, provided that the rate per cent or the amount of the commission paid or agreed to be paid shall be disclosed in the manner required under the Act and rules made thereunder.

(ii) The rate or amount of the commission shall not exceed the rate or amount prescribed in rules made under the Act.

(iii) The commission may be satisfied by the payment of cash or the allotment of fully or partly paid shares or partly in the one way and partly in the other.

*T. E. Omana*

**T. E. OMANA**  
Advocate & Notary  
Osaka District, New District  
Kuala Lumpur, Kuala Lumpur





of the shares of that class) may, subject to the provisions of the Act, and whether or not the company is being wound up, be varied with the consent in writing of the holders of three-fourths of the issued shares of that class, or with the sanction of a special resolution passed at a separate meeting of the holders of the shares of that class.

- (ii) To every such separate meeting, the provisions of these regulations relating to general meetings shall mutatis mutandis apply.

10. The rights conferred upon the holders of the shares of any class issued with preferred or other rights shall not, unless otherwise expressly provided by the terms of issue of the shares of that class, be deemed to be varied by the creation or issue of further shares ranking *pari passu* therewith.

11. Subject to the provisions of the Act, any preference shares may be issued on the terms that they are to be redeemed or converted into equity shares on such terms and in such manner as the company before the issue of the shares may determine.

12. The Board or the Company as the case may be, may, by way of right issue or preferential offer or private placement or any other manner, subject to and in accordance with Act and the Rules, issue further securities to:

(a) persons who, at the date of the offer, are holders of equity shares of the Company. Such offer shall be deemed to include a right exercisable by the person concerned to renounce the shares offered to him or any of them in favor of other person or;

(a) employees under the employees' stock option or;

(c) any person whether or not those persons include the persons referred to in clause (a) or clause (b) above.

#### LIEN

13. (i) The company shall have a first and paramount lien-

(a) on every share (not being a fully paid share), for all monies (whether presently payable or not) called, or payable at a fixed time, in respect of that share; and

(b) on all shares (not being fully paid shares) standing registered in the name of a single person, for all monies presently payable by him or his estate to the company;

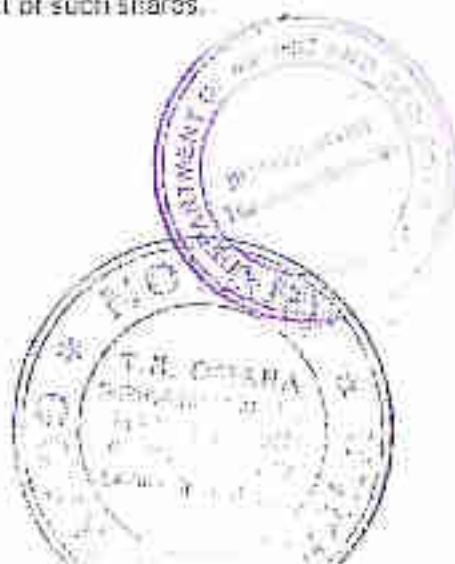
Provided that the Board of directors may at any time declare any share to be wholly or in part exempt from the provisions of this clause.

- (ii) The company's lien, if any, on a share shall extend to all dividends payable and bonuses declared from time to time in respect of such shares.

*T.H. Ojha*

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T.H. OJHA  
President, T.H. Ojha  
The Government of Odisha, District  
Kendrapada, Kendrapada



Provided that no sale shall be made-

- (a) unless a sum in respect of which the lien exists is presently payable; or
- (b) until the expiration of fourteen days after a notice in writing stating and demanding payment of such part of the amount in respect of which the lien exists as is presently payable, has been given to the registered holder for the time being of the share or the person entitled thereto by reason of his death or insolvency.

15. (i) To give effect to any such sale, the board may authorise some person to transfer the shares sold to the purchaser thereof.
- (ii) The purchaser shall be registered as the holder of the shares comprised in any such transfer.
- (iii) The purchaser shall not be bound to see to the application of the purchase money, nor shall his title to the shares be affected by any irregularity or invalidity in the proceedings in reference to the sale.
16. (i) The proceeds of the sale shall be received by the company and applied in payment of such part of the amount in respect of which the lien exists as is presently payable.
- (ii) The residue, if any, shall, subject to a like lien for sums not presently payable as existed upon the shares before the sale, be paid to the person entitled to the shares at the date of the sale.

The provisions of these Articles relating to Lien shall mutatis mutandis apply to any other Securities including debentures of the Company.

#### CALLS ON SHARES

17. (i) The Board may, from time to time, make calls upon the members in respect of any monies unpaid on their shares (whether on account of the nominal value of the shares or by way of premium) and not by the conditions of allotment thereof made payable at fixed times:

Provided that no call shall exceed one fourth of the nominal value of the share or be payable at less than one month from the date fixed for the payment of the last preceding call.

- (ii) Each member shall, subject to receiving at least fourteen days' notice specifying the time or times and place of payment, pay to the company, at the time or times and place so specified, the amount called on his shares.
- (iii) A call may be revoked or postponed at the discretion of the Board.
18. A call shall be deemed to have been made at the time when the resolution of the Board authorising the call was passed and may be required to be paid by instalments.

*T. N. B. Rao*





20. (i) If a sum called in respect of a share is not paid before or on the day appointed for payment thereof, the person from whom the sum is due shall pay interest thereon from the day appointed for payment thereof to the time of actual payment at ten per cent per annum or at such lower rate, if any, as the Board may determine.
- (ii) The Board shall be at liberty to waive payment of any such interest wholly or in part.
21. (i) Any sum which by the terms of issue of a share becomes payable on allotment or at any fixed date, whether on account of the nominal value of the share or by way of premium, shall, for the purposes of these regulations, be deemed to be a call duly made and payable on the date on which by the terms of issue such sum becomes payable.
- (ii) In case of non-payment of such sum, all the relevant provisions of these regulations as to payment of interest and expenses, forfeiture or otherwise shall apply as if such sum had become payable by virtue of a call duly made and notified.
22. The Board:
- (a) may, if it thinks fit, receive from any member willing to advance the same, all or any part of the monies uncalled and unpaid upon any shares held by him; and
- (b) upon all or any of the monies so advanced, may (until the same would, but for such advance, become presently payable) pay interest at such rate not exceeding, unless the company in general meeting shall otherwise direct, twelve per cent per annum, as may be agreed upon between the Board and the member paying the sum in advance.

#### TRANSFER OF SHARES

23. (i) The instrument of transfer of any share in the company shall be executed by or on behalf of both the transferor and transferee.
- (ii) The transferor shall be deemed to remain a holder of the share until the name of the transferee is entered in the register of members in respect thereof.
24. The Board may, subject to the right of appeal conferred by the Act decline to register-
- (a) the transfer of a share, not being a fully paid share, to a person of whom they do not approve; or
- (b) any transfer of shares on which the company has a lien.



*T. N. Omana*

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Thiruvananthapuram District  
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(a) the instrument of transfer is in the form as prescribed in rules made under the Act;

(b) the instrument of transfer is accompanied by the certificate of the shares to which it relates, and such other evidence as the Board may reasonably require to show the right of the transferor to make the transfer; and

(c) the instrument of transfer is in respect of only one class of shares.

26. On giving not less than seven days' previous notice in accordance with the Act and rules made there under, the registration of transfers may be suspended at such times and for such periods as the Board may from time to time determine:

Provided that such registration shall not be suspended for more than thirty days at any one time or for more than forty-five days in the aggregate in any year.

27. The provision of these Articles relating to transfer of shares shall mutatis mutandis apply to any other securities including debentures of the Company.

#### TRANSMISSION OF SHARES

28. (i) On the death of a member, the survivor or survivors where the member was a joint holder, and his nominee or nominees or legal representatives where he was a sole holder, shall be the only persons recognised by the company as having any title to his interest in the shares.

(ii) Nothing in clause (i) shall release the estate of a deceased joint holder from any liability in respect of any share which had been jointly held by him with other persons.

29. (i) Any person becoming entitled to a share in consequence of the death or insolvency of a member may, upon such evidence being produced as may from time to time properly be required by the Board and subject as hereinafter provided, elect, either-

(a) to be registered himself as holder of the share; or

(b) to make such transfer of the share as the deceased or insolvent member could have made.

(ii) The Board shall, in either case, have the same right to decline or suspend registration as it would have had, if the deceased or insolvent member had transferred the share before his death or insolvency.

30. (i) If the person so becoming entitled shall elect to be registered as holder of the share himself, he shall deliver or send to the company a notice in writing signed by him stating that he so elects.



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- (11) All the limitations, restrictions and provisions of these regulations relating to the right to transfer and the registration of transfers of shares shall be applicable to any such notice or transfer as aforesaid as if the death or insolvency of the member had not occurred and the notice or transfer were a transfer signed by that member.

31. A person becoming entitled to a share by reason of the death or insolvency of the holder shall be entitled to the same dividends and other advantages to which he would be entitled if he were the registered holder of the share, except that he shall not, before being registered as a member in respect of the share, be entitled in respect of it to exercise any right conferred by membership in relation to meetings of the company:

Provided that the Board may, at any time, give notice requiring any such person to elect either to be registered himself or to transfer the share, and if the notice is not complied with within ninety days, the Board may thereafter withhold payment of all dividends, bonuses or other monies payable in respect of the share, until the requirements of the notice have been complied with.

32. The Company shall incur no liability or responsibility whatsoever in consequence of its registering or giving effect to any transfer of shares made or purporting to be made by any apparent legal owner thereof (as shown or appearing in the Register of Members) to the prejudice of persons having or claiming any equitable right, title or interest in or in the said shares, notwithstanding that the company may have had notice of such equitable right, title or interest or notice prohibiting registration of such transfer and may have entered such notice referred thereto in any book of the company and the company shall not be bound or required to regard or attend or give effect to any notice which may be given to it of any equitable right, title or interest or be under any liability whatsoever for refusing or neglecting so to do, though it may have been entered or referred to in some book of the company, but the company shall nevertheless be at liberty to regard and attend to any such notice and give effect thereto if the Directors shall so think fit.

#### FOREFEITURE OF SHARES

33. If a member fails to pay any call, or installment of a call, on the day appointed for payment thereof, the Board may, at any time thereafter during such time as any part of the call or installment remains unpaid, serve a notice on him requiring payment of so much of the call or installment as is unpaid, together with any interest which may have accrued.

34. The notice aforesaid shall—

- (a) name a further day (not being earlier than the expiry of fourteen days from the date of service of the notice) on or before which the payment required by the notice is to be made; and

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T.N. GNANAPAVAN

Attorney-at-Law

Ministry of Agriculture, Fisheries and Aquaculture  
Kuala Lumpur, Malaysia



forfeited.

35. If the requirements of any such notice as aforesaid are not complied with, any share in respect of which the notice has been given may, at any time thereafter, before the payment required by the notice has been made, be forfeited by a resolution of the Board to that effect.
36. (i) A forfeited share may be sold or otherwise disposed of on such terms and in such manner as the Board thinks fit.
- (ii) At any time before a sale or disposal as aforesaid, the Board may cancel the forfeiture on such terms as it thinks fit.
37. (i) A person whose shares have been forfeited shall cease to be a member in respect of the forfeited shares, but shall, notwithstanding the forfeiture, remain liable to pay to the company all monies which, at the date of forfeiture, were presently payable by him to the company in respect of the shares.
- (ii) The liability of such person shall cease if and when the company shall have received payment in full of all such monies in respect of the shares.
38. (i) A duly verified declaration in writing that the declarant is a director, the manager or the secretary, of the company, and that a share in the company has been duly forfeited on a date stated in the declaration, shall be conclusive evidence of the facts therein stated as against all persons claiming to be entitled to the share;
- (ii) The company may receive the consideration, if any, given for the share on any sale or disposal thereof and may execute a transfer of the share in favour of the person to whom the share is sold or disposed of;
- (iii) The transferee shall thereupon be registered as the holder of the share; and
- (iv) The transferee shall not be bound to see to the application of the purchase money, if any, nor shall his title to the share be affected by any irregularity or invalidity in the proceedings in reference to the forfeiture, sale or disposal of the share.
39. The provisions of these regulations as to forfeiture shall apply in the case of non-payment of any sum which, by the terms of issue of a share, becomes payable at a fixed time, whether on account of the nominal value of the share or by way of premium, as if the same had been payable by virtue of a call duly made and notified.

#### ALTERATION OF CAPITAL

40. Subject to provisions of the Act the company may, from time to time, increase the share capital by such sum, to be divided into shares of such amount, as may be specified in the resolution.



*T. S. Srinivasan*



- (a) consolidate and divide all or any of its share capital into shares of larger amount than its existing shares;
- (b) convert all or any of its fully paid-up shares into stock, and reconvert that stock into fully paid-up shares of any denomination;
- (c) sub-divide its existing shares or any of them into shares of smaller amount than is fixed by the memorandum;
- (d) cancel any shares which, at the date of the passing of the resolution, have not been taken or agreed to be taken by any person.

42.

Where shares are converted into stock:-

- (a) the holders of stock may transfer the same or any part thereof in the same manner as, and subject to the same regulations under which, the shares from which the stock arose might before the conversion have been transferred, or as near thereto as circumstances admit;

Provided that the Board may, from time to time, fix the minimum amount of stock transferable, so, however, that such minimum shall not exceed the nominal amount of the shares from which the stock arose.

- (b) the holders of stock shall, according to the amount of stock held by them, have the same rights, privileges and advantages as regards dividends, voting at meetings of the company, and other matters, as if they held the shares from which the stock arose; but no such privilege or advantage (except participation in the dividends and profits of the company and in the assets on winding up) shall be conferred by an amount of stock which would not, if existing in shares, have conferred that privilege or advantage;
- (c) such of the regulations of the company as are applicable to paid-up shares shall apply to stock and the words "share" and "shareholder" in those regulations shall include "stock" and "stock-holder" respectively.

43.

The company may, subject to provisions of the Act, reduce in any manner and with, and subject to, any incident authorised and consent required by law:-

- (a) its share capital;
- (b) any capital redemption reserve account; or
- (c) any share premium account;
- (d) any other reserve in the nature of share capital.

#### CAPITALISATION OF PROFITS

44. (i)

The company in general meeting may, upon the recommendation of the Board, resolve:-



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*T.N. GRANA*  
T.N. GRANA  
Assistant Engineer  
Thiruvananthapuram District  
Kerala State South India

or to the credit of the profit and loss account, or otherwise available for distribution; and

(b) that such sum be accordingly set free for distribution in the manner specified in clause (i) amongst the members who would have been entitled therein, if distributed by way of dividend and in the same proportions;

(ii) The sum aforesaid shall not be paid in cash but shall be applied, subject to the provision contained in clause (iii), either in or towards-

(a) paying up any amounts for the time being unpaid on any shares held by such members respectively;

(b) paying up in full, unissued shares of the company to be allotted and distributed, credited as fully paid-up, to and amongst such members in the proportions aforesaid;

(c) partly in the way specified in sub-clause (a) and partly in that specified in sub-clause (b);

(d) A securities premium account and a capital redemption reserve account may, for the purposes of this regulation, be applied in the paying up of unissued shares to be issued to members of the company as fully paid bonus shares;

(e) The Board shall give effect to the resolution passed by the company in pursuance of this regulation

45. (i) Whenever such a resolution as aforesaid shall have been passed, the Board shall

(a) make all appropriations and applications of the undivided profits resolved to be capitalised thereby, and all allotments and issues of fully paid shares if any; and

(b) generally do all acts and things required to give effect thereto.

(ii) The Board shall have power-

(a) to make such provisions, by the issue of fractional certificates or by payment in cash or otherwise as it thinks fit, for the case of shares becoming distributable in fractions; and

(b) to authorise any person to enter, on behalf of all the members entitled thereto, into an agreement with the company providing for the allotment to them respectively, credited as fully paid-up, of any further shares to which they may be entitled upon such capitalisation, or as the case may require, for the payment by the company on their behalf, by the



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Director, Registrar of Companies  
Government of India, New Delhi



unpaid on their existing shares;

- (iii) Any agreement made under such authority shall be effective and binding on such members.

#### BUY-BACK OF SHARES

46. Notwithstanding anything contained in these articles but subject to the provisions of the Act or any other law for the time being in force, the company may purchase its own shares or other specified securities.

#### GENERAL MEETINGS

47. All General Meetings other than Annual General Meeting shall be called Extraordinary General Meeting.  
48. The Board may, whenever it thinks fit, call an Extraordinary General Meeting.

#### PROCEEDINGS AT GENERAL MEETINGS

49. (i) No business shall be transacted at any general meeting unless a quorum of members is present at the time when the meeting proceeds to business.  
(ii) Save as otherwise provided herein, the quorum for the general meetings shall be as provided in the Act.  
50. The chairperson, if any, of the Board shall preside as Chairperson at every general meeting of the company.  
51. If there is no such Chairperson, or if he is not present within fifteen minutes after the time appointed for holding the meeting, or is unwilling to act as chairperson of the meeting, the directors present shall elect one of their members to be Chairperson of the meeting.  
52. If at any meeting no director is willing to act as Chairperson or if no director is present within fifteen minutes after the time appointed for holding the meeting, the members present shall choose one of their members to be Chairperson of the meeting.  
53. On any business at any general meeting in the case of an equality of votes, whether on a show of hands, electronically or on a poll, the Chairman of the meeting shall have second or casting vote.

#### ADJOURNMENT OF MEETING

54. (i) The Chairperson may, *suo moto* and, in the absence of quorum shall adjourn the meeting from time to time and from place to place.  
(ii) No business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting from which the adjournment took place.



*T.N. OMATA*

T.N. OMATA  
Assistant & Deputy  
District Officer, Kathmandu District

- (iv) Save as aforesaid, and as provided in the Act, it shall not be necessary to give any notice of an adjournment or of the business to be transacted at an adjourned meeting.

#### VOTING RIGHTS

55. Subject to any rights or restrictions for the time being attached to any class or classes of shares:-
- (a) on a show of hands, every member present in person shall have one vote; and
- (b) on a poll or through voting by electronic means, the voting rights of members shall be in proportion to his share in the paid-up equity share capital of the company.
56. A member may exercise his vote at a meeting by electronic means in accordance with the Act and shall vote only once.
57. (i) In the case of joint holders, the vote of the senior who tenders a vote, whether in person or by proxy, shall be accepted to the exclusion of the votes of the other joint holders.
- (ii) For this purpose, seniority shall be determined by the order in which the names stand in the register of members.
58. A member of unsound mind, or in respect of whom an order has been made by any court having jurisdiction in lunacy, may vote, whether on a show of hands or on a poll or through voting by electronic means, by his nominee or other legal guardian, and any such nominee or guardian may, on a poll, vote by proxy.
59. Any business other than that upon which a poll has been demanded may be proceeded with, pending the taking of the poll.
60. No member shall be entitled to vote at any general meeting unless all calls or other sums presently payable by him in respect of shares in the company have been paid.
61. (i) No objection shall be raised to the qualification of any voter except at the meeting or adjourned meeting at which the vote objected to is given or tendered, and every vote not disallowed at such meeting shall be valid for all purposes.
- (ii) Any such objection made in due time shall be referred to the Chairperson of the meeting, whose decision shall be final and conclusive.



*T.A. Qasana*  
Y.H. QASANA  
Deputy Commissioner, District  
Jammu & Kashmir



62. The instrument appointing a proxy and the power-of-attorney or other authority, if any, under which it is signed or a notarised copy of that power or authority, shall be deposited at the registered office of the company not less than 48 hours before the time for holding the meeting or adjourned meeting at which the person named in the instrument proposes to vote, or in the case of a poll, not less than 24 hours before the time appointed for taking of the poll; and in default the instrument of proxy shall not be treated as valid.

63. An instrument appointing a proxy shall be in the form as prescribed in the rules made under the Act.

64. A vote given in accordance with the terms of an instrument of proxy shall be valid, notwithstanding the previous death or insanity of the principal or the revocation of the proxy or of the authority under which the proxy was executed, or the transfer of the shares in respect of which the proxy is given:

Provided that no intimation in writing of such death, insanity, revocation or transfer shall have been received by the company at its office before the commencement of the meeting or adjourned meeting at which the proxy is used.

#### BOARD OF DIRECTORS

65. (i) Until otherwise determined by a General Meeting of the Company and subject to the provisions of the Act, the number of Directors shall not be less than three nor more than fifteen.

(ii) The first Directors of the Company are:

1. Sudipta Bhattacharya (DIN: 06817333)
2. Karan Adani (DIN: 03088095)
3. Santosh Kumar Mohapatra (DIN: 00284280)

66. Subject to provisions of the Act, the Board shall have the power to determine the directors whose period of office is or is not liable to determination by retirement of directors by rotation.

67. The same individual may, at the same time, be appointed as Chairman as well as Managing Director or Chief Executive Officer of the Company.

68. (i) The remuneration of the directors shall, in so far as it consists of a monthly payment, be deemed to accrue from day-to-day.

(ii) In addition to the remuneration payable to them in pursuance of the Act, the directors may be paid all travelling, hotel and other expenses properly incurred by them:-

(a) in attending and returning from meetings of the Board of Directors or any committee thereof or general meetings of the company; or

(b) in connection with the business of the company.



*T. N. Ghosh*  
T. N. GHOSH  
Advocate & Solicitor  
Bhubaneswar, Odisha

provisions of under the Act) make and vary such regulations as it may think fit respecting the keeping of any such register.

70. All cheques, promissory notes, drafts, hundis, bills of exchange and other negotiable instruments, and all receipts for monies paid to the company, shall be signed, drawn, accepted, endorsed or otherwise executed, as the case may be, by such person and in such manner as the Board shall from time to time by resolution determine.
71. Every director present at any meeting of the Board or of a committee thereof shall sign against his name in a book to be kept for that purpose.
72. (i) Subject to the provisions of the Act, the Board shall have power at any time, and from time to time, to appoint a person as an Additional Director, provided the number of the Directors and Additional Directors together shall not at any time exceed the maximum strength fixed for the Board by the articles.
- (ii) Such person shall hold office only up to the date of the next Annual General Meeting of the company but shall be eligible for appointment by the company as a Director at that meeting subject to the provisions of the Act.
73. (i) The Board may appoint an Alternate Director to act for a Director (herein after in this Article called 'the Original Director') during his absence for a period not less than three months from India. No person shall be appointed as an Alternate Director for an Independent Director unless he is qualified to be appointed as an Independent Director under the provisions of the Act.
- (ii) An Alternate Director shall not hold office for a period longer than that permissible to the Original Director in whose place he has been appointed and shall vacate the office if and when Original Director returns to India.
- (iii) If the term of office of the Original Director is determined before he returns to India the automatic reappointment or re-appointing directors in default of another appointment shall apply to the Original Director and not the Alternate Director.
74. (i) If the office of any director appointed by the Company in general meeting is vacated before his term of office expires in the normal course, the resulting casual vacancy may be filled by the Board of Directors at a meeting of the Board.
- (ii) The Director so appointed shall hold office only upto the date till which the Director in whose place he is appointed would have held office if it had not been vacated.

#### NOMINEE DIRECTOR

25. Notwithstanding anything to the contrary contained in these Articles, so long as any moneys shall be owing by the Company to the any financial institutions, corporations, banks or such other financing entities, or so long as



*M. P. M.*

Director, District Office, Punalur, District  
Kerala State, South India.



subscription or so long as any guarantee given by any of the aforesaid financial institutions or such other financing entities in respect of any financial obligation or commitment of the Company remains outstanding then in that event any of the said financial institutions or such other financing entities shall, subject to an agreement in that behalf between it and the Company, have a right but not an obligation, to appoint one or more persons as Director(s) on the Board of Directors as their nominee on the Board of Company. The aforesaid financial institutions or such other financing entities may at any time and from time to time remove the Nominee Director appointed by it and may in the event of such removal and also in case of the Nominee Director ceasing to hold office for any reason whatsoever including resignation or death, appoint other or others to fill up the vacancy. Such appointment or removal shall be made in writing by the relevant corporation and shall be delivered to the Company and the Company shall have no power to remove the Nominee Director from office. Each such Nominee Director shall be entitled to attend all General Meetings, Board Meetings and meetings of the Committee of which he is a member and he and the financial institutions or such other financing entities appointing him shall also be entitled to receive notice of all such meetings.

#### MANAGEMENT UNDER GENERAL CONTROL OF DIRECTORS

76. (i) The general control, management and supervision of the Company shall vest in the Board and the Board may exercise all such powers and do all such acts and things as the Company is by its Memorandum of Association or otherwise authorised except as are required to be exercised or done by the Company in General Meeting, but subject nevertheless to the provisions of the Act, and of these presents and to any regulations not being inconsistent with these presents from time to time made by the Company in General Meeting provided that no such regulation shall invalidate any prior acts of the Directors which would have been valid if such regulation had not been made.
- (ii) Subject to the provisions of the Act, the Director may borrow, raise and secure the payment of such sum or sums in such manner and upon such terms and conditions in all respects as they may think fit and in particular by the issue of bonds, perpetual or redeemable, debenture or debenture-stock or any mortgage or charge or other security on the undertaking of the whole or any part of the property of the Company (both present and future) including its uncalled capital for the time being.
- (iii) Subject to the provisions of the Act, the Company may enter into any contract, arrangement or agreement in which a Director or Directors of the Company are, in any manner, interested.
- (iv) A Director, Managing Director, officer or employee of the Company may be or become a Director, of any company promoted by the Company or in which it may be interested as a vendor, member or otherwise, and no such Director shall be accountable for any benefits received as Director or member of such company except to the extent and under the circumstances as may be provided in the Act.



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**T. R. V. JAYARAJ**  
 Assistant Secretary  
 Industries and Commerce Department, Kerala State

subject to the provisions of the Act execute or cause to be executed any mortgage, charge or security over or affecting the whole or any part of the assets of the Company by way of indemnity to secure the Directors or persons so becoming liable as aforesaid from any loss in respect of such liability.

- (vi) A Director may resign from his office upon giving notice in writing to the Company.

#### PROCEEDINGS OF THE BOARD

77. (i) The Board of Directors may meet for the conduct of business, adjourn and otherwise regulate its meetings as it thinks fit.
- (ii) A Director may, and the manager or secretary on the requisition of a director shall, at any time, summon a meeting of the Board.
78. (i) Save as otherwise expressly provided in the Act, questions arising at any meeting of the Board shall be decided by a majority of votes.
- (ii) In case of an equality of votes, the Chairperson of the Board shall have a second or casting vote.
79. The continuing Directors may act notwithstanding any vacancy in the Board; but, if and so long as their number is reduced below the quorum fixed by the Act for a meeting of the Board, the continuing directors or director may act for the purpose of increasing the number of directors to that fixed for the quorum, or of summoning a general meeting of the company, but for no other purpose.
80. (i) The Board may elect a Chairperson of its meetings and determine the period for which he is to hold office.
- (ii) If no such Chairperson is elected, or if at any meeting the Chairperson is not present within five minutes after the time appointed for holding the meeting, the directors present may choose one of their number to be Chairperson of the meeting.
81. (i) The Board may, subject to the provisions of the Act, delegate any of its powers to committees consisting of such member or members of its Body as it thinks fit.
- (ii) Any committee so formed shall, in the exercise of the powers so delegated, conform to any regulations that may be imposed on it by the Board.
82. (i) A committee may elect a Chairperson of its meetings.
- (ii) If no such Chairperson is elected, or if at any meeting the Chairperson is not present within five minutes after the time appointed for holding the meeting,



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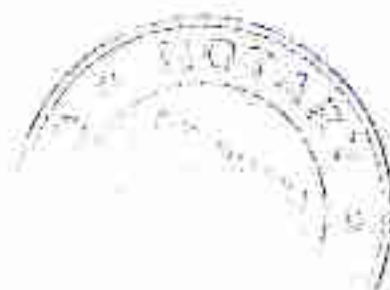
83. (i) A committee may meet and adjourn as it thinks fit.
- (ii) Questions arising at any meeting of a committee shall be determined by a majority of votes of the members present, and in case of an equality of votes, the Chairperson shall have a second or casting vote.
84. All acts done in any meeting of the Board or of a committee thereof or by any person acting as a Director, shall, notwithstanding that it may be afterwards discovered that there was some defect in the appointment of any one or more of such Directors or of any person acting as aforesaid, or that they or any of them were disqualified, be as valid as if every such Director or such person had been duly appointed and was qualified to be a Director.
85. Save as otherwise expressly provided in the Act, a resolution in writing, signed by all the members of the Board or of a committee thereof, whether manually or electronically, for the time being entitled to receive notice of a meeting of the Board or committee, shall be valid and effective as if it had been passed at a meeting of the Board or committee, duly convened and held.

#### MANAGING DIRECTORS

86. (i) Subject to the provisions of the Act and of these Articles the Board shall have power to appoint from time to time any of its members as Managing Director or Managing Directors and/or Whole Time Directors of the Company for a fixed term not exceeding five years at a time and upon such terms and conditions, including liability to retire by rotation, as the Board thinks fit, and the Board may by resolution vest in such Managing Director or Managing Directors/Whole Time Director(s), such of the power hereby vested in the Board generally as it thinks fit, and such powers may be made exercisable for such period or periods, and upon such condition and subject to such restriction as it may determine, the remuneration of such Directors may be way of monthly remuneration and/ or fee for each meeting and/or participation in profits, or by any or all of those modes, or of any other mode not expressly prohibited by the Act.
- (ii) The Directors may whenever they appoint more than one Managing Director designate one or more of them as "Joint Managing Director" or "Joint Managing Directors" or "Deputy Managing Directors" as the case may be.
- (iii) Subject to the provisions of the Act, the appointment and payment of remuneration to the above Director shall be subject to approval of the members in the General Meeting and of the Central Government, if required.

#### CHIEF EXECUTIVE OFFICER, MANAGER, COMPANY SECRETARY OR CHIEF FINANCIAL OFFICER

87. Subject to the provisions of the Act,-
- (i) A Chief Executive Officer, Manager, Company Secretary or Chief Financial Officer may be appointed by the Board for such term, at such



*T. H. Qureshi*  
T. H. QURESHI  
CHIEF FINANCIAL OFFICER

officer so appointed may be removed by means of a resolution of the Board;

- (ii) A Director may be appointed as Chief Executive Officer, Manager, Company Secretary or Chief Financial Officer.

A provision of the Act or these regulations requiring or authorizing a thing to be done by or to a Director and Chief Executive Officer, Manager, Company Secretary or Chief Financial Officer shall not be satisfied by its being done by or to the same person acting both as Director and as, or in place of, Chief Executive officer, Manager, Company secretary or Chief Financial Officer.

#### THE SEAL

88. (i) The Board shall provide for the safe custody of the seal.
- (ii) The seal of the company shall not be affixed to any instrument except by the authority of a resolution of the Board or of a committee of the Board authorised by it in that behalf, and except in the presence of at least one Director or of the Manager or Secretary or such other person as the Board or Committee may appoint for the purpose; and the Director or Manager or Secretary or other person aforesaid shall sign every instrument to which the seal of the company is so affixed in his /her presence.

#### DIVIDENDS AND RESERVE

89. The company in general meeting may declare dividends, but no dividend shall exceed the amount recommended by the Board, but the Company in a general meeting may declare a lesser dividend.
90. Subject to the provisions of the Act, the Board may from time to time pay to the members such interim dividends of such amount on such class of shares as appear to it to be justified by the profits of the company.
91. (i) The Board may before recommending any dividend, set aside out of the profits of the company such sums as it thinks fit as a reserve or reserves which shall, at the discretion of the Board, be applicable for any purpose to which the profits of the company may be properly applied, including provision for meeting contingencies or for equalising dividends; and pending such application, may, at the like discretion, either be employed in the business of the company or be invested in such investments (other than shares of the company) as the Board may, from time to time, think fit.
- (ii) The Board may also carry forward any profits which it may consider necessary not to divide, without setting them aside as a reserve.
92. (i) Subject to the rights of persons, if any, entitled to shares with special rights as to dividends, all dividends shall be declared and paid according to the amounts paid or credited as paid on the shares in respect whereof the

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*T. N. OMARA*  
T. N. OMARA  
District Officer, Kollam  
Kollam District





amounts of the shares.

- (ii) No amount paid or credited as paid on a share in advance of calls shall be treated for the purposes of this Article as paid on the share.
- (iii) All dividends shall be apportioned and paid proportionately to the amounts paid or credited as paid on the shares during any portion or portions of the period in respect of which the dividend is paid; but if any share is issued on terms providing that it shall rank for dividend as from a particular date such share shall rank for dividend accordingly.

93. The Board may deduct from any dividend payable to any member all sums of money, if any, presently payable by him to the company on account of calls or otherwise in relation to the shares of the company.

94. (i) Any dividend, interest or other monies payable in cash in respect of shares may be paid by electronic mode or by cheque or warrant sent through the post directed to the registered address of the holder or, in the case of joint holders, to the registered address of that one of the joint holders who is first named on the register of members, or to such person and to such address as the holder or joint holders may in writing direct.

(ii) Every such cheque or warrant shall be made payable to the order of the person to whom it is sent.

(iii) Payment in any way whatsoever shall be made at the risk of the person entitled to the money paid or to be paid. The Company will not be responsible for any payment which is lost or delayed. The Company will be deemed to having made a payment and received a good discharge for it if the payment using any of the foregoing permissible means is made.

95. Any one of two or more joint holders of a share may give effective receipts for any dividends, bonuses or other monies payable in respect of such share.

96. Notice of any dividend that may have been declared shall be given to the persons entitled to share therein in the manner mentioned in the Act.

97. The waiver in whole or in part of any dividend on any share by any document shall be effective only if such document is signed by the member (or the person entitled to the share in consequence of death or bankruptcy of the holder) and delivered to the Company and if or to the extent that the same is accepted as such or acted upon by the Board.

98. No dividend shall bear interest against the company.

#### ACCOUNTS

99. (i) The books of accounts and books and papers of the Company, or any of them, shall be open to the inspection of Directors in accordance with the applicable

20



T.N. CHANDRA  
Assistant District Officer  
Munakrishna Nagar, Tumkur District  
Bangalore District, Karnataka

- (ii) No member (not being a director) shall have any right of inspecting any account or book or document of the company except as conferred by law or authorised by the Board or by the company in general meeting.

#### WINDING UP

100. Subject to the applicable provisions of the Act and rules made thereunder:-

- (i) If the company shall be wound up, the liquidator may, with the sanction of a special resolution of the company and any other sanction required by the Act, divide amongst the members, in specie or kind, the whole or any part of the assets of the company, whether they shall consist of property of the same kind or not.
- (ii) For the purpose aforesaid, the liquidator may set such value as he deems fair upon any property to be divided as aforesaid and may determine how such division shall be carried out as between the members or different classes of members.
- (iii) The liquidator may, with the like sanction, vest the whole or any part of such assets in trustees upon such trusts for the benefit of the contributories if he considers necessary, but so that no member shall be compelled to accept any shares or other securities whereon there is any liability.

#### INDEMNITY

101. Every officer of the company shall be indemnified out of the assets of the company against any liability incurred by him in defending any proceedings, whether civil or criminal, in which judgment is given in his favour or in which he is acquitted or in which relief is granted to him by the court or the Tribunal.

#### GENERAL POWER

102. Wherever in the Act, it has been provided that the Company shall have any right, privilege or authority or that the Company could carry out any transaction only if the Company is authorised by its Articles, then in that case this Article authorises and empowers the Company to have such rights, privileges or authorities and to carry such transactions as have been permitted by the Act, without there being any specific Article in that behalf herein provided.










*H. C. ...*  
13.6.2016

THIRUVANANTHAPURAM  
District Office, Thiruvananthapuram  
District Office, Thiruvananthapuram  
District Office, Thiruvananthapuram





Photo	Sr. No.	Name, addresses, descriptions, occupation and signatures of the subscribers	Signature, names, addresses, descriptions and occupation of witnesses
	1	For and on behalf of M/s Adani Ports and Special Economic Zone Limited (CIN: 6309091998PLC034162) having its registered office at Adani House, Nr. Mithakhali Six Roads, Navrangpura, Ahmedabad - 380009 through its authorised person vide Board Resolution passed on 1 <sup>st</sup> May, 2015 Dipali Shah W/o Yogesh Shah residing at 601, Shalra Tower, Nehru Park, Vastropur, Ahmedabad-380015 Occupation: Service Sd/-	Common witness for all 7 subscribers I, witness to subscribers who have subscribed and signed in my presence. Further, I have verified his/her/their identify details for their identification and satisfied myself of their identification particulars as filed in  Hardik Sanghvi S/o. Shri Harshadkumar Sanghvi residing at 15, Parshwanathnagar Society, Nr. Police Chowki, Narangpura Char Rasta, Ahmedabad-380013, Occupation: Service Company Secretary FCS No. 7247 Sd/-
	2	Malay Mahadevia [As nominee of Adani Ports and Special Economic Zone Ltd.] S/o Dr. Ranesh Mahadevia residing at 12-B, Cyankuni Society, Opp. St. Xavier's College, Navrangpura, Ahmedabad - 380009. Occupation: Service Sd/-	
	3	Ravi Bhamidipaty [As nominee of Adani Ports and Special Economic Zone Ltd.] S/o Shri Srirama Murthy Bhamidipaty residing at 'Amrut' 2G, Amrashish Bungalows, Opp. Chimanbhai Patel Institute, Bk. Shirodh 4, Prahaladnagar, Ahmedabad-380058 Occupation: Service Sd/-	
	4	Azad Kumar Samani [As nominee of Adani Ports and Special Economic Zone Ltd.] S/o Shri Jyoti Prasad Samani residing at 84, Star Apartments, Karnavati Nagar, Nr. Bazar, Ahmedabad-380001 Occupation: Service Sd/-	
	5	Manoj Kumar Chanduka [As nominee of Adani Ports and Special Economic Zone Ltd.] S/o Shri Biswanath Lal Chanduka residing at 9-101, Panchashila Apartments, Opp. Nehru Foundation, Bodokdev, Ahmedabad-380054. Occupation: Service Sd/-	
	6	Anish Ashokkumar Shah [As nominee of Adani Ports and Special Economic Zone Ltd.] S/o Shri Ashokkumar Amrutlal Shah residing at 6-12, Keshav Apartments, Near Memnagar Talavdi, Memnagar, Ahmedabad-380052. Occupation: Service Sd/-	
	7	Kailash Bhagla [As nominee of Adani Ports and Special Economic Zone Ltd.] S/o Shri Prabhudas Bhagla residing at A-203, Samarth Residency, Nr. P. R. Patel School, Dastin, Kalligam, Sabarmati, Ahmedabad-380019, Occupation: Service Sd/-	

Place: Ahmedabad

Dated: 22.07.2015



RECEIVED  
MINISTRY OF FINANCE AND REVENUE  
GOVT. OF INDIA  
22/7/2015

*Handwritten signature and date: 22/7/2015*

For and on behalf of Adani Ports and Special Economic Zone Limited  
Company Secretary



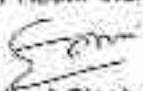
EXTRACT OF MINUTES OF MEETING OF BOARD OF DIRECTORS OF ADANI VIZHINJAM PORT PRIVATE LIMITED HELD ON 30<sup>TH</sup> APRIL, 2018 AT THE REGISTERED OFFICE OF THE COMPANY

\*RESOLVED THAT Mr. Rajesh Kumar Jha, Managing Director of the Company be delegated following powers:

- 1) To represent, negotiate and settle with Central Government authorities, State Government authorities, local bodies and other concerned authorities in respect of customs, central excise, income-tax, service tax, sales tax, licensing and other related matters in connection with the business of the Company;
- 2) To represent and appear on behalf of the Company in any Court, Tribunal or Authority under different laws and rules, to appoint advocates, pleaders or specialists to represent the Company;
- 3) To sub-delegate and/or withdraw any of powers to any officer or officers working in the Company for the aforesaid authorities.\*

\*RESOLVED FURTHER THAT Mr. Rajesh Kumar Jha, Managing Director of the Company be and is hereby authorized to sign deeds, documents, papers, MoUs, undertakings, execute agreements, to make correspondence, to represent on behalf of the Company and to do all such acts, deeds and things as may be necessary, desirable or expedient in connection therewith.\*

Certified True Copy  
For Adani Vizhinjam Port Private Limited

  
Daljeet Singh Sandhu  
Company Secretary



  
KANTHARAJ K.  
KOMBARAM

Adani Vizhinjam Port Pvt Ltd  
Adani House  
Nr Nithakudi Six Roads, Naurangpore  
Ahmedabad 380 005  
Gujarat, India

TEL: +91 79 2655 5555  
Fax: +91 79 2555 5500  
info@adani.com  
www.adani.com  
CIN: U61206GJ2015PTC082654

Registered Office: Adani House, Nr Nithakudi Six Roads, Naurangpore, Ahmedabad 380 005, Gujarat, India



आवक संख्या: 100/130/2000/4

GOVERNMENT OF INDIA

राजस्थान सरकार

कनिष्ठा चान्दा जी

82717505

Permanent Account Number

AAXPJ85006

Signature



GOVT. OF INDIA



आवक संख्या: 100/130/2000/4

GOVERNMENT OF INDIA

राजस्थान सरकार

Address:

कनिष्ठा चान्दा जी  
आवक संख्या: 100/130/2000/4  
विशेष विभाग, राजस्थान  
10-मिनट का समय, राजस्थान  
अजमेर, राजस्थान  
305001  
आवक संख्या: 100/130/2000/4

82717505  
Permanent Account Number  
AAXPJ85006

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KANTHARAJ K.  
RQPI/GOA/130/2000/4



भारत सरकार  
GOVERNMENT OF INDIA



राजेश कुमार झा

Rajesh Kumar Jha

तम्र लिपि NOB. 03/11/1985

पुरुष / MALE



2712 8B15 7724

मेरा आधार, मेरी पहचान

Signature





No. 37-40283/2017

കളക്ടറേറ്റ്, സിവിൽ സപ്ലൈ  
കുടുംബകാര്യ വിഭാഗം  
തീയതി: 30-04-2018

നിരന്ദേശപ സാക്ഷ്യപത്രം.

തിരുവനന്തപുരം ജില്ലയിൽ ചിറയിൻകീഴ് താലൂക്കിൽ നഗരസഭ വില്ലേജിൽ ഏറ്റുണ്ട് നമ്പർ 37-ൽ വീസൻവെ 555/2-ൽ ഉൾപ്പെട്ട സർക്കാർ പാറ ചിറയിൻ ഏറ്റുണ്ട് എന്നും ചെയ്യുന്നതിന് NOC അനുവദിക്കുന്നതിനായി ശ്രീ. വിഷ്ണു പി. നായർ, ശ്രീ. രാമദാസ്, ശ്രീ. രഞ്ജിത്ത് അഡ്വ. സന്തോഷ് കൈരത്ത് & ഫിറോസ്, M/s ഓഷോൺസ് ലിമിറ്റഡ് എന്നിവർ അപേക്ഷ സമർപ്പിച്ചിട്ടുള്ളതാണ്. എന്നാൽ വിഴിഞ്ഞം തുറമുഖ നിർമ്മാണത്തിന് ആവശ്യമായ പാറയും പാറ ഉല്പന്നങ്ങളും ലഭ്യമല്ലാത്ത സ്ഥാനപര്യന്തൽ ടി പാറ എന്നും ചെയ്യുന്നതിന് NOC കൂടാതെ ശ്രീ. സുഷീൽ നായർ, ഹെഡ് മോർട്ട്വേർ അഫയർസ്, അടാനി ഗ്രൂപ്പ് 16-03-2018-ൽ /MPPL/Gck/2018-19/398 നമ്പർ കത്ത് പ്രകാരം അപേക്ഷ സമർപ്പിച്ചിട്ടുള്ളതാണ്. വിഴിഞ്ഞം തുറമുഖ നിർമ്മാണത്തിനായി പാറ എന്നും ചെയ്യുന്നതിന് NOC അനുവദിക്കുന്നതിനായി 20-04-2018-ലെ VISA/2015-16/EE & E1-4/83-2 നമ്പർ കത്ത് മുഖേന വിഴിഞ്ഞം തുറമുഖനിർമ്മാണത്തിന് സ്പോർട്ട് ലിമിറ്റഡ് മാനേജിംഗ് ഡയറക്ടർ & ചീഫ് എക്സിക്യൂട്ടീവ് ഓഫീസർ ശുപാർശ ചെയ്തിട്ടുള്ളതാണ്. അടാനി വിഴിഞ്ഞം പോർട്ടസ് പ്രൈവറ്റ് ലിമിറ്റഡിന് പാറ ലഭ്യമാക്കുന്നതിന് ആവശ്യമായ നടപടികൾ സ്വീകരിക്കാൻ 23-04-2018-ലെ 31/E/2017/F&PD നമ്പർ കത്ത് പ്രകാരം ഫിറോസ് & പോർട്ടസ് (ഇ) വകുപ്പിന്റെ നിർദ്ദേശവും ഉൾപ്പെട്ടിട്ടുള്ളതാണ്. ഈ സ്ഥാനപര്യന്തൽ നഗരസഭ വില്ലേജിലെ ഏറ്റുണ്ട് 37-ൽ വീസൻവെ 555/2-ൽ ഉൾപ്പെട്ട 4,8065 ഹെക്ടർ പ്രദേശത്തെ സർക്കാർ പാറ ചുവടെ ചേർത്തതിലേന്ന നിബന്ധനകൾക്ക് വിധേയമായി നിയമാനുസൃതമായി ഖനനം ചെയ്യുന്നതിന് ചീഫ് എക്സിക്യൂട്ടീവ് ഓഫീസർ അടാനി വിഴിഞ്ഞം പോർട്ടസ് പ്രൈവറ്റ് ലിമിറ്റഡിന് നിരന്ദേശപ സാക്ഷ്യപത്രം അനുവദിക്കുന്നു.

നിബന്ധനകൾ

1. ഈ NOC പ്രകാരം ഖനനം ചെയ്യുന്ന പാറ വിഴിഞ്ഞം തുറമുഖ നിർമ്മാണത്തിന് ഉപയോഗിക്കേണ്ടതാണ്. ഖനനം ചെയ്യുന്ന പാറ വിപണനം ചെയ്യാൻ പാടുള്ളതല്ല.

വിനിയോഗിക്കേണ്ടതാണ്. ഖനനം ചെയ്യുന്ന പാറ വിപണനം ചെയ്യാൻ പാടുള്ളതല്ല.

  
KANTHARAJ K.  
30/04/2018





- 2) NOC അനുവദിച്ച തീയതി മുതൽ 3 മാസക്കാലത്തുള്ള പാരിസ്ഥിതിക അനുമതി അടിയന്തിരിക്കേണ്ടതാണ്.
- 3) നൽകാൻ ഉദ്ദേശിക്കുന്ന മറ്റ് പൊതുവായ ആവശ്യങ്ങൾക്കോ നൽകാൻ ഉദ്ദേശിക്കുന്ന കൂടുതൽ നിർമ്മാണത്തിനോ നിയമത്തിൽ പറയും പാറ ഉത്പന്നങ്ങളും നടപ്പാക്കേണ്ടതാണ്.
- 4) NOC അനുവദിച്ച തീയതി മുതൽ രണ്ട് വർഷത്തിനുള്ളിൽ മനസ്സിലാക്കുന്ന പ്രവർത്തനങ്ങൾ ആരംഭിച്ചിട്ടില്ലെങ്കിൽ ഈ NOC അനാഥമാകുന്നതാണ്.
- 5) മനസ്സിലാക്കുന്ന പ്രവർത്തനങ്ങൾ അനുവദിച്ച ഡിപ്പാർട്ട്മെന്റിന്റെ അനുമതിയോടുകൂടി ആരംഭിക്കേണ്ടതും മറ്റുള്ളവർ മുഖേന നടത്തുവാൻ പാടില്ലാത്തതാണ്.
- 6) പാരിസ്ഥിതിക അനുമതിയും നിയമപരമായ ആവശ്യങ്ങളുടെ മറ്റ് എല്ലാ അനുമതിയും നേടിയ ശേഷം മാത്രമേ മാനദണ്ഡങ്ങൾ ആരംഭിക്കാൻ പാടുള്ളൂ.
- 7) 2015-ലെ കെ.എം.എം.സി. ചട്ടങ്ങളിലെയും 1957-ലെ കെ. എൽ.സി. ആക്റ്റിലെയും വ്യവസ്ഥകൾ കർശനമായി പാലിക്കേണ്ടതാണ്.
- 8) പാറ മനസ്സിലാക്കുന്ന പ്രവർത്തനമായി നിരവധിയിടങ്ങളിൽ പരിശോധനയുടെ വിവരങ്ങൾ നൽകേണ്ട ഒരു റിപ്പോർട്ട് സമർപ്പിക്കേണ്ടതാണ്.
- 9) ഏക്സ് പ്ലാനിംഗ് ആക്ട് പ്രകാരമുള്ള നിബന്ധനകൾ കർശനമായി പാലിക്കേണ്ടതും മറ്റ് അനുബന്ധ സാങ്കല്പികങ്ങൾ ടി സ്ഥാപിച്ച് ലഭ്യമാക്കേണ്ടതുമാണ്.
- 10) മനസ്സിലാക്കുന്ന ഉണ്ടാകുന്ന കഴികൾ മണ്ണിട്ട് മൂടി അപരദേശീയമാക്കേണ്ടതും കമ്പി വേലി കെട്ടി സംരക്ഷിക്കേണ്ടതുമാണ്.
- 11) നിരവധി സാക്ഷ്യ പത്രത്തിന്റെ കാലാവധി മെയ് 2017 & ജൂലൈ 2017 വകുപ്പ് ലിസ്റ്റ് നൽകുന്ന തീയതി മുതൽ 10 വർഷത്തേയ്ക്കും വിവിധ പദ്ധതിയുടെ നിർമ്മാണ പ്രവർത്തനങ്ങൾ തീരുന്നതിന് വരെയാണോ ഏതാണോ ആദ്യം അനുവദിക്കേണ്ടതാണ്.
- 12) തഹസീൽദാർ അംഗീകരിച്ച് നൽകുന്ന സ്പെഷ്യൽ പ്രകാരമുള്ള ഭൂമിയിൽ മാത്രമേ മനസ്സിലാക്കേണ്ടതാണ് പാടുള്ളൂ.



പ്രതികരണങ്ങൾ: 1. "എന്നാൽ ഏതു സമയത്താണ് ഇത് സംഭവിച്ചത്?"  
2. "എന്നാൽ ഏതു സ്ഥലത്താണ് ഇത് സംഭവിച്ചത്?"  
3. "എന്നാൽ ഏതു വ്യക്തിയാണ് ഇത് സംഭവിച്ചത്?"

കാൽ മീമ്പരിച്ച നിബന്ധനകൾ കൊണ്ടുണ്ടാക്കുന്ന പക്ഷം ഈ നിരോധനപത്രം നാടകം ആണെന്നു തിരിച്ചറിയപ്പെടുകയും സിംഗിളിനാടകമായിത്തീരുകയും ചെയ്യും.

(304)  
பிள்ளை கிணற்று

ഒപ്പിടുക: \_\_\_\_\_

[illegible]

resulting

1. ഗവൺമെന്റ് ജീവനാശിപ്രകാരം തൊഴിലാളിമാർക്ക് തൊഴിലില്ലായ്മ പരിരക്ഷയും ഇവർക്ക് (ആരുമില്ലാത്ത) സഹായം
2. ഡയറക്ടർ ഓഫ് ഹ്യൂമൻ റിസോഴ്സ് & മാനവോരുജ്ജ്വലം, തിരുവനന്തപുരം
3. തൊഴിലാളിമാർ, കമ്മ്യൂണിക്കേഷൻ ഫിനാൻസ് ഓഫീസ്
4. റിപ്പോർട്ട് ഓഫീസർ, കമ്മ്യൂണിക്കേഷൻ ഓഫീസ്
5. ജില്ലാ മാനവോരുജ്ജ്വലം, തിരുവനന്തപുരം
6. MD & CEO, VISI.

അദ്ധ്യക്ഷാവർണ്ണനാമം



വെഡ്ഡിംഗ് കളിപ്പാർ (എൽ.ആർ.)



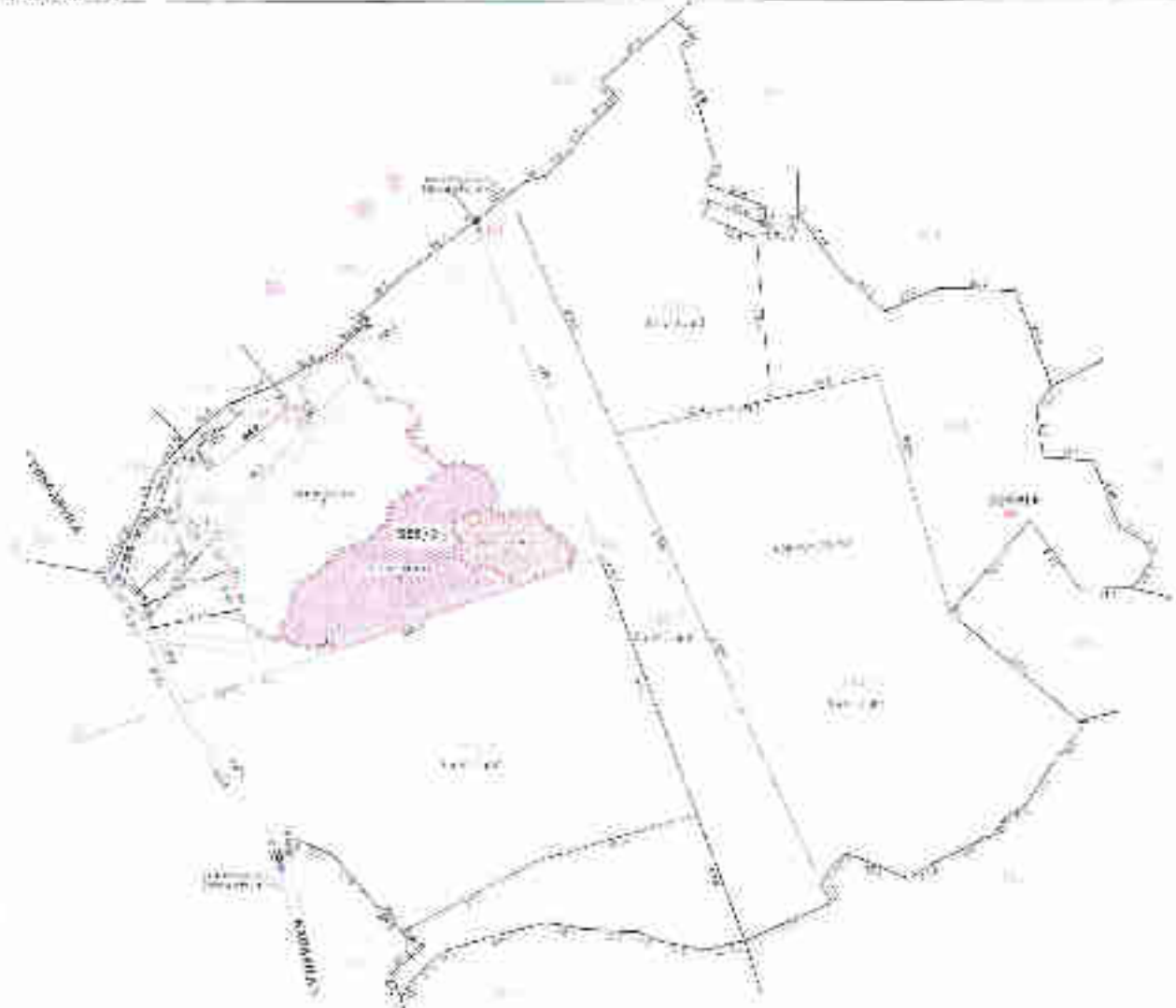
DISTRICT: HIRIVANATHAPURAM  
TALUK: CHIRAYANSEEZHI  
VILLAGE: NAGARODE

FILE NO.



Map No. 15592

Block No. 177



- 1. Land owned by the Government of India
- 2. Land owned by the Government of Kerala
- 3. Land owned by the Government of Tamil Nadu
- 4. Land owned by the Government of Karnataka
- 5. Land owned by the Government of Andhra Pradesh
- 6. Land owned by the Government of Maharashtra
- 7. Land owned by the Government of Gujarat
- 8. Land owned by the Government of Rajasthan
- 9. Land owned by the Government of Madhya Pradesh
- 10. Land owned by the Government of Uttar Pradesh
- 11. Land owned by the Government of Bihar
- 12. Land owned by the Government of West Bengal
- 13. Land owned by the Government of Assam
- 14. Land owned by the Government of Manipur
- 15. Land owned by the Government of Mizoram
- 16. Land owned by the Government of Nagaland
- 17. Land owned by the Government of Arunachal Pradesh
- 18. Land owned by the Government of Jammu and Kashmir
- 19. Land owned by the Government of Punjab
- 20. Land owned by the Government of Haryana
- 21. Land owned by the Government of Himachal Pradesh
- 22. Land owned by the Government of Jharkhand
- 23. Land owned by the Government of Chhattisgarh
- 24. Land owned by the Government of Odisha
- 25. Land owned by the Government of Telangana
- 26. Land owned by the Government of Andhra Pradesh
- 27. Land owned by the Government of Karnataka
- 28. Land owned by the Government of Kerala
- 29. Land owned by the Government of Tamil Nadu
- 30. Land owned by the Government of India

As per the Title Deed and Original Documents

Sl. No.	Name of the Land	Area (Acres)	Remarks
1	Land owned by the Government of India	10.00	
2	Land owned by the Government of Kerala	5.00	
3	Land owned by the Government of Tamil Nadu	3.00	
4	Land owned by the Government of Karnataka	2.00	
5	Land owned by the Government of Andhra Pradesh	1.00	
6	Land owned by the Government of Maharashtra	0.50	
7	Land owned by the Government of Gujarat	0.25	
8	Land owned by the Government of Rajasthan	0.125	
9	Land owned by the Government of Madhya Pradesh	0.0625	
10	Land owned by the Government of Uttar Pradesh	0.03125	
11	Land owned by the Government of Bihar	0.015625	
12	Land owned by the Government of West Bengal	0.0078125	
13	Land owned by the Government of Assam	0.00390625	
14	Land owned by the Government of Manipur	0.001953125	
15	Land owned by the Government of Mizoram	0.0009765625	
16	Land owned by the Government of Nagaland	0.00048828125	
17	Land owned by the Government of Arunachal Pradesh	0.000244140625	
18	Land owned by the Government of Jammu and Kashmir	0.0001220703125	
19	Land owned by the Government of Punjab	0.00006103515625	
20	Land owned by the Government of Haryana	0.000030517578125	
21	Land owned by the Government of Himachal Pradesh	0.0000152587890625	
22	Land owned by the Government of Jharkhand	0.00000762939453125	
23	Land owned by the Government of Chhattisgarh	0.000003814697265625	
24	Land owned by the Government of Odisha	0.0000019073486328125	
25	Land owned by the Government of Telangana	0.00000095367431640625	
26	Land owned by the Government of Andhra Pradesh	0.000000476837158203125	
27	Land owned by the Government of Karnataka	0.0000002384185791015625	
28	Land owned by the Government of Kerala	0.00000011920928955078125	
29	Land owned by the Government of Tamil Nadu	0.000000059604644775390625	
30	Land owned by the Government of India	0.0000000298023223876953125	

Scale 1cm = 10 m



Signature of the Officer

PLATE NO. 4





## GOVERNMENT OF KERALA

## Abstract

Vizhinjam International Deep water Multipurpose Seaport Project - Bid submitted by M/s Adani Ports & Special Economic Zone Ltd - Approved - Orders issued.

## Fisheries &amp; Ports (E) Department

G.O(MS) No.35/2015/F&amp;PD.

Dated, Thiruvananthapuram, 13-07-2015.

- Read:-
- 1 G.O(MS) 69/2013/F&PD dated 29-11-2013.
  - 2 G.O(MS) 21/2014/F&PD dated 01-03-2014
  - 3 G.O(MS) 26/2014/F&PD dated 31-03-2014
  - 4 G.O(MS) 28/2014/F&PD dated 22-04-2014
  - 5 Letters No. VISL/PPP/2014/420 dated 02-05-2015, VISL/PPP/2014/471 dated 14-05-2015, VISL/PPP/2014/497 dated 26-05-2015, VISL/2014-15/GOM/511 dated 28-05-2015, VISL/2014-15/GOM/519 dated 29-05-2015 of Managing Director, Vizhinjam International Seaport Ltd.
  - 6 G.O(MS) No 31/2015/F&PD dated 12-06-2015

## ORDER

As per Government Order read as 1st paper above Government have restructured Vizhinjam International Deep water Multipurpose Seaport Project as suggested by the Planning Board for availing Viability Gap Funding from Government of India. Based on the above order, Vizhinjam International Seaport Ltd issued Request for Qualification (RFQ).

Subsequently as per Government Order read as 2nd paper above, the Engineering Procurement Construction work for the construction of Breakwater and fishing harbour was included as Funded Works in the Public Private Partnership tender for the Vizhinjam International Deep water Multipurpose Seaport Project for which State would provide the funding.

As per Government Order read as 3rd paper above, all the 5 applicants who submitted the Request for Qualification were shortlisted, strictly based on the financial and technical qualification set in the Request for Qualification document. The Request For Proposal document in respect of Vizhinjam International Deep water Multipurpose Seaport Project was approved by Government vide Government Order read as 4th paper above and authorized Vizhinjam International Seaport Ltd



*Kantharaj K.*  
KANTHARAJ K.  
RQP/GOA/130/2000/A



to issue the same to shortlisted applicants on behalf of Government of Kerala. Three bidders purchased the bid documents.

The Bid due date for the project was scheduled at 05:00 PM, 24<sup>th</sup> April 2015. Up to the closing time of bid submission, only one qualified bidder M/s Adani Ports & Special Economic Zone Limited submitted its bid. The Bid Opening Committee opened the bid at the scheduled bid opening time of 5:30 PM. The bids were evaluated by the Project Consultants. The bid documents / submissions were found to be in conformity with the Request For Proposal requirement and were hence found responsive. The authenticity of the bid bond submitted by the bidder was also confirmed with the bank which issued the bond.

The grant sought by the bidder M/s Adani Ports & Special Economic Zone Limited is INR 1,635 crore. This works out to around 39.985% of the Total Project Cost as mentioned in the Draft Concession Agreement (INR 4,089 crore) and hence is within the range permitted under the Viability Gap Funding (VGF) guidelines. The amount is within the range of 40.7% (Rs.1664 Cr) estimated in the revised Feasibility Report also.

Managing Director, Vizhinjam International Seaport Ltd, as per letter read as 5th paper above reported that the Minutes of bid opening meeting, bid evaluation report submitted by Transaction Advisors M/s Ernst & Young and Legal Consultant M/s HSA, Letter from Bank confirming the authenticity of the bid bond were submitted before the 23<sup>rd</sup> Meeting of the Empowered Committee.

The Empowered Committee noted that, in the current model, the cash outflow with respect to this particular concession from the State Government is limited to Rs. 2280.20 Cr (Rupees Two thousand two hundred and Eighty Crore Twenty Lakh only). This comprises of Rs.1463 Crore towards cost of funded works and Rs. 817.2 Crore towards Government of Kerala contribution of VGF. The cost of Funded Work will be adjusted for the Whole sale Price Index variation between the Bid Due Date and Appointed Date as per the provisions of DCA. The Committee noted that the current model offers considerable saving to State Government when compared to the earlier model on current price level.

Government vide orders read as 6<sup>th</sup> paper, ratified the amendment made by the Empowered Committee in the Draft Concession Agreement regarding the revision of project cost to Rs.4089 crore and cost of funded works to Rs.1463 crore. Empowered Committee also noted that no restrictive changes suiting any particular applicant or bidder were made during the selection process in respect of Project



Structure, DCA, qualification criteria and specification. The committee further noted that the certainty of cash outflow, potential savings and other merits of the current model. The Committee also felt that the chances of getting a better offer in a future bid is negligible considering the traffic risk involved, high investment needed and depressed market internationally and nationally. Therefore it is a situation where in the project may not materialise in future, if it does not materialise now ("Now or Never") This is particularly important in the light of the fact that this is the fourth attempt to bid the project and in the context of the development of the proposed nearby competing port locations.

The Committee after detailed discussions and based on the above, decided to recommend to the Board of Directors of VISL and Government of Kerala to accept the bid submitted by M/s Adani Ports and Special Economic Zone Ltd and to issue the Letter of Award (LOA) to M/s Adani Ports and Special Economic Zone Ltd.

Managing Director, Vizhinjam International Seaport Ltd in his letter dated 14-05-2015 has further reported that the recommendations of the Empowered Committee were placed before the Board of Directors of VISL at its 37th Meeting held on 13th May 2015. The decisions of Empowered Committee were discussed by Board of Directors and approved the above decisions and recommended Government of Kerala to approve the following:

- i) Approve and accept the bid submitted by M/s Adani Ports and Special Economic Zone Ltd for a grant of Rs.1635 crore (Rupees one thousand six hundred and thirty five crore)
- ii) Issue Letter of Award to M/s Adani Ports and Special Economic Zone Ltd.

Managing Director, Vizhinjam International Seaport Ltd has therefore requested Government to approve and accept the bid submitted by M/s Adani Ports and Special Economic Zone Ltd and to issue Letter of Award to the firm.

Government have examined the matter in detail. Vizhinjam International Deep water Multipurpose Seaport Project is a flagship project of the State. It is found that Development of this port is of great national importance considering the fact that the major share of Indian transshipment is currently handled by foreign ports of Colombo, Singapore and Dubai. The Project would shift these operations to India and thereby generate considerable saving in foreign exchange to the national economy. The port has the potential to become the transshipment hub serving the entire Indian Coast. The development of port and its allied facilities would





significantly contribute to the large scale growth of Industry and Economy in Kerala, besides generating employment opportunities. Retendering of the project will lead to further time delay and cost escalation resulting in loss to the State exchequer. Besides chances of getting a better offer in a future bid is negligible considering the traffic risk involved, high investment needed and depressed market Internationally and Nationally.

In the circumstance, Government are pleased to approve the bid submitted by M/s Adani Ports and Special Economic Zone Ltd for a grant of Rs.1635 crore (817.8 crores from Government of India and 817.2 crores from Government of Kerala) for the development of Vizhinjam International Deep water Multipurpose Seaport Project. Accordingly, Letter of Award will be issued to M/s Adani Ports and Special Economic Zone Ltd

(By Order of the Governor)

**JAMES VARGHESE**  
Principal Secretary to Government

To

- 1) The Managing Director, Vizhinjam International Seaport Ltd, Thiruvananthapuram.
- 2) The Principal Accountant General (Audit), Kerala
- 3) The Accountant General (A&E), Kerala, Thiruvananthapuram.
- 4) The General Administration (SC) Department (Vide item No. 6787 dated 20-05-2013 and item No. 6885 dated 10-06-2015)
- 5) The Finance Department
- 6) The Law Department
- 7) SF/OC

Forwarded/By order

  
Section Officer

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**PROCEEDINGS OF THE ADDITIONAL DIRECTOR OF MINING & GEOLOGY,  
THIRUVANANTHAPURAM, KERALA**

(Present Shri. T K Ramakrishnan)

- Subj:** Department of Mining & Geology, Government of Kerala - Mines & Minerals - Minor Minerals - Granite (Building Stone) - Quarrying Lease to M/s. Adani Vizhinjam Port Private Limited, 2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram District - 695 014 (Registered Office at: Adani House, Near Mithakhal Six Road, Navrangpura, Ahmedabad, Gujrat State - 380 009) (Represented by its Chief Executive Officer, Shri. Rajesh Kumar Jha) - sanctioned-orders-issued.
- Ref:**
- 1 Application dated 13/06/2018 from M/s. Adani Vizhinjam Port Private Limited, 2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram District - 695 014 (Registered Office at: Adani House, Near Mithakhal Six Road, Navrangpura, Ahmedabad, Gujrat State - 380 009) (Represented by its Chief Executive Officer, Shri. Rajesh Kumar Jha)
  - 2 Letter No. 1716/DOT/ML/2018 dated. 18/08/2018, 16/03/2019 from the Geologist, District Office, Thiruvananthapuram.
  - 3 Letter of Intent No. 9363/M3/2018 dtd. 04/09/2018 issued by Director of Mining and Geology
  - 4 Environmental clearance No. 02/2019 issued vide Pro. order No. 1200/EC2/2018/SEIAA dtd. 01/03/2019 by the State Environment Impact Assessment Authority, Kerala (valid till 28/02/2024)
  - 5 Integrated consent to operate No. PCB/TVM-DO/ICO/QRY/103/2019 dt. 05/03/2019 issued by Kerala State Pollution Control Board, Thiruvananthapuram (valid till 27/02/2021)
  - 6 Explosive License No. E/SE/KL/22/129(E95316) dated. 18/05/2019 issued by Petroleum and Explosive Safety Organization, Ernakulam (valid till 31.03.2022)
  - 7 Dangerous and Offensive Trade Licence No. A2 - 1836/2019 dated. 01/04/2019 issued by Nagaroor Grama Panchayat (valid till 31.03.2020)
  - 8 Mines and Minerals (Development & Regulation) Act, 1957.
  - 9 Kerala Minor Mineral Concession Rules, 2015
  - 10 Kerala Minerals (Prevention of Illegal Mining, Storage & Transportation) Rules 2015

No. 79/2019-20/9363/M3/2018/DMG

Dated, Thiruvananthapuram 20/05/2019

**ORDER**

M/s. Adani Vizhinjam Port Private Limited, 2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram District - 695 014 (Registered Office at: Adani House, Near Mithakhal Six Road, Navrangpura, Ahmedabad, Gujrat State - 380 009) a Private Limited Company having Corporate Identity No. U61200GJ2015PTC083954, represented by its Chief Executive Officer, Shri. Rajesh Kumar Jha (Aadhaar No. 2712 6816 7724) submitted an application vide reference first cited to obtain quarrying lease to quarry Granite (Building Stone) over an area of 3.6630 Hectares of land (as per the survey map No. B9/9590/18 issued by Tahsildar, Chirayinkeezhu) comprised in Re - Survey Block No. 37, Re - Survey No. 555/2 of Nagaroor



Page 1 of 6

*Kantharaj K.*  
KANTHARAJ K.  
03/06/2019



**Village, Chirayinkeezhu Taluk.** The District Geologist, Thiruvananthapuram has intimated that the applied area was previously quarried with the strength of quarrying permits issued by the Revenue Department.

Based on the merit of the application and the enclosed mandatory documents including survey map, possessions certificates, demarcation certificate and land assignment certificate issued by Revenue Authorities and based on the recommendation of the District Geologist, a letter of intent was issued to the applicant vide reference cited 3 intimating the intention of the department to grant quarrying lease subject to production of approved mining plan and other statutory licenses. The District Geologist forwarded the mining plan (prepared by Shri. Kantharaj. K, Recognized Qualified Person – Reg. No. RQP/GOA/130/2000/A) approved by him and other statutory licenses submitted by the applicant to this office. In the approved mining plan it is mentioned that mineable mineral reserve of granite (building stone) in the applied area is **17,78,750 tonnes** and that it is proposed to mine **17,78,750 tonnes** of granite (building stone) within a period of **5 (Five) years**. It is also proposed to mine **3,98,375 MT** in the first year, **3,00,625 MT** in the 2<sup>nd</sup> year and **10,78,750 MT** in the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> year. In the approved mining plan it is also mentioned that a total quantity of **9,06,500 MT** of building stones has already been excavated from the area. Since the applicant has produced all statutory documents as per the Letter of Intent, it is decided to grant a quarrying lease in the said land and hence the following orders are issued:

A quarrying lease is hereby granted to **M/s. Adani Vizhinjam Port Private Limited, 2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram District – 695 014 (Registered Office at: Adani House, Near Mithakhali Six Road, Navrangpura, Ahmedabad, Gujrat State – 380 009) a Private Limited Company having Corporate Identity No. U61200GJ2015PTC083954, represented by its Chief Executive Officer, Shri. Rajesh Kumar Jha (Aadhaar No. 2712 8816 7724) to quarry Granite (Building Stone) over an area of 3.6630 Hectares of land (as per the survey map No. B9/9590/18 issued by the Tahsildar, Chirayinkeezhu) comprised in Re - Survey Block No. 37, Re – Survey No. 555/2 of Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District for **5 (Five) years** as per the Kerala Minor Mineral Concession Rules, 2015, subject to the conditions mentioned below:**

1. The lessee shall execute a quarrying lease deed within a period of six months from the date of this order in form 'H' as per Rule 43 of the Kerala Minor Mineral Concession Rules, 2015 and the quarrying leases deed shall be registered in accordance with the provisions of the Indian Registration Act, 1908.
2. The lessee shall commence quarrying operation only after the deed is executed and registered.
3. The lessee shall not assign, sublet or transfer his lease or any right or interest therein to any person without previous written permission of the Director of Mining & Geology.
4. Royalty is payable to Government as per Rule 32 of the Kerala Minor Mineral Concession Rules, 2015 in respect of minor mineral quarried and moved out of the quarry subject to revision from time to time on the basis of amendments to the schedule I of the said Rules. In case the lessee opts for consolidated royalty payment system by registering attached metal





crusher units as per Rule 89, then consolidated royalty at the rate specified in Schedule III said Rules shall be paid instead of royalty specified in Schedule I.

5. Dead rent is realizable under 40(1)(d) of the said rules subject to revision from time to time on the basis of amendments to the schedule II of the said rules.
6. Surface rent realizable under 40(1)(e) of the said rules will be equal to the land revenue assessed by the Revenue Department subject to revision from time to time on the basis of the land revenue.
7. The lessee shall also deposit an amount of **Rs. 36,630/- (Rupees thirty six thousand six hundred and thirty only)** being the security deposit at the rate of Rs 10,000/- per hectare as security deposit for the observance of the terms and conditions of the lease before the deed is executed as per rule 42 of the said rules.
8. The lessee shall produce financial guarantee for **Rs. 1,00,000/- (Rupees one lakh only)** as stipulated in rule 62 of KMMC Rules 2015, before execution of lease deed.
9. The lessee shall pay tax related to Revenue Department, if any, as directed by them and the details should be furnished to the District Geologist periodically.
10. The lessee shall pay 10% of the amount of royalty/consolidated royalty as the case may be paid by them, being the quarry safety fund in addition to the royalty/consolidated royalty, as per rule 63 of KMMC rules, 2015.
11. In addition to the royalty, rents, funds, fees etc. that are required to be remitted by the lessee as per the Mines and Minerals (Development and Regulation) Act, 1957 and Rules made thereunder, the lessee shall pay all other fees, rents, taxes etc. as required by other agencies including Goods and Service Tax (GST) for royalty.
12. The quarrying shall be carried out as per the conditions stipulated in Kerala Minor Mineral Concession Rules 2015 and storage and transportation of mineral shall be carried out as per Kerala Minerals (Prevention of Illegal Mining, Storage and Transportation) Rules 2015.
13. The lessee shall renew Environmental Clearance on or before **28/02/2024** for the operation of the quarry for the remaining period.
14. The quarrying operations shall be strictly as per the approved mining plan and schemes of mining.
15. The lessee shall review the progressive quarry closure plan every five years from the date of opening of the quarry and shall submit to the competent authority for its approval. The lessee shall submit to the competent authority in this behalf any early report before 1st July of every year describing protective works including reclamation and rehabilitation work

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carried out as envisaged in the approved quarry closure plan and if there is any deviation, reasons thereof.

16. The lessee shall submit a scheme of mining for the next five years or remaining period of the lease to the competent authority for approval at least one hundred and twenty days before the expiry of the first five year period for which it was approved on the last occasion.
17. The lessee shall submit final quarry closure plan one year prior to the proposed closure of the quarry and close the quarry as per the approved quarry closure plan.
18. The production of Granite (Building Stone) from the area covered under this grant shall be subject to the year-wise quantity specified in the approved Mining Plan and scheme of mining.
19. The lessee shall not win and dispose of any type of dimension and decorative stones from the area over which the quarrying lease has been sanctioned on the strength of this order.
20. The Lessee shall comply with any and all laws, ordinances, rules and orders related to quarrying operations of any and all governmental or quasi-governmental authorities.
21. The lessee shall obtain all other statutory licences required from the authorities concerned during the period of operation of the quarry and comply with all the conditions mentioned in other statutory license required for carrying out quarrying operations.
22. The lessee shall stop all quarrying activities in the event of expiry of any other statutory licenses which is required for carrying out quarrying activities in the State as per the prevailing Acts and Rules. Any quarrying activity undertaken violating the above condition will be treated as illegal and lessee will be solely responsible for such act and lessee will be liable to pay the penalty imposed by any officer competent to enforce such Acts and Rules.
23. In case the lessee makes any breaches in the conditions of the lease deed or violates the conditions stipulated in relevant Act and Rules based on which all Statutory Licenses are issued for quarrying, then the lessee will be solely responsible for any such breaches and violation and in such cases, the lessee will be solely liable to pay such sum of money as fixed by competent authorities as due and penalty.
24. The Lessee shall indemnify and keep indemnified the State Government against all actions, proceedings, suits, claims, demands, losses, damages, costs, charges, and expenses incurred or suffered by them as a reason of any non-observance or non-performance of rules and regulations.





25. This lease is granted in good faith based on the documents/licenses submitted by the lessee. The lessee is solely responsible for the authenticity of the documents/licenses submitted. At any stage, if it is observed that the documents submitted are incorrect or fake or forged or if it is found that some information was omitted or suppressed, then this lease is liable to be cancelled. In such an event the quarrying carried out with the strength of this lease will be treated as quarrying conducted without any lawful authority.
26. The lessee shall properly maintain the boundary pillars erected as per the demarcation certificate issued by the Village Officer till the expiry of lease.
27. The lessee shall erect a notice board in Malayalam at a prominent place with a minimum size of 1 metre X 1.5 metres in a metallic board near to the entrance of the quarry to the effect that it shall contain the name and address of the lessee, mineral concession number and date, validity of concession, the name of the mineral quarried, proposed annual production etc. In addition, details of other statutory licenses shall also be displayed.
28. The lessee shall erect by the side of the road leading to quarry (preferably 100 m away from quarry), a warning board with danger sign regarding operation of the quarry and use of explosives.
29. The lessee should take effective preventive measures for the safety of labourers as well as the general public. In due course of quarrying, if any part of the quarry becomes unsafe, then the lessee shall properly fence that area for preventing accidents by falling of human beings, animals, vehicles or any objects into the pit formed by quarrying.
30. The lessee shall not carry out any quarrying operations within 7.5 meters from the boundary of the lease area and quarrying operations shall be carried out in benches.
31. The lessee shall send a notice in form D appended to KMMC Rules 2015 to the Director (Mining), Directorate General of Mines Safety, No.5, 14<sup>th</sup> Main (100ft) Road, 4<sup>th</sup> B Block, Koramangla, Bengaluru - 560034 and to the District Magistrate concerned before commencing the quarrying operation and shall intimate the same to the District office of the Department of Mining and Geology concerned.
32. The lessee shall keep book of accounts of production and dispatch of granite (building stone) and shall file monthly and annual returns in Form F and Form G appended to KMMC Rules 2015.
33. The quarrying permit granted from the district office, if any, in the area of this quarrying lease is hereby stands cancelled from the date of this order.
34. In this case, the anticipated royalty to be remitted for the mineral extracted per year at the present rate of royalty of **Rs. 24/-** per tonne with average annual production of **3,55,750 tonne** is **Rs. 85,38,000/- (Rupees eighty five lakhs thirty eight thousand only)**. In this case, the surface rent to be remitted per year at the present rate of Rs. 5 per Are per year is **Rs. 1,832/- (Rupees one thousand eight hundred and thirty two only)** and in the event





of non – functioning of quarry the Dead Rent to be realized for the 1<sup>st</sup> year – NIL. IInd year – Rs. 300/- (Rupees three hundred only) and IIIrd year onwards – Rs. 1,200/- (Rupees one thousand and two hundred only) per hectare subject to revision from time to time.

The terms and conditions stated in this order will be subject to such further modifications as may be made by the State Government from time to time.

Sd/-

**T. K. RAMAKRISHNAN**  
**ADDITIONAL DIRECTOR OF MINING & GEOLOGY**

To

M/s. Adani Vizhinjam Port Private Limited,  
2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud,  
Thiruvananthapuram District – 695 014  
(Registered Office at: Adani House,  
Near Mithakhali Six Roads, Navrangpura,  
Ahmedabad, Gujrat State – 380 009)  
(Represented by its Chief Executive Officer, Shri. Rajesh Kumar Jha)

Copy to:

- 1 The Director (Mining), Directorate General of Mines Safety, No.5, 14<sup>th</sup> Main (100ft) Road, 4<sup>th</sup> B Block, Koramangla, Bengaluru – 560034
- 2 Member Secretary, SEIAA, Thampanoor Bus Terminal, Thiruvananthapuram
- 3 The Chairman, SEIAA, Thampanoor Bus Terminal, Thiruvananthapuram.
- 4 The Deputy Chief Controller of Explosives, PESO, C2-III Floor, CGO Complex, Kakkanad, Ernakulam
- 5 The Environmental Engineer, Kerala State Pollution Control Board, District Office, Thiruvananthapuram.
- 6 The Secretary, Nagaroor Grama Panchayath, Thiruvananthapuram District.
- 7 The Tahsildar, Chirayinkeezhu Taluk Office, Thiruvananthapuram District.
- 8 The Village officer, Nagaroor Village, Thiruvananthapuram District.
- 9 Shri. Kantharaj K, #200, 2<sup>nd</sup> Floor, 40<sup>th</sup> Main, 1<sup>st</sup> Cross, Behind Silk Board, BTM Layout, 2<sup>nd</sup> Stage, Kuvempu Nagar, Bangalore – 560 068
- 10 The Geologist, District Office of the Dept. of Mining and Geology, Thiruvananthapuram.
- 11 Stock File
- 12 File Copy

(By Order)

*[Handwritten Signature]*  
25/05/2019

Senior Superintendent



No. 9363/M3/2018

Directorate of Mining & Geology  
Keeavadasapuram, Pattom P.O.  
Thiruvananthapuram-4  
Tel: 0471-2447428  
Fax: 0471-2447429

E-mail: [director.dmg@kerala.gov.in](mailto:director.dmg@kerala.gov.in)

Web: [www.dmg.kerala.gov.in](http://www.dmg.kerala.gov.in)

Dated: 20/05/2019

From

The Director of Mining & Geology

To

M/s. Adani Vizhinjam Port Private Limited,  
2<sup>nd</sup> Floor, Vipanchika Tower,  
Thycaud, Thiruvananthapuram District – 695 014  
(Registered Office at: Adani House, Near Mithakhali Six Road,  
Navrangpura, Ahmedabad, Gujarat State – 380 009)  
(Represented by its Chief Executive Officer, Shri. Rajesh Kumar Jha)

Sir,

Sub: Mining & Geology - Mines and Minerals - Minor Minerals- Granite Building Stone -  
Preparation and execution of quarrying lease deed – reg.

Ref: 1. Pro. Order No. 79/2019-20/9363/M3/2018/DMG Dated: 20/05/2019

2. Kerala Minor Mineral Concession Rules, 2015

3. Kerala Minerals (Prevention of illegal Mining, Storage & Transportation) Rules, 2015.

4. Mines & Minerals (Development & Regulation) Act, 1957.

Please refer to the Proceedings Order cited above wherein a quarrying lease for Granite (Building Stone) is granted to M/s. Adani Vizhinjam Port Private Limited, 2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram District – 695 014 (Registered Office at: Adani House, Near Mithakhali Six Road, Navrangpura, Ahmedabad, Gujarat State – 380 009) (Represented by its Chief Executive Officer, Shri. Rajesh Kumar Jha). A draft copy of quarrying lease deed in Form H is enclosed. I request you to prepare three copies of the quarrying lease deed, original on plain paper and two copies of the same in stamped paper worth Rs. 500/- and produce the same before the Geologist, District Office, Thiruvananthapuram for scrutiny and execution. The date of execution will be filled by the Geologist at the time of execution or you fill in the date after getting confirmation from the District Geologist. After scrutiny of the quarrying lease deed, the Geologist will inform you the date of execution convenient to him. You have to be present in person at the District Office on such date with two witnesses for execution of deed. It may be noted that the survey map based on which lease is granted to you forms a part of the deed and same has to be included in the lease deed. The signature of the lessee and lessor has to be affixed in the survey map also. After execution of deed, as per the request of the District Geologist stamp duty shall be fixed by District Registrar. On remittance of stamp duty, a certificate of remittance of stamp duty will be entered in the lease deed by the Registrar. The lease deed has to be registered by the office of the Registration Department concerned. After registration, the documents have to be produced before the District Geologist.

A chalan for Rs. 36,630/- (Rupees thirty six thousand six hundred and thirty only) being the security deposit is enclosed herewith duly countersigned. Please affix your signature at the appropriate places before remittance of money in the treasury. The original treasury receipted chalan may also be produced along with the typed copies of the lease deed before the Geologist, District Office, Thiruvananthapuram at the time of execution.



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Please note that the quarrying lease deed has to be executed within a period of six months from the date on which quarrying lease has been granted and got registered in accordance with the Registration Act, 1908 vide Rules 44 of the Kerala Minor Mineral Concession Rules, 2015.

Before starting quarrying operations you have to send 2 copies of notice in attached Form D to the Director (Mining), Directorate General of Mines Safety, No. 5, 14<sup>th</sup> Main (100ft) Road, 4<sup>th</sup> B Block, Koramangla, Bangalore – 560 034 and one copy to District Magistrate concerned.

Yours faithfully,

*[Handwritten signature]*  
20/05/2019

**DIRECTOR OF MINING & GEOLOGY**

Encl (applicant):

1. Proceedings order
2. Draft Form H
3. Form D
4. Countersigned Chalan

Copy to:

The Geologist, District Office, Thiruvananthapuram for further necessary action.  
(Ref your letters No. 1716/DOT/ML/2018 dated. 18/08/2018, 16/03/2019)

You are instructed to execute the lease deed as and when it is received. The Proceedings Order cited as reference 1, original survey map and draft Form H are enclosed herewith. The survey map forms a part of lease deed and the signatures of both lessor and lessee. A copy of the lease deed may be forwarded to this office soon after registration. Please ensure that the area under this grant is demarcated and boundary stones maintained properly before execution of the lease deed.

You may ensure remittance of security deposit, surface rent etc. for the amount specified in the lease order. You may also obtain financial guarantee from the lessee for the amount specified in the lease order.

You are also instructed to obtain and forward the Form D to this office. Since Form D is a statutory document, no movement permits shall be issued to lessee if lessee fails to prove that he had sent notice in Form D to the Director of Mines Safety, Office of the DDGMS, (Bangalore Region) Southern Zonal Office, No. 5, 100ft Road, 17<sup>th</sup> Main, Koramangala, Bangalore – 560 034 and District Magistrate.

You are further instructed to forward photocopies of the registered lease deed to the Director of Mines Safety, Bangalore & District Collector. Please ensure that the lessee is observing the requirements as per mining plan, lease grant order, form H and KMMC Rules, 2015.

Encl (District Geologist)

1. Original Survey Map
2. Draft Form H
3. Proceedings order





കേരളം KERALA

F 041258

FORM H  
(See Rule 43)  
QUARRYING LEASE



This deed of lease made on this the 22<sup>nd</sup> day of MAY 2019 between the Governor of Kerala (hereinafter referred to as the "State Government" which expression shall, where the context so admits be deemed to include his successors and assigns) of the one part and M/s. Adani Vizhinjam Port Private Limited, 2<sup>nd</sup> Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram District - 695 014 (Registered Office at: Adani House, Near Mithakhali Six Road, Navrangpura, Ahmedabad, Gujarat

LESSOR  
DISTRICT OFFICE  
THIRUVANANTHAPURAM



LESSEE



Value of lease: 500/- only  
Signed by: Rajesh Kumar Jha  
ADD: 2 CER  
05/05/2019 Adani Vizhinjam Port Private Limited

PAID TO VENDOR  
11 MAY 2019



Rajesh Kumar Jha, aged 33 years, and Anshu Chandra Jha, residing at House No. - H7 - H8, Nishant Vihar, Near Aashiana Trade Centre, Jamshedpur, Adityapur, Seraikela - Kharsawan, Jharkhand - 831 013 (Aadhaar No. 2712 6816 7724) (hereinafter called the "lessee/lessees" which expression shall where the context so admits, include his/their heirs, executors, administrators, representatives and permitted assigns) of the other part.

Witnesseth that in consideration of the rents and royalties and lessee's/Lessees' covenants, hereinafter reserved and contained the State Government hereby give on lease to the lessee/lessees the land measuring **3.6630 hectares** described in the schedule hereunder and delineated on the plan hereto annexed and therein coloured red (hereinafter called the "said lands") to hold the same for a period of **5 (Five) years** commencing from the 22.05.2019 and ending on the 21.05.2024 for the purposes of extracting minor mineral/minerals and subject to the terms and conditions contained in the Kerala Minor Mineral Concession Rules, 2015 (hereinafter referred to as "the Rules") and to the terms and conditions hereinafter appearing

1. The lessee/lessees shall have the right in and upon the said lands to extract Granite Building Stone (here in after called the said mineral/minerals) and to do all acts necessary for the extraction of the said mineral/minerals including the erection on the said lands, buildings and plant required for the purposes and also to take lead and carry away over the said lands and to dispose of the said minerals extracted as aforesaid.
2. The lessee/lessees shall during the subsistence of this lease have the liberty to work the said mineral/minerals and remove the same from the leasehold on permits issued by the State Government/competent authority or any other officer authorized by him in this regard. The permits shall be issued only on the basis of pre-paid royalty at the rates specified in Schedule I to these Rules. The royalty rates shall be subject to revision from time to time as the State Government may order.
3. The lessee/lessees shall pay to the State Government a yearly surface rent equal to the land revenue if any, assessable under the rules for the time being in force, or if the land be the property of Government or in reserve forest then equal to the land revenue plus cess, if any, per hectare of the land the surface whereof shall be occupied or used by the lessee/lessees for any of the purposes of this deed and so in proportion for any area less than one hectare. The said surface rent shall be paid by yearly payments; the first of such payments to be made on or before the last day of the first year of occupation provided always that no such rent shall be paid or demanded in respect of any roads or ways now in existence.

  
Lessor



  
Lessee



quantity of the said minerals extracted and the weight and value of the said mineral sold or exported together with the names of the purchasers or consignees. The lessee shall also maintain a register of employees showing therein separately men, women employed daily and shall at reasonable times allow the competent authority appointed under the rules (hereinafter referred to as "competent authority") or the officer authorised by him to examine the said books of account and the register of employees and to take copies and extracts there from. The lessee/lessees shall submit reports in Forms F and G on the specified dates.

5. All sums found due under or by virtue of this deed from the lessee/lessees may be recovered from him jointly and severally from them and his/their properties movable and immovable under the provisions of the Revenue Recovery Act for the time being in force as though such sums are arrears of land revenue or in any other manner as the State Government may deem fit.

6. The lessee/lessees shall at the lessee's/lessees' own expense erect and at all times maintain and keep in repair boundary marks and pillars along the boundaries of the said lands according to the demarcation shown in the plan here to annexed.

7. The lessee shall not carry on or allow to be carried on any quarrying operations at or to any points within a distance of 100 metres from any railway line except with the previous written permission of the railway administration concerned and any bridge on National Highway or 50 metres from any reservoir, tanks, canals, rivers, bridges, public roads, other public works, residential buildings, the boundary walls of places of worship, burial grounds, burning ghats or one kilometer from the boundaries of National Park or Wildlife Sanctuaries except with the previous permission of the authorities concerned or the Government or competent authority.

8. The sides of open workings shall be sloped, stepped or secured by the lessee in such a manner as to prevent slope failure, when an open working is worked in steps, steps shall be of sufficient breadth in relation to their height to secure safety. In open workings trees liable to fall and all loose ground and material shall be removed by the lessee sufficiently far from the edge or otherwise made source in order to prevent danger to persons employed in the quarry.

9. If a working place is found to be unsafe all persons shall be withdrawn by the lessee/lessees immediately from the dangerous area and all access to such working place except for the purpose of removing the danger of saving life shall be prevented by securely fencing the full width of all entrances to the place.

10. The lessee/lessees shall at all reasonable times allow any officer authorised by the Central Government or by the State Government in that

  
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inspection and afford them all information they may reasonably require, and shall conform to and observe all orders which the Central and State Governments as the result of such inspection or otherwise, may from time to time pass.

11. The lessee shall be responsible for implementing the provisions of the Various labour laws applicable, from time to time, to the quarry.

12. The lessee/lessees shall not assign or underlet the said lands or any part thereof or the rights or privileges, therein hereby granted or any of them without the previous permission in writing of the State Government / competent authority.

13. Where the lease or any right, title or interest therein has been assigned, sublet or transferred as provided in rule 45 read with condition 12, then the person in whose favour such assignment, sublease or transfer has been made shall be responsible for implementing the provisions of the various labour laws applicable, from time to time, to the quarry.

14. The lease may be surrendered by the lessee/lessees at any time after 3 months notice in writing to the State Government/competent authority provided the lessee/lessees has/have paid all sums due on account of the lease: Provided that if the lessee/lessees elects/elect to determine this lease before the expiry of the term of the lease, shall pay in addition to other dues a sum equal to the dead rent payable for the remaining part of the term of the lease deed.

15. If the lessee/lessees shall be desirous of taking a further lease of the said lands he/they shall give three months' previous notice in writing of such desire to the State Government/competent authority and if the lessee/lessees has/have duly observed all the conditions of this lease, the State Government/competent authority may agree to renew the lease for such further term and on such terms and conditions as the State Government/competent authority may determine which shall be in accordance with the provisions of these rules.

16. If the lessee/lessees shall at any time during the said term use the said lands or any part thereof in any manner other than as authorised by this lease or fail to carry on quarrying operations continuously without sufficient cause of which the State Government/competent authority shall be the judge or shall commit a breach of any of the conditions of this lease it shall be lawful for the State Government/competent authority to cancel this lease and take possession of the said lands or the alternative to receive from the lessee/lessees such penalty not exceeding Rs. 25,000/- (Rupees twenty five thousand only) for the breach as the State Government/competent authority may fix.

17. If at the expiration of three calendar months after the expiry of the lease or its sooner determination, there shall remain in or the said lands, any engines, machinery, plant buildings, structures and other works,



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if not removed by the lessee/lessees within one calendar month after notice in writing requiring their removal be given to the lessee/lessees by the State Government/competent authority be deemed to become the property of the State Government in such manner as they may deem fit without liability to pay any compensation or to account to the lessee/lessees in respect thereof.

18. This lease subject to all rules and regulations which may from time to time be issued by the State Government regulating the working of the quarries and other matters affecting safety, health and convenience of the lessee's/lessees' employees or of the public, whether under the Indian Mines Act or otherwise.

19. The lessee/lessees shall without delay send to the District Collector and the competent authority or the officer authorised by him in this regard report of any accident causing loss of life or serious bodily injuries or seriously affecting or endangering life or property which may at any time occur at or in the said lands in the course of operations under this lease.

20. The lessee/lessees shall furnish such reports and returns relating to output, labourers employed and other matters as the State Government may prescribe.

21. The lessee/lessees shall make and pay such reasonable compensation as may be assessed by lawful authority in accordance with the law in force on the subject for all damage, injury or disturbance which may be done by him/them in exercise of the powers granted by this lease and shall indemnify and shall keep indemnified fully and completely the State Government against all claims which may be made by any person or persons in respect of any such damage, injury or disturbance and all costs and expenses in connection therewith.

22. Any condition prescribed in the Kerala Minor Mineral Concession Rules, 2015 but left out in this lease which may be found applicable to the lessee / lessees shall be treated as binding on the lessee/lessees.

23. In this case, the anticipated royalty to be remitted for the mineral extracted per year at the present rate of royalty of Rs. 24/- per tonne with proposed average annual production of 3,55,750 tonne is **Rs. 85,38,000/- (Rupees eighty five lakhs and thirty eight thousand only)** and may enhance the quantity of production and period of lease with the prior permission of the lessor and registration of the lease deed accordingly.

24. In this case, the surface rent to be remitted per year at the present rate of Rs. 5/- per Are per year is **Rs. 1,832/- (Rupees one thousand eight hundred and thirty two only)** and the refundable Security Deposit is **Rs. 36,630/- (Rupees thirty six thousand six hundred and thirty only).**

  
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District : Thiruvananthapuram  
Taluk : Chirayinkeezhu

Village	Re - Survey Block No.	Re - Survey No.	Lease Area in Hectares
Nagaroor	37	555/2	3.6630
Total Area in Hectares			3.6630


**Bounded by Survey No:**

On the North by : Re - Survey No. 555/2  
On the East by : Re - Survey No. 554/1  
On the South by : Re - Survey No. 555/8  
On the West by : Re - Survey No. 555/2

In witness whereof the parties hereto have set their hands here unto on the day and year first above written.

Signed by.....  **GITA S.R.**  
Geologist  
District Office  
Department of Mining & Geology  
Thiruvananthapuram-696004

for and on behalf of the Governor of Kerala.

In the presence of  
(1)  **SHYJU. P**  
Assistant Geologist  
Department of Mining and Geology  
District Office  
Thiruvananthapuram


(2) *J. V. Jirany* Mineral Revenue Inspector,  
District Office, Dept. of Mining and Geology.  
For ADANI VIZHINJAM PORT PRIVATE LTD  
*Kapish*

Signed by..... *Kapish*  
K. Kapish  
MD & CEO

for and on behalf of the lessee/lessees

In the presence of

(1)  **K. Suman M.A.R.**

(2)  **MUNEER B-T**  
ADAR 9273 5759 4800  
S. B. T. MOHAMMED BASHEER  
SOOMYAM, MAPRA, VAZHAKKAD  
MALAPPURAM, KERALA 673641

  
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No. 1716/DOT/ML/2018

DEPARTMENT OF MINING & GEOLOGY  
District Office, Thiruvananthapuram  
email : [geo.thi.dmg@kerala.gov.in](mailto:geo.thi.dmg@kerala.gov.in)  
Phone: 0471-2442055

Dated : 26-09-2018

From  
The Geologist

To  
**M/s. Adani Vizhinjam Port Pvt Limited,**  
**2nd Floor, Vipanchika Tower, Thycaud**  
**Thiruvananthapuram**

Sir,  
Sub:- Mining and Geology – Mines & Minerals – Approval of Eco-Friendly Mining Plan – Granite Building Stone Quarry at Survey Nos. **555/2**, Government land of **Nagaroor** Village, **Chirayinkeezhu** Taluk, Thiruvananthapuram District, Kerala State – reg.

The mining plan for the building stone quarry project at Survey Nos. **555/2**, Government land of **Nagaroor** Village, **Chirayinkeezhu** Taluk, Thiruvananthapuram District, Kerala State is hereby approved vide the powers delegated to the District Geologist for the approval of mining plan for the minor minerals vide Kerala Minor Mineral Concession Rules, 2015 with the following conditions:-

1. That you will follow the prescribed Rules & Regulations of Central Government and State Government issued from time to time in regard to mining.
2. That you will follow the Mine Safety Rules and Regulations.
3. That you will store the mining waste in the earmarked location/dumping yard only as specified in the plan.
4. That you will carry out the plantation as committed in the plan.
5. That provision shall be made for the housing facility for the labour with all basic infrastructure facilities including safe drinking water, toilets etc. within the site.

Yours Faithfully

  
26/9/18  
GEOLOGIST



  
**KANTHARAJ K.**  
RQP/GOA/130/2000/A





## ***Proceedings of the State Environment Impact Assessment Authority Kerala***

*Present: Dr. H. Nagesh Prabhu, IFS (Retd.), Chairman, Dr. K. Jayachandran, Member &  
Dr. Usha Titus I.A.S Member Secretary.*

**Sub: SEIAA- Environmental Clearance for the proposed building stone quarry project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala by Mr. Rajesh Jha, Chief Executive Officer, M/s Adani Vizhinjam Port Private Limited - Granted - Orders issued.**

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### **STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, KERALA**

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**No. 1200/EC2/2018/SEIAA**

***Dated, Thiruvananthapuram 01.03.2019***

- Ref:**
1. Application received on 31.12.2018 from Mr. Rajesh Jha, Chief Executive Officer, M/s Adani Vizhinjam Port Private Limited, 2<sup>nd</sup> floor, Vipanchika Tower, Thycaud, Thiruvananthapuram - 695014
  2. Minutes of the 90<sup>th</sup> meeting of SEAC held on 4<sup>th</sup> January, 2019
  3. Minutes of the 92<sup>nd</sup> meeting of SEAC held on 22.01.2019
  4. Minutes of the 89<sup>th</sup> meeting of SEIAA held on 27<sup>th</sup> February 2019.
  5. Affidavit received on 28.02.2019 from Sri. Manoranjan Tripathy, Deputy General Manager- Projects, Adani Vizhinjam Port Pvt. Ltd.

### **ENVIRONMENTAL CLEARANCE NO.02/2019**

Mr. Rajesh Jha, Chief Executive Officer, M/s Adani Vizhinjam Port Private Limited, 2<sup>nd</sup> floor, Vipanchika Tower, Thycaud, Thiruvananthapuram - 695014, vide the hardcopy of application received on 31.12.2018, has sought Environmental Clearance under EIA Notification, 2006 for the quarry project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala for an area of 3.6630 Ha. The project comes under Category B2, Activity-1(a), (i) as per the Schedule of EIA Notification 2006,

2. The proposed project site falls within Latitude 8°43'42.88" N to 8°33'51.74" N Longitude 76°50'15.26" E to 76°50'23.24" E. The lease area consists of 3.6630 hectares,



*(Signature)*  
**KANTHARAJ K.**  
RQP/GOA/130/2000/A

which belongs to Government (Puranhooke) land. The proposed project is for quarrying of 5,12,500 tonnes per annum. The daily water demand will be about 4 KLD, in which 2 KLD for domestic, 1KLD for plantation and 1KLD for dust suppression. The total project cost is 750 lakhs.

3. The proposal was placed in the 90<sup>th</sup> meeting of SEAC held on 4<sup>th</sup> January, 2019 and in the 92<sup>nd</sup> meeting of SEAC held on 22.01.2019. The Committee decided to recommend to issue EC subject to the following observations and conditions in addition to the general conditions.

1. *The NE and SW portion of the proposed quarry area is already mined to the localized baseline. Therefore, the area remaining to be mined out is the eastern portion of the proposed land.*
2. *On completion of the proposed mining activity, one quarter of the hillock under government land will vanish.*
3. *The geological reserve estimated is 51,96,250 tons out of which the mineable reserve is 17,78,750 tone (up to the bench level of 28m AMSL) and blocked reserve is 34,17,500 tons. The mineable reserve up to 40m AMSL is 15,07,500 tons. It means that if the total mineable quantity is allowed to be extracted, the mine will go below the present ground level of 40m AMSL by a depth of 12m creating a pit.*
4. *The reclamation and rehabilitation plan indicates that after the extraction over five years, there will a pit of 3 Ha out of which 0.95 Ha will be converted as a water pond and balance area of 2.05 Ha will be retained as pit.*
5. *The proposal for year-wise mining indicates that the extraction will be to the tune of 1,52,500 tons (1<sup>st</sup> year), 4,99,375 tons (2<sup>nd</sup> year), 5,12,500 tons (3<sup>rd</sup> year), 5,11,875 tons (4<sup>th</sup> year) and 1,02,500 tons (5<sup>th</sup> year). However, the proposal does not mention about the requirement for the next two years, during which it is understood that the breakwater construction will be over.*
6. *If we consider that the breakwater construction will be completed in two years and the quantity of stone projected for extraction in the first two years is the actual requirement for the proponent, then the quantity extracted will be 6,51,875 tons, i.e., 37% of the mineable reserve. If the mining is allowed upto the bench level of 70m as per the mine plan, the quantity extractable is 7,51,875 tons, i.e. 15% more than the requirement.*





7. Kerala experiences intermittent micro earthquakes such as the ones in Nedumkandam in 1988 with 4.5 magnitude, Vadakkencherry in 1994 with 4.3 magnitude, Erattupetta in 2000 and 2001 with magnitudes 5 and 4.8 respectively, off the coast of Thiruvananthapuram in 2001 with magnitude 4.5 etc. Based on the studies on the causative factors of micro tremors in Kerala, it is understood that variation in hydraulic pressure in the near-surface joints and fractures, increased pore-pressure and its uncertain variations etc lead to disturbance in the subsurface rock formations. Studies also indicated that from among the micro-tremors recorded in the seismograph installed in Peechi between 2000 and 2008, 45% occurred between July and October and 29% between November and January when there is significant rainfall and groundwater recharge. It indicates that the landuse changes, hydraulic pressure build up, pore-pressure variations etc. could influence occurrence of micro-tremors. There have been micro-tremors centered around Vamanapuram in September 1988, Parippalli in December 1994, Kilimanur in August 2006 and Atingal in January 2008. It is suspected that the subsurface rock formations do not have adequate strength to absorb the high magnitude variations in the landuse pattern, landform changes, hydraulic pressure variations etc.. Therefore, there need to be utmost restraints in disturbing the natural landforms of the region.
8. The earlier quarrying of the hillock has left a vertical fall of 70m which is very dangerously poised. If mining is allowed as per mining rules, the vertical fall will become a bench cut which will improve the safety aspect of the frontal portion of the quarry.
9. Since the proposal is to extract stone from one portion of the hillock, there will not be complete removal of the hillock, thus overcoming the implications on micro-climate of the region.
10. There are other quarries in the vicinity of the proposed quarry, but not within 500m as per a document produced by the proponent. It may be verified whether the proponent has submitted the relevant documents along with the application for EC, so as to ensure that there are no quarries within the radius of 500m.
11. The mining is proposed with Non-electric detonator (NONEL) method thereby minimizing air blast, fly rock and ground vibration.
12. The proponent should be directed to constitute a Local Area Monitoring Committee, involving the Grama Panchayat.



13. No environmental management intervention could adequately mitigate the impacts caused due to the activities linked to quarrying/mining. However, the demand for building stones for essential developmental activities need to be met. Therefore, it is desirable to restrict mining to the minimum essential requirement so as to minimize the environmental impact as well as to protect the resource for future demand of development activities. Hence, mining should not be allowed for extracting the whole of mineable quantity but be permitted to meet the essential requirement. This approach will also minimize the change in landform.
14. The proponent may be permitted to extract a maximum of 7 lakh tons of building stone within a period of two years. Further permission for mining may be considered based on the requirement then and environmental assessment.
15. The proponent should be asked to comply with all mandatory environmental management conditions that are stipulated while giving EC for such mining projects.
16. The social and environmental needs of the locality should be assessed in consultation with the Local Governments based on which the Corporate Social & Environmental Responsibility should be exercised.
4. The proposal was placed in the 89<sup>th</sup> meeting of SEIAA held on 27<sup>th</sup> February 2019. Authority decided to recommend for issuance of EC with general conditions in tune with KMMC Rules 2015 and its amendments and subject to the following specific conditions.
1. The mining should be conducted with Non-electric detonator (NONEL) method thereby minimizing air blast, fly rock and ground vibration.
  2. Extract a maximum of 7 lakh tons of building stone within a period of two years. Further permission for mining may be considered based on the requirement then and environmental assessment.
  3. The proponent shall file an affidavit that he will expend Rs.15 lakhs as part of CER in consultation with Local Self Government.
  4. The proponent should follow the closure plans (progressive closure and final closure) as per KMMC Rules.

The proponent has submitted notarised affidavit committing the CSR activities vide reference 5<sup>th</sup> cited.

5. Environmental Clearance as per the EIA Notification 2006 is hereby accorded for the quarry project of Mr. Rajesh Jha, Chief Executive Officer, M/s Adani Vizhinjam Port Private





Limited, 2<sup>nd</sup> floor, Vipanchika Tower, Thycaud, Thiruvananthapuram – 695014 in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala for an area of 3.6630 Ha, subject to the specific conditions as in para 4<sup>th</sup> above, all the environmental impact mitigation and management measures undertaken by the project proponent in the Form I, EMP, PFR and Mining plan submitted to SEIAA. The assurances and clarifications given by the proponent will be deemed to be a part of these proceedings as if incorporated herein. Also the general conditions for projects stipulated for mining (items 1 to 48), appended hereto will be applicable and have to be strictly adhered to.

6. The Clearance issued will also be subject to full and effective implementation of all the undertakings given in the application form, mitigation measures as assured in the Environment Management Plan and the mining features including progressive mine closure plan as submitted with the application and relied on for grant of this clearance. The above undertakings and the conditions and the undertakings in Chapter 2 (Mining) & (Blasting), Chapter 3 (Mines Drainage), Chapter 4 (Stacking of Mineral rejects and Disposal of waste) Chapter 8 (Progressive Mine Closure Plan) & EMP of the Mining Plan as submitted will be deemed to be part of this proceedings as conditions as undertaken by the proponent, as if incorporated herein.

7. Validity of the Environmental Clearance will be five years from the date of this clearance, subject to inspection by SEIAA on annual basis and compliance of the conditions, subject to earlier review of E.C in case of violation or non-compliance of conditions or genuine complaints from residents within the security area of the quarry.

8. Compliance of the conditions herein will be monitored by the State Environment Impact Assessment Authority or its authorised offices and also by the regional office of the Ministry of Environment & Forests, Govt. of India, Bangalore.

- i. Necessary assistance for entry and inspection should be provided by the project proponent and those who are engaged or entrusted by him to the staff for inspection or monitoring.
- ii. Instances of violation if any shall be reported to the District Collector, Thiruvananthapuram.





- iii. The given address for correspondence with the authorised signatory of the project is Mr.Rajesh Jha, Chief Executive Officer, M/s Adani Vizhinjam Port Private Limited, 2<sup>nd</sup> floor, Vipanchika Tower, Thycaud, Thiruvananthapuram – 695014,

Sd/-  
**Dr.Usha Titus I.A.S**  
Member Secretary, SEIAA

To,

Mr.Rajesh Jha,  
Chief Executive Officer,  
M/s Adani Vizhinjam Port Private Limited,  
2<sup>nd</sup> floor, Vipanchika Tower, Thycaud,  
Thiruvananthapuram – 695014

Forwarded/By order

  
Administrator, SEIAA

Copy to,

1. MoEF Regional Office, Southern Zone, Kendriya Sadan, 4<sup>th</sup> Floor, E&F Wing, 11 Block, Koramangala, Bangalore-560034.
2. The Principal Secretary to Government, Environment Department, Government of Kerala.
3. District Collector, Thiruvananthapuram
4. Director, Mining & Geology, Thiruvananthapuram -4.
5. The Member Secretary, Kerala State Pollution Control Board
6. District Geologist, Thiruvananthapuram
7. Tahsildhar, Chirayinkeezhu Taluk, Thiruvananthapuram district
8. Village Officer, Nagaroor Village (Kudavila), Thiruvananthapuram
9. Chairman, SEIAA.
10. Website,
11. S/f
12. O/c



**STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY KERALA**  
**GENERAL CONDITIONS (for mining projects)**

1. A separate environmental management and monitoring cell with qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.
  2. Suitable avenue trees should be planted along either side of the tarred road and open parking areas, if any, including of approach road and internal roads.
  3. Sprinklers shall be installed and used in the project site to contain dust emissions.
  4. Eco-restoration including the mine closure plan shall be done at the own cost of the project proponent.
  5. In view of the deep pits left after the excavation, stacking at maximum top level should be carried out.
  6. Corporate Environment Responsibility agreed upon by the proponent should be implemented.
  7. The project proponent shall comply the conditions stipulated by the statutory authorities concerned.
  8. Tarring /multiple options on the access roads shall be undertaken so as to reduce dust pollution during movement of vehicle.
  9. Overburden materials should be managed within the site and used for reclamation of mine pit as per mine closure plan / specific conditions.
  10. Height of benches should not exceed 5 m, and width should not be less than 5 m, if there is no mention in the mining plan/specific condition.
  11. Ground level should be fixed in individual cases separately.
  12. No mining operations should be carried out at places having a slope greater than 45°.
  13. Acoustic enclosures should have been provided to reduce sound amplifications in addition to the provisions of green belt and hollow brick envelop for crushers so that the noise level is kept within prescribed standards given by CPCB/KSPCB. This condition is applicable only in such cases if a crusher is adjacent to the quarry.
  14. The workers on the site should be provided with the required protective equipment such as ear muffs, helmet, etc.
  15. Garland drains with clarifiers to be provided in the lower slopes around the core area to channelize storm water.
  16. The transportation of minerals should be done in covered trucks to contain dust emissions. The proponent should plant trees at least 5 times of the loss that has been occurred while clearing the land for the project. SEAC should assess the number of trees in each project site before the issuance of EC so as to ensure the promptness in planting.
  17. Explosives should be stored in magazines in isolated place specified and approved by the Explosives Department.
  18. A minimum buffer distance of 100m from the boundary of the quarry to the nearest dwelling unit or other structures, not being any facility for mining shall be provided.
  19. 50 m buffer distance should be maintained from forest boundaries.
  20. Consent from Kerala State Pollution Control Board under Water and Air Act(s) should be obtained before initiating mining activity.
  21. All other statutory clearances should be obtained, as applicable, by project proponents from the respective competent authorities including that for blasting and storage of explosives.
  22. In the case of any change(s) in the scope of the project, extent quantity, process of mining technology involved or in any way affecting the environmental parameters/impacts as assessed, based on which only the E.C is issued, the project would require a fresh appraisal by this Authority, for which the proponent shall apply and get the approval of this Authority.
  23. The Authority reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environment (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.
- The stipulations by Statutory Authorities under different Acts and Notifications should be complied with, including the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and control of Pollution) act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification, 2006.






25. The project proponent should advertise in at least two local newspapers widely circulated in the region, one of which (both the advertisement and the newspaper) shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the State Environment Impact Assessment Authority (SEIAA) office and may also be seen on the website of the Authority at [www.seiaakerala.org](http://www.seiaakerala.org). The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same signed in all pages should be forwarded to the office of this Authority as confirmation.
26. The Environmental Clearance shall be put on the website of the company by the proponent.
27. Proponent shall submit half yearly reports in soft copy and SEIAA will upload it on the website.
28. The details of Environmental Clearance should be prominently displayed in a metallic board of 3 ft x 3 ft with green background and yellow letters of Times New Roman font of size of not less than 40. Sign board with extent of lease area and boundaries shall be depicted at the entrance of the quarry, visible to the public
29. The proponent should provide notarized affidavit (indicating the number and date of Environmental Clearance proceedings) that all the conditions stipulated in the EC shall be scrupulously followed.
30. No change in mining technology and scope of working should be made without prior approval of the SEIAA. No further expansion or modifications in the mine shall be carried out without prior approval of the SEIAA, as applicable.
31. The Project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any mining operations. Necessary safeguard measures to protect the first order streams, if any, originating from the mine lease shall be taken.
32. The top soil, if any, shall temporarily be stored at earmarked site(s) only for the topsoil shall be used for land reclamation and plantation. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only. The maximum height of the dumps shall not exceed 8m and width 20m and overall slope of the dumps shall be maintained to 45°. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dump. The entire excavated area shall be backfilled. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining.
33. Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps to prevent run off of water and flow of sediments directly into the river and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly.
34. Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of  $PM_{10}$  and  $PM_{2.5}$ , such as haul Road, loading and unloading points and transfer points- it shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.
35. Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.
36. Measures should be taken for control of noise levels below 85 dBA in the work environment.
37. The funds earmarked for environmental protection measures and CER activate should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the State Environment Impact Assessment Authority (SEIAA) office.
38. The Regional Office of MOEF & CC located at Bangalore shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (S) of the Regional Office by furnishing the requisite data/information/monitoring reports.
39. Any appeal against this Environmental Clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.
40. Concealing the factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.
41. The SEIAA may revoke or suspend the order, for non implementation of any of the specific or this implementation of any of the above conditions is not satisfactory. The SEIAA reserves the right to alter/modify the above conditions or stipulate any further condition in the interest of environment protection.



42. The above conditions shall prevail notwithstanding anything to the contrary, in consistent, or simplified, contained in any other permit, license or consent given by any other authority for the same project.
43. The Environmental Clearance will be subject to the final order of the courts in any pending litigation related to the land or project, in any court of law.
44. The mining operation shall be restricted to above ground water table and it should not intersect ground water table.
45. All vehicles used for transportation and within the mines shall have 'PUC' certificate from authorized pollution taking centre. Washing of all vehicles shall be inside the lease area.
46. Project proponent should obtain necessary prior permission of the competent authorities for drawal of requisite quantity of surface water and ground water for the project.
47. Regular monitoring of flow rates and water quality upstream and downstream of the springs and perennial nallals flowing in and around the mine lease area shall be carried out and reported in the six monthly reports to SEIAA.
48. Occupational health surveillance program of the workers should be under taken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.

  
For Member Secretary, SEIAA Kerala



No. 1716/DOT/ML/18

Department of Mining & Geology  
Government of KeralaDistrict Office, Thiruvananthapuram,  
Kessevadasapuram, Pattom Palace P. O.,  
Thiruvananthapuram 695004  
Phone 0471-2442055  
eMail: geo.thirdmg@kerala.gov.in  
Dated 20.03.2019From  
GeologistTo  
M/s. Adani Vizhinjam Port Pvt. Ltd.,  
2<sup>nd</sup> Floor, Vipanchika Tower, Thycad,  
Thiruvananthapuram.Sir,  
Sub:- Approval of Eco-friendly modified Mining Plan - Granite Building Stone  
quarry in Block no. 37 Re-sy. nos. 555/2, of Nagaroor Village,  
Chirayinkeezhu Taluk, Thiruvananthapuram District - reg.Ref:- 1. Kerala Minor Mineral Concession Rules 2015  
2. Your application dated 13.6.2018  
3. Site inspection dated 16.5.2019

The modified mining plan for the Granite Building Stone quarry of M/s. Adani Vizhinjam Port Pvt. Ltd., 2<sup>nd</sup> Floor, Vipanchika Tower, Thycad, Thiruvananthapuram District in Block no. 37 Re-sy. nos. nos. 555/2 of Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District, Kerala for an extent of 3.6630 Hectares is hereby approved vide the powers delegated to the District geologist for the approval of mining plan for the minor minerals issued under Rule 66 of Kerala Minor Mineral Concession Rules 2015, with the following conditions:-

1. That you will follow the prescribed Rules & Regulations of Central Government and State Government issued from time to time in regard to mining.
2. That you will follow the Mines Safety Rules & Regulations.
3. That you will store the mining waste in the earmarked location/dumping yard only as specified in the plan.
4. That you will carry out the plantation as committed in the plan.
5. That provision shall be made for the housing facility for the labour with all basic infrastructure facilities including safe drinking water, toilets etc., within the site.
6. That the yearly production (1<sup>st</sup> year - 399375MT, 2<sup>nd</sup> year - 300625MT, 3<sup>rd</sup> year, 4<sup>th</sup> year & 5<sup>th</sup> year - 1078750MT respectively) approved in the plan shall be strictly adhered to and if any deviation is required the same shall be intimated in advance.



*Kantharaj K.*  
KANTHARAJ K.  
ROP/GOA/130/2000/A



Yours faithfully,  
*(Signature)*  
Geologist



# CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON TO PREPARE MINING PLANS

(Under Rule 22C of Mineral Concession Rules, 1960)



Shri KANTHARAJ K resident

of SURGA - COA, 2001

of KOCHUVA, having given satisfactory evidence of his qualifications and experience is hereby granted recognition under Rule 22C of the Mineral Concession Rules, 1960 as a Qualified Person to prepare Mining Plans.

His registration number is RRP/GOA/130/2000/A



This recognition is valid for a period of two years  
ending 5.10.2002

Regional Controller of Mines  
Indian Bureau of Mines  
Govt. Regional Office

Place : Mangal

Date : 6.10.2000.

KANTHARAJ K.  
RRP/GOA/130/2000/A





From 01 April 2019 till 31 March 2020

ANNEXURE No. 12

Dated: 24 June 2020

Concession Holder: Adani Vizhinjam Port Private Limited

Concession Type &amp; Mineral: Quarrying Lease, Granite (Building Stone)

Date and time of Stock entry	Opening Stock (Tonnes)	Production since previous stock entry (Tonnes)	Total Quantity (Tonnes)	Sale since previous stock entry (Tonnes)	Consumption since previous stock entry (Tonnes)	Current Stock (Tonnes)	Passes issued since previous stock entry	Cumulative production (Tonnes)
2-07-2019 01:51 PM	10000	0	10000	0	0	10000	0	10000
5-07-2019 12:24 PM	10000	0	10000	100	0	9900	3	10000
06-07-2019 12:47 PM	9950	0	9950	85.365	0	9864.635	0	10000
09-07-2019 11:21 AM	9864.635	0	9864.635	85.365	0	9779.27	0	10000
10-07-2019 09:00 AM	9779.27	0	9779.27	59.38	0	9719.89	0	10000
26-07-2019 12:08 PM	9719.89	0	9719.89	182.38	0	9537.51	2	10000
01-08-2019 07:38 AM	9537.51	0	9537.51	177.235	0	9360.275	15	10000
22-08-2019 05:25 PM	9360.275	0	9360.275	81.81	0	9278.465	6	10000
25-08-2019 08:40 AM	9278.465	0	9278.465	81.81	0	9196.655	6	10000
3-09-2019 11:30 AM	9196.655	5	9201.655	68.175	0	9133.48	5	10005
6-09-2019 06:30 AM	9133.48	0	9133.48	177.255	0	8956.225	13	10005
08-09-2019 12:34 PM	8956.225	0	8956.225	328.8	0	8627.425	24	10005
09-09-2019 12:15 PM	8627.425	0	8627.425	51.27	0	8576.155	8	10005
27-09-2019 03:10 PM	8576.155	0	8576.155	54.27	0	8521.885	4	10005
28-09-2019 09:00 AM	8521.885	0	8521.885	81	0	8440.885	6	10005
29-09-2019 08:48 AM	8440.885	0	8440.885	52.705	0	8388.18	6	10005
01-10-2019 02:11 AM	8388.18	0	8388.18	281.75	0	8106.43	19	10005
01-10-2019 01:20 PM	8106.43	0	8106.43	89.07	0	8017.36	5	10005
03-10-2019 06:17 PM	8017.36	0	8017.36	55.195	0	7962.165	4	10005
05-10-2019 08:32 AM	7962.165	0	7962.165	192.955	0	7769.21	14	10005
07-10-2019 08:55 AM	7769.21	0	7769.21	476.04	0	7303.17	34	10005
08-10-2019 12:00 AM	7303.17	0	7303.17	67.55	0	7235.62	5	10005
14-10-2019 08:02 AM	7235.62	0	7235.62	269.085	0	6966.535	19	10005
15-10-2019 08:56 AM	6966.535	0	6966.535	124.80	0	6841.735	8	10005
03-11-2019 05:10 AM	6841.735	0	6841.735	417.467	0	6424.268	30	10005
07-11-2019 06:31 AM	6424.268	0	6424.268	410.610	0	6013.658	29	10005
08-11-2019 12:51 PM	6013.658	0	6013.658	293.512	0	5720.146	21	10005
09-11-2019 07:44 AM	5720.146	0	5720.146	315.054	0	5405.092	22	10005
09-11-2019 08:26 AM	5405.092	0	5405.092	128.762	0	5276.33	9	10005
23-11-2019 05:32 PM	5276.33	0	5276.33	42.94	0	5233.39	9	10005
24-11-2019 07:56 AM	5233.39	0	5233.39	185.775	0	5047.615	13	10005
25-11-2019 07:49 AM	5047.615	0	5047.615	620.149	0	4427.466	37	10005
26-11-2019 12:04 AM	4427.466	0	4427.466	457.448	0	3970.018	9	10005



27-09-2019 07:04 AM	4153.159	0	4153.159	163.857	0	5969.632	10	10000
27-09-2019 02:47 PM	3509.852	220	4169.632	112.437	0	4057.595	8	10205
29-09-2019 07:16 AM	4057.355	0	4067.355	85.892	0	3971.515	6	10450
30-09-2019 08:09 AM	3571.513	0	3571.513	184.952	0	3787.151	13	10150
01-10-2019 03:05 PM	3787.161	300	4067.161	182.592	0	3901.569	13	10150
03-10-2019 06:02 PM	3504.569	300	4204.569	298.874	0	3607.555	21	10150
05-10-2019 04:35 PM	3607.595	750	4637.595	0	0	4637.595	0	10150
06-10-2019 08:05 AM	4637.595	0	4637.595	111.141	0	4146.554	36	11655
09-10-2019 10:07 PM	4146.554	500	4636.554	41.325	0	4635.304	3	13035
10-10-2019 12:32 AM	4635.304	0	4635.304	94.325	0	4510.744	7	13055
10-10-2019 12:20 AM	4510.744	1300	5310.744	368.834	0	5141.91	26	13055
11-10-2019 12:17 AM	5141.91	2	5141.91	194.24	0	4947.67	14	13055
11-10-2019 11:56 AM	4947.67	1500	5547.67	342.036	0	5505.574	24	14150
12-10-2019 02:52 PM	5505.574	1000	6505.574	15.003	0	5590.569	1	15150
14-10-2019 03:23 PM	6590.569	1000	7590.569	170.002	0	7419.567	12	16150
15-10-2019 01:33 AM	7419.567	0	7419.567	512.042	0	6607.525	57	13055
15-10-2019 06:43 AM	6607.525	0	6607.525	195.277	0	6412.408	14	15055
16-10-2019 12:23 PM	6412.408	1000	7412.408	195.792	0	7228.676	13	17055
17-10-2019 08:17 PM	7228.676	1200	8428.676	0	0	8428.676	0	18255
18-10-2019 10:05 AM	8428.676	0	8428.676	175.32	0	8250.356	13	18255
18-10-2019 02:49 PM	8250.356	800	9050.356	23.355	0	9025.001	2	19150
22-10-2019 08:31 AM	9025.001	2	9025.001	310.686	0	8705.315	25	19150
07-11-2019 08:06 AM	8705.315	0	8705.315	304.346	0	8350.763	20	19150
08-11-2019 06:00 AM	8350.763	0	8350.763	494.301	0	7363.456	54	19150
09-11-2019 05:27 AM	7363.456	0	7363.456	434.433	0	7432.03	30	19050
11-11-2019 11:54 AM	7432.03	0	7432.03	13.599	0	7415.635	1	19050
12-11-2019 08:16 AM	7415.635	0	7415.635	17.330	0	7301.323	6	19050
13-11-2019 09:39 AM	7301.323	0	7301.323	103.039	0	7138.227	7	19050
14-11-2019 06:36 AM	7138.227	0	7138.227	59.392	0	7130.605	4	19050
15-11-2019 12:12 PM	7130.605	0	7138.305	30.572	0	7108.283	2	19150
21-11-2019 10:02 AM	7108.283	0	7108.283	120.116	0	6986.147	8	19150
22-11-2019 08:25 AM	6986.147	0	6986.147	175.726	0	6812.421	12	19150
23-11-2019 05:46 AM	6812.421	0	6812.421	275.953	0	6536.536	19	19050
25-11-2019 11:26 AM	6536.536	750	7286.536	0	0	7286.536	0	19805
25-11-2019 11:29 AM	7286.536	750	8036.536	0	0	8036.536	0	20555
26-11-2019 11:05 AM	8036.536	0	8036.536	254.672	0	7781.866	16	20555
26-11-2019 02:44 PM	7781.866	750	8531.866	167.662	0	8354.004	12	21005
29-11-2019 03:19 AM	8354.004	0	8354.004	282.887	0	8061.607	20	21150
29-11-2019 10:14 AM	8061.607	750	8831.607	320.139	0	8511.415	23	22150



30-11-2019 10:40 AM	8611.411	530	9011.415	376.762	0	8634.632	27	22555
1-12-2019 05:32 AM	8614.889	0	8635.633	612.143	0	7792.487	60	22555
3-12-2019 12:32 PM	7792.487	2020	9792.467	14.17	0	9778.017	1	21555
4-12-2019 04:44 AM	9778.017	0	9778.017	761.544	0	8028.670	53	21555
15-12-2019 06:10 AM	9036.675	0	9036.873	379.567	11	8855.760	27	21555
15-12-2019 12:47 PM	8656.706	750	9406.706	266.517	5	8139.789	19	25305
05-12-2019 16:08 AM	9139.789	0	9139.789	266.727	0	8973.062	15	25305
05-12-2019 12:10 PM	8673.059	750	9423.062	375.179	0	9246.863	27	26055
07-12-2019 10:42 AM	2246.885	750	3096.883	440.652	0	9556.031	32	26205
09-12-2019 14:26 AM	3556.03	0	9556.031	519.032	0	9037.029	37	26805
9-12-2019 12:17 PM	5057.029	300	5337.029	451.150	0	9886.673	32	29105
9-12-2019 04:17 AM	3865.873	0	9886.673	840.941	0	5044.837	60	29105
9-12-2019 05:03 PM	6043.932	1200	10944.892	136.56	0	10107.972	10	29305
11-12-2019 06:24 AM	10107.972	0	10107.972	805.571	0	9307.451	57	29305
12-12-2019 08:15 AM	9307.401	0	9307.401	589.489	0	8717.062	42	29305
13-12-2019 16:20 AM	6717.362	2	8717.062	95.8	1	8522.062	14	29305
13-12-2019 10:21 AM	6522.062	1500	10522.062	54.038	0	9665.327	4	30805
13-12-2019 11:40 AM	9665.327	1000	10668.027	484.432	0	10475.595	35	31805
14-12-2019 05:34 AM	10475.595	0	10475.595	856.638	0	8616.657	61	31805
14-12-2019 10:21 PM	8616.657	1220	10816.957	0	0	10816.957	0	33005
15-12-2019 04:51 AM	10816.957	0	10816.957	719.489	0	10097.486	51	33005
16-12-2019 05:47 PM	10097.486	1150	11137.486	341.427	0	10855.061	24	34105
17-12-2019 12:12 AM	10855.061	0	10855.061	437.969	0	10418.062	31	34105
17-12-2019 11:40 PM	10418.062	1300	11418.062	702.514	0	10715.478	50	34105
18-12-2019 14:23 AM	10715.478	0	10715.478	325.682	0	10399.786	23	35105
18-12-2019 18:05 AM	10399.786	1500	11899.786	320.927	0	11568.659	23	35605
18-12-2019 21:25 PM	11568.659	500	12068.659	421.282	0	11347.527	30	37105
19-12-2019 04:25 AM	11647.527	0	11647.527	595.262	0	10852.315	50	37105
19-12-2019 03:59 PM	10952.315	1600	12452.315	560.464	0	11891.951	40	38605
20-12-2019 12:05 AM	11891.951	0	11891.951	1787.061	0	10124.77	127	38605
21-12-2019 12:05 AM	10124.77	0	10124.77	276.475	0	9846.996	20	38605
21-12-2019 02:27 PM	9846.996	2000	11846.996	512.334	0	11353.981	37	40305
22-12-2019 12:52 AM	11353.981	0	11353.981	1099.481	0	10074.5	90	40805
23-12-2019 04:01 AM	10074.5	0	10074.5	329.197	0	9752.305	25	40805
23-12-2019 08:05 AM	9752.305	2020	11752.305	1235.721	0	10517.032	80	42005
24-12-2019 02:06 AM	10517.032	0	10517.032	550.184	0	9968.036	50	42805
24-12-2019 11:25 AM	9968.036	1500	11468.036	414.752	0	11052.148	30	44105
25-12-2019 03:46 AM	11052.148	0	11052.148	1550.103	0	9502.043	111	44105
27-12-2019 02:34 AM	9502.043	0	9502.043	1702.12	0	7789.501	124	44105



29-12-2019 12:21 AM	7769.931	0	7769.931	38.413	2	7417.518	25	44100
29-12-2019 09:26 AM	7417.519	0	7417.519	857.779	1	6572.74	60	44100
30-12-2019 04:06 PM	6579.74	0	6579.74	726.434	0	5853.506	52	44100
31-12-2019 12:08 AM	5853.506	0	5853.506	726.184	0	5127.142	52	44100
31-12-2019 11:04 AM	5127.142	2500	7827.42	1722.896	0	6354.246	91	44100
01-01-2020 04:42 AM	6354.246	0	6354.246	163.077	0	3651.169	38	44100
01-01-2020 05:59 AM	3651.169	1500	7351.50	26.19	0	7320.979	2	44100
01-01-2020 10:30 AM	7320.979	1000	8324.879	642.064	0	7682.915	45	44100
02-01-2020 02:00 AM	7682.915	0	7682.915	188.892	0	7483.223	14	44100
02-01-2020 02:37 AM	7483.223	1000	8483.223	431.345	0	8051.273	31	44100
02-01-2020 05:10 PM	8051.273	1500	9551.273	1304.351	0	8246.527	25	44100
03-01-2020 02:50 AM	8246.527	0	8246.527	267.168	0	7979.825	19	44100
03-01-2020 04:41 PM	7979.825	2500	10479.825	720.367	0	9749.635	52	44100
04-01-2020 12:00 AM	9749.635	0	9749.635	89.375	0	9660.563	5	44100
04-01-2020 01:07 AM	9660.563	0	9660.563	40.298	0	9543.283	3	44100
04-01-2020 08:28 AM	9543.283	1000	10543.283	0	0	10343.283	0	44100
04-01-2020 09:21 AM	10343.283	1200	11543.283	356.307	0	11583.976	18	44100
04-01-2020 03:15 PM	11583.976	1000	12583.976	714.184	0	11689.852	51	44100
05-01-2020 12:00 AM	11689.852	0	11689.852	41.815	0	11626.037	3	44100
05-01-2020 01:00 AM	11626.037	0	11626.037	58.24	0	11774.797	4	44100
05-01-2020 02:00 AM	11774.797	0	11774.797	45.796	0	11731.002	5	44100
05-01-2020 02:50 AM	11731.002	0	11731.002	236.869	0	11902.033	32	44100
06-01-2020 12:06 PM	11902.033	0	11902.033	27.009	0	10975.023	2	44100
06-01-2020 03:05 PM	10975.023	3000	13975.023	954.687	0	13020.143	68	44100
07-01-2020 01:28 AM	13020.143	0	13020.143	1368.636	0	11631.548	31	44100
07-01-2020 03:57 PM	11631.548	2500	14131.548	764.087	0	13386.531	55	44100
08-01-2020 12:42 AM	13386.531	0	13386.531	447.162	0	12919.379	32	44100
09-01-2020 06:30 AM	12919.379	1000	13919.379	0	0	13819.379	0	44100
09-01-2020 07:15 PM	13819.379	2500	16419.379	587.127	0	13832.252	42	44100
10-01-2020 12:30 AM	13832.252	0	13832.252	1425.132	0	14407.119	131	44100
11-01-2020 12:02 AM	14407.119	0	14407.119	447.557	0	13959.562	32	44100
11-01-2020 06:32 AM	13959.562	2500	16459.562	743.589	0	15712.803	50	44100
12-01-2020 12:06 AM	15712.803	0	15712.803	421.354	0	15291.639	30	44100
13-01-2020 05:13 AM	15291.639	0	15291.639	1420.931	0	13873.808	101	44100
14-01-2020 06:32 AM	13873.808	2500	16373.808	1252.951	0	15116.357	88	44100
15-01-2020 08:32 AM	15116.357	0	15116.357	532.722	0	14684.135	98	44100
15-01-2020 10:02 AM	14684.135	2500	17084.135	1096.529	0	16017.606	76	44100
16-01-2020 12:03 AM	16017.606	0	16017.606	728.709	0	15258.9	62	44100
16-01-2020 12:04 PM	15258.9	2500	17758.9	1387.494	0	16401.477	99	44100





17-01-2020 12:02 AM	18401.477	0	18401.477	288.390	0	16113.084	80	76305
17-01-2020 10:41 AM	18118.084	2500	18616.584	2096.508	0	16562.077	47	76805
18-01-2020 01:33 PM	18582.027	0	18582.027	2117.203	0	14444.773	151	76305
18-01-2020 02:59 AM	14444.775	2500	18944.775	2156.508	0	11608.447	158	81305
19-01-2020 03:11 AM	14808.447	0	14808.447	1753.943	0	13072.504	184	81305
19-01-2020 08:40 AM	13072.504	0	13072.504	561.252	0	12511.232	40	81305
20-01-2020 17:11 AM	12511.232	2500	15011.232	2865.924	0	12144.75	204	83805
20-01-2020 18:58 AM	12144.75	0	12144.75	574.784	0	11369.896	41	83805
21-01-2020 12:39 PM	11369.896	2500	14069.896	1280.172	0	12759.814	91	88305
24-01-2020 09:03 AM	12759.814	0	12759.814	27.47	0	12762.344	2	88305
24-01-2020 09:06 AM	12762.344	2500	15362.344	2299.355	0	12863.009	164	88805
25-01-2020 12:02 AM	12863.009	0	12863.009	635.894	0	12227.115	45	88805
25-01-2020 08:02 AM	12227.115	2500	14827.115	588.542	0	14236.573	92	91305
27-01-2020 04:17 AM	14236.573	0	14236.573	1060.439	0	13158.039	77	91305
27-01-2020 03:48 PM	13158.039	2500	15658.039	899.137	0	14753.947	64	93805
28-01-2020 02:22 AM	14753.947	0	14753.947	1135.089	0	15623.858	81	93805
28-01-2020 12:10 AM	15623.858	2500	18123.858	727.547	0	16392.311	32	96305
29-01-2020 04:38 AM	16392.311	0	16392.311	506.297	0	14895.014	38	96305
29-01-2020 06:31 AM	14895.014	2500	17395.014	1957.883	0	15436.131	140	98805
30-01-2020 08:47 AM	15436.131	2500	17936.131	1286.631	0	16671.448	51	101305
31-01-2020 12:07 AM	16671.448	0	16671.448	743.957	0	15922.493	54	101305
31-01-2020 10:15 AM	15922.493	2500	18422.493	1029.504	0	17392.988	74	103805
31-02-2020 12:07 AM	17392.988	0	17392.988	851.962	0	16741.008	47	103805
01-02-2020 10:22 AM	16741.008	2500	19241.008	1668.201	0	17572.727	120	105305
03-02-2020 06:27 AM	17572.727	0	17572.727	751.835	0	18810.631	55	105305
03-02-2020 01:18 PM	18810.631	2500	19310.631	888.617	0	16441.074	63	108805
04-02-2020 06:00 AM	16441.074	0	16441.074	610.717	0	17880.357	44	108805
04-02-2020 05:28 PM	17880.357	2500	20330.357	516.567	0	19614.789	37	111305
05-02-2020 10:31 AM	19614.789	0	19614.789	710.824	0	18133.067	61	111305
05-02-2020 01:40 PM	18133.067	2500	21103.067	429.45	0	20674.486	31	113305
06-02-2020 08:11 AM	20674.486	2500	23174.486	1749.636	0	21424.65	126	115805
07-02-2020 07:18 AM	21424.65	0	21424.65	2737.402	0	18637.447	137	115805
08-02-2020 12:23 AM	18637.447	0	18637.447	2602.595	0	18084.652	187	115805
10-02-2020 03:12 AM	18084.652	0	18084.652	633.804	0	15400.949	49	118305
10-02-2020 09:38 AM	15400.949	2500	17900.949	726.932	0	17181.980	51	118305
11-02-2020 08:25 AM	17181.980	0	17181.980	20.905	0	17167.382	2	118305
11-02-2020 10:04 AM	17167.382	2500	19687.382	1402.706	0	18284.377	101	120805
12-02-2020 12:14 AM	18284.377	0	18284.377	1306.518	0	16957.850	94	120805
12-02-2020 09:24 PM	16957.850	2500	19457.850	279.237	0	18075.623	20	123305





12:22 AM	19178.623	0	19178.623	1246.274	0	17937.35	80	125305
13-02-2020 02:58 PM	17932.05	2500	20432.35	1124.714	0	19507.833	81	125305
14-02-2020 12:50 AM	19307.635	0	19307.635	2239.463	0	17098.172	158	125305
15-02-2020 12:04 AM	17058.172	0	17098.172	489.717	0	15598.460	38	125305
15-02-2020 05:18 AM	16550.455	2500	19098.455	270.822	0	16877.533	10	125305
16-02-2020 06:43 PM	16877.533	2500	21577.533	574.618	0	20797.822	49	130115
16-02-2020 12:01 AM	20797.922	0	20797.922	264.727	0	20583.192	19	130115
17-02-2020 09:04 AM	20550.193	2500	23033.193	1473.008	0	21360.129	107	130115
18-02-2020 08:56 AM	21360.129	2500	24050.129	1913.908	0	22145.223	138	135805
19-02-2020 12:02 AM	22145.223	0	22145.223	41.235	0	22104.085	8	135805
19-02-2020 08:37 AM	22104.986	2500	24604.886	1487.188	0	23117.759	37	136305
20-02-2020 12:02 AM	23117.759	0	25117.799	515.222	0	22605.576	37	136305
20-02-2020 02:33 AM	22605.576	2500	25105.576	2941.153	0	22604.363	180	140115
21-02-2020 12:13 AM	22604.363	0	22504.888	3141.468	0	20462.805	154	140115
22-02-2020 07:28 AM	20462.995	0	20462.805	682.892	0	19880.201	42	140115
23-02-2020 09:14 AM	19680.201	2500	22860.201	2207.569	0	20172.645	103	142005
23-02-2020 12:02 AM	20172.645	0	20172.645	388.387	0	19764.256	26	143005
24-02-2020 07:03 AM	19764.256	0	19764.253	682.892	0	19201.554	42	143005
24-02-2020 11:52 AM	19201.554	2500	21701.554	1300.839	0	20700.756	77	145805
25-02-2020 12:07 AM	20700.756	0	20730.756	1375.086	0	18724.563	142	145805
26-02-2020 08:41 PM	16724.086	2500	21224.686	583.137	0	20611.551	42	148115
26-02-2020 12:06 AM	20611.551	0	20611.551	340.919	0	16700.632	68	148115
26-02-2020 11:26 AM	19700.632	2000	21700.632	582.599	0	21117.939	42	150115
27-02-2020 07:00 AM	21117.939	0	21117.939	1918.518	0	19205.922	38	150115
28-02-2020 12:08 AM	19205.922	0	19205.922	551.722	0	18551.199	41	150115
28-02-2020 07:25 AM	18551.199	2500	21051.199	0	0	21051.199	0	152805
28-02-2020 08:45 AM	21051.199	2500	23551.199	1702.108	0	21845.092	123	155805
29-02-2020 12:32 AM	21845.092	0	21845.092	1690.268	0	20154.824	122	155805
01-03-2020 12:02 AM	20154.824	0	20154.824	314.75	0	19840.045	23	155805
02-03-2020 06:36 AM	19840.045	2500	22340.045	2310.675	0	19699.063	159	157115
03-03-2020 12:01 AM	19699.063	0	19699.063	1573.731	0	18420.275	114	157115
05-03-2020 12:12 PM	18420.275	2500	20920.275	1845.016	0	19275.26	119	160115
04-03-2020 12:02 AM	19275.26	0	19275.26	1383.319	0	17851.939	100	160115
04-03-2020 07:57 AM	17851.939	2500	20351.939	2422.493	0	17568.447	175	162805
05-03-2020 12:02 AM	17568.447	0	17363.447	329.502	0	17425.863	35	162805
05-03-2020 11:37 AM	17425.863	2500	19823.863	1759.131	0	18170.374	127	165305
06-03-2020 12:04 AM	18170.374	0	18170.374	402.007	0	17768.066	29	165305
06-03-2020 08:45 AM	17768.066	2500	20268.066	550.649	0	19711.418	40	167115
07-03-2020 12:01 AM	19711.418	0	19711.418	1175.26	0	17538.156	157	167115

06-03-2020 12:04 AM	17530.156	0	17530.156	5166.531	0	12371.606	322	107805
09-03-2020 01:25 AM	12371.606	0	12371.606	16744.528	0	6747.576	465	107805
0-03-2020 12:11 AM	6747.576	0	6747.576	1195.054	0	5552.324	89	107805
11-03-2020 04:10 AM	5552.324	0	5552.324	1482.681	0	4069.643	98	107805
12-03-2020 07:29 AM	4069.643	0	4069.643	1018.389	0	3051.254	74	167605
13-03-2020 12:12 AM	3051.274	0	3051.274	485.107	0	2566.167	38	167605
13-03-2020 02:51 PM	2566.167	2500	3066.167	712.764	0	4355.403	51	170305
14-03-2020 12:02 AM	4355.403	0	4355.403	1181.988	0	3173.414	86	170305
15-03-2020 12:03 AM	3173.414	0	3173.414	386.712	0	2786.702	28	170305
16-03-2020 05:21 AM	2786.702	0	2786.702	2086.485	0	167.807	188	170305
17-03-2020 12:47 AM	167.807	0	167.807	182.072	0	5.835	13	170305
17-03-2020 12:54 AM	5.835	2500	2505.835	2500.068	0	5.772	181	172605
17-03-2020 11:04 PM	5.772	2500	2505.772	24.22	0	2478.502	2	175305
18-03-2020 12:04 AM	2478.502	0	2478.502	67.5	0	2411.002	5	175305
18-03-2020 12:30 AM	2411.002	2500	4911.002	2822.146	0	2388.857	182	177805
18-03-2020 02:45 PM	2388.857	2500	4888.857	132.019	0	3826.645	79	180305
19-03-2020 12:04 AM	3826.645	2500	6326.645	3096.404	0	2400.351	288	182605
20-03-2020 12:01 AM	2400.351	2500	4900.351	2652.063	0	1327.386	998	185305
21-03-2020 12:02 AM	1327.386	2500	3827.386	2364.298	0	1273.088	186	187805
22-03-2020 12:03 AM	1273.088	0	1273.088	574.687	0	716.401	36	187805
22-03-2020 01:08 AM	716.401	2500	3216.401	747.622	0	2500.709	54	190305
23-03-2020 06:32 AM	2500.709	2500	5000.709	3311.362	0	1689.147	343	192605
24-03-2020 08:02 AM	1689.147	2500	4189.147	0	0	4189.147	0	195305
<b>Total</b>		<b>195305</b>		<b>191115.891</b>	<b>0</b>		<b>13718</b>	





**Stock Report of THI/QL/GBS/AV/2019/1 (File Ref No: 14179)**

**From 01 April 2020 till 31 October 2020**

**ANNEXURE No. 13**

Concession Holder: Adani Vizhinjam Port Private Limited

Dated: 02 November 2020

Concession Type & Mineral: Quarrying Lease, Granite (Building Stone)

Date and time of Stock entry	Opening Stock (Tonnes)	Production since previous stock entry (Tonnes)	Total Quantity (Tonnes)	Sale since previous stock entry (Tonnes)	Consumption since previous stock entry (Tonnes)	Current Stock (Tonnes)	Passes issued since previous stock entry	Cumulative production (Tonnes)
02-04-2020 12:00 AM	4185.147	0	4185.147	0	0	4185.147	0	0
28-04-2020 06:00 AM	4185.147	2500	5685.147	1035.484	0	5655.653	75	2500
28-04-2020 08:14 AM	5655.653	2500	8155.653	2785.518	0	6056.145	200	5000
30-04-2020 12:00 AM	6056.145	0	6056.145	1119.184	0	4237.011	81	5000
30-04-2020 06:00 AM	4237.011	2500	6737.011	4728.322	0	2007.389	343	7500
22-05-2020 08:00 AM	2007.389	2500	4507.389	300.064	0	3607.309	65	10000
04-05-2020 07:21 AM	3607.309	0	3607.309	1355.544	0	2251.661	08	10000
05-05-2020 06:59 AM	2251.661	0	2251.661	665.652	0	1585.209	48	0000
06-05-2020 03:05 PM	1585.209	2500	4085.209	1467.411	0	2617.798	106	12500
06-05-2020 10:45 AM	2617.798	2500	5117.798	1232.544	0	3911.254	87	15000
07-05-2020 08:00 AM	3911.254	0	3911.254	581.842	0	3329.412	42	15000
07-05-2020 02:45 PM	3329.412	2500	5834.212	2001.784	0	3832.428	140	17500
08-05-2020 08:25 AM	3832.428	0	3832.428	554.552	0	3277.866	41	17500
08-05-2020 02:28 PM	3277.866	2500	5757.866	800.167	0	4629.709	66	20000
09-05-2020 06:30 AM	4629.709	0	4629.709	853.604	0	3675.825	39	20000
09-05-2020 09:08 PM	3675.825	2500	6175.825	593.895	0	5379.45	29	22500
09-05-2020 07:15 PM	5379.45	2500	7879.45	445.102	0	8333.366	30	25000
11-05-2020 08:07 AM	8333.366	3000	11333.366	1544.875	0	9160.709	134	28000
12-05-2020 07:32 AM	9160.709	3000	12160.709	2273.401	0	9615.308	151	31000
13-05-2020 07:27 AM	9615.308	3000	12615.308	1570.351	0	11338.957	114	34000
14-05-2020 08:35 AM	11338.957	3000	14338.957	2421.651	0	11917.306	173	37000
15-05-2020 07:06 AM	11917.306	3000	14917.306	1675.154	0	13241.142	139	40000
16-05-2020 09:40 AM	13241.142	3000	16041.142	3250.85	0	13790.462	183	43000
18-05-2020 08:08 AM	13790.462	0	13790.462	1306.362	0	12481.70	87	43000
18-05-2020 02:28 PM	12481.70	3000	15481.70	1154.531	0	14237.243	83	46000
18-05-2020 07:08 AM	14237.243	2500	16737.243	637.515	0	15956.734	61	48500
19-05-2020 08:35 PM	15956.734	1000	16956.734	1175.383	0	15284.351	84	49000
20-05-2020 08:26 AM	15284.351	2500	17784.351	1028.309	0	15757.261	74	51500
20-05-2020 03:12 PM	15757.261	500	16257.261	1158.158	0	16003.164	86	52000
21-05-2020 08:34 AM	16003.164	0	16003.164	845.233	0	15255.925	61	52000
21-05-2020 12:41 PM	15255.925	3000	18255.925	1553.273	0	16804.352	118	55000
22-05-2020 08:55 AM	16804.352	0	16804.352	925.084	0	15875.568	180	55000
22-05-2020 04:35 PM	15875.568	3000	16665.568	1109.384	0	17735.034	180	58000

Adani Vizhinjam Port Private Limited

**KANTHARAJ K.**  
RQP/GOA/130/2020/3





20-05-2020 12:14 AM	14756.254	0	17755.904	2999.68	0	14756.254	217	50000
24-05-2020 12:04 AM	14756.254	0	14756.254	850.005	0	14756.254	47	50000
25-05-2020 08:18 AM	14106.240	5000	17106.240	2925.509	0	14760.74	188	61000
26-05-2020 12:29 AM	14760.74	0	14760.74	143.377	0	14540.425	10	61000
26-05-2020 08:02 AM	15640.420	3000	17840.420	1675.474	0	15964.009	121	54000
27-05-2020 08:14 AM	15964.009	3000	19964.01	2705.084	0	19053.828	152	37000
29-05-2020 12:02 AM	19956.826	0	19956.826	134.787	0	19974.158	13	37000
29-05-2020 08:23 AM	19974.158	3000	19974.158	977.027	0	19938.83	71	70000
29-05-2020 12:08 AM	19938.83	0	19938.83	684.972	0	18701.633	43	70000
29-05-2020 08:01 AM	18701.633	3000	21101.633	3148.713	0	17952.745	228	74000
30-05-2020 12:17 AM	17952.745	0	17952.146	416.447	0	17535.638	30	73000
30-05-2020 08:40 AM	17535.638	3000	20535.638	2774.621	0	18021.098	175	75000
31-05-2020 12:03 AM	18021.098	0	19001.098	180.372	0	17980.787	15	76000
01-06-2020 08:27 AM	17980.787	3000	20881.727	2400.381	0	18385.744	160	75000
02-06-2020 08:21 AM	18385.744	0	18303.744	460.002	0	17925.747	36	79000
02-06-2020 11:24 AM	17925.742	3000	20833.742	1570.524	0	19854.219	143	82000
03-06-2020 12:39 AM	19854.219	0	18954.219	600.472	0	18860.607	53	82000
03-06-2020 07:50 AM	18860.607	3000	21220.607	2784.255	0	18479.553	231	65000
04-06-2020 12:03 AM	18479.553	0	18479.553	1038.503	0	17093.013	100	65000
04-06-2020 08:20 PM	17093.016	3000	20083.016	276.297	0	16815.715	30	68000
05-06-2020 12:05 AM	16815.719	0	13816.710	916.921	0	16880.780	66	68000
05-06-2020 10:16 PM	16880.799	3000	21689.799	65.5	0	21734.458	19	81000
06-06-2020 12:27 AM	21734.498	0	21734.493	787.254	0	20947.244	57	81000
06-06-2020 07:15 PM	20947.244	3000	23947.244	352.102	0	23595.143	25	84000
07-06-2020 12:43 AM	23595.143	0	23095.143	81.515	0	23513.227	3	94000
08-06-2020 08:30 AM	23513.227	3000	26513.227	1635.524	0	24877.705	118	97000
09-06-2020 12:07 AM	24877.705	0	24377.705	500.077	0	24251.127	48	97000
09-06-2020 06:11 AM	24251.127	3000	27251.127	1954.951	0	25316.178	141	100000
10-06-2020 12:06 AM	25316.178	0	25316.173	465.355	0	24852.221	34	100000
10-06-2020 08:18 AM	24852.221	3000	27852.221	2107.979	0	25744.542	159	103000
11-06-2020 12:05 AM	25744.542	0	25744.542	433.703	0	25312.637	31	103000
11-06-2020 09:57 AM	25312.637	3000	28312.637	3008.601	0	25211.331	225	105000
12-06-2020 11:59 AM	25211.334	3000	28211.334	714.605	0	27487.031	52	108000
13-06-2020 12:11 AM	27487.031	0	27487.031	41.14	0	27486.993	3	108000
13-06-2020 08:27 AM	27486.993	3000	30486.993	1980.051	0	28405.741	141	112000
14-06-2020 12:06 AM	28405.741	0	28405.041	264.259	0	28230.736	13	112000
15-06-2020 11:33 AM	28230.738	3000	31230.738	1655.059	0	29575.75	118	115000
16-06-2020 08:24 AM	29575.75	0	29575.75	793.867	0	28725.783	57	115000
16-06-2020 09:37 PM	28725.785	3000	31725.785	251.222	0	31525.561	19	118000

17-06-2020 08:15 AM	01525.561	0	31525.551	602.512	0	50922.548	50	119000
17-06-2020 04:17 PM	30892.042	3000	33892.648	548.497	0	33966.152	29	121000
18-06-2020 08:24 AM	33488.152	0	35488.152	388.377	0	33097.773	28	121000
18-06-2020 05:41 PM	35007.773	3000	26387.773	579.35	0	35517.024	42	124000
18-06-2020 08:14 AM	35517.824	3000	28317.824	1052.725	0	31464.098	76	127000
20-06-2020 06:12 AM	37454.098	0	37454.098	915.294	0	36548.163	80	127000
22-06-2020 06:13 AM	36548.752	3000	39516.752	1342.749	0	35306.012	74	130000
23-06-2020 08:29 AM	38706.012	3000	41506.012	1308.650	0	40427.375	78	133000
24-06-2020 06:31 AM	40427.375	0	42497.275	2469.549	0	28056.125	187	133000
25-06-2020 05:28 AM	38008.125	3000	41008.125	2899.300	0	39109.62	203	136000
26-06-2020 07:15 AM	39109.62	0	76109.62	1429.469	0	35883.362	133	136000
26-06-2020 12:19 PM	35883.362	3000	35683.357	1811.894	0	37661.551	13	138000
27-06-2020 12:02 AM	37661.551	0	37838.551	1693.024	0	36305.625	115	139000
27-06-2020 05:57 AM	36305.625	3000	39335.625	1634.174	0	37671.419	116	142000
28-06-2020 12:05 AM	37671.419	0	38871.449	176.185	0	37422.985	113	145000
28-06-2020 06:31 AM	37422.985	3000	40422.985	2976.103	0	31514.463	215	145000
30-06-2020 06:15 AM	31514.463	3000	40514.563	2762.158	0	37727.703	231	148000
01-07-2020 06:24 AM	37727.703	3000	43727.703	9523.783	0	37803.518	211	151000
02-07-2020 12:02 AM	37803.518	0	37803.918	27.22	0	37776.695	2	151000
02-07-2020 05:42 AM	37776.695	3000	40776.695	2031.131	0	36715.536	149	154000
03-07-2020 06:56 AM	36715.536	3000	41715.598	2195.476	0	39630.09	159	157000
04-07-2020 07:00 AM	39630.09	3000	42530.09	394.857	0	41875.754	62	160000
05-07-2020 12:03 AM	41875.754	0	41875.234	740.405	0	41425.529	18	160000
06-07-2020 11:10 AM	41425.529	3000	44425.829	651.423	0	43591.406	60	163000
07-07-2020 12:13 AM	43591.406	0	43594.406	698.019	0	42088.086	50	163000
07-07-2020 09:04 PM	42088.086	3000	45898.086	330.125	0	45884.963	24	166000
08-07-2020 12:10 AM	45884.963	0	45885.953	254.346	0	45301.309	13	168000
09-07-2020 02:43 PM	45301.309	3000	48301.309	558.667	0	47702.735	46	169000
09-07-2020 12:06 AM	47702.735	0	47702.728	261.652	0	47438.685	19	169000
09-07-2020 09:57 AM	47438.685	3000	50438.688	54.98	0	50385.807	4	172000
10-07-2020 10:48 AM	50385.807	3000	53535.687	493.017	0	52100.952	107	175200
11-07-2020 12:07 AM	52100.952	0	52130.952	1772.160	0	50328.684	126	175200
11-07-2020 05:03 PM	50328.684	3000	53328.984	873.255	0	52655.426	40	178200
12-07-2020 12:11 AM	52655.426	0	52655.426	113.005	0	52341.752	5	178200
13-07-2020 07:29 AM	52341.752	0	52541.762	26.921	0	52514.754	2	178200
13-07-2020 08:24 AM	52514.754	3000	52514.785	805.517	0	52735.27	58	178200
14-07-2020 12:07 AM	52735.27	0	52709.27	150.105	0	52573.194	10	178200
14-07-2020 07:19 AM	52573.194	1000	53573.164	903.192	0	52888.875	70	180200
15-07-2020 12:21 AM	52888.875	0	52803.873	54.57	0	52540.255	1	180200





15-07-2020 06:16 AM	52549.005	1000	53549.305	844.639	0	52704.766	61	181200
16-07-2020 07:16 AM	52704.766	1000	53704.766	1256.694	0	52455.879	92	182200
17-07-2020 12:06 AM	52455.879	0	52455.879	114.415	0	52321.465	9	182200
17-07-2020 02:10 AM	52321.465	1000	52321.465	876.837	0	52442.899	63	183200
18-07-2020 12:14 AM	52442.899	0	52442.899	556.547	0	51884.513	40	184200
18-07-2020 03:52 PM	51884.513	1000	52664.313	825.922	0	52258.501	46	184200
19-07-2020 12:18 AM	52258.501	0	52258.501	164.276	0	52094.113	12	184200
20-07-2020 05:04 AM	52094.113	1000	53094.113	1477.260	0	51618.875	106	185200
21-07-2020 09:20 AM	51618.875	1000	52618.875	1275.514	0	51341.059	77	185200
22-07-2020 12:09 AM	51341.059	0	51341.059	886.505	0	51154.855	28	185200
22-07-2020 08:45 AM	51154.855	1000	52154.855	851.579	0	51205.277	68	187200
23-07-2020 12:02 AM	51205.277	0	51205.277	1000.142	0	50205.157	79	187200
24-07-2020 12:02 AM	50205.157	0	50205.137	590.027	0	49813.113	42	187200
25-07-2020 05:22 PM	49813.113	1000	50813.113	516.812	0	50006.199	39	188200
25-07-2020 07:20 AM	50006.199	0	50386.199	238.095	0	49770.105	21	188200
26-07-2020 05:17 PM	49770.105	1000	50770.105	512.852	0	50288.242	67	189200
26-07-2020 12:35 AM	50288.242	0	50756.742	209.535	0	50045.711	15	189200
27-07-2020 05:11 AM	50045.711	1000	51045.711	1436.181	0	49550.567	166	193200
28-07-2020 07:26 AM	49550.567	1000	50550.567	1110.137	0	49440.41	60	193200
29-07-2020 07:20 AM	49440.41	1000	50440.41	1231.56	0	48206.449	301	192200
30-07-2020 07:11 AM	48206.449	1000	47206.449	2406.763	0	44801.802	173	195200
31-07-2020 12:02 AM	44801.802	0	44801.699	125.35	0	44676.516	9	195200
31-07-2020 07:56 AM	44676.516	1000	45676.516	747.842	0	44923.477	54	194200
01-08-2020 11:41 AM	44923.477	1000	45386.477	557.837	0	45371.695	40	195200
02-08-2020 12:06 AM	45371.695	0	45370.866	171.125	0	45126.503	12	195200
03-08-2020 09:01 AM	45126.503	0	45159.543	36.75	0	45144.753	4	195200
03-08-2020 01:47 PM	45144.753	1000	45844.753	869.594	0	44755.199	63	195700
04-08-2020 12:05 AM	44755.199	0	44755.199	137.265	0	44617.637	13	195700
04-08-2020 07:18 AM	44617.637	1000	45617.637	743.237	0	44638.379	54	196700
05-08-2020 12:04 AM	44638.379	0	44638.379	135.545	0	44693.031	15	196700
06-08-2020 07:45 AM	44693.031	1000	45693.031	810.182	0	44872.852	60	197700
06-08-2020 12:35 AM	44872.852	0	44872.852	43.76	0	44820.077	3	197700
06-08-2020 07:12 AM	44820.077	1000	45820.077	749.877	0	45079.094	54	198700
07-08-2020 12:13 AM	45079.094	0	45079.094	153.877	0	44913.223	11	198700
07-08-2020 07:16 AM	44913.223	1000	45913.223	463.055	0	45450.158	34	199700
08-08-2020 12:20 AM	45450.158	0	45450.158	330.912	0	45148.254	21	199700
08-08-2020 07:39 AM	45148.254	1000	46148.254	699.1	0	46065.446	4	200700
09-08-2020 06:40 AM	46065.446	1000	47065.446	526.447	0	46168.593	45	201700
10-08-2020 12:05 AM	46168.593	0	46508.593	279.145	0	46189.555	20	201700





11-08-2020 07:51 AM	46169.555	1000	47189.535	476.31 /	0	46712.597	34	203700
12-08-2020 12:12 AM	46712.637	0	46712.637	867.852	0	46344.742	46	203700
13-08-2020 12:10 AM	46344.742	0	46344.742	378.327	0	45860.418	27	202700
14-08-2020 07:54 AM	45860.418	1000	46680.418	2635.743	0	41880.679	204	205700
14-08-2020 07:31 AM	43630.678	0	46830.678	778.702	0	43651.873	58	200700
14-08-2020 08:38 AM	43051.973	1000	44351.973	1009.177	0	42673.195	77	204700
15-08-2020 12:05 AM	42973.195	0	42973.195	205.202	0	42787.992	15	204700
15-08-2020 09:28 AM	42787.992	1000	43787.992	7488.87	0	36279.071	538	205700
17-08-2020 17:33 AM	36279.071	0	36279.071	2056.696	0	34220.088	148	205700
18-08-2020 12:31 AM	34220.088	0	34220.088	303.39	0	33887.297	24	205700
16-08-2020 07:04 AM	33887.297	1000	34887.297	805.457	0	34081.84	58	206700
19-08-2020 12:03 AM	34081.84	0	34081.84	458.09	0	33623.75	51	206700
19-08-2020 07:13 AM	33623.75	1000	34623.75	660.642	0	33642.809	40	207700
20-08-2020 17:04 AM	33642.809	0	33842.809	268.102	0	33574.605	28	207700
20-08-2020 07:00 AM	33574.605	1000	34574.605	872.007	0	33705.801	32	208700
21-08-2020 17:02 AM	33705.801	0	33705.801	817.612	0	33395.186	26	208700
21-08-2020 16:59 AM	33395.186	500	33995.186	611.357	0	33275.878	44	209200
22-08-2020 12:19 AM	33275.878	0	33275.878	165.7	0	33107.73	12	209200
22-08-2020 17:01 AM	33107.73	500	33607.73	484.435	0	33123.297	35	209700
23-08-2020 12:17 AM	33123.297	0	33123.297	249.212	0	32874.082	18	209700
24-08-2020 07:58 AM	32874.082	500	33374.082	864.007	0	32510.078	82	210200
25-08-2020 12:12 AM	32510.078	0	32510.078	261.885	0	32246.691	10	210200
25-08-2020 12:03 AM	32246.691	500	32746.691	407.508	0	32311.189	20	210700
26-08-2020 12:08 AM	32311.189	0	32311.189	230.855	0	32080.304	19	210700
26-08-2020 07:43 AM	32080.304	500	32580.304	34.75	0	32525.584	6	211200
27-08-2020 17:14 AM	32525.584	500	33025.584	824.857	0	32201.547	59	211700
28-08-2020 12:07 AM	32201.547	0	32201.547	777.804	0	31425.852	66	211700
29-08-2020 12:08 AM	31425.852	0	31425.852	541.995	0	31078.358	25	211700
03-09-2020 07:48 AM	31078.358	500	31578.358	112.259	0	31466.990	80	212200
04-09-2020 07:03 AM	31466.990	500	31966.990	1434.214	0	25461.688	384	212700
05-09-2020 12:07 AM	25461.688	0	25461.688	3055.799	0	20385.837	366	212700
06-09-2020 12:02 AM	20385.837	0	20385.837	402.005	0	19983.381	29	212700
07-09-2020 06:29 AM	19983.381	0	19983.381	8609.623	0	18153.250	432	212700
08-09-2020 12:02 AM	18153.250	0	18153.250	4010.34	0	0443.514	280	212700
09-09-2020 12:19 AM	0443.514	0	9144.316	2780.271	0	6095.047	300	212700
10-09-2020 12:02 AM	6095.047	0	9364.347	850.787	0	3513.326	61	212700
11-09-2020 12:37 AM	3513.326	0	8813.28	848.207	0	4897.053	81	212700
12-09-2020 12:15 AM	4897.053	0	4687.033	253.552	0	4413.601	111	212700
12-09-2020 08:51 AM	4413.601	500	4913.601	456.587	0	4158.936	35	213200



13-09-2020 12:03 AM	4458.906	0	4458.906	233.036	0	4225.871	17	219200
14-09-2020 07:04 AM	4225.871	0	4225.871	54.75	0	4169.121	4	219200
14-09-2020 11:21 AM	4169.121	2000	6169.121	0	0	6169.121	0	219200
15-09-2020 11:08 AM	6169.121	1000	7169.121	0	0	7169.121	0	219200
16-09-2020 05:20 AM	7169.121	0	7169.121	2423.283	0	4745.838	174	219200
16-09-2020 03:45 PM	4745.858	0	4745.858	375.357	0	5970.591	38	219200
16-09-2020 05:41 PM	5970.591	500	6470.591	351.182	0	6138.349	24	219200
20-09-2020 12:14 AM	6138.349	0	6138.349	2751.471	0	1307.878	186	219200
21-09-2020 08:29 AM	1307.878	0	1307.878	1304.361	0	5.514	100	219200
21-09-2020 09:51 AM	5.514	1000	1003.814	158.80	0	344.584	11	219200
21-09-2020 03:50 AM	344.584	2000	2844.684	2477.608	0	366.815	179	219200
22-09-2020 12:01 AM	366.815	0	366.815	761.3	0	5.513	26	219200
22-09-2020 01:11 AM	5.513	2000	2005.513	1098.036	0	8.579	144	219200
22-09-2020 07:34 AM	8.579	1500	1388.579	988.577	0	17.002	71	219200
22-09-2020 09:45 AM	17.002	2000	2017.002	1987.238	0	18.733	161	219200
22-09-2020 10:56 PM	18.733	1000	1818.733	67.82	0	351.848	5	219200
23-09-2020 12:01 AM	351.848	0	351.848	316.894	0	35.119	86	219200
23-09-2020 09:02 AM	35.119	2000	2035.119	360.102	0	1875.017	26	219200
23-09-2020 1:00 AM	1875.017	2000	3675.017	1667.509	0	1667.509	143	219200
24-09-2020 12:12 AM	1667.509	0	1667.509	778.495	0	609.013	38	219200
24-09-2020 01:50 AM	609.013	1000	1688.013	1900.352	0	6.88	137	219200
24-09-2020 12:12 PM	6.88	2000	2008.88	2034.168	0	4.491	144	219200
24-09-2020 07:17 PM	4.491	2000	2004.491	1334.281	0	83.2	188	219200
24-09-2020 10:28 PM	83.2	2000	2086.2	1325.512	0	754.868	60	219200
25-09-2020 12:41 AM	754.868	0	754.868	751.703	0	2.561	34	219200
25-09-2020 03:08 AM	2.561	1500	1600.561	529.029	0	474.952	38	219200
25-09-2020 10:58 AM	474.952	4000	4474.952	441.7	0	4035.252	32	219200
25-09-2020 05:28 PM	4035.252	1000	5035.252	6138.881	0	839.881	225	219200
25-09-2020 12:02 AM	1839.881	0	1839.881	1868.546	0	3.245	186	219200
25-09-2020 07:08 AM	3.245	4000	4003.245	888.215	0	3213	53	219200
26-09-2020 09:54 AM	5315	3000	8315	2077.708	0	4837.264	186	219200
26-09-2020 09:54 AM	4237.254	0	4237.254	1694.675	0	5670.838	41	219200
29-09-2020 07:03 AM	3870.889	0	3870.889	13.641	0	3857.244	1	219200
29-09-2020 08:07 AM	3857.244	2000	5857.244	15.586	0	5843.809	1	219200
30-09-2020 06:34 AM	5843.809	0	5843.809	93.755	0	5847.654	7	219200
13-10-2020 06:54 AM	5847.654	0	5847.654	53.925	0	5403.929	4	219200
14-10-2020 08:13 AM	5403.929	0	5403.929	5538.174	0	254.755	378	219200
14-10-2020 08:46 PM	254.755	2500	2754.755	0	0	2754.755	0	219200
15-10-2020 08:05 AM	2754.755	0	2754.755	140.432	0	2744.323	32	219200



15-10-2020 10:05 AM	2914.355	2500	4814.223	4564.347	0	2493.770	325	256730
16-10-2020 06:22 AM	245.376	0	245.376	224.73	0	24.645	15	250700
16-10-2020 09:46 AM	24.516	2500	2524.645	0	0	2524.645	0	259200
16-10-2020 09:19 AM	2524.346	2500	5034.645	222.658	0	4031.991	15	261700
17-10-2020 06:25 AM	4301.994	0	4301.994	444.43	0	4357.314	32	261700
18-10-2020 06:10 AM	4357.314	0	4357.314	463.612	0	3896.902	30	251700
20-10-2020 06:27 AM	3896.902	0	3896.902	448.002	0	3448.97	32	251700
21-10-2020 03:53 AM	3448.97	0	3448.97	447.755	0	3001.115	38	251730
21-10-2020 06:54 PM	3001.115	3000	6301.115	0	0	3001.115	0	264730
22-10-2020 06:03 AM	3001.115	0	3001.115	455.127	0	5507.663	31	264730
22-10-2020 17:48 PM	5507.663	4000	9507.663	0	0	5507.663	0	268700
23-10-2020 06:25 AM	5507.663	0	9507.663	360.352	0	5177.639	26	268700
25-10-2020 10:17 AM	5177.639	4000	13177.639	224.05	0	12953.285	10	272700
24-10-2020 05:26 PM	12953.285	4000	16953.285	0	0	16953.285	0	278700
26-10-2020 06:27 AM	16953.285	0	16953.285	903.73	0	16549.436	22	278730
26-10-2020 10:20 AM	16949.436	4000	20949.436	0	0	20949.436	0	280700
26-10-2020 10:49 AM	20949.436	4000	24949.436	280.092	0	24369.404	21	284700
27-10-2020 08:17 AM	24369.404	0	24369.404	581.32	0	23788.084	42	284700
28-10-2020 06:23 AM	23788.084	0	23788.084	319.45	0	23468.594	23	284700
28-10-2020 10:45 AM	23468.594	4000	27468.594	305.852	0	27153.032	22	288700
28-10-2020 06:05 AM	27153.032	0	27153.032	1000.229	0	26145.674	72	288730
29-10-2020 00:34 AM	26145.674	4000	30145.674	3194.053	0	26955.319	229	288730
30-10-2020 09:28 AM	26955.319	0	26955.319	1163.377	0	25792.242	34	288700
30-10-2020 01:03 PM	25792.242	4000	29792.242	1506.113	0	28293.123	129	293700
31-10-2020 08:24 AM	28293.123	0	28293.123	203.145	0	27948.08	23	293700
31-10-2020 10:52 AM	27948.08	3500	31448.58	292.150	0	31184.426	20	300230
<b>Total</b>		<b>300200</b>		<b>279224.781</b>	<b>0</b>		<b>19583</b>	





മെമ്പർഷിപ്പ്

നമ്പർ : 756/ഡിഒറ്റി/എംഎൽ/2020



മൈനിങ് & ജിയോളജി വകുപ്പ്  
ജില്ലാ ഓഫീസ്, തിരുവനന്തപുരം  
മേയറോട്റോപ്പാർക്ക്, പട്ടം പാലം ഫി.ഒ.,  
email : geo.thi.dmg@kerala.gov.in  
Phone: 0471-2442055  
തീയതി : 08.09.2020

**വിവരങ്ങൾ ഡിമാന്റ് നോട്ടീസ്**

വിഷയം:- മൈനിങ് & ജിയോളജി - ഖനിയും ഖനീജങ്ങളും - ചെറുകിട ധാതു - കുമിളപ്പുറം  
അനധികൃതവനനം - സിയമനടപടി സ്വീകരിക്കുന്നത് - സംബന്ധിച്ച്.

- സൂചന:- 1. 2015-ലെ കേരള മൈനിങ് മിനറൽ മൺസ്ട്രി പാറ്റേൺ  
2. 20.05.2019 തീയതിയിലെ 79/2019-20/9363/എം3/2018/DMG നമ്പർ ഉത്തരവ്  
3. Administrator, SEIAA 03.03.2020 ലെ T200/EC2/2018/SEIAA നമ്പർ കത്തും ശ്രീ പി. അജിത്ത് പി യുടെ പരാതിയും  
4. 26.05.2020 തീയതിയിലെ ഈ ഓഫീസിൽ നിന്നുള്ള സ്ഥലപരിശോധന  
5. ഈ ഓഫീസിന്റെ 09.06.2020 ലെ 13-ൽ നമ്പർ കാരണം കാണിക്കൽ നോട്ടീസ്  
6. ഈ ഓഫീസിന്റെ 17.06.2020 ലെ 756/ഡിഒറ്റി/എംഎൽ/2020 ഡിമാന്റ് നോട്ടീസ്.  
7. അഭിമാനി വിഴിഞ്ഞം പോർട്ട് പ്രൈവറ്റ് ലിമിറ്റഡിന്റെ 17/06/2020, 19/08/2020 തീയതികളിലെ അപേക്ഷകൾ.  
8. അസിസ്റ്റന്റ് ജിയോളജിസ്റ്റിന്റെ 07/09/2020ലെ റിപ്പോർട്ട്.

മേൽ സൂചനകളിലേയ്ക്ക് ശ്രദ്ധ ക്ഷണിക്കുന്നു. ചിറയിൻകീഴ് താലൂക്കിൽ നഗരത്തിൽ വില്ലേജിൽ സർവ്വേ നമ്പർ 555/2 ത്വപെട്ട സർക്കാർ പുറമ്പോക്കിൽ കുമിളപ്പുറം ഖനനത്തിന് സൂചന (2) ആയി കാണിയിട്ട് ലിസ്റ്റ് നൽകിയ സ്ഥലത്ത് സൂചന (3) ന്റെ അടിസ്ഥാനത്തിൽ സൂചന (4) പ്രകാരം നടത്തിയ പരിശോധനയിൽ സർവ്വേ നമ്പർ 555/2 ന്റെ ബഫർ മേന്മാനിലും ലിസ്റ്റ് എരിയൽ പുറത്ത് സർവ്വേ നമ്പർ 554/1 ൽ നിന്നുമായി 53713 MT കുമിളപ്പുറം അനധികൃതമായി വനനം ചെയ്ത് നീക്കിയതായി നോട്ടീസ് ചെയ്തിരുന്നു. ടി പ്രവർത്തി സൂചന (5) പട്ടാളത്തിന്റെ ലാലനമാകയാൽ എന്തെങ്കിലും വിശദീകരണം സമർപ്പിക്കാത്തതുകൊണ്ട് ആയത് സമർപ്പിക്കുന്നതിന് സൂചന (5) ആയി നിർദ്ദേശം നൽകിയിരുന്നു. എങ്കിലും ലിസ്റ്റിന്റെ ഭാഗത്തുനിന്നും പ്രതികരണം ഉണ്ടാകാത്തതായതിനാൽ അനധികൃതമായി നീക്കം ചെയ്തതായി കണ്ടെത്തിയിരുന്ന 53713 മെട്രിക് കുമിളപ്പുറം പൊതുവായി ഇനത്തിൽ 38,92,340/- രൂപ കടമയെന്നതിന് സൂചന (6) ആയി ഡിമാന്റ് നോട്ടീസ് നൽകിയതായി. സൂചന (7) ആയി താമശ്ശി സമർപ്പിച്ച വിശദീകരണം പരിശോധിച്ചതിൽ അനധികൃത വനനം തിട്ടപ്പെടുത്തിയ 53,713 മെട്രിക് 43,750 മെട്രിക് താങ്കൾക്ക് സൂചന (2) ആയി ലിസ്റ്റ് അനുബന്ധ സ്ഥലത്തിൽ പുറത്ത് താങ്കളുടെ തന്നെ മറ്റൊരു ലിസ്റ്റ് എരിയൽ നിന്നും മൂൻപ് ചെട്ടിച്ചെട്ടിച്ചെട്ടിയായിട്ടുള്ളതായി ഈ ഓഫീസിൽ നിന്നും

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അംഗീകരിച്ച ക്ലെയിംസ് പൂരിപ്പിക്കുന്നതിനായിട്ടുള്ളതായി ബോധ്യപ്പെട്ടിട്ടുണ്ട്. സൂചന (8) പ്രകാരമുള്ള അസിസ്റ്റന്റ് ജിയോളജിസ്റ്റ്-1 ന്റെ റിപ്പോർട്ടിൽ റിസോർവ്വുകൾ പരിശോധിച്ചതിൽ നിന്നും ലിസ്റ്റ് അനുവദിച്ചതിനുശേഷം ആകെ 11093 മെട്രിക് ടൺ ആണ് അനുവദിക്കാൻ നിമക്കു ചെയ്തിട്ടുള്ളതെന്ന് വ്യക്തമാക്കിയിട്ടുണ്ട്. ഈ സാഹചര്യത്തിൽ അനുവദിക്കാൻ നിമക്കു ചെയ്ത 11093 മെട്രിക് ടൺ കരിങ്കല്ല് റോയൽറ്റി/വില്പനത്തിൽ 7,98,700/- രൂപയും പിഴ ഇനത്തിൽ 25,000/- രൂപയും ചേർത്ത് B, 23,700/- രൂപ ഒട്ടക്കണത്തിന് തുല്യ ബാധ്യസ്ഥനാണ്. ടി ഇക് ഈ റോട്ടീസ് കൈപ്പറ്റി 7 ദിവസത്തിനുള്ളിൽ ട്രഷറിയിൽ ഒപ്പുവെക്കി അല്ലെങ്കിൽ പൊതു ഹാജരാക്കേണ്ടതാണ്. അല്ലാത്തപക്ഷം വിഷയം കൂടി റവന്യൂ റീമററി നടപടിയിലൂടെ ഈടാക്കേണ്ടതാണ്.

സൂചന (6) ആയുള്ള വിഷയം റോട്ടീസ് നൽകിയിട്ടുള്ള വിവരവും അറിയിക്കുന്നു.

  
 സിന്ധ്യ മിസ്സോളജിസ്റ്റ്  


To  
 ശ്രീ. അരുൺ കുമാർ മേനോൻ  
 മെത്താൻ വിഴിഞ്ഞം പോർട്ട് പ്രൈവറ്റ് ലിമിറ്റഡ്  
 2<sup>nd</sup> Floor, വിപണന കെട്ടിടം, കൈക്കാട്  
 തിരുവനന്തപുരം - 695 014

- കുറിപ്പ് : തഹസിൽദാർ, ചിറയിൻകീഴ് അനുവദിക്കാൻ നിമക്കു ചെയ്ത 53713 മെട്രിക് ടൺ കരിങ്കല്ല് സീനിയറേജ് ഈടാക്കി അറിയിക്കുന്നതിനും സർവ്വേയറുടെ സാക്ഷ്യത്താൽ ബജറ്റ് തിട്ടപ്പെടുത്തി റിപ്പോർട്ട് ലഭ്യമാക്കുന്നതിനും
2. വില്ലേജ് ഓഫീസർ, നഗരൂർ
  3. അഡ്വക്കേറ്റ് സർവ്വേയർ, ചിറയിൻകീഴ്



## ANNEXURE NO. 15

ကုမ္ပဏီများ

အမှတ် : ၇၆၅/လမ်းမကြီး/ဧရာဝတီမြစ်/အပူပူ

മലയാളത്തിൽ 'ക' അക്ഷരം ഉപയോഗിച്ച് എഴുതിയ വാക്കുകൾ, അക്ഷരമാലാക്രമം അനുസരിച്ച്, താഴെ പറയുന്നവയാണ്:

Phone: 0471-2442055

തീയതി : 22.05.2020

လယ်ကောက် ဧကစဉ်

**വിചാരക:** തൊന്നിയിന്റേ & ലിംഗാലുപ്പി - മനസ്സും ബലിയത്തയും - ചെങ്കുകിട ധാര്യ -  
കവർത്തിയ്ക്ക് പ്രിയം. പൂർവ്വമണ്ണിലെ കൽക്കല്ലിൽ നിന്നും  
തൊണ്ടുത്- വിഷയ നക്ഷത്രം സ്വർഗ്ഗമായിത്തീർന്നു - അനുഭവപ്രദം.

സ്വപ്രശ്നം:- 1. 2015-ലെ നിയമസഭാ തിരഞ്ഞെടുപ്പിൽ പങ്കെടുത്തതിൽ പട്ടണത്തിൽ

2. အကျဉ်းချုပ် လေ့လာမှုနည်း၊ စာစာအုပ်များနှင့် အခြားအချက်အလက်များ 20.03.2019 ခုနေ့ 7  
20/2063/43/2018/1340 အရပ် ရှိသည်။

3. 03.07.2019 ព្រឹត្តិការណ៍ 16.03.2025 កាលបរិច្ឆេទ 15/03/2025 ឧបនាយករដ្ឋមន្ត្រី ព្រះរាជាណាចក្រកម្ពុជា

4. Ц.Б.З.2020-09 АВП/Л/ГОК/2019-20/1123 томиг (с.70)



രണ്ടാം സുപ്രകരണത്തിനുള്ള ശ്രദ്ധ ക്ഷണിക്കണം, ചിറയിൻകീഴ് താലൂക്കിൽ അഗസ്റ്റ് വിദ്യാലയം

സംബന്ധിച്ച് നമ്പർ 555/2 തീരുമാനം 1.0630 രഹസ്യാത്മക സാക്ഷ്യം നിന്നും ക്രമീകരിച്ചു മാനദണ്ഡത്തിന് അനുസൃതമായി

ഇത്തരത്തിൽ പ്രകാരം G. സിദ്ധാർത്ഥൻ കോടതിയിൽ ലിസ്റ്റ് നൽകിയിട്ടുണ്ട്. ലിസ്റ്റ് എഴുതിയതിൽ

നിന്നും 03.07.2019 മുതൽ 30.03.2020 വരെയുള്ള ച.വ.നയമുറവിൽ തയ്യാറാക്കിയിട്ടുള്ളതും മുമ്പാകെ പാർശ്വീകൃതം

പ്രകാരം 1,91,115.69 ശെക്കിം 5ന്റെ ചെങ്കിട്ടപ്പ് നിക്ഷേപത്തിനാണ് അനുരൂപി തുക കിടയിച്ചുന്നത്. എന്നാൽ

സൂചന (4) സൂചി സമർപ്പിച്ച അനലിസി പ്രകാരം 2,14,166.30 തൊട്ടിയ്ക്ക് 5൯൪ കെ.എച്ച്.ടി. വിഭജനം

പ്രകാശിപ്പിച്ചിട്ടുള്ളതാണ്. എന്ന് വ്യക്തമാക്കിയിട്ടുണ്ട്. എന്ന് വ്യക്തമാക്കിയിട്ടുണ്ട്. എന്ന് വ്യക്തമാക്കിയിട്ടുണ്ട്.

പരിമിത്ത് സമ്പന്നത ചെലവ് നിർമ്മാണ സാധനം (i) ചട്ടങ്ങളുടെ നിലവിലുള്ള ശിക്ഷാവിധേയമാണ്

KANTHARAJ K.  
RONGGA/13022005



ആകുലത നേരിടുന്നവർക്കായി നിരക്കം ചെലു 23,050.00 രൂപകീഴ് ത്തെ കർമ്മപ്പരിസ്ഥിതി നോക്കി

ഇനത്തിൽ 3,53,203/- രൂപയും വിലയിരുത്തിയിട്ടു 11,06,403/- രൂപയും ചെലു ഇനത്തിൽ 25,000/-

രൂപയും ചെലുത്ത് ആകെ 16,84,603 /- രൂപ ഇതേ അടിസ്ഥാനം കൈപ്പറ്റി 7 ദിവസത്തിനുള്ളിൽ

ആവശ്യമായി വന്നാൽ ചെലു കൈപ്പറ്റി കയറിയിട്ടു ഒട്ടെങ്കിലും അതേ ചെലു

പ്രകാരമുള്ളതാണ്. അല്ലാത്ത പക്ഷം താങ്കളിൽ നിന്നും ടി ഇതേ അടിസ്ഥാനം കൈപ്പറ്റി നൽകിയിട്ടു

ഇതേ അടിസ്ഥാനമാണ്.

*[Handwritten signature]*  
22/5/20  
വിജയലക്ഷ്മി

ശ്രീ. രാജേഷ് കമ്മൽ

മെ. അക്കാദമി വിജ്ഞാപനം കോർട്ട് കൈപ്പറ്റി ലിമിറ്റഡ്

2<sup>nd</sup> Floor, വിജ്ഞാപനം കോർട്ട്, മൈസൂർ

ഫോൺ നമ്പർ - 695 014

പകർപ്പ്: അക്കാദമിയിൽ, ചിറ്റാലിൽ, 23,050.00 രൂപകീഴ് ത്തെ കർമ്മപ്പരിസ്ഥിതി നോക്കി  
ഇതേ അടിസ്ഥാനമാണ്.



GOVERNMENT OF KERALA  
CHALAN  
FORM T.R. 12

(See Rules 102 (a) and 124 of Kerala Treasury Code)  
Chalan for payment of Money into the  
District Treasury/Sub Treasury/  
State Bank of India

ORIGINAL

At

Computer Seq. No

Date

Head of Account 0853 102 99 (01)

Major Sub Minor Sub Other Other S. Code

\*DDO Code: (Dept.) 450 DDO 002

\*SDO Code

By whom paid and name and address of the person on whose behalf money is paid	Purpose of remittance & authority, if any	Amount in Rs	Order to the Bank
---	---	--------------	-------------------

Adani Vizhinjam Port (P  
2nd Floor, Vipanchika  
Tower, Thycaud,  
Thiruvananthapuram-  
695014

Royalty Price and fine  
for 11093 Mt GUS

823700

Correct

Receive  
and grant  
receipt

Signature & Designation  
Of the Departmental  
Officer countersigning  
The remittance

SEEDLOGIS  
DISTRICT OFFICE  
DEPT OF MINING & GEOL  
THIRUVANANTHAPURAM

Treasury  
Officer

823700

Total in words Rupees Eight Lac Twenty Three Thousand Seven Hundred Only

Signature of Remitter

Received Rs (Rupees only)

Date

Signature of Treasurer/Cashier

Treasury Officer / Bank Manager

Note

1. The seal / stamp of the Treasury / Bank of collection shall be Affixed.
2. If remittance is in official capacity (SSO/DO) with corresponding code in the challan.
3. For repayment of SDO with instalment number in all cases cash.

24/9/2020

(P.T.O.)





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Kumbhara		Kumbhara		Kumbhara	
1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
73	74	75	76	77	78
79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100	101	102

Kumbhara		Kumbhara		Kumbhara	
1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
73	74	75	76	77	78
79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100	101	102

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Handwritten text at the bottom of the page, possibly a signature or date.





4070121: (660) 517-2917 (toll-free) \* 1-800-966-6666

1. The first step is to identify the problem. This involves understanding the current situation and what needs to be changed.

အိတ်ဒါးရှင်း ကော့ဒ်နစ်

1.  $\frac{1}{2} \log \frac{1}{2} = -\frac{1}{2} \log 2 = -\frac{1}{2} \times 0.3010 = -0.1505$   
 2.  $\frac{1}{4} \log \frac{1}{4} = -\frac{1}{4} \log 4 = -\frac{1}{4} \times 0.6020 = -0.1505$   
 3.  $\frac{1}{8} \log \frac{1}{8} = -\frac{1}{8} \log 8 = -\frac{1}{8} \times 0.9030 = -0.1129$   
 4.  $\frac{1}{16} \log \frac{1}{16} = -\frac{1}{16} \log 16 = -\frac{1}{16} \times 1.2041 = -0.0753$   
 5.  $\frac{1}{32} \log \frac{1}{32} = -\frac{1}{32} \log 32 = -\frac{1}{32} \times 1.5051 = -0.0469$   
 6.  $\frac{1}{64} \log \frac{1}{64} = -\frac{1}{64} \log 64 = -\frac{1}{64} \times 1.8062 = -0.0282$   
 7.  $\frac{1}{128} \log \frac{1}{128} = -\frac{1}{128} \log 128 = -\frac{1}{128} \times 2.1072 = -0.0164$   
 8.  $\frac{1}{256} \log \frac{1}{256} = -\frac{1}{256} \log 256 = -\frac{1}{256} \times 2.4082 = -0.0094$   
 9.  $\frac{1}{512} \log \frac{1}{512} = -\frac{1}{512} \log 512 = -\frac{1}{512} \times 2.7092 = -0.0053$   
 10.  $\frac{1}{1024} \log \frac{1}{1024} = -\frac{1}{1024} \log 1024 = -\frac{1}{1024} \times 3.0103 = -0.0029$   
 11.  $\frac{1}{2048} \log \frac{1}{2048} = -\frac{1}{2048} \log 2048 = -\frac{1}{2048} \times 3.3113 = -0.0016$   
 12.  $\frac{1}{4096} \log \frac{1}{4096} = -\frac{1}{4096} \log 4096 = -\frac{1}{4096} \times 3.6123 = -0.0009$   
 13.  $\frac{1}{8192} \log \frac{1}{8192} = -\frac{1}{8192} \log 8192 = -\frac{1}{8192} \times 3.9133 = -0.0005$   
 14.  $\frac{1}{16384} \log \frac{1}{16384} = -\frac{1}{16384} \log 16384 = -\frac{1}{16384} \times 4.2143 = -0.0003$   
 15.  $\frac{1}{32768} \log \frac{1}{32768} = -\frac{1}{32768} \log 32768 = -\frac{1}{32768} \times 4.5153 = -0.0001$   
 16.  $\frac{1}{65536} \log \frac{1}{65536} = -\frac{1}{65536} \log 65536 = -\frac{1}{65536} \times 4.8163 = -0.0000$   
 17.  $\frac{1}{131072} \log \frac{1}{131072} = -\frac{1}{131072} \log 131072 = -\frac{1}{131072} \times 5.1173 = -0.0000$   
 18.  $\frac{1}{262144} \log \frac{1}{262144} = -\frac{1}{262144} \log 262144 = -\frac{1}{262144} \times 5.4183 = -0.0000$   
 19.  $\frac{1}{524288} \log \frac{1}{524288} = -\frac{1}{524288} \log 524288 = -\frac{1}{524288} \times 5.7193 = -0.0000$   
 20.  $\frac{1}{1048576} \log \frac{1}{1048576} = -\frac{1}{1048576} \log 1048576 = -\frac{1}{1048576} \times 6.0203 = -0.0000$   
 21.  $\frac{1}{2097152} \log \frac{1}{2097152} = -\frac{1}{2097152} \log 2097152 = -\frac{1}{2097152} \times 6.3213 = -0.0000$   
 22.  $\frac{1}{4194304} \log \frac{1}{4194304} = -\frac{1}{4194304} \log 4194304 = -\frac{1}{4194304} \times 6.6223 = -0.0000$   
 23.  $\frac{1}{8388608} \log \frac{1}{8388608} = -\frac{1}{8388608} \log 8388608 = -\frac{1}{8388608} \times 6.9233 = -0.0000$   
 24.  $\frac{1}{16777216} \log \frac{1}{16777216} = -\frac{1}{16777216} \log 16777216 = -\frac{1}{16777216} \times 7.2243 = -0.0000$   
 25.  $\frac{1}{33554432} \log \frac{1}{33554432} = -\frac{1}{33554432} \log 33554432 = -\frac{1}{33554432} \times 7.5253 = -0.0000$   
 26.  $\frac{1}{67108864} \log \frac{1}{67108864} = -\frac{1}{67108864} \log 67108864 = -\frac{1}{67108864} \times 7.8263 = -0.0000$   
 27.  $\frac{1}{134217728} \log \frac{1}{134217728} = -\frac{1}{134217728} \log 134217728 = -\frac{1}{134217728} \times 8.1273 = -0.0000$   
 28.  $\frac{1}{268435456} \log \frac{1}{268435456} = -\frac{1}{268435456} \log 268435456 = -\frac{1}{268435456} \times 8.4283 = -0.0000$   
 29.  $\frac{1}{536870912} \log \frac{1}{536870912} = -\frac{1}{536870912} \log 536870912 = -\frac{1}{536870912} \times 8.7293 = -0.0000$   
 30.  $\frac{1}{1073741824} \log \frac{1}{1073741824} = -\frac{1}{1073741824} \log 1073741824 = -\frac{1}{1073741824} \times 9.0303 = -0.0000$   
 31.  $\frac{1}{2147483648} \log \frac{1}{2147483648} = -\frac{1}{2147483648} \log 2147483648 = -\frac{1}{2147483648} \times 9.3313 = -0.0000$   
 32.  $\frac{1}{4294967296} \log \frac{1}{4294967296} = -\frac{1}{4294967296} \log 4294967296 = -\frac{1}{4294967296} \times 9.6323 = -0.0000$   
 33.  $\frac{1}{8589934592} \log \frac{1}{8589934592} = -\frac{1}{8589934592} \log 8589934592 = -\frac{1}{8589934592} \times 9.9333 = -0.0000$   
 34.  $\frac{1}{17179869184} \log \frac{1}{17179869184} = -\frac{1}{17179869184} \log 17179869184 = -\frac{1}{17179869184} \times 10.2343 = -0.0000$   
 35.  $\frac{1}{34359738368} \log \frac{1}{34359738368} = -\frac{1}{34359738368} \log 34359738368 = -\frac{1}{34359738368} \times 10.5353 = -0.0000$   
 36.  $\frac{1}{68719476736} \log \frac{1}{68719476736} = -\frac{1}{68719476736} \log 68719476736 = -\frac{1}{68719476736} \times 10.8363 = -0.0000$   
 37.  $\frac{1}{137438953472} \log \frac{1}{137438953472} = -\frac{1}{137438953472} \log 137438953472 = -\frac{1}{137438953472} \times 11.1373 = -0.0000$   
 38.  $\frac{1}{274877906944} \log \frac{1}{274877906944} = -\frac{1}{274877906944} \log 274877906944 = -\frac{1}{274877906944} \times 11.4383 = -0.0000$   
 39.  $\frac{1}{549755813888} \log \frac{1}{549755813888} = -\frac{1}{549755813888} \log 549755813888 = -\frac{1}{549755813888} \times 11.7393 = -0.0000$   
 40.  $\frac{1}{1099511627776} \log \frac{1}{1099511627776} = -\frac{1}{1099511627776} \log 1099511627776 = -\frac{1}{1099511627776} \times 12.0403 = -0.0000$   
 41.  $\frac{1}{2199023255552} \log \frac{1}{2199023255552} = -\frac{1}{2199023255552} \log 2199023255552 = -\frac{1}{2199023255552} \times 12.3413 = -0.0000$   
 42.  $\frac{1}{4398046511104} \log \frac{1}{4398046511104} = -\frac{1}{4398046511104} \log 4398046511104 = -\frac{1}{4398046511104} \$

1. 2019年12月31日，公司总资产为1,000,000,000.00元，净资产为500,000,000.00元，营业收入为1,200,000,000.00元，净利润为100,000,000.00元。

[illegible]

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[illegible]

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[illegible]

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$$= \frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} e^{-t^2} dt = \frac{1}{\sqrt{\pi}} \cdot \sqrt{\pi} = 1.$$
[illegible][illegible][illegible]

1.  $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

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 President

11/02/2014 10:56:56 AM

$$a_{n+1} = \frac{1}{n+1} \left( \sum_{k=0}^n a_k \right) + \frac{1}{n+1} \left( \sum_{k=0}^n b_k \right) + \frac{1}{n+1} \left( \sum_{k=0}^n c_k \right)$$

$\partial^{\alpha} \psi|_{\partial D}, \partial^{\beta} \psi|_{\partial D} = 0$ ,  $\forall \alpha + |\beta| \leq m-1$

47-27261-105,125 505-514

[illegible]





CERTIFICATE OF REMITTANCE

..... has  
received amount of Rs. 11,53,500/- (Rupees Eleven Lakh Fifty Three  
Thousand and Five Hundred only) into  
his Treasury as per Chalan No. 16-400-2410745-2020/17  
dated 10/1/2020 under the Head of Account 00-29-00-500-92

.....  
Sd/-

Sub Treasury Officer  
Vellayambalam





കേരളം കേരള KERALA

CR 508128

## സത്യവാങ്മൂലം

മൈനിംഗ് ആന്റ് ജിയോളജി വകുപ്പ് മുമ്പാകെ M/s Adani Vizhinjam Port Pvt. Ltd. ന്റെ CEO ആയ Rajesh Kumar Jha സമർപ്പിക്കുന്ന സത്യവാങ്മൂലം

ഞാൻ CEO ആയ M/s Adani Vizhinjam Port Pvt. Ltd എന്ന കമ്പനിയുടെ പേരിൽ ചിറയിൻകീഴ് താലൂക്കിൽ നഗരൂർ വില്ലേജിൽ റീസർവ്വേ നം. 555/2 തീപ്പെട്ട സ്ഥലത്ത് 79/2019-20/9363/193/2018/DMG dated 20.05.2019 നമ്പരമായി ക്വാറിംഗ് ലീസ് സമ്പാദിച്ചിട്ടുണ്ട്. അങ്ങയുടെ ഓഫീസിന്റെ നിർദ്ദേശപ്രകാരം ക്വാറിയിൻ ലീസിന്റെ ബഹർ പ്ലാനിൽ നടന്നിട്ടുള്ള അനധികൃത കരികല്ല് ഖനനം തിട്ടപ്പെടുത്തിയ RQRയുടെ സ്കെച്ച് ഹാജരാക്കിയിട്ടുണ്ട്. ആയത് പ്രകാരം പിഴ അടയ്ക്കുവാൻ ഞാൻ തയ്യാറാണ്. അങ്ങയുടെ ഓഫീസ് താലൂക്ക് സർവ്വേയ്ക്കുമായി ചേർന്ന് ടി ക്വാറിയിലെ ഖനനം തിട്ടപ്പെടുത്തുന്ന വേളയിൽ



KANTHARAJ K.  
RDP/GDA/130/200006

S. USHAKUMARI  
STAMP CONTROLLER





കേരളം KERALA

CR 508120

ഇപ്പോൾ അടച്ചിരിക്കുന്ന റോയൽറ്റി/വില പിഴയിൽ കൂടുതൽ തുല്യ തായി ബോധ്യപ്പെട്ടാൽ അങ്ങയുടെ നിർദ്ദേശപ്രകാരം ആ തുകയും ഞാൻ അടയ്ക്കുന്നതാണ്.

ആയതിനാൽ ക്വാനിറ്റിയിലെ മുഖ്യാന്തർ പെർമിറ്റ് നൽകണമെന്ന് അപേക്ഷിക്കുന്നു.

Rajesh Kumar Jha  
CEO

M/s Adani Vizhinjam Port Pvt. Ltd

സാക്ഷികൾ

1. പേര്:  
അഡ്രസ്:

2. പേര്:  
അഡ്രസ്:



No. 21129 of 16-2-2020  
Value Rs. 100/-  
Issued for Vizhinjam Port Pvt. Ltd

S. USHAKUMARY  
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**KADAVILA BUILDING STONE QUARRY OF**  
**M/s. ADANI VIZHINJAM PORT PVT. LTD.**  
**TABLE SHOWING THE DETAILED CALCULATION ABSTRACT OF RESERVES ESTIMATION**  
**IN-SITU RESERVES - AREA, VOLUME & TONNAGE**

## ABSTRACT - CROSS SECTION WISE

BEYON. CR. SEC.	AV. AREA	Sec Int.	VOLUME	Sp. Gr. / Bu. Du.	TONNAGE	MINEABLE @ 100 %	WASTE @ 0 %
T : 2050 E : 2100	392.30	50.00	39,753.00	2.50	99,382.50	99,382.50	-
E : 2100 F : 2150	2,005.50	50.00	100,250.00	2.50	250,625.00	250,625.00	-
F : 2150 H : 2200	2,952.60	50.00	147,630.00	2.50	369,075.00	369,075.00	-
H : 2200 S : 2250	2,160.44	50.00	58,021.75	2.50	145,054.38	145,054.38	-
S : 2250 T : 2300	375.44	50.00	58,771.75	2.50	146,929.38	146,929.38	-
<b>TOTAL</b>	<b>10,330.87</b>	<b>50.00</b>	<b>516,543.50</b>	<b>2.50</b>	<b>1,291,358.75</b>	<b>1,291,358.75</b>	<b>-</b>

Say 12,91,359 tonnes

## ABSTRACT - BENCH WISE

BENCH RT.	AV. AREA	Sec Int.	VOLUME	Sp. Gr. / Bu. Du.	TONNAGE	MINEABLE @ 100 %	WASTE @ 0 %
90.00	185.00	50.00	9,250.00	2.50	23,125.00	23,125.00	-
88.00	300.00	50.00	12,000.00	2.50	30,000.00	30,000.00	-
87.00	423.00	50.00	21,150.00	2.50	52,875.00	52,875.00	-
76.00	335.00	50.00	16,750.00	2.50	41,875.00	41,875.00	-
70.00	1,610.00	50.00	80,500.00	2.50	201,250.00	201,250.00	-
64.00	1,253.00	50.00	62,650.00	2.50	156,625.00	156,625.00	-
58.00	1,240.00	50.00	62,000.00	2.50	155,000.00	155,000.00	-
52.00	1,775.00	50.00	88,750.00	2.50	221,875.00	221,875.00	-
45.00	1,185.00	50.00	59,250.00	2.50	148,125.00	148,125.00	-
40.00	1,060.87	50.00	53,043.50	2.50	132,608.75	132,608.75	-
34.00	1,145.00	50.00	57,250.00	2.50	143,125.00	143,125.00	-
28.00	975.00	50.00	48,750.00	2.50	121,875.00	121,875.00	-
<b>TOTAL</b>	<b>10,330.87</b>	<b>50.00</b>	<b>516,543.50</b>	<b>2.50</b>	<b>1,291,358.75</b>	<b>1,291,358.75</b>	<b>-</b>





# KADAPILA BUILDING STONE QUARRY OF

M/S. ADANI VIZHINJAM PORE PVT. LTD.

## TABLE SHOWING THE DETAIL CALCULATION OF MINERABLE RESERVE ESTIMATION ON-SITUE RESERVE - AREA, VOLUME & TONNAGE

ANNEXURE No. 19

### CALCULATION BETWEEN SECTION E-2050 F-2100

S.L.	E-2050	F-2100	AV. AREA	Sq. Int.	VOLUME	Sq. Gr./Bn. Dm.	TONNAGE	MINERABLE @100 %	WASTE @ 0 %
54.00	-	250.00	15.00	30.00	5,500.00	2.50	13,750.00	13,750.00	-
55.00	-	215.00	107.50	10.00	5,375.00	2.50	13,437.50	13,437.50	-
56.00	-	211.00	107.50	10.00	5,275.00	2.50	13,187.50	13,187.50	-
57.00	-	250.00	100.00	10.00	5,000.00	2.50	12,500.00	12,500.00	-
58.00	-	250.00	125.00	10.00	6,100.00	2.50	15,250.00	15,250.00	-
59.00	-	295.00	115.00	10.00	3,250.00	2.50	8,125.00	8,125.00	-
25.00	-	205.00	100.00	20.00	2,000.00	2.50	5,000.00	5,000.00	-
Total			792.00	50.00	37,900.00	2.50	89,275.00	89,275.00	-

### CALCULATION BETWEEN SECTION E-2100 F-2150

S.L.	E-2100	F-2150	AV. AREA	Sq. Int.	VOLUME	Sq. Gr./Bn. Dm.	TONNAGE	MINERABLE @100 %	WASTE @ 0 %
60.00	-	230.00	135.00	10.00	6,500.00	2.50	16,250.00	16,250.00	-
61.00	220.00	230.00	265.00	10.00	12,300.00	2.50	30,750.00	30,750.00	-
62.00	215.00	230.00	145.50	10.00	12,125.00	2.50	30,312.50	30,312.50	-
63.00	215.00	230.00	145.50	10.00	2,125.00	2.50	5,312.50	5,312.50	-
64.00	200.00	230.00	230.00	10.00	1,700.00	2.50	4,250.00	4,250.00	-
65.00	250.00	250.00	250.00	10.00	12,750.00	2.50	31,875.00	31,875.00	-
66.00	250.00	447.00	385.00	20.00	18,250.00	2.50	45,625.00	45,625.00	-
68.00	300.00	380.00	340.00	20.00	16,300.00	2.50	40,750.00	40,750.00	-
Total			1405.00	60.00	100,250.00	2.50	250,625.00	250,625.00	-

### CALCULATION BETWEEN SECTION F-2150 E-2200

S.L.	E-2150	F-2200	AV. AREA	Sq. Int.	VOLUME	Sq. Gr./Bn. Dm.	TONNAGE	MINERABLE @100 %	WASTE @ 0 %
69.00	270.00	350.00	310.00	10.00	6,200.00	2.50	15,500.00	15,500.00	-
70.00	270.00	400.00	335.00	10.00	6,800.00	2.50	17,000.00	17,000.00	-
71.00	270.00	400.00	335.00	10.00	13,800.00	2.50	34,500.00	34,500.00	-
72.00	270.00	520.00	395.00	10.00	15,750.00	2.50	39,375.00	39,375.00	-
73.00	300.00	550.00	425.00	10.00	30,500.00	2.50	76,250.00	76,250.00	-
74.00	300.00	600.00	450.00	10.00	15,750.00	2.50	39,375.00	39,375.00	-
75.00	440.00	410.00	425.00	20.00	21,750.00	2.50	54,375.00	54,375.00	-
76.00	350.00	340.00	345.00	20.00	18,100.00	2.50	45,250.00	45,250.00	-
Total			2,995.00	70.00	149,750.00	2.50	370,375.00	370,375.00	-

### CALCULATION BETWEEN SECTION E-2200 F-2250

S.L.	E-2200	F-2250	AV. AREA	Sq. Int.	VOLUME	Sq. Gr./Bn. Dm.	TONNAGE	MINERABLE @100 %	WASTE @ 0 %
77.00	-	185.00	95.50	10.00	4,625.00	2.50	11,562.50	11,562.50	-
78.00	-	150.00	130.00	10.00	3,500.00	2.50	8,750.00	8,750.00	-
79.00	-	420.00	210.00	10.00	15,300.00	2.50	38,250.00	38,250.00	-
80.00	350.00	350.00	155.00	10.00	8,750.00	2.50	21,875.00	21,875.00	-
81.00	350.00	350.00	155.00	10.00	18,000.00	2.50	45,000.00	45,000.00	-
82.00	400.00	340.00	370.00	10.00	8,400.00	2.50	21,000.00	21,000.00	-
83.00	420.00	310.00	365.00	10.00	8,875.00	2.50	22,187.50	22,187.50	-
84.00	320.00	370.00	345.00	10.00	9,750.00	2.50	24,375.00	24,375.00	-
85.00	350.00	370.00	360.00	10.00	9,750.00	2.50	24,375.00	24,375.00	-
86.00	350.00	265.00	307.50	10.00	14,125.00	2.50	35,312.50	35,312.50	-
87.00	400.00	260.00	330.00	10.00	13,750.00	2.50	34,375.00	34,375.00	-
88.00	410.00	300.00	355.00	10.00	16,575.00	2.50	41,437.50	41,437.50	-
28.00	340.00	-	170.00	10.00	1,625.00	2.50	4,062.50	4,062.50	-
Total			3,604.00	80.00	155,075.00	2.50	395,054.35	395,054.35	-

### CALCULATION BETWEEN SECTION E-2250 F-2300

S.L.	E-2250	F-2300	AV. AREA	Sq. Int.	VOLUME	Sq. Gr./Bn. Dm.	TONNAGE	MINERABLE @100 %	WASTE @ 0 %
89.00	185.00	-	92.50	10.00	4,625.00	2.50	11,562.50	11,562.50	-
90.00	150.00	-	120.00	10.00	3,500.00	2.50	8,750.00	8,750.00	-
91.00	420.00	-	210.00	10.00	15,300.00	2.50	38,250.00	38,250.00	-
92.00	350.00	-	155.00	10.00	8,750.00	2.50	21,875.00	21,875.00	-
93.00	350.00	-	155.00	10.00	8,750.00	2.50	21,875.00	21,875.00	-
94.00	340.00	-	130.00	10.00	8,400.00	2.50	21,000.00	21,000.00	-
95.00	370.00	-	135.00	10.00	9,750.00	2.50	24,375.00	24,375.00	-
96.00	270.00	-	130.00	10.00	9,350.00	2.50	23,375.00	23,375.00	-
97.00	165.00	-	82.50	10.00	4,125.00	2.50	10,312.50	10,312.50	-
98.00	40.00	-	30.00	10.00	1,125.00	2.50	2,812.50	2,812.50	-
Total			1,372.44	60.00	69,775.00	2.50	171,929.35	171,929.35	-



## ABSTRACT

Year	Ave. Area	SFC. INT.	VOLUME	Sp. Gr. / Bl. Density	Tonnage	MINEBLE @ 100%	WASTE
2020 - 21	1,700.00	50.00	60,000.00	2.50	150,000.00	150,000.00	-
2021 - 22	4,000.00	50.00	200,000.00	2.50	500,000.00	500,000.00	-
2022 - 23	3,360.00	50.00	168,000.00	2.50	420,000.00	420,000.00	-
2023 - 24	70.00	50.00	3,500.00	2.50	8,750.00	8,750.00	-
Total	8,630.00	50.00	431,500.00	2.50	1,078,750	1,078,750	-



*Manoj*  
**KANTHARAJ K.**  
 RQ/IGOAJ130/2000/2



**KADAVIL BUILDING STONE QUARRY OF**  
**M/s. ADANI VIZHINJAM PORT PVT. LTD.,**  
**TABLE SHOWING THE DETAIL CALCULATION ABSTRACT OF PRODUCTION PROGRAMME**  
**FOR THE YEAR 20 21, i.e. AREA, VOLUME & TONNAGE**

**ABSTRACT - CROSS SECTION WISE**

RFTN. CR. SEC.		AV. AREA	Sec Int.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINEABLE @ 100 %	WASTE @ 0 %
L: 2050	L: 2100	-	50.00	-	2.50	-	-	-
R: 3100	R: 2150	-	50.00	-	2.50	-	-	-
L: 2150	L: 2200	-	50.00	-	2.50	-	-	-
R: 2200	R: 2250	300.00	50.00	30,000.00	2.50	75,000.00	75,000.00	-
L: 2250	L: 2300	500.00	50.00	50,000.00	2.50	125,000.00	125,000.00	-
TOTAL		800.00	50.00	80,000.00	2.50	150,000.00	150,000.00	-

**ABSTRACT - BENCH WISE**

BENCH NO.	AV. AREA	Sec Int.	VOLUME	Sp. Gr. / Bu. Un.	TONNAGE	MINEABLE @ 100 %	WASTE @ 0 %
54.00	155.00	50.00	9,750.00	2.50	24,375.00	24,375.00	-
86.00	300.00	50.00	15,000.00	2.50	37,500.00	37,500.00	-
82.00	420.00	50.00	21,000.00	2.50	52,500.00	52,500.00	-
75.00	285.00	50.00	14,250.00	2.50	35,625.00	35,625.00	-
TOTAL	1,780.00	50.00	50,000.00	2.50	150,000.00	150,000.00	-



**KADAVILA BUILDING STONE QUARRY OF  
M/s. ADANI VIZHINJAM PORT PVT. LTD.,  
TABLE SHOWING THE DETAIL CALCULATION OF PRODUCTION PROGRAMME  
FOR THE YEAR 20 - 21, i.e. AREA, VOLUME & TONNAGE**

**CALCULATION BETWEEN SECTION E: 2200 E:2250**

S.L	E: 2200	E:2250	AV. AREA	Sec Int.	VOLUME	Sp. Gr. / Bu. Gr.	TONNAGE	MINEABLE @ 100 %	WASTE @ 0 %
54.00		185.00	82.50	50.00	6,625.00	2.50	11,562.50	11,562.50	
55.00		300.00	150.00	50.00	17,500.00	2.50	38,750.00	18,750.00	
56.00		470.00	210.00	50.00	16,500.00	2.50	41,250.00	26,250.00	-
75.00		205.00	147.50	50.00	7,375.00	2.50	18,437.50	18,437.50	-
<b>Total</b>		<b>1,200.00</b>	<b>500.00</b>	<b>50.00</b>	<b>30,000.00</b>	<b>2.50</b>	<b>75,000.00</b>	<b>75,000.00</b>	<b>-</b>

**CALCULATION BETWEEN SECTION E:2250 E:2300**

S.L	E:2250	E:2300	AV. AREA	Sec Int.	VOLUME	Sp. Gr. / Bu. Gr.	TONNAGE	MINEABLE @ 100 %	WASTE @ 0 %
34.00	185.00	-	82.50	50.00	6,625.00	2.50	11,562.50	11,562.50	-
35.00	300.00	-	150.00	50.00	17,500.00	2.50	38,750.00	18,750.00	-
36.00	470.00	-	210.00	50.00	16,500.00	2.50	41,250.00	26,250.00	-
75.00	205.00	-	147.50	50.00	7,375.00	2.50	18,437.50	18,437.50	-
<b>Total</b>	<b>1,200.00</b>	<b>-</b>	<b>500.00</b>	<b>50.00</b>	<b>30,000.00</b>	<b>2.50</b>	<b>75,000.00</b>	<b>75,000.00</b>	<b>-</b>



**KADAVILA BUILDING STONE QUARRY OF**  
**M/s. ADANI VIZHINJAM PORT PVT. LTD.,**  
**TABLE SHOWING THE DETAIL CALCULATION ABSTRACT OF PRODUCTION PROGRAMME**  
**FOR THE YEAR 21 - 22, i.e. AREA, VOLUME & TONNAGE**

ABSTRACT - CROSS SECTION WISE							
SECTN. CR. 330		AV. AREA	SECTN.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINFASLE @ 100%
E-2000	E-2100	52.50	50.00	2,625.00	2.80	6,562.50	6,562.50
E-2100	E-2200	572.50	50.00	28,625.00	2.50	71,562.50	71,562.50
F-2150	E-2200	1,020.00	50.00	51,000.00	2.30	117,300.00	117,300.00
E-2200	E-2250	1,407.50	50.00	70,375.00	2.30	161,862.50	161,862.50
E-2250	F-2300	855.50	50.00	42,775.00	2.50	106,937.50	106,937.50
TOTAL		4,000.00	50.00	200,000.00	2.50	500,000.00	500,000.00

ABSTRACT - BENCH WISE							
BENCH	AV. AREA	SECTN.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINFASLE @ 100%	WASTE @ 8%
75.00	55.00	50.00	2,750.00	2.30	6,375.00	6,375.00	-
70.00	1,020.00	50.00	51,000.00	2.50	127,500.00	127,500.00	-
65.00	1,100.00	50.00	55,000.00	2.50	137,500.00	137,500.00	-
55.00	1,020.00	50.00	51,000.00	2.50	127,500.00	127,500.00	-
50.00	790.00	50.00	39,500.00	2.50	98,750.00	98,750.00	-
TOTAL		4,000.00	50.00	200,000.00	2.50	500,000.00	500,000.00





**KADAVU A BUILDING STONE QUARRY OF**  
**M/s. ADANI KIZHINJAM PORT PVT. LTD.,**  
**TABLE SHOWING THE DETAIL CALCULATION OF PRODUCTION PROGRAMME**  
**FOR THE YEAR 21 - 22 i.e. AREA, VOLUME & TONNAGE**



CALCULATION BETWEEN SECTION E-2050 E-2100									
B.L	E-2050	E-2100	AV. AREA	Sec.int.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINERABLE @ 100 %	WASTE @ 0 %
64.00	-	105.00	54.36	50.00	2,625.00	1.50	6,562.50	5,562.50	-
Total	-	105.00	54.36	50.00	2,625.00	1.50	6,562.50	5,562.50	-

CALCULATION BETWEEN SECTION E-2100 E-2150									
B.L	E-2100	E-2150	AV. AREA	Sec.int.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINERABLE @ 100 %	WASTE @ 0 %
75.00	-	270.00	182.00	50.00	6,750.00	2.50	30,875.00	15,875.00	-
64.00	105.00	130.00	187.50	20.00	5,375.00	1.50	23,437.50	23,437.50	-
38.00	-	240.00	135.00	30.00	2,700.00	1.50	15,275.00	15,275.00	-
19.00	-	270.00	135.00	10.00	3,330.00	1.50	15,675.00	16,875.00	-
Total	105.00	1,080.00	642.50	50.00	28,125.00	2.50	74,062.50	74,062.50	-

CALCULATION BETWEEN SECTION E-2150 E-2200									
B.L	E-2150	E-2200	AV. AREA	Sec.int.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINERABLE @ 100 %	WASTE @ 0 %
70.00	240.00	350.00	333.00	20.00	15,300.00	2.50	41,250.00	21,750.00	-
34.00	270.00	460.00	337.50	50.00	16,875.00	1.50	42,187.50	42,187.50	-
58.00	270.00	440.00	357.50	50.00	17,875.00	2.50	44,687.50	44,687.50	-
52.00	270.00	530.00	355.00	50.00	19,350.00	1.50	48,375.00	49,125.00	-
Total	1,080.00	1,780.00	1,420.00	50.00	71,000.00	2.50	177,500.00	177,500.00	-

CALCULATION BETWEEN SECTION E-2200 E-2250									
B.L	E-2200	E-2250	AV. AREA	Sec.int.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINERABLE @ 100 %	WASTE @ 0 %
75.00	-	35.00	27.50	50.00	1,375.00	1.50	3,437.50	3,437.50	-
70.00	350.00	350.00	370.00	50.00	18,500.00	1.50	46,250.00	46,250.00	-
64.00	405.00	340.00	272.50	50.00	18,625.00	1.50	46,562.50	46,562.50	-
58.00	440.00	510.00	375.00	50.00	18,750.00	2.50	47,187.50	47,187.50	-
52.00	530.00	-	350.00	30.00	10,500.00	1.50	32,500.00	32,500.00	-
Total	1,780.00	1,035.00	1,497.50	30.00	70,850.00	2.50	177,937.50	177,937.50	-

CALCULATION BETWEEN SECTION E-2250 E-2300									
B.L	E-2250	E-2300	AV. AREA	Sec.int.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINERABLE @ 100 %	WASTE @ 0 %
78.00	35.00	-	27.50	30.00	1,375.00	1.50	3,437.50	3,437.50	-
70.00	350.00	-	370.00	50.00	8,750.00	1.50	21,875.00	21,875.00	-
64.00	340.00	-	272.50	30.00	6,500.00	1.50	21,250.00	21,250.00	-
58.00	310.00	-	255.00	50.00	7,750.00	2.50	19,375.00	19,375.00	-
Total	1,035.00	-	1,027.50	50.00	24,375.00	1.50	65,937.50	65,937.50	-

**KADAVILA BUILDING STONE QUARRY OF**  
**MR. ADAMI VIZHINJAM PORT PVT. LTD.,**  
**TABLE SHOWING THE DETAIL CALCULATION ABSTRACT OF PRODUCTION PROGRAMME**  
**FOR THE YEAR 22 - 23, i.e. AREA, VOLUME & TONNAGE**

**ABSTRACT - CROSS SECTION WISE**

SECT. OR. 1:1	AV. AREA	Sec. mt.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINERABLE @ 100%	WASTE @ 0%
F-2350 E-2100	477.50	50.00	23,875.00	2.50	59,687.50	59,687.50	-
C-2100 E-2150	937.50	50.00	46,875.00	2.50	118,437.50	118,437.50	-
S-2250 L-2200	985.00	50.00	49,250.00	2.50	123,125.00	123,125.00	-
F-2700 E-2250	772.50	50.00	38,625.00	2.50	96,562.50	96,562.50	-
L-2250 F-2700	772.50	50.00	38,625.00	2.50	96,562.50	96,562.50	-
<b>TOTAL</b>	<b>3,360.00</b>	<b>50.00</b>	<b>168,000.00</b>	<b>2.50</b>	<b>420,000.00</b>	<b>420,000.00</b>	<b>-</b>

**ABSTRACT - BENCH WISE**

SECTION	AV. AREA	Sec. mt.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINERABLE @ 100%	WASTE @ 0%
82.00	915.00	50.00	45,750.00	2.50	114,375.00	114,375.00	-
45.00	1,185.00	50.00	59,250.00	2.50	148,125.00	148,125.00	-
40.00	1,000.00	50.00	50,000.00	2.50	125,000.00	125,000.00	-
42.00	300.00	50.00	15,000.00	2.50	37,500.00	37,500.00	-
<b>TOTAL</b>	<b>3,360.00</b>	<b>50.00</b>	<b>168,000.00</b>	<b>2.50</b>	<b>420,000.00</b>	<b>420,000.00</b>	<b>-</b>





**KADAVILA BUILDING STONE QUARRY OF**  
**M/s. ADANI VIZHINJAM PORT PVT. LTD.**  
**TABLE SHOWING THE DETAIL CALCULATION OF PRODUCTION PROGRAMME**  
**FOR THE YEAR 22 - 23. I.e. AREA, VOLUME & TONNAGE**

B.L.	E-2050	E-2100	AV. AREA	Sec. int.	VOLUME	Sp. Gr. / Cu. Dn.	TONNAGE	MINEABLE @ 100%	WASTE @ 0%
52.00		215.00	107.50	50.00	5,375.00	2.50	13,437.50	13,437.50	-
40.00		105.00	105.00	50.00	5,250.00	2.50	13,125.00	13,125.00	-
40.00		180.00	120.00	50.00	6,000.00	2.50	15,000.00	15,000.00	-
34.00		240.00	120.00	50.00	6,000.00	2.50	15,000.00	15,000.00	-
<b>Total</b>			<b>452.50</b>	<b>50.00</b>	<b>22,625.00</b>	<b>2.50</b>	<b>56,562.50</b>	<b>56,562.50</b>	

CALCULATION BETWEEN SECTION E-2100 E-2150									
B.L.	E-2100	E-2150	AV. AREA	Sec. int.	VOLUME	Sp. Gr. / Cu. Dn.	TONNAGE	MINEABLE @ 100%	WASTE @ 0%
52.00	215.00	270.00	242.50	50.00	12,125.00	2.50	30,312.50	30,312.50	-
40.00	100.00	160.00	130.00	50.00	6,500.00	2.50	16,250.00	16,250.00	-
40.00	250.00	300.00	275.00	50.00	13,750.00	2.50	34,375.00	34,375.00	-
34.00	250.00	300.00	275.00	50.00	13,750.00	2.50	34,375.00	34,375.00	-
<b>Total</b>	<b>815.00</b>	<b>930.00</b>	<b>922.50</b>	<b>50.00</b>	<b>46,125.00</b>	<b>2.50</b>	<b>115,312.50</b>	<b>115,312.50</b>	

CALCULATION BETWEEN SECTION E-2150 E-2200									
B.L.	E-2150	E-2200	AV. AREA	Sec. int.	VOLUME	Sp. Gr. / Cu. Dn.	TONNAGE	MINEABLE @ 100%	WASTE @ 0%
52.00	270.00	320.00	295.00	50.00	14,750.00	2.50	36,875.00	36,875.00	-
40.00	160.00	220.00	190.00	50.00	9,500.00	2.50	23,750.00	23,750.00	-
40.00	300.00	350.00	325.00	50.00	16,250.00	2.50	40,625.00	40,625.00	-
34.00	300.00	350.00	325.00	50.00	16,250.00	2.50	40,625.00	40,625.00	-
<b>Total</b>	<b>1,030.00</b>	<b>1,240.00</b>	<b>1,135.00</b>	<b>50.00</b>	<b>56,750.00</b>	<b>2.50</b>	<b>142,125.00</b>	<b>142,125.00</b>	

CALCULATION BETWEEN SECTION E-2200 E-2250									
B.L.	E-2200	E-2250	AV. AREA	Sec. int.	VOLUME	Sp. Gr. / Cu. Dn.	TONNAGE	MINEABLE @ 100%	WASTE @ 0%
52.00	320.00	370.00	345.00	50.00	17,250.00	2.50	43,125.00	43,125.00	-
40.00	220.00	270.00	245.00	50.00	12,250.00	2.50	30,625.00	30,625.00	-
40.00	350.00	400.00	375.00	50.00	18,750.00	2.50	46,875.00	46,875.00	-
<b>Total</b>	<b>1,190.00</b>	<b>1,440.00</b>	<b>1,365.00</b>	<b>50.00</b>	<b>48,250.00</b>	<b>2.50</b>	<b>120,625.00</b>	<b>120,625.00</b>	

CALCULATION BETWEEN SECTION E-2250 E-2300									
B.L.	E-2250	E-2300	AV. AREA	Sec. int.	VOLUME	Sp. Gr. / Cu. Dn.	TONNAGE	MINEABLE @ 100%	WASTE @ 0%
52.00	370.00	420.00	395.00	50.00	19,750.00	2.50	49,375.00	49,375.00	-
40.00	270.00	320.00	295.00	50.00	14,750.00	2.50	36,875.00	36,875.00	-
<b>Total</b>	<b>1,440.00</b>	<b>1,740.00</b>	<b>1,690.00</b>	<b>50.00</b>	<b>34,500.00</b>	<b>2.50</b>	<b>86,250.00</b>	<b>86,250.00</b>	





**KADAVILA BUILDING STONE QUARRY OF**  
**M/s. ADANI VIZHINJAM PORT PVT. LTD.,**  
**TABLE SHOWING THE DETAIL CALCULATION ABSTRACT OF PRODUCTION PROGRAMME**  
**FOR THE YEAR 23 - 24, i.e. AREA, VOLUME & TONNAGE**

**ABSTRACT - CROSS SECTION WISE**

BETN. CR. SEC.	AV. AREA	Sec Int.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINEABLE @ 100 %	WASTE @ 0 %
F: 2200 E: 2250	35.00	50.00	1,750.00	2.50	4,375.00	4,375.00	
F: 2250 E: 2300	35.00	50.00	1,750.00	2.50	4,375.00	4,375.00	
<b>TOTAL</b>	<b>70.00</b>	<b>50.00</b>	<b>3,500.00</b>	<b>2.50</b>	<b>8,750.00</b>	<b>8,750.00</b>	<b>-</b>

**ABSTRACT - BENCH WISE**

BENCH RL	AV. AREA	Sec Int.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINEABLE @ 100 %	WASTE @ 0 %
40.00	70.00	50.00	3,500.00	2.50	8,750.00	8,750.00	-
<b>TOTAL</b>	<b>70.00</b>	<b>50.00</b>	<b>3,500.00</b>		<b>8,750.00</b>	<b>8,750.00</b>	<b>-</b>



**KADAVILA BUILDING STONE QUARRY OF**  
**M/s. ADANI VIZHINJAM PORT PVT. LTD.,**  
**TABLE SHOWING THE DETAIL CALCULATION OF PRODUCTION PROGRAMME**  
**FOR THE YEAR 23 - 24, i.e. AREA, VOLUME & TONNAGE**

B.L.	E: 2200	E: 2250	AV. AREA	Sec. Int.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINEABLE @ 100 %	WASTE @ 0 %
40.00	-	70.00	35.00	50.00	1,750.00	2.50	4,375.00	4,375.00	-
Total	-	70.00	35.00	50.00	1,750.00	2.50	4,375.00	4,375.00	-

CALCULATION BETWEEN SECTION E: 2100 E: 2150									
B.L.	E: 2250	E: 2300	AV. AREA	Sec. Int.	VOLUME	Sp. Gr. / Bu. Dn.	TONNAGE	MINEABLE @ 100 %	WASTE @ 0 %
40.00	70.00	-	35.00	50.00	1,750.00	2.50	4,375.00	4,375.00	-
Total	70.00	-	35.00	50.00	1,750.00	2.50	4,375.00	4,375.00	-



**EXTRACT FROM NATIONAL AMBIENT AIR QUALITY MONITORING**  
**SERIES : NAAOMS / .... / 2003 - 04**

#### **4.0 GUIDELINES FOR MONITORING**

For setting up of any ambient air quality monitoring station, the most important thing to be considered prior to commencement of actual monitoring is to collect its background information.

##### **4.1 Background Information**

The background information that needs to be collected includes details of sources and emissions, health status, demography, population growth, landuse pattern, epidemiological studies. Such prior information will provide immense help to identify the likely effects and in particular health impacts resulting from population exposure to air pollutants.

##### **(i) Sources and Emissions**

Sources in a city includes vehicles, industries, domestic etc. In an industrial area, information should be obtained on the type of industries including their number, fuel used, composition of fuel, pollutants emitted etc. Information on number and distribution of sources should be collected. This information will help in identifying which pollutants can be expected in an area and thus should be measured. In case of industrial stacks, locations of maximum ground level concentrations should be determined by modeling.

The stations should be located at locations where maximum ground level concentrations are expected. Information on type and number of vehicles should be obtained. Information on domestic fuel that is used in household should be obtained. Pollution load emanating from these sources should be estimated so as to identify sources that are generating significant amount of pollution.

##### **(ii) Previous Air Quality Information**

Any previous information collected on ambient air quality can serve as a basis for selecting areas where monitoring should be conducted and previous studies may include data collected for any health studies etc. Previous studies can be used to estimate the magnitude of the problem.



  
**KANTHARAJ K.**  
RQP/GOA/130/2000/A



Once the background information is collected, the ambient air quality monitoring is to be initiated and selection of type of pollutant to be measured, number and distribution of monitoring stations etc. should be made:

## 4.2 Components of Monitoring

The following parameters needs to be decided for carrying out ambient air quality monitoring.

### 4.2.1 Number and Distribution of Monitoring Locations

Knowledge of existing air pollutants levels and pattern within the area are essential for deciding number and distribution of stations. Isopleths distribution of an ambient concentrations determined from modeling or previous air quality information can be used to determine number and distribution of stations. When isopleths maps are not available information of emission densities and land use pattern may be used with windrose data to determine areas of expected higher concentrations. The number of monitoring stations in a city can be selected based on background information collected on sources and emissions, Population figures which can be used as indicators of region variability of the pollutants concentration

The no. of sampling sites depends on

- Size of the area to be covered
- The variability of pollutant concentration over the area to be covered
- The data requirements, which are related to the monitoring
- Pollutant to be monitored and
- Population figures which can be used as indicators of criticality both from view of likely air quality deterioration as also health implications.

A general guide to the no. of minimum stations and its distribution needed for monitoring trends of the common pollutants in urban areas based on population consideration is recommended in the Table. 4.2 as per IS 5183 Part 14; 2000. These criteria is for reference only, actual criteria followed at site must be based on compromise between available resources and site specific parameters such as size of the area to be covered, variability in pollutants concentration etc.

**Table 4.1 : Recommended Minimum Number of Stations, Population-wise**

(Source: IS : 5182 (Part 14), 2000).



Pollutant	Population of Evaluation Area	Minimum No. of AAQ Monitoring Station
SPM (Hi-Vol.)	<100 000	4
	100 000- 1000 000	4+0.6 per 100 000 population
	1000 000 – 5000 000	7.5 + 0.25 per 100 000 population
	>5000 000	12 + 0.16 per 100 000 population
SO <sub>2</sub> (Bubbler)	<100 000	3
	100 000- 1 000 000	2.5+0.5 per 100 000 population
	1000 000 - 10 000 000	6+0.15 per 100 000 population
	>10 000 000	20
NO <sub>2</sub> (Bubbler)	<100 000	4
	100 000- 1000 000	4+0.6 per 100 000 population
	>1000 000	10
CO	<100 000	1
	100 000- 5 000 000	1+0.15 per 100 000 population
	>5 000 000	6+0.05 per 100 000 population
Oxidants	-do-	-do-

For other monitoring objectives, particularly in relation to epidemiological studies, the nos. will have to be increased. There are several other modifying factors as follows :

- In highly industrialized cities the no. of stations for SPM and SO<sub>2</sub> must be increased. In areas, where large amounts of heavy fuels are used the no. of stations for SO<sub>2</sub> should be more or vice-versa.
- In regions with irregular terrain, increase the no. of stations.
- In cities with extremely heavy traffic the no. of stations for NO<sub>x</sub>, Oxidants and CO may need to be doubled.
- In cities with low traffic and a population of > 4 million, the no. of station for SO<sub>2</sub>, NO<sub>x</sub> and CO can be reduced.

Table 4.1 (Source: WHO 1977) gives guide to the distribution of stations. These criteria is for reference only, actual criteria followed at site must be based on compromise between available resources and site specific parameters such as size of the city, nature of terrain and spatial variations in the concentrations of the pollutants etc. It is assumed in these tables that population figures are indicators of region size and pollution variability. The number of monitoring stations are generally based on experience gathered over the years in monitoring and can be increased or





decreased based on the analysis of data obtained in monitoring. Resource availability is also an important factor in determining the number of monitoring stations in a city. Generally three monitoring stations are chosen as one each in residential (or commercial), sensitive and industrial area. Distribution of monitoring station in a city depend on the distribution of pollution sources and population in a city. More stations should be located in areas where population density is high, number of industries are more and vehicular density is high. Distribution of stations can also be carried out by dividing the entire area in a grid and locating stations at intersections of a grid or within a grid. However, the grid pattern is not very economical as most often it requires large number of stations in a city. Dispersion models can be used to find maximum pollution levels and spatial variation of pollutant concentration can be used to determine distribution of stations.

**Table: 4.2 Distribution of Sampling Stations (Source: WHO, 1977)**

Total number of stations	Number of stations	
	In city centre or Industrial areas	In residential areas
1	1	0
2	1	1
3	2	1
4	2	2
5	3	2
10	6	4

#### **4.2.2 Selection of Monitoring Location**

Principal factors governing the locations of the sampling stations are the objectives, the particular method of instrument used for sampling, resources available, physical access and security against loss and tampering. Air quality monitoring should be done in areas where pollution problem exists or is expected i.e. mainly in industrial areas, urban areas, traffic intersections etc. One of the objective of monitoring is to determine status and trends and the air quality monitoring should be done in metropolitan cities and other urban areas so as to compare their levels and determine trends. Selection of site is very important as a incorrect location may result in data that may not meet the objectives of monitoring and will be of limited value. In general the following requirements should be satisfied for site selection.







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ANNEXURE NO. 22

### TEST REPORT

#### AMBIENT AIR QUALITY DATA

1. Name of the Project : M/s. Adani Vizhinjam Port Pvt. Ltd.,
2. Location Name : Quarry Area
3. Name of the project Propagator : Building Stone Quarry of M/s. Adani Vizhinjam Port Pvt. Ltd.,  
Nagrove village (Kadavil), Chirayinkeer Taluk, Thiruvananthapuram District, Kerala
4. Month of sampling : February 2020
5. Duration of sampling : 8 Hours
6. Date of reporting : 17.03.2020

Parameter	PM <sub>10</sub> µg/m <sup>3</sup>	PM <sub>2.5</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	Ammonia µg/m <sup>3</sup>
Sample no.	MGF648853/03	PT0718729/03	04191146/03	04191147/03	—
Date of Sampling					
26.02.2020	55.4	29.9	19.4	11.4	—
Protocol / Method	IS-5182 (Part 23) Gravimetric method	MLPL/SOP/44 Gravimetric method	IS-5182 (Part 6) – Jacob and Hochreiter method	IS-5182 (Part 22) Improved West and Gaeke method	MLPL/SOP/41 Indophenol blue method
NAAQ Standards	100	60	80	80	400

**INFERENCE** As per CPCB Standards Report Status: All values are within the prescribed standards

Sample Collected By: M/s. METAMORPHOSIS Laboratory Private Limited, Bengaluru.

\*\* End of Report \*\*

Authorized Signatory

*(Signature)*

Laboratory Head  
Dr. Shanth A. Thimmaiah



*(Signature)*  
**KANTHARAJ K.**  
RQP/GOA/130/2000/0



TC-5841

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### TEST REPORT

#### AMBIENT AIR QUALITY DATA

- |                                  |  |
|----------------------------------|--|
| 1. Name of the Project           | : M/s. Adani Vishvajit Port Pvt. Ltd.  |
| 2. Location Name                 | : Nearest settlement towards: Near (Kadavala bus stop) @ 450 mts approx  |
| 3. Name of the project Proponent | : Building Stone Quarry of M/s. Adani Vishvajit Port Pvt. Ltd.,<br>Nagavara Village (Kadavala), Chikmagalur Taluk, Chikmagalur District, Karnataka |
| 4. Month of sampling             | : February 2020  |
| 5. Duration of sampling          | : 3 - 11 hours   |
| 6. Date of reporting             | : 17.02.2020   |

Parameter	PM <sub>10</sub> µg/m <sup>3</sup>	PM <sub>2.5</sub> µg/m <sup>3</sup>	NO <sub>x</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	Ammonia µg/m <sup>3</sup>
Sample no.	0419276B/03	0419277B/03	0419278B/03	0419279B/03	—
Date of Sampling	16.02.2020	28.0	23.2	11.9	—
Protocol / Method	IS:5182 (Part 23) - Gravimetric method	MTPL/SOP74 - Gravimetric method	IS:5182 (Part A) - Jacob and Hochmeister method	IS:5182 (Part 3) - Improved West and Gaeke method	MLPL/SOP44 - Incubation blue method
NAAQ Standards	100	60	80	80	600

INTERPRENCE	As per CPCB Standards Report Status: All values are within the prescribed standards
Sample Collected By	M/s. METAMORPHOSIS Laboratory Private Limited, Bengaluru

\*\* End of Report \*\*

Authorized Signatory

Laboratory Head  
Dr. Shanth A. Thimmaiah



TC-5841

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### TEST REPORT

#### AMBIENT AIR QUALITY DATA

1. Name of the Project : M/s. Adani Vizhinjam Port Pvt. Ltd.
2. Location Name : Nearest settlement @ 900 mts S-W
3. Name of the project Proponent : Building Stone Quarry of M/s. Adani Vizhinjam Port Pvt. Ltd.,  
Nagaroor Village (Kadavilla), Chirayinkeezh Taluk, Thiruvananthapuram District, Kerala
4. Month of sampling : February 2020
5. Duration of sampling : 8 - Hours
6. Date of reporting : 17.03.2020

Parameter	PM <sub>10</sub> µg /m <sup>3</sup>	PM <sub>2.5</sub> µg /m <sup>3</sup>	NO <sub>2</sub> µg /m <sup>3</sup>	SO <sub>2</sub> µg /m <sup>3</sup>	Ammonia µg /m <sup>3</sup>
Sample no.					
Date of Sampling	04192808/03	04192810/03	04192828/03	04192830/03	--
26.02.2020	43.9	26.8	15.1	11.4	--
Protocol / Method	IS:5182 (Part 23) - Gravimetric method	MLPL/SOP/44 Gravimetric method	IS:5182 (Part 6) - Jacob and Hoochraet method	IS:5182 (Part 2) - Improved West and Gaeke method	MLPL/SOP/41 - Inductoanal ytic method
NAAQ Standards	100	50	80	80	400

INFERENCE	As per CPCB Standards, Report Status: All values are within the prescribed standards.
Sample Collected By	M/s. METAMORPHOSIS Laboratory Private Limited, Bengaluru

\*\* End of Report \*\*

Authorized Signatory

Laboratory Head  
Dr. Shanth A. Thimmiah



TC-5841

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### TEST REPORT

#### AMBIENT AIR QUALITY DATA

1. Name of the Project : M/s. Adani Vizhinjam Port Pvt. Ltd.,
2. Location Name : Nearest settlement @ 330 mms to NNW
3. Name of the project Proponent : Building Stage Quarry of M/s. Adani Vizhinjam Port Pvt. Ltd.,  
Nagaroor village (Kadavilla), Chirayinkeezh Taluk, Thiruvananthapuram District, Kerala.
4. Month of sampling : February 2020
5. Duration of sampling : 8 - Hours
6. Date of reporting : 17.02.2020

Parameter	PM <sub>10</sub> µg / m <sup>3</sup>	PM <sub>2.5</sub> µg / m <sup>3</sup>	NO <sub>x</sub> µg / m <sup>3</sup>	SO <sub>2</sub> µg / m <sup>3</sup>	Ammonia µg / m <sup>3</sup>
Sample no.	0419284B/03	0419285B/03	0419286B/03	0419287B/03	—
Date of Sampling	0419284B/03	0419285B/03	0419286B/03	0419287B/03	—
28.02.2020	40.1	21.0	16.7	13.1	—
Protocol / Method	IS:5182 (Part 23) Gravimetric method	MLPL/SOP/44 - Gravimetric method	IS:5182 (Part 6) - Jacob and Hochheiser method	IS:5182 (Part 2) - Improved West and Gaeke method	MLPL/SOP/44 - Indophenol blue method
NAAQ Standards	100	50	80	80	400

INFERENCE	As per CPCB Standards Report Status: All values are within the prescribed standards.
Sample Collected By	M/s. METAMORPHOSIS Laboratory Private Limited, Bengaluru

\*\*\* End of Report \*\*\*

Authorized Signatory

Laboratory Head  
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### TEST REPORT

#### AMBIENT AIR QUALITY DATA

- |                                  |  |
|----------------------------------|--|
| 1. Name of the Project           | : M/s. Adani Vizhupattam Port Pvt. Ltd.  |
| 2. Location Name                 | : Nearest settlement towards (near AlLazamdu bus stop) @ 825 mtrs @ NNE  |
| 3. Name of the project Proponent | : Building Stone Quarry of M/s. Adani Vizhupattam Port Pvt. Ltd.,<br>Nagumkur village (Kadavilla), Calagayinkkuz Taluk, Thiruvananthapuram District, Kerala. |
| 4. Month of sampling             | : February 2020  |
| 5. Duration of sampling          | : 8 hours  |
| 6. Date of reporting             | : 17.02.2020   |

Parameter	PM <sub>10</sub> µg/m <sup>3</sup>	PM <sub>2.5</sub> µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	Ammonia µg/m <sup>3</sup>
Sample no.	0419360B/03	0419361B/03	0419362B/03	0419363B/03	-
Date of Sampling 26.02.2020	46.8	25.4	18.4	13.1	-
Protocol / Method	IS:5182 (Part 23) Gravimetric method	MLPL/SOP/44 - Gravimetric method	IS:5182 (Part 6) - Jacob and Hochheiser method	IS:5182 (Part 2) - Improved West and Gaeke method	MLPL/SOP/41 - Inducted/bias method
NAAQ Standards	100	60	80	80	400

<b>INFERENCE</b>	As per CPCB Standards Report Status: All values are within the prescribed standards.
Sample Collected By	M/s. METAMORPHOSIS Laboratory Private Limited, Bengaluru
** End of Report **	

Authorized Signatory

Laboratory Head  
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TC-5841

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### TEST REPORT

ANNEXURE NO. 23

#### ANALYSIS REPORT OF WATER QUALITY

1. Name of the Project : M/s. Adani Vizhinjam Port Pvt. Ltd.
2. Location Name : Quarry Area DW
3. Name of Project Proponent : Building Stone Quarry of M/s. Adani Vizhinjam Port Pvt. Ltd., Nagaroor village (Kacavilal, Chirayinkeezh Taluk, Thiruvananthapuram District, Kerala)
4. Date of Sampling : 26.02.2020
5. Particulars of Sample Collected : Ground Water
6. Sample Number : 34191065/03
7. Date of Sample Receipt : 28.02.2020
8. Analysis Started On : 28.02.2020
9. Date of Reporting : 17.03.2020

Date of Reporting		Date 2020		Standard IS 10500: 2012 (2 <sup>nd</sup> Revision) mdt.1		
Sr. No.	Parameters	Protocol	Unit	Result	Acceptable Limit	Permissible limit in the absence of alternate source
<b>A. PHYSICAL PARAMETERS</b>						
1.	Colour	IS:1025 (Part 4)	Hazen	—	5	15
2.	pH @ 25°C	IS:1025 (Part 11)	—	6.94	6.5 to 8.5	No Relaxation
3.	Turbidity	IS:1025 (Part 10)	NTU	1.2	1	5
<b>B. CHEMICAL PARAMETERS</b>						
4.	Conductivity @ 25°C	IS:1025 (Part 14)	µS/cm	807.5	Not Specified	No. Specified
5.	Total Dissolved Solids	IS:1025 (Part 16)	mg/l	322.8	500	2000
6.	Total Suspended Solids	IS:1025 (Part 17)	mg/l	—	Not Specified	No. Specified
7.	Total Hardness as CaCO <sub>3</sub>	IS:1025 (Part 21)	mg/l	139.0	200	500
8.	Calcium as Ca	IS:1025 (Part 40)	mg/l	48.4	75	200
9.	Magnesium as Mg	IS:1025 (Part 46)	mg/l	19.6	30	100
10.	Total Alkalinity as CaCO <sub>3</sub>	IS:1025 (Part 22)	mg/l	16.6	200	600
11.	Fluorides as F <sup>-</sup>	IS:1025 (Part 60)	mg/l	0.33	1	1.5
12.	Chlorides as Cl <sup>-</sup>	IS:1025 (Part 33)	mg/l	103.8	250	1000
13.	Sulphate as SO <sub>4</sub>	IS:1025 (Part 24)	mg/l	57.9	200	400
14.	Nitrate as NO <sub>3</sub>	IS:1025 (Part 50)	mg/l	0.48	45	No Relaxation
15.	Dissolved Oxygen	IS:1025 (Part 38)	mg/l	—	Not Specified	No. Specified
16.	Chemical Oxygen Demand (COD)	IS:1025 (part 35): 2006 (RA 2013)	mg/l	BDL	Not Specified	Not Specified
17.	Biochemical Oxygen Demand (BOD) 3 d 20°C (30D)	APHA 22nd Edition, 4500-H <sub>2</sub> B	mg/l	BDL	Not Specified	Not Specified
18.	Iron as Fe	IS:1025 (Part 53)	mg/l	0.021	0.3	No Relaxation
<b>C. MICROBIOLOGICAL PARAMETERS</b>						
19.	Total Bacteria/100ml*	IS:1025-1981	MPN	ND	Shall not be detected in any 100 ml sample	
20.	E. Coli Bacteria/100ml*	IS:1025-1981	—	ND		

\*Note: The tests marked with an \* are not accredited by NABL. The result & inference pertains to the sample tested only and pertains to the responsibility of the client. BDL: Below Detection Limit; NA: Not Analyzed

REFERENCE:	As per IS Standards Report Status: All tested parameters are within acceptable limits.
Sample Collected by:	M/s. ADANI VIZHINJAM PORT LTD. Laboratory Private Limited, Bangalore

\*\* End of Report \*\*

Authorized Signatory

Laboratory Head

Dr. Shanth A. Thimmiah



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RQP/GOA/130/2000/A



TC-5842

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### TEST REPORT

#### ANALYSIS REPORT OF WATER QUALITY

1. Name of the Project : M/s. Adani, Vizhinjam Port Pvt. Ltd.
2. Location Name : DW at Nanguneri settlement towards Nerr (Kadavilathu ship) 450 mts >> SE
3. Name of Project Proponent : Building Stone Quarry of M/s. Adani Vizhinjam Port Pvt. Ltd., Nanguneri village (Kadavilathu), Chirayinkeezh Taluk, Thiruvananthapuram District, Kerala
4. Date of Sampling : 26.02.2020
5. Particulars of Sample Collected : Ground Water
6. Sample Number : 04191066/03
7. Date of Sample Receipt : 28.02.2020
8. Analysis Started On : 28.02.2020
9. Date of Reporting : 17.03.2020

9. Date of Reporting		10. Location		Standard IS (4500: 2012) (3 <sup>rd</sup> Revision) part 1		
Sr. No.	Parameters	Protocol	Unit	Result	Acceptable Limit	Permissible limit in the absence of alternate source
<b>A. PHYSICAL PARAMETERS</b>						
1.	Colour	IS:3025 (Part 4)	Placm	—	5	15
2.	pH@ 25°C	IS:3025 (Part 11)	—	7.51	6.5 to 8.5	No Relaxation
3.	Turbidity	IS:3025 (Part 10)	NTU	1.9	3	5
<b>B. CHEMICAL PARAMETERS</b>						
4.	Conductivity@ 25°C	IS:3025 (Part 14)	uS/cm	108.6	Not Specified	Not Specified
5.	Total Dissolved Solids	IS:3025 (Part 16)	mg/l	367.7	500	2000
6.	Total Suspended Solids	IS:3025 (Part 17)	mg/l	—	Not Specified	Not Specified
7.	Total Hardness as CaCO <sub>3</sub>	IS:3025 (Part 21)	mg/l	129.3	200	600
8.	Calcium as Ca	IS:3025 (Part 40)	mg/l	40.5	75	200
9.	Magnesium as Mg	IS:3025 (Part 46)	mg/l	20.1	30	100
10.	Total Alkalinity as CaCO <sub>3</sub>	IS:3025 (Part 23)	mg/l	112.8	200	600
11.	Fluorides as F	IS:3025 (Part 60)	mg/l	0.77	1	1.5
12.	Chlorides as Cl	IS:3025 (Part 36)	mg/l	106.2	250	1000
13.	Sulphate as SO <sub>4</sub>	IS:3025 (Part 24)	mg/l	34.2	200	400
14.	Nitrate as NO <sub>3</sub>	IS:3025 (Part 50)	mg/l	0.53	45	No Relaxation
15.	Dissolved Oxygen	IS:3025 (Part 38)	mg/l	—	Not Specified	Not Specified
16.	Chemical Oxygen Demand(COD)	IS:3025 (part 58): 2006 (I.A. 2012)	mg/l	BDL	Not Specified	Not Specified
17.	Biochemical Oxygen Demand (BOD) @ 20°C (BOD <sub>5</sub> )	APHA 22nd Edition, 4500-B-5	mg/l	BDL	Not Specified	Not Specified
18.	Iron as Fe	IS:3025 (Part 53)	mg/l	0.015	0.3	No Relaxation
<b>C. MICROBIOLOGICAL PARAMETERS</b>						
19.	Coliform organisms/100ml*	IS:1622-1981	MPN	ND	Shall not be detected in any 100 ml sample	
20.	E.Coli bacteria/100ml*	IS:1621-1981	—	ND		

\*Note: The term marked with an \* are not accredited by NABL. The result & inference pertains to the sample tested only and parameter is per the regulation of the client. BDL: Below Detection Limit; NA: Not Applicable

REFERENCE	As per IS Standards & Report Status: All tested parameters are within acceptable limits
Sample Collected by	Vin METAMORPHOSIS <sup>SM</sup> Laboratory Private Limited, Bangalore

\*\* End of Report \*\*

Authorized Signatory

Laboratory Head  
Dr. Shanthi A. Thimmaiah



TC-5841



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### TEST REPORT

#### ANALYSIS REPORT OF WATER QUALITY

- Name of the Project : M/s. Adani Vizhinjam Port Pvt. Ltd.,
- Location Name : DW at Narmad settlement towards @ 500 mts >> W
- Name of Project Proponent : Building Stone Quarry at M/s. Adani Vizhinjam Port Pvt. Ltd., Narmad village (Kadavil), Chirayinkeezh Taluk, Thiruvananthapuram District, Kerala.
- Date of Sampling : 26.02.2020
- Particulars of Sample Collected : Ground Water
- Sample Number : 04191067007
- Date of Sample Receipt : 28.02.2020
- Analysis Started On : 28.02.2020
- Date of Reporting : 17.03.2020

Date of Reporting		TDS, mg/l			Standard IS 10500: 2012 (2 <sup>nd</sup> Revision) and C1	
Sr. No.	Parameters	Protocol	Unit	Result	Acceptable Limit	Permissible limit in the absence of alternate source
<b>A. PHYSICAL PARAMETERS</b>						
1.	Colour	IS: 3025 (Part 4)	Hazen	—	5	15
2.	pH @ 25°C	IS: 3025 (Part 11)	—	8.38	6.5 to 8.5	No Relaxation
3.	Turbidity	IS: 3025 (Part 10)	NTU	3.8	1	5
<b>B. CHEMICAL PARAMETERS</b>						
4.	Conductivity @ 25°C	IS: 3025 (Part 14)	µS/cm	380.5	Not Specified	Not Specified
5.	Total Dissolved Solids	IS: 3025 (Part 16)	mg/l	353.1	500	2000
6.	Total Suspended Solids	IS: 3025 (Part 17)	mg/l	—	Not Specified	Not Specified
7.	Total Hardness as CaCO <sub>3</sub>	IS: 3025 (Part 21)	mg/l	131.5	300	600
8.	Calcium as Ca	IS: 3025 (Part 40)	mg/l	61.9	75	200
9.	Magnesium as Mg	IS: 3025 (Part 46)	mg/l	30.9	30	100
10.	Total Alkalinity as CaCO <sub>3</sub>	IS: 3025 (Part 23)	mg/l	123.6	200	600
11.	Fluorides as F	IS: 3025 (Part 60)	mg/l	0.22	1	1.5
12.	Chlorides as Cl	IS: 3025 (Part 32)	mg/l	144.2	250	1000
13.	Sulphate as SO <sub>4</sub>	IS: 3025 (Part 34)	mg/l	124.1	200	400
14.	Nitrate as NO <sub>3</sub>	IS: 3025 (Part 66)	mg/l	19.8	45	No Relaxation
15.	Dissolved Oxygen	IS: 3025 (Part 18)	mg/l	—	Not Specified	Not Specified
16.	Chemical Oxygen Demand (COD)	IS: 3025 (part 58); 2006 (RA 2012)	mg/l	BDL	Not Specified	Not Specified
17.	Biochemical Oxygen Demand @ 20°C (BOD <sub>5</sub> )	APHA 23rd Edition, 4500-B-18	mg/l	BDL	Not Specified	Not Specified
18.	Iron as Fe	IS: 3025 (Part 52)	mg/l	0.015	0.3	No Relaxation
<b>C. MICROBIOLOGICAL PARAMETERS</b>						
19.	Coliform organisms/100ml*	IS: 1622-1981	MPN	ND	Shall not be detected in any 100 ml sample	
20.	E.Coli Bacteria/100ml*	IS: 1622-1981	—	ND		

Note: The tests marked with an \* are not accredited by NABL. The result is reference pertain to the sample tested only and parameters as per the requirement of the client. BDL: Below Detectable Limit; NA: Not Analyzed

INTERPRETATION	As per IS Standards Report Status: All tested parameters are within acceptable limits.
Sample Collected by	M/S. METAMORPHOSIS <sup>SM</sup> Laboratory Private Limited, Bengaluru

\*\* End of Report \*\*

Authorized Signatory

Laboratory Head  
Dr. Shanth A. Thimmaiah

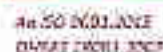


TC-5841



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## TEST REPORT

## ANALYSIS REPORT OF WATER QUALITY

- |    |                                 |   |
|----|---------------------------------|---|
| 1. | Name of the Project             | : M/s. Adani Vizhinjam Port Pvt. Ltd.,  |
| 2. | Location Name                   | : DW at Nearest settlement towards @ 330 mts @ NNW  |
| 3. | Name of Project Proponent       | : Beliding Stone Quarry of M/s. Adani Vizhinjam Port Pvt. Ltd, Nagaroor village (Kadavil), Chirayinkeezh Taluk, Thiruvananthapuram District, Kerala |
| 4. | Date of Sampling                | : 28.02.2020  |
| 5. | Particulars of Sample Collected | : Ground Water  |
| 6. | Sample Number                   | : 0419106703  |
| 7. | Date of Sample Receipt          | : 28.02.2020  |
| 8. | Analysis Started On             | : 28.02.2020  |
| 9. | Date of Reporting               | : 17.05.2020  |

Sr. No.		Parameters	Protocol	Unit	Result	Acceptable Limit	Permissible limit in the absence of alternate source
Standard IS 10500: 2012 (2nd Revision)md.1							
A. PHYSICAL PARAMETERS							
1.	Colour	IS:3025 (Part 4)	Hazen		2	15	
2.	pH @ 25°C	IS:3025 (Part 11)		8.04	9.5 to 9.5	No Relaxation	
3.	Turbidity	IS:3025 (Part 10)	NTU	1.4		2	
B. CHEMICAL PARAMETERS							
4.	Conductivity @ 25°C	IS:3025 (Part 14)	µS/cm	167.2	No. Specified	Not Specified	
5.	Total Dissolved solids	IS:3025 (Part 16)	mg/L	217.6	500	2000	
6.	Total Suspended Solids	IS:3025 (Part 17)	mg/L		Not Specified	Not Specified	
7.	Total Hardness as CaCO <sub>3</sub>	IS:3025 (Part 21)	mg/L	143.3	200	600	
8.	Calcium as Ca	IS:3025 (Part 40)	mg/L	36.8	75	220	
9.	Magnesium as Mg	IS:3025 (Part 46)	mg/L	27.2	50	180	
10.	Total Alkalinity as CaCO <sub>3</sub>	IS:3025 (Part 23)	mg/L	196.6	200	600	
11.	Fluorides as F	IS:3025 (Part 60)	mg/L	0.42	1	1.5	
12.	Chlorides as Cl	IS:3025 (Part 32)	mg/L	26.4	250	1000	
13.	Sulphate as SO <sub>4</sub>	IS:3025 (Part 34)	mg/L	89.1	200	400	
14.	Nitrate as NO <sub>3</sub>	IS:3025 (Part 66)	mg/L	30.1	45	No Relaxation	
15.	Dissolved Oxygen	IS:3025 (Part 38)	mg/L	—	Not Specified	Not Specified	
16.	Chemical Oxygen Demand (COD)	IS:3025 (Part 58); 2006 (RA 2012)	mg/L	BDL	Not Specified	Not Specified	
17.	Biochemical Oxygen Demand 3 d 20°C (BOD)	APHA 22nd Edition, 4500-B-11-01	mg/L	BDL	Not Specified	Not Specified	
18.	Iron as Fe	IS:3025 (Part 53)	µg/L	0.023	0.3	No Relaxation	
C. MICROBIOLOGICAL PARAMETERS							
19.	Coliform organism/100ml <sup>2</sup>	IS:1622-1981	MPN	ND	Shall not be detected in any 100 ml sample		
20.	E.Coli Bacteri/100ml <sup>2</sup>	IS:1622-1981		ND			

Note: The tests marked with an \* are not accredited by NABL. The result is informative pertaining to the sample tested only and parameters as per the requirement of the client. BQL: Below Detection Limit; NA: Not Assessed

INSTRANCE	As per IS Standards Report Status: Total instances: 4 - based parameters are within acceptable limits
Samples Collected by	M/S M. TAMARPOREY, Laboratory Private Limited, Bangalore

\* Term Report \*

Authorized Signatory

**Laboratory Head**  
Dr. Shanth A. Thimmappa



TC-5841

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# METAMORPHOSIS<sup>SM</sup>

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### TEST REPORT

#### ANALYSIS REPORT OF WATER QUALITY

- Name of the Project : M/s. Adani Vizhinjam Port Pvt. Ltd.,
- Location Name : DW at Nearest settlement towards (near Athiramanthala bus stop) @ 825 mts. by NNE
- Name of Project Proponent : Building Stone Quarry of M/s. Adani Vizhinjam Port Pvt. Ltd.,  
Nagavara village (Kadavila), Chirayinkeezh Taluk, Thiruvananthapuram District, Kerala.
- Date of Sampling : 26.02.2020
- Particulars of Sample Collected : Ground Water
- Sample Number : 04191067/07
- Date of Sample Receipt : 28.02.2020
- Analysis Started On : 28.02.2020
- Date of Reporting : 17.03.2020


Date of Reporting		27.03.2024		Standard IS 10500: 2012 (2 <sup>nd</sup> Revision)mdt.1		
Sr. No.	Parameters	Protocol	Unit	Result	Acceptable Limit	Permissible limit in the absence of alternate source
<b>A. PHYSICAL PARAMETERS</b>						
1.	Colour	IS:3025 (Part 4)	Hazen	—	5	15
2.	pH @ 25°C	IS:3025 (Part 11)	—	7.85	6.5 to 8.5	No Relaxation
3.	Turbidity	IS:3025 (Part 10)	NTU	1.1	1	5
<b>B. CHEMICAL PARAMETERS</b>						
4.	Conductivity @ 25°C	IS:3025 (Part 14)	µS/cm	160.1	Not Specified	Not Specified
5.	Total Dissolved solids	IS:3025 (Part 16)	mg/l	109.4	500	2000
6.	Total Suspended Solids	IS:3025 (Part 17)	mg/l	—	Not Specified	Not Specified
7.	Total Hardness as CaCO <sub>3</sub>	IS:1025 (Part 21)	mg/L	72.6	700	600
8.	Calcium as Ca	IS:3025 (Part 40)	mg/L	25.0	75	200
9.	Magnesium as Mg	IS:3025 (Part 46)	mg/L	12.1	30	100
10.	Total Alkalinity as CaCO <sub>3</sub>	IS:3025 (Part 23)	mg/L	88.8	200	600
11.	Fluoride as F <sup>-</sup>	IS:3025 (Part 60)	mg/L	0.33	1	1.5
12.	Chlorides as Cl <sup>-</sup>	IS:3025 (Part 32)	mg/l	107.8	250	1000
13.	Sulphate as SO <sub>4</sub>	IS:3025 (Part 34)	mg/l	118.8	300	400
14.	Nitrate as NO <sub>3</sub>	IS:3025 (Part 60)	mg/L	11.7	45	No Relaxation
15.	Dissolved Oxygen	IS:3025 (Part 38)	mg/L	—	Not Specified	Not Specified
16.	Chemical Oxygen Demand (COD)	IS:3025 (part 58): 2006 (ISA 3012)	mg/l	BDL	Not Specified	Not Specified
17.	Biochemical Oxygen Demand @ 27°C (BOD)	APHA 22nd Ed'n, 4500-10, 3	mg/L	BDL	Not Specified	Not Specified
18.	Iron as Fe	IS:3025 (Part 52)	mg/L	0.024	0.3	No Relaxation
<b>C. MICROBIOLOGICAL PARAMETERS</b>						
19.	Coliform organisms/100ml*	IS:1622-1984	MPN	ND	Shall not be detected in any 100 ml sample.	
20.	E.Coli Bacteria/100ml*	IS:1622-1984	—	ND		

Note: The tests marked with an \* are not accredited by NABL. The report & reference pertains to the sample tested only and pertains only as per the expiration of the stated BDLs below Detection Limit; NA - Not Analyzed

INTERPRETATION	As per IS Standards Report Status: All tested parameters are within acceptable limits.
Sample Collected by	MA-METAMORPHOSIS <sup>SM</sup> Laboratory Private Limited, Bangalore

\*\*\* End of Report \*\*\*

Authorised Signatory

  
Laboratory Head  
Dr. Shanth A. Thimmatah



TC-5841



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## TEST REPORT

## ANALYSIS REPORT OF WATER QUALITY

- |    |                                 |   |
|----|---------------------------------|---|
| 1. | Name of the Project             | M/s. Arun Vishajam Port Pvt. Ltd.,  |
| 2. | Location Name                   | Surface water in Vannapuram River @ 1.90 km >> SSE  |
| 3. | Name of Project Proponent       | Building Stone Quarry of M/s. Arun Vishajam Port Pvt. Ltd.,<br>Nagarin village (Kadavilla), Chavivakkur Taluk, Thiruvananthapuram<br>District, Kerala |
| 4. | Date of Sampling                | 26.02.2020  |
| 5. | Particulars of Sample Collected | Surface Water   |
| 6. | Sample Number                   | 0419100703  |
| 7. | Date of Sample Receipt          | 28.02.2020  |
| 8. | Analysis Started On             | 28.02.2020  |
| 9. | Date of Reporting               | 17.03.2020  |

Date of Reporting		17.05.2020		Standard IS 10500: 2012 (2 <sup>nd</sup> Revision)/ml.l		
Sr. No.	Parameters	Protocol	Unit	Result	Acceptable Limit	Permissible limit in the absence of alternate source
<b>A. PHYSICAL PARAMETERS</b>						
1.	Colour	IS:3025 (Part 4)	Uazen	—	5	5
2.	pH@ 25°C	IS: 3025 (Part 1)	—	7.02	6.5 to 8.5	No Relaxation
3.	Turbidity	IS: 3025 (Part 10)	NTU	1.1	1	3
<b>B. CHEMICAL PARAMETERS</b>						
4.	Conductivity@ 25°C	IS: 3025 (Part 14)	µS/cm	920.1	Not Specified	Not Specified
5.	Total Dissolved solids	IS: 3025 (Part-16)	mg/l	439.9	500	2000
6.	Total Suspended Solids	IS: 3025 (Part-17)	mg/l	—	Not Specified	Not Specified
7.	Total Hardness as CaCO <sub>3</sub>	IS: 3025 (Part 21)	mg/L	112.6	200	600
8.	Calcium as Ca	IS: 3025 (Part 40)	mg/L	60.3	75	200
9.	Magnesium as Mg	IS: 3025 (Part 46)	mg/L	27.6	30	100
10.	Total Alkalinity as CaCO <sub>3</sub>	IS:3025 (Part 23)	mg/L	114.7	200	600
11.	Fluorides as F	IS: 3025 (Part 50)	mg/L	0.56	1	15
12.	Chlorides as Cl	IS:3025 (Part 32)	mg/L	108.1	250	1000
13.	Sulphate as SO <sub>4</sub>	IS: 3025 (Part 34)	mg/L	27.7	200	400
14.	Nitrate as NO <sub>3</sub>	IS: 3025 (Part 60)	mg/l	0.20	45	No Relaxation
15.	Dissolved Oxygen	IS:3025 (Part 38)	mg/L	—	Not Specified	Not Specified
16.	Chemical Oxygen Demand(COD)	IS: 3025 (part 58): 2006 (3A: 2012)	mg/l	BDL	Not Specified	Not Specified
17.	Biological Oxygen Demand 2 @ 27°C (BOD)	APHA 19 <sup>th</sup> Edition, 4500-H+B	mg/l	BDL	Not Specified	Not Specified
18.	Iron as Fe	IS: 3025 (Part 53)	mg/L	0.01	0.3	No Relaxation
<b>C. MICROBIOLOGICAL PARAMETERS</b>						
19.	Coliform organisms/100ml*	IS: (21-198)	MPN	ND	Shall not be detected in any 100 ml sample.	
20.	E.Coli Bacteria/100ml*	IS: (21-198)	—	ND		

Note: The tests marked with an \* are not accessible by NANO. The result is informative precisely to the sample tested only and not to the entire population of the effect. HBL: Before Decision; N/A: Not Analyzed

INFERENCE	As per IS Standards Report Status: A1, Initial examination within 60 days of receipt
Sample Collected by	MD, METAMORPHOSIS <sup>TM</sup> Laboratory Private Limited, Bangalore

<sup>3</sup> "Find a Recipe."

Authorised Signatory

Laboratory Head

Dr. Shanth A. Thimmiah



TC-5847

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ANNEXURE NO. 24

### TEST REPORT

#### AMBIENT NOISE MEASUREMENT

- |                                  |  |
|----------------------------------|--|
| 1. Name of the project           | : Mrs. Aduri Vizhinjam Port Pvt. Ltd.,   |
| 2. Location name                 | : Quarry Area  |
| 3. Name of the project Proponent | : Building Stone Quarry of Mrs. Aduri Vizhinjam Port Pvt. Ltd.,<br>Nagunoor village (Kadavilla), Chirayinkeezh Taluk, Thiruvananthapuram Dist.,<br>Kerala. |
| 4. Date of Measurement           | : 26.02.2020   |
| 5. Name of instrument            | : Digital sound level meter Equinox & EQ-107   |
| 6. Date of reporting             | : 17.03.2020   |

Sampling point	Sample no.	Protocol	Result (dB (A))					
			Day			Night		
			LMin	LMax	Leq	LMin	LMax	Leq
Quarry Area	04191095/03	IS-9989 -1981	64.3	70.7	66.8	49.1	55.1	51.2


Limits in dB (A) Leq			
Area Code	Category of Area/ Zone	Day (6 a.m. to 10 p.m.)	Night (10 p.m. to 6 a. m.)
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Sensitive Zone	50	40

Note: The result & inference pertains to the sample tested only and parameters as per the requisition of the client.

INFERENCE	Report Status as per KSPCB Standards: - Values are found to be within the permissible limits, applicable to industrial area.
Sample Collected By	M/s. METAMORPHOSIS <sup>SM</sup> Laboratory Private Limited, Bengaluru.

\*\* End of Report \*\*

Authorized Signatory

  
Laboratory Head  
Dr. Shanth A. Thimmiah







TC-5841

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### TEST REPORT

#### AMBIENT NOISE MEASUREMENT

- |                                  |   |
|----------------------------------|---|
| 1. Name of the project           | : Mrs. Adani Vizhinjam Port Pvt. Ltd.   |
| 2. Location name                 | : Nearest settlement towards Near (Kadavilla bus stop) @ 450 mts >> SE  |
| 3. Name of the project Proponent | : Building Stone Quarry of Mrs. Adani Vizhinjam Port Pvt. Ltd.,<br>Nagaroor village (Kadavilla), Chirayinkeezh Taluk, Thiruvananthapuram District,<br>Kerala. |
| 4. Date of Measurement           | : 26.02.2020  |
| 5. Name of instrument            | : Digital sound level meter Equinox & EQ-107  |
| 6. Date of reporting             | : 17.03.2020  |

Sampling point	Sample no.	Protocol	Result (dB (A))					
			Day			Night		
			LMin	LMax	Leq	LMin	LMax	Leq
Nearest settlement towards Near (Kadavilla bus stop) @ 450 mts >> SE	04191096/03	IS:9989-1981	55.2	64.4	64.3	42.2	47.9	44.6

Limits in dB (A) Leq			
Area Code	Category of Area/ Zone	Day (6 a.m. to 10 p.m.)	Night (10 p.m. to 6 a. m.)
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Sensitive Zone	50	40

**Note:** The result & inference pertains to the sample tested only and parameters as per the requisition of the client.

INFERENCE	Report Status as per KSPCB Standards: - Since the location was near the bus stop, so the values are higher, due the movement of vehicular traffic.
Sample Collected By	M/s. METAMORPHOSIS <sup>SM</sup> Laboratory Private Limited, Bengaluru.

\*\*End of Report\*\*

Authorized Signatory

  
Laboratory Head  
Dr. Shanth A. Thirumalaiah



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## TEST REPORT

### AMBIENT NOISE MEASUREMENT

- |                                   |   |
|-----------------------------------|---|
| 1. Name of the project            | : Mrs. Adam Vitharjan Pori Pvt Ltd,   |
| 2. Location name                  | : Nandan settlement towards @ 900 mts @ W   |
| 3. Name of the project Proponent: | : Building Store, Quarry of Mrs. Adam Vitharjan Pori Pvt Ltd,<br>Mazhuvu village (Kadavole), Chuvannokoz Taluk, Thiruvananthapuram District,<br>Kerala. |
| 4. Date of Measurement            | : 26.02.2020  |
| 5. Name of instrument             | : Digital sound level meter Equipex & 50-107  |
| 6. Date of reporting              | : 17.03.2020  |

Sampling point	Sample no.	Protocol	Result (dB (A))					
			Day			Night		
			LMin	LMax	Leq	LMin	LMax	Leq
Nearest settlement towards @ 950 mts @ 157	04191097/03	IS:9989-1981	55.1	62.9	57.8	42.2	46.7	48.2

Limits in dB (A) Leq			
Area Code	Category of Area/ Zone	Day (6 a.m. to 10 p.m.)	Night (10 p.m. to 6 a.m.)
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Sensitive Zone	50	40

**NOTE:** The result & inference pertains to the sample tested only and parameters as per the requisition of the client.

INFERENCE	Report Status as per KSPCB Standards:- Values are found to be higher as there was movement of vehicle in the nearby road.
Sample Collected By	M/s. METAMORPHOSIS <sup>SM</sup> Laboratory Private Limited, Bengaluru.

<sup>a</sup>First of Region.<sup>b</sup>

**Authorized Signatory**

Laboratory Head  
Dr. Shanth A. Thimmaiah



1C-584U

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### TEST REPORT

#### AMBIENT NOISE MEASUREMENT

- |                                  |   |
|----------------------------------|---|
| 1. Name of the project           | 1. M/s. Adani Vizhinjam Port Pvt. Ltd.,   |
| 2. Location name                 | 1. Nearest settlement towards @ 330 mts >> NNW  |
| 3. Name of the project Proponent | 1. Building Stone Quarry of M/s. Adani Vizhinjam Port Pvt. Ltd.,<br>Nagroom Village (Cadaivila), Chirayinkeezh Taluk, Thiruvananthapuram District,<br>Kerala. |
| 4. Date of Measurement           | 1. 26.02.2020   |
| 5. Name of instrument            | 1. Digital sound level meter Equinox & EQ-107   |
| 6. Date of reporting             | 1. 17.03.2020   |

Sampling point	Sample no.	Protocol	Result (dB (A))					
			Day			Night		
			LMin	LMax	Leq	LMin	LMax	Leq
Nearest settlement towards @ 330 mts >> NNW	04191098/03	IS:9989-1981	56.7	65.1	57.3	44.7	50.0	49.2


Limits in dB (A) Leq			
Area Code	Category of Area/ Zone	Day (6 a.m. to 10 p.m.)	Night (10 p.m. to 6 a.m.)
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Sensitive Zone	50	40

Note: The result & inference pertains to the sample tested only and parameters as per the requisition of the client.

INFERENCE	Report Status as per KSPCB Standards: - Values are higher as there was an rubber couple of rubber making units and quarry operation nearby i.e. at a distance of 330 mts.
Sample Collected By	M/s. METAMORPHOSIS <sup>SM</sup> Laboratory Private Limited, Bengaluru.

\*\*End of Report\*\*

Authorized Signatory

  
Laboratory Head  
Dr. Shanth A. Thimmamath



TC-584T

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### TEST REPORT

#### AMBIENT NOISE MEASUREMENT

- |                                  |  |
|----------------------------------|--|
| 1. Name of the project           | : M/s. Adani Vizhinjam Port Pvt. Ltd.,   |
| 2. Location name                 | : Nearest settlement towards (near Altharumudi bus stop) @ 825 mts >>> NNE   |
| 3. Name of the project Proponent | : Building Stone Quarry of M/s. Adani Vizhinjam Port Pvt. Ltd.,<br>Magaroor village (Kadavila), Chirayinkeezh Taluk, Thiruvananthapuram District,<br>Kerala. |
| 4. Date of Measurement           | : 26.02.2020   |
| 5. Name of instrument            | : Digital sound level meter hqinox & EQ-107  |
| 6. Date of reporting             | : 17.03.2020   |

Sampling point	Sample no.	Protocol	Result (dB (A))					
			Day			Night		
			LMin	LMax	Leq	LMin	LMax	Leq
Nearest settlement towards (near Altharumudi bus stop) @ 825 mts >>> NNE	04191164/03	IS:9989-1981	55.1	64.4	59.4	45.9	51.6	49.8

Limits in dB (A) Leq			
Area Code	Category of Area/ Zone	Day (6 a.m. to 10 p.m.)	Night (10 p.m. to 6 a.m.)
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Sensitive Zone	50	40

Note: The result & inference pertains to the sample tested only and parameters as per the requisition of the client.

<b>INFERENCE:</b>	Report Status as per KSPCB Standards: - Since the location was near the bus stop, so the values are higher, due the movement of vehicular traffic.
Sample Collected By	M/s. METAMORPHOSIS <sup>SM</sup> Laboratory Private Limited, Bengaluru.

\*\*End of Report\*\*

Authorized Signatory

Laboratory Head  
Dr. Shanthi A. Thimmiah



TC-5841

"PRAKRTI BHAVAN", #200, 1<sup>st</sup> & 2<sup>nd</sup> Floor, 40<sup>th</sup> Main, 1<sup>st</sup> Cross,  
BTM Layout II Stage, Behind Central Silk Board,  
Bengaluru - 560068, Karnataka, India, Telefax: +91 80 26783006  
Email: mail@metamorphosis-india.com





AN ISO 9001:2015  
CERTIFIED

# METAMORPHOSIS<sup>SM</sup>

## LABORATORY PRIVATE LIMITED

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ANNEXURE NO. 25

### TEST REPORT

#### ANALYSIS REPORT OF SOIL SAMPLE

- |                                    |   |
|------------------------------------|---|
| 1. Name of the Project             | 1. M/s. Adani Vizhinjam Port Pvt. Ltd.,   |
| 2. Location Name                   | 1. Quarry Area Soil   |
| 3. Name of Project Proponent       | 1. Building Stone Quarry of M/s. Adani Vizhinjam Port Pvt. Ltd., Naganur village (Kadalai), Chirayinkeezh Taluk, Thiruvananthapuram District, Kerala. |
| 4. Date of Sampling                | 2. 26.02.2020   |
| 5. Particulars of Sample Collected | 2. Soil sample  |
| 6. Sample Number                   | 2. 04191126007  |
| 7. Date of Sample Receipt          | 2. 28.02.2020   |
| 8. Analysis Started On             | 2. 28.02.2020   |
| 9. Date of Reporting               | 2. 17.03.2020   |

Sr. No.	Parameters	Protocol	Unit	Result
1	pH @ 25°C	IS:2720 (Part 26)	-	7.79
2	Conductivity @ 25°C	IS:1476:2000	µm/cm	42.5
3	Total Organic Matter	IS:2720 (Part 22)	%	0.71
4	Moisture	IS:2720 (Part II)	%	2.72
5	Available Nitrogen as N	IS:14688:1999	Kg/ha	4.54
6	Available potassium as K	M.T.P. 8507:12	Kg/ha	18.5
7	Available Phosphorus as PO <sub>4</sub> <sup>3-</sup>	IS:10158-1983	Kg/ha	17.7
8	Sand*	IS:1498-1970	%	58.1
9	Silt*	IS:1498-1970	%	24.4
10	Clay*	IS:1498-1970	%	9.47
11	Soil Type*	-	-	Sandy Loam

*Note: The tests marked with an \* are not accredited by NABL. The result & inference pertains to the sample tested only and parameters as per the requisition of the client. BDL= Below Detection Limit; NA= Not Analyzed*

INFERENCE	Report Status: All parameters meet the requirements and are within acceptable limits.
Sample Collected by	M/s. METAMORPHOSIS <sup>SM</sup> Laboratory Private Limited, Bengaluru

\*\* End of Report \*\*

Authorised Signatory

Laboratory Head  
Dr. Shanthi A. Thimmiah



*Kantharaj K.*  
KANTHARAJ K.  
RQP/GOA/130/2000/A



TC-584E

"PRAKRUTI BHAVAN", #200, 1<sup>st</sup> & 2<sup>nd</sup> Floor, 40<sup>th</sup> Main, 1<sup>st</sup> Cross,  
BTM Layout II Stage, Behind Central Silk Board,  
Bengaluru - 560068, Karnataka, India, Telefax: +91.80.26783006  
Email: mail@metamorphosis-india.com.





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## LABORATORY PRIVATE LIMITED

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### TEST REPORT

#### ANALYSIS REPORT OF SOIL SAMPLE

1. Name of the Project	: M/s. Acani Vizhinjam Port Pvt. Ltd.,
2. Location Name	: Soil at Nearest settlement towards Near (Kadavilla ma stop) 450 mts. SE
3. Name of Project Proponent	: Building Stone Quarry of M/s. Acani Vizhinjam Port Pvt. Ltd., Nagerur village (Kadavilla), Chavayinkuzh Taluk, Thiruvananthapuram District, Kerala.
4. Date of Sampling	: 26.02.2020
5. Particulars of Sample Collected	: Soil sample
6. Sample Number	: 04191125/03
7. Date of Sample Receipt	: 28.02.2020
8. Analysis Started On	: 28.02.2020
9. Date of Reporting	: 17.03.2020

Sl. No.	Parameters	Protocol	Unit	Result
1.	pH @ 25°C	IS:2720 (Part 26)	-	4.87
2.	Conductivity @ 25°C	IS:1476:2009	µm/cm	54.9
3.	Total Organic Matter	IS:2720 (Part 22)	%	1.16
4.	Moisture	IS:2720 (Part II)	%	0.82
5.	Available Nitrogen as N	IS:14686:1999	Kg/ha	3.12
6.	Available potassium as K	MLPL/800/52	Kg/ha	14.4
7.	Available Phosphorus as P <sub>2</sub> O <sub>5</sub> *	IS:10158:1982	Kg/ha	19.1
8.	Sand*	IS:1498-1970	%	61.3
9.	Silt*	IS:1498-1970	%	31.5
10.	Clay*	IS:1498-1970	%	9.20
11.	Soil Type*	-	-	Sandy Loam

Note: The tests marked with an \* are not accredited by NABL. The result & inference pertains to the sample tested only and parameters as per the requisition of the client. BDL = Below Detection Limit; NA = Not Analysed

INFERENCE	Report Status: All parameters meet the requirements and are within acceptable limits.
Sample Collected by	M/s. METAMORPHOSIS <sup>SM</sup> Laboratory Private Limited, Bengaluru

\*\* End of Report \*\*

Authorized Signatory

Laboratory Head  
Dr. Shanth A. Thimmiah



TC-5841

"PRAKRUTI BHAVAN", W200, 1<sup>st</sup> & 2<sup>nd</sup> Floor, 40<sup>th</sup> Main, 1<sup>st</sup> Cross,  
BIM Layout-II Stage, Behind Central Silk Board,  
Bengaluru - 560068, Karnataka, India, Telefax: +91 80 26783006  
Email: mail@metamorphosis-india.com.



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CERTIFIED COMPANY

# METAMORPHOSIS<sup>SM</sup>

## LABORATORY PRIVATE LIMITED

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### TEST REPORT

#### ANALYSIS REPORT OF SOIL SAMPLE

- |                                    |   |
|------------------------------------|---|
| 1. Name of the Project             | 1. M/s. Adani Vithuram Port Pvt. Ltd.,  |
| 2. Location Name                   | 1. Soil at Nearest settlement towards @ 330 mts >>> NNW   |
| 3. Name of Project Proponent       | 1. Building Stone Quarry of M/s. Adani Vithuram Port Pvt. Ltd., Neeroor village (Kadavila), Changanassery Taluk, Thiruvananthapuram District, Kerala. |
| 4. Date of Sampling                | 1. 26.02.2020   |
| 5. Particulars of Sample Collected | 1. Soil sample  |
| 6. Sample Number                   | 1. 04191128/23  |
| 7. Date of Sample Receipt          | 1. 28.02.2020   |
| 8. Analysis Started On             | 1. 28.02.2020   |
| 9. Date of Reporting               | 1. 17.03.2020   |

Sr. No.	Parameters	Protocol	Unit	Result
1	pH @ 25°C	IS:1720 (Part 3c)	-	6.03
2	Conductivity @ 25°C	IS:1476:2000	µS/cm	85.2
3	Total Organic Matter	IS:2720 (Part 22)	%	0.67
4	Moisture	IS:2720 (Part III)	%	0.27
5	Available Nitrogen as N	IS:14586:1999	Kg/ha	6.44
6	Available potassium as K	MLPL/SOP/22	Kg/ha	14.9
7	Available Phosphorus as PO <sub>4</sub> <sup>3-</sup>	IS:10138-1982	Kg/ha	25.8
8	Sand*	IS:1498-1970	%	71.0
9	Silt*	IS:1498-1970	%	11.3
10	Clay*	IS:1498-1970	%	8.62
11	Soil Type*	-	-	Loamy sand

*Note: The tests marked with an \* are not accredited by NABL. The result & inference pertains to the sample tested only and parameters as per the requisition of the client. BDL= Below Detection Limit; NA= Not Analyzed.*

<b>INFERENCE</b>	Report Status: All parameters meet the requirements and are within acceptable limits.
Sample Collected by	M/s. METAMORPHOSIS <sup>SM</sup> Laboratory Private Limited, Bengaluru.
** End of Report **	

Authorised Signatory

Laboratory Head  
Dr. Shaanth A. Thimmaiah



"PRAKRUTI BHAVAN", #200, 1<sup>st</sup> & 2<sup>nd</sup> Floor, 40<sup>th</sup> Main, 1<sup>st</sup> Cross,  
BTM Layout II Stage, Behind Central Silk Board,  
Bengaluru - 560068, Karnataka, India, Telefax: +91 80 26783006  
Email: mail@metamorphosis-india.com.

TC-5821



21.09.2020  
Thiruvananthapuram

ANNEXURE No. 91

To

The Dist Geologist  
Thiruvananthapuram

Dear Sir,

**Sub: CER Activities from June 2019 to August 2020.**

We are herewith submitting the CER Activities done by our Management at our Kadavila 1 Stone Quarry located at Nagarror (V), Chiryankeezhu (Tk) and Thiruvananthapuram during the period from June 2019 to August 2020 as given below:-

Sl. No.	Description	Amount Spent in Rs
1.	Bitumen Road laid for 1.5 Kms	80,00,000
2.	House hold materials issued to 150 Beneficiaries at Covid - 19 locked down period. (Rs.1000/ Kid)	1,50,000
3.	Onam Kit given to 175 Beneficiaries during 2020 (Rs.1000/ Kid)	1,75,000
4.	Drinking water supply for Village people by Summer Season	2,72,580
	<b>TOTAL</b>	<b>8,597,580</b>

Kindly acknowledge the receipt.

Yours Sincerely,

  
**RAJESH KUMAR JHA**  
CEO



  
**KANTHARAJ K.**  
RQP/GOA/130/2000/A



Tel: +91 79 2694 5500  
Fax: +91 79 2555 5500  
info@adani.com  
www.adani.com  
CIN: U61200GJ2015FTC003534

Adani Vizhinjam Port Pvt Ltd  
2<sup>nd</sup> Floor, Vigneshika Tower, Thycaud  
Thiruvananthapuram  
Kerala-695014



**IndusInd Bank**

AHMEDABAD BRANCH World Business House, M.G. Road Nr. Parnal Garden, Ellis Bridge  
 SWIFT Code: INDB IN DD AHA

To

Geologist, Mining and Geology  
 Kesavadasapuram,  
 Thiruvananthapuram 695004

Date: May 24, 2019

Dear Sir/ Madam,

At the request of ADANI VIZHINIAM PORT PRIVATE LIMITED, We have issued guarantee as per following details.

Bank Guarantee No & Date of Issue	OGT0009190032242 May 24, 2019
Amount	INR 100,000.00
Expiry Date	May 23, 2022
Claim Date	May 23, 2022

We confirm that the officials who have signed the above bank guarantee are authorized to sign the same on behalf of IndusInd Bank Ltd. You may verify the genuineness of issuance of said Bank Guarantee by writing to Head, Bank Guarantee Operations, at the following address:

IndusInd Bank Limited  
 CGMO Central Processing Centre  
 PNA House, 3<sup>rd</sup> Floor, Plot No. 57 & 57/1,  
 Street No. 17, Near ESI Hospital, MIDC,  
 Andheri (East), Mumbai - 400 093.  
 Mail ID: cpguarantee@indusind.com  
 Tel No 022 61898390 / 022 61898478



Claims, if any under this Guarantee to be lodged only with the Issuing Branch as per the terms of the Bank Guarantee.

For INDUSIND BANK LIMITED

DEPUTY BRANCH MANAGER  
 KAZHAKUTAM BRANCH



THIS IS A COMPUTER GENERATED ADVICE. NO SIGNATURE REQUIRED.

Please note that this advice provides details of the transaction facilitated by us on your behalf. Regarding details of charges / GST deducted (if applicable), in case you have registered your GSTIN details with us, you will receive a separate GST invoice (if applicable) on your registered mail id. We request you to ensure that your GSTIN details have been submitted to us and that your email id is registered with us to receive the GST invoice.

In case you wish to register your GSTIN details with us, please send an email to GST@indusind.com from your registered mail id and courier the documents to us at the following address: IndusInd Bank Limited - GST Client Support Team, One IndusInd Centre, Tower 1, 8th Floor, 841 Senabati Bapat Marg, Hiranagar Road (W), Mumbai - 400 011.

For any queries, please feel free to contact your Service manager/ Relationship manager.

KANTHARAJ K.  
 RQP/GOA/130/2000/A



കേരളം KERALA

CB 081723



BANK GUARANTEE NO.: 08T0009190032242

DATE: 24.05.2019

Geologist, Mining and Geology  
Keshavadasapuram,  
Thiruvananthapuram 695004.

GL No. 6901 Value Rs.

Issued to 24-05-2019 Indus Ind Bank -  
Lyons.

Killipuzha Vardar  
A.R. Sugatha kumari Thankadip





In consideration of the Geologist, mining and Geology Kesavadasapuram, Thiruvananthapuram 695004 (hereinafter called The Beneficiary) having offered to exempt M/s Adani Vizhinjam Port Private Limited, 2nd Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram District -695014 (Registered Office at : Adani House, Near Mithakhali Six Road, Navarangpura, Ahmedabad, Gujarat State-380009) (Represented by its Chief Executive Officer, Shri. Rajesh Kumar Jha) (herein after called "The Applicant")

From the demand of the security deposit under the terms and conditions of an agreement dated 22.05.2019 made between The Beneficiary and The Applicant for the due fulfilment by the said applicant of terms and conditions contained in said agreement and **In compliance of the rule no.58 and 62 of Kerala Minor Mineral Concession Rules (KMMCR) 2015**, a bank guarantee of Rs.100,000/- (Rupees One Lakh Only) need to be provided by the Owner to the Kerala State Government for the purpose of the performance with respect to the progressive Quarry closure plan which is a component of the approved Mining plan. We Indusind Bank Limited, a banking company incorporated and registered under Companies Act 1956 and having license to carry on banking business under the Banking Regulation Act, 1949 having its registered office at 2401, General Thimmayya Road, Cantonment, Pune - 411 001 and its Corporate Office at 8th Floor, Tower - 1, One India Bulls Centre, 841, S.B. Marg, Elphinstone Road, Mumbai - 400 013 and its one of branch office at Module 14, Nila Bldg. Technopark Complex, Kazhakkuttom, Thiruvananthapuram 695 581 (hereinafter referred to as "bank / guarantor" do hereby undertake to pay to the Beneficiary an amount not exceeding Rs 1,00,000/- (Rupees One Lakh Only) against any loss or damage caused to or suffered or would be caused to or suffered by the Beneficiary by reason of any breach by the said applicant of any of the terms and conditions contained in the said agreement.

This guarantee shall remain in force until **23.05.2022** and unless a written demand to enforce a claim is made under this bank guarantee by the Beneficiary to the bank within the said date i.e., on or before **23.05.2022**, the rights of the Beneficiary under this guarantee shall be forfeited and the bank shall be relieved and discharged from all liability thereunder.

The applicant does hereby confirm and declare that the guarantor entitled to issue this guarantee and a duly authorised person on behalf of the guarantor signs this guarantee.

We Indusind Bank Ltd undertake not to revoke this guarantee during its currency without the previous consent of the Beneficiary in writing.

Notwithstanding anything contained herein:

- Our Liability under this bank guarantee shall not exceed Rs. 1,00,000/- (Rupees One Lakh Only).
- The guarantee shall be valid up to **23.05.2022**.
- We are liable to pay the guaranteed amount or any thereof under this guarantee only and only if you serve upon us a written claim or demand on or before **23.05.2022** and the Bank shall be discharged of all its liabilities under the Guarantee thereafter, irrespective of whether or not the original bank guarantee is returned to us.







കേരളം KERALA

29AA 497609

This forms an integral part of the bank guarantee number **OGT0009190032242** dated **24/05/2019** issued for a value of **Rs.100,000/-** (Rupees One Lakh Only) on behalf of "M/s Adani Vizhinjam Port Private Limited"



no. 3857

24.5.2019

Issue to

Rupees... only

Adani Vizhinjam Port Private Limited



FALODE VENDOR

BANK GUARANTEE NO.: OGT0009190032242

DATE: 24.05.2019

d) This Bank Guarantee is subject to the ICC Uniform Rules for Demand Guarantees (ICC Publication No.758) and shall be governed by and construed in all respects, in accordance with the law of India.

In witness thereof the bank through its authorized officers has set its hand and stamp on this day the 24th day of May 2019.

For Indusind Bank Limited

For INDUSIND BANK LIMITED

[Authorized Signatory]  
(Name and Designation / SS NO)

SS No. 1796  
SUJEEV SAYED



For Indusind Bank Limited

For INDUSIND BANK LIMITED  
Thiruvananthapuram Branch

[Authorized Signatory]  
(Name and Designation / SS NO)

SS No. 8684





**Decision:** The Committee decided to direct the proponent to submit the following documents/details:

1. *Justification on the source and quantity of water required for the quarry.*

Item No.114.18

Requirement of Additional quantity of rocks for completion of Vizhinjam Port breakwater construction by 2023, by M/sAdaniVizhinjam Port Pvt. Ltd (File No.1200/EC2/2018/SEIAA)

**Decision:** The proponent has produced a letter from the consultant indicating the estimated quantity of rock required for the phase I project as 86,531 MT. In the letter from the proponent, it has been submitted that the total amount of rock that can be obtained from the quarries for which they have obtained EC upto 2023 is only 25,171 MT which is much below the total requirement for the project. Therefore, there is an additional requirement for completing the phase I of the Vizhinjam project. In these circumstances, the Committee decided to recommend the issuance of EC for mining 10.79 lakh MT in addition to the existing clearance for 7 lakh MT already given as per the mining plan approved vide letter no 1716/DOT/ML/2018 dated 26-09-2018. The proponent will regulate the transportation so as to avoid traffic congestion in the approach road to the quarry as well as other roads used for transportation of the rock mined, especially during the peak traffic hours.

Item No.114.19

*Justification for Environment Clearance*

KANTHARAJ K.  
RQ/IGOAI/13012000/A

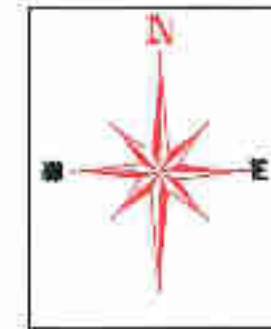




# PLATES



PLATE NO. 1



# REFERENCE

- 5.0 kms radius
- Quarry area
- settlements
- Road
- River / nallah
- plantation

## ENVIRONMENTAL MONITORING LOCATION

- A AIR
- N NOISE
- W WATER
- S SOIL

**KANTHARAJ K.**  
RQP/GOA/130/2000/A

**ADANI VIZHINJAM PORT PVT. LTD.**  
2nd Floor, Vipanchika Tower Thycad,  
Thiruvananthapuram - 695 014, Kerala

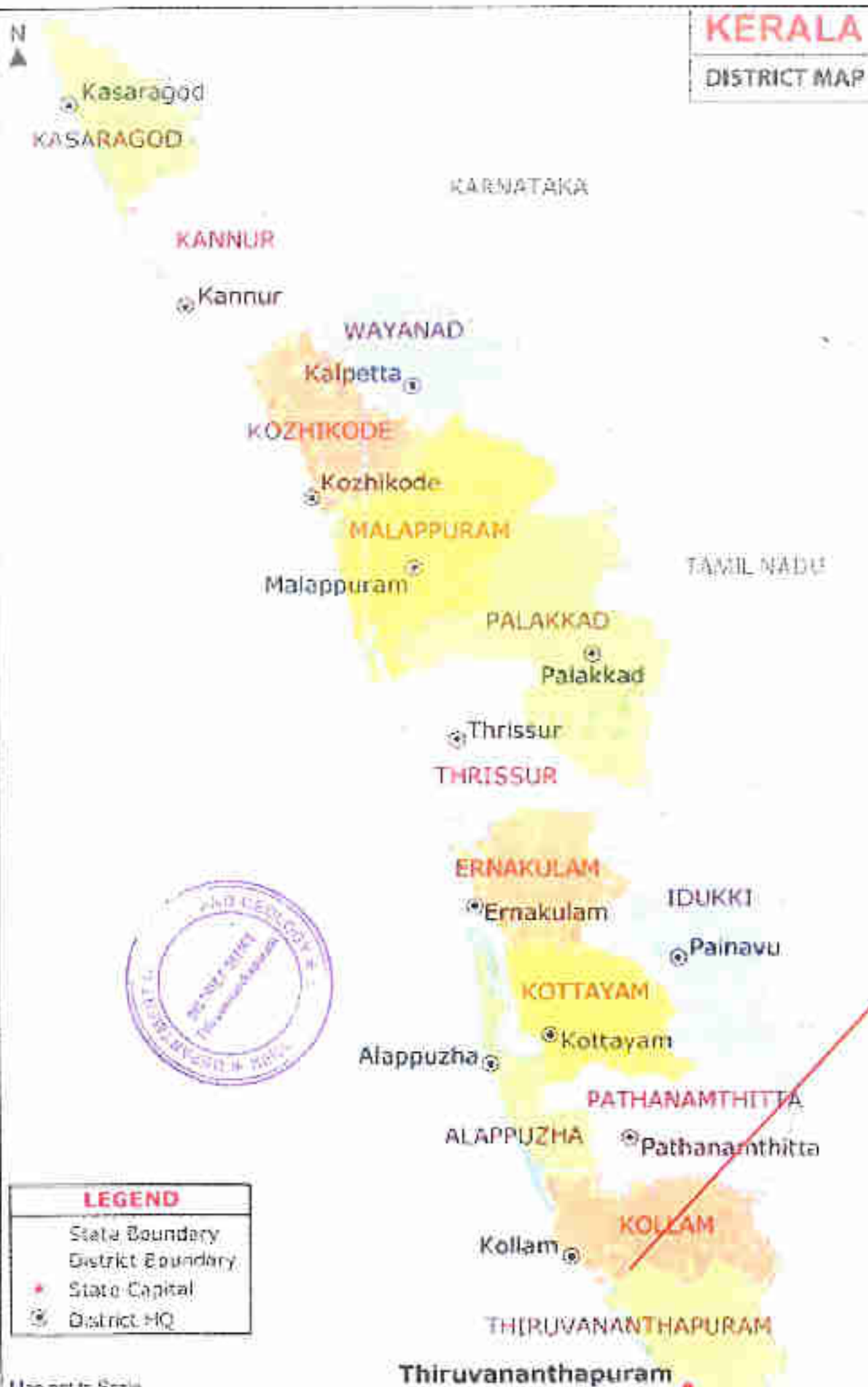
## KEY PLAN BUILDING STONE QUARRY

Situated at Sy. No. 555/2, Nagaroor Village (Kadavila),  
Chirayinkeezhu Taluk, Thiruvananthapuram Dist,  
Kerala State

Date of preparation: 01-07-2020 Scale : 1:13500

TOPO MAP NO: 55/D/13 & 55/D/14 EXTENT: 3.9630 Ha





Location and accessibility map





PLATE NO. 3

BLOCK MAP SHOWING THE BUILDING STONE QUARRY AREA, BELONGS TO M/s. ADANI VIZHIJAM PORT PVT. LTD.

BLOCK No. 39  
KARAYAKAM VILLAGE

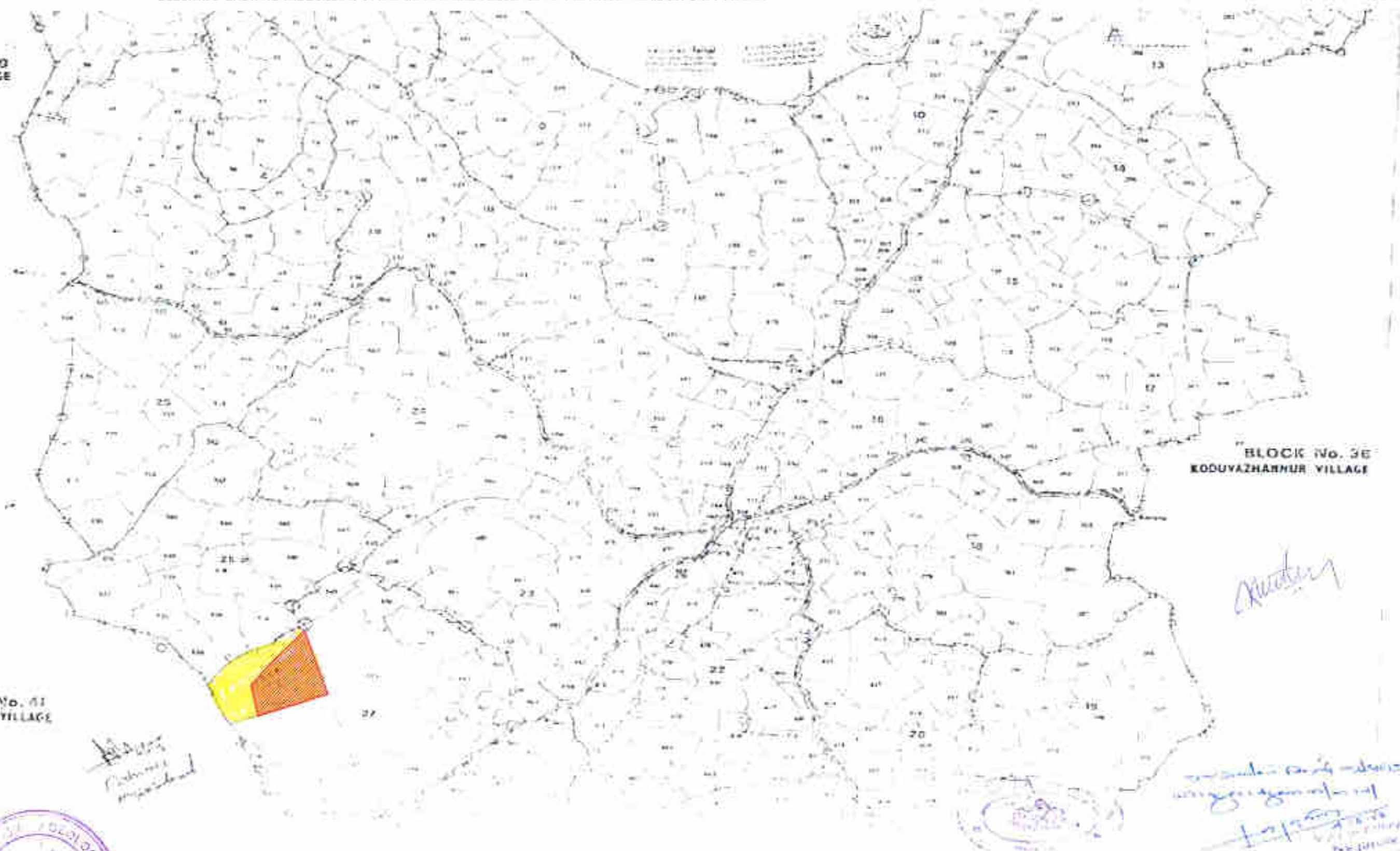
No. 1104/18

BLOCK No. 36  
KODUVAZHANNUR VILLAGE

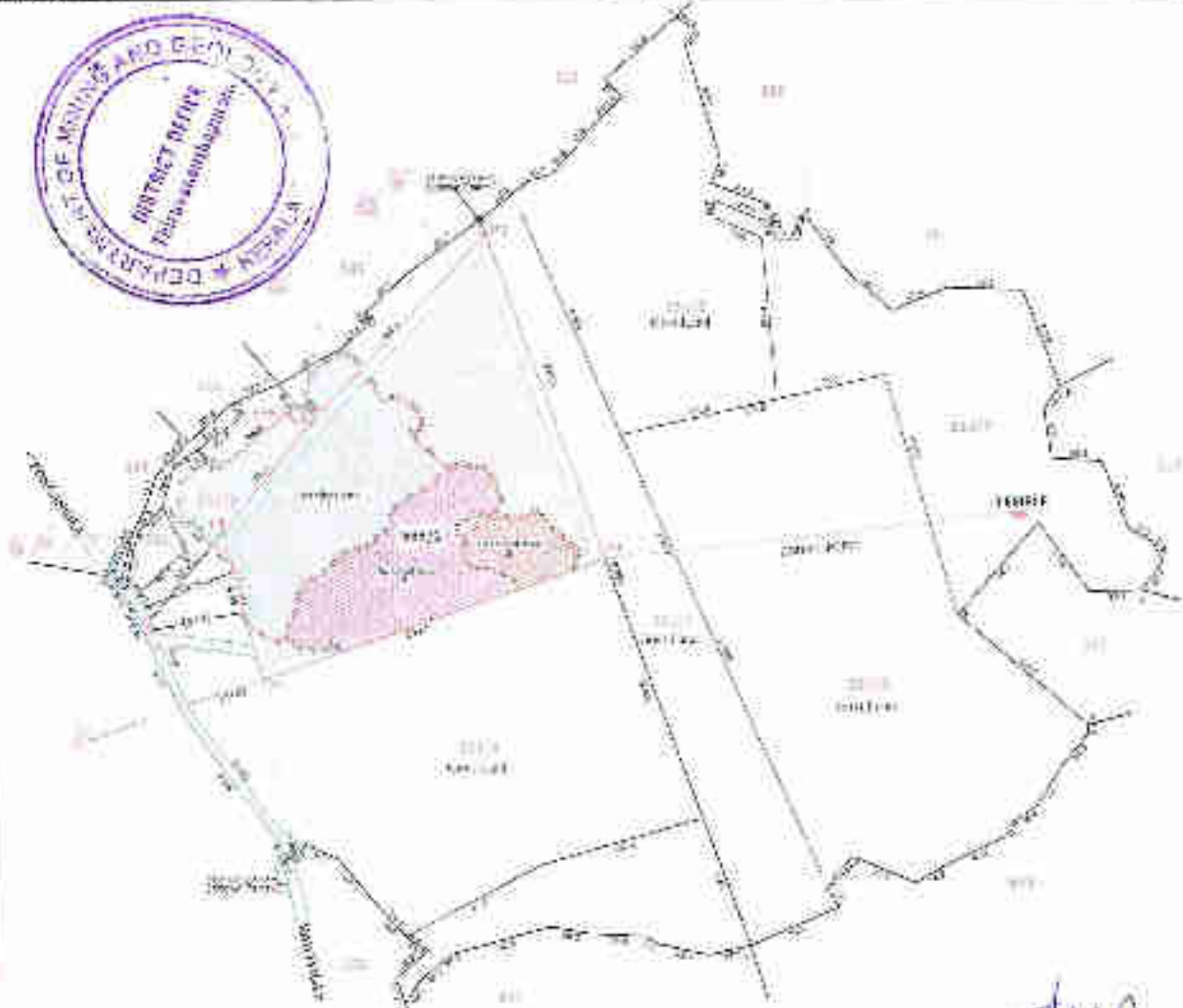
BLOCK No. 41  
ALANKODE VILLAGE

*Handwritten signature*

*Handwritten notes:*  
The quarry area is situated in the village of Karayakam, Block No. 39, Karayakam Village, Taluk of Vizhinjam, District of Thiruvananthapuram.



DEPARTMENT OF MINING AND GEOLOGY  
DISTRICT : TIRUVANANTHAPURAM  
TALUKA : CHELVANKEEZHI  
VILLAGE : KADURUZH  
FILE NO. :  
R/Sy No : 555/1



*Kantharaj K.*

KANTHARAJ K.  
RQ/GOA/130/2000/A

- 1. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/1
- 2. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം നൽകി മാറ്റിയതിനു ശേഷം പുതിയ സ്ഥലം - 114/2
- 3. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/3
- 4. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/4
- 5. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/5
- 6. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/6
- 7. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/7
- 8. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/8
- 9. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/9
- 10. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/10
- 11. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/11
- 12. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/12
- 13. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/13
- 14. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/14
- 15. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/15
- 16. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/16
- 17. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/17
- 18. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/18
- 19. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/19
- 20. പരിസ്ഥിതി മാറ്റം വരുത്തുന്നതിനായി അനുവദിച്ചിട്ടുള്ള സ്ഥലം - 114/20

Sl. No.	Area (Acres)	Area (Cents)
1	114/1	114/1
2	114/2	114/2
3	114/3	114/3
4	114/4	114/4
5	114/5	114/5
6	114/6	114/6
7	114/7	114/7
8	114/8	114/8
9	114/9	114/9
10	114/10	114/10
11	114/11	114/11
12	114/12	114/12
13	114/13	114/13
14	114/14	114/14
15	114/15	114/15
16	114/16	114/16
17	114/17	114/17
18	114/18	114/18
19	114/19	114/19
20	114/20	114/20

Scale 1cm = 20 m



12  
KANTHARAJ K.  
RQ/GOA/130/2000/A



GOOGLE IMAGE SHOWING THE KADAVILA BUILDING STONE QUARRY OF M/s. ADANI VIZHIJAM PORT PVT LTD.

# Nagaroor quarry area

- Legend**
- BP
  - Bus Stop
  - quarry boundary
  - Nagaroor Masjid
  - Nagaroor quarry - Kadavila

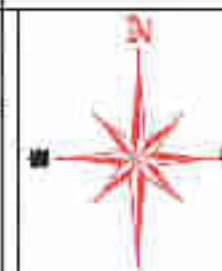


*Kantharaj K.*  
KANTHARAJ K.  
REGIONAL MANAGER

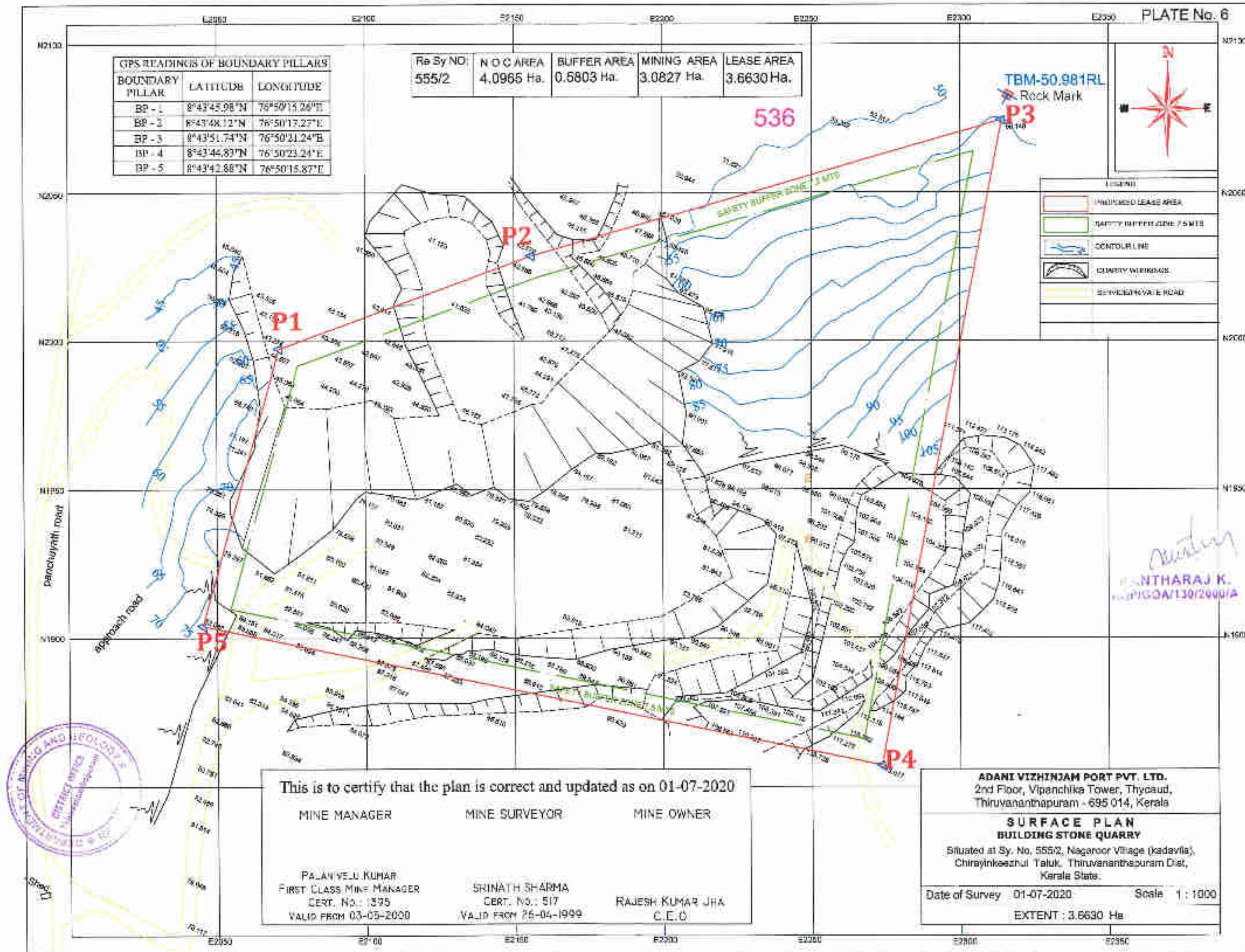


GPS READINGS OF BOUNDARY PILLARS		
BOUNDARY PILLAR	LATITUDE	LONGITUDE
BP - 1	8°43'45.98"N	76°50'15.26"E
BP - 2	8°43'48.12"N	76°50'17.27"E
BP - 3	8°43'51.74"N	76°50'21.24"E
BP - 4	8°43'44.83"N	76°50'23.24"E
BP - 5	8°43'42.88"N	76°50'15.87"E

Re Sy NO	N O C AREA	BUFFER AREA	MINING AREA	LEASE AREA
555/2	4.0965 Ha.	0.5803 Ha.	3.0827 Ha.	3.6630 Ha.



LEGEND	
<span style="border: 1px solid red; display: inline-block; width: 20px; height: 10px;"></span>	PROPOSED LEASE AREA
<span style="border: 1px solid green; display: inline-block; width: 20px; height: 10px;"></span>	SAFETY BUFFER ZONE 75 MTS
<span style="color: blue; font-weight: bold;">—</span>	CONTOUR LINE
<span style="border-bottom: 1px dashed black; display: inline-block; width: 20px;"></span>	CLARRY WEIRINGS
<span style="border-bottom: 2px solid yellow; display: inline-block; width: 20px;"></span>	SERVICE/HAUL ROAD



This is to certify that the plan is correct and updated as on 01-07-2020

MINE MANAGER

MINE SURVEYOR

MINE OWNER

PALANVELU KUMAR  
FIRST CLASS MINE MANAGER  
CERT. NO.: 1395  
VALID FROM 03-05-2000

SRINATH SHARMA  
CERT. NO.: 517  
VALID FROM 26-04-1999

RAJESH KUMAR JHA  
C.E.O

ADANI VIZHINJAM PORT PVT. LTD.  
2nd Floor, Vipanchika Tower, Thycaud,  
Thiruvananthapuram - 695 014, Kerala

### SURFACE PLAN BUILDING STONE QUARRY

Situated at Sy. No. 555/2, Nagaroor Village (Kadavilla),  
Chirayinkeezhu Taluk, Thiruvananthapuram Dist,  
Kerala State.

Date of Survey 01-07-2020

Scale 1 : 1000

EXTENT : 3.6630 Ha





GPS READINGS OF BOUNDARY PILLARS		
BOUNDARY PILLAR	LATITUDE	LONGITUDE
BP-1	8°43'45.98"N	76°50'15.26"E
BP-2	8°43'48.12"N	76°50'17.27"E
BP-3	8°43'51.74"N	76°50'21.24"E
BP-4	8°43'44.83"N	76°50'23.24"E
BP-5	8°43'42.88"N	76°50'15.87"E

Re Sy NO:	N.O.C AREA	BUFFER AREA	MINING AREA	LEASE AREA
555/2	4.0965 Ha.	0.5803 Ha.	3.0827 Ha.	3.6630 Ha.

TBM-50.981RL  
Rock Mark

LEGEND	
	PROPOSED LEASE AREA
	SAFETY BUFFER ZONE 7.5 MTS
	CONTOUR LINE
	QUARRY WORKING
	SERVICED PRIVATE ROAD

# GEOLOGY INDEX

	M.L. JARASINE
	NO. COVER
	DR & STREAM

This is to certify that the plan is correct and updated as on 01-07-2020

MINE MANAGER

MINE SURVEYOR

MINE OWNER

PALANIVELU KUMAR  
FIRST CLASS MINE MANAGER  
CERT. No.: 1395  
VALID FROM 03-05-2000

SRINATH SHARMA  
CERT. No.: 517  
VALID FROM 26-04-1999

RAJESH KUMAR JHA  
C.E.O.

ADANI VIZHINJAM PORT PVT. LTD.  
2nd Floor, Vipanchika Tower, Thycaud,  
Thiruvananthapuram - 685 014, Kerala

## SURFACE PLAN BUILDING STONE QUARRY

Situated at Sy. No. 555/2, Nagaroor Village (Kadavila),  
Chirayinkeezhu Taluk, Thiruvananthapuram Dist,  
Kerala State.

Date of Survey 01-07-2020

Scale 1 : 1000

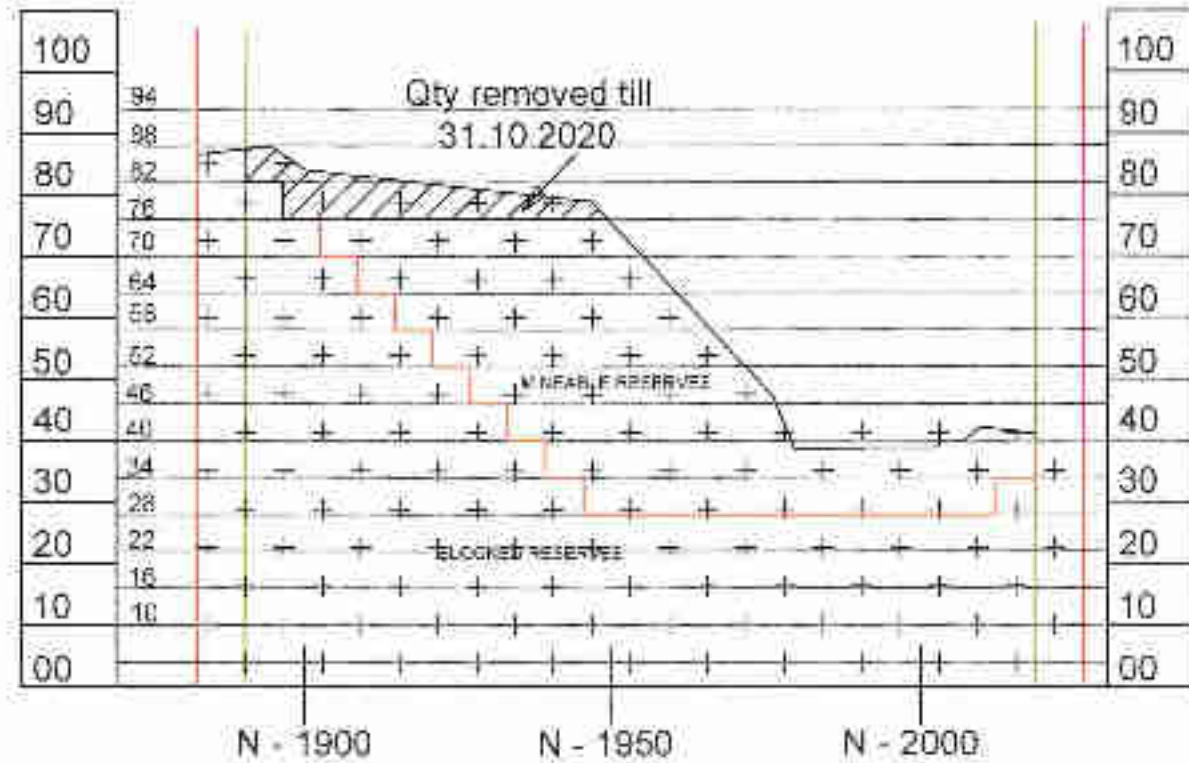
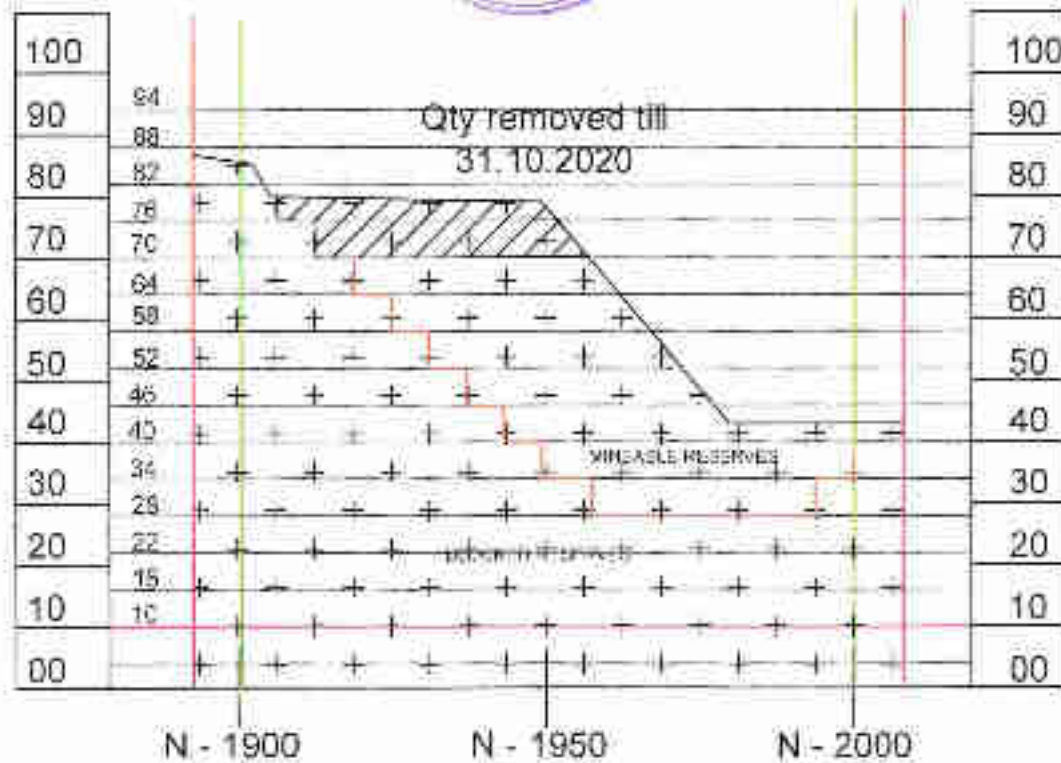
EXTENT : 3.6630 Ha

KANTHARAJ K.  
RQP/GOA/130/2000/A



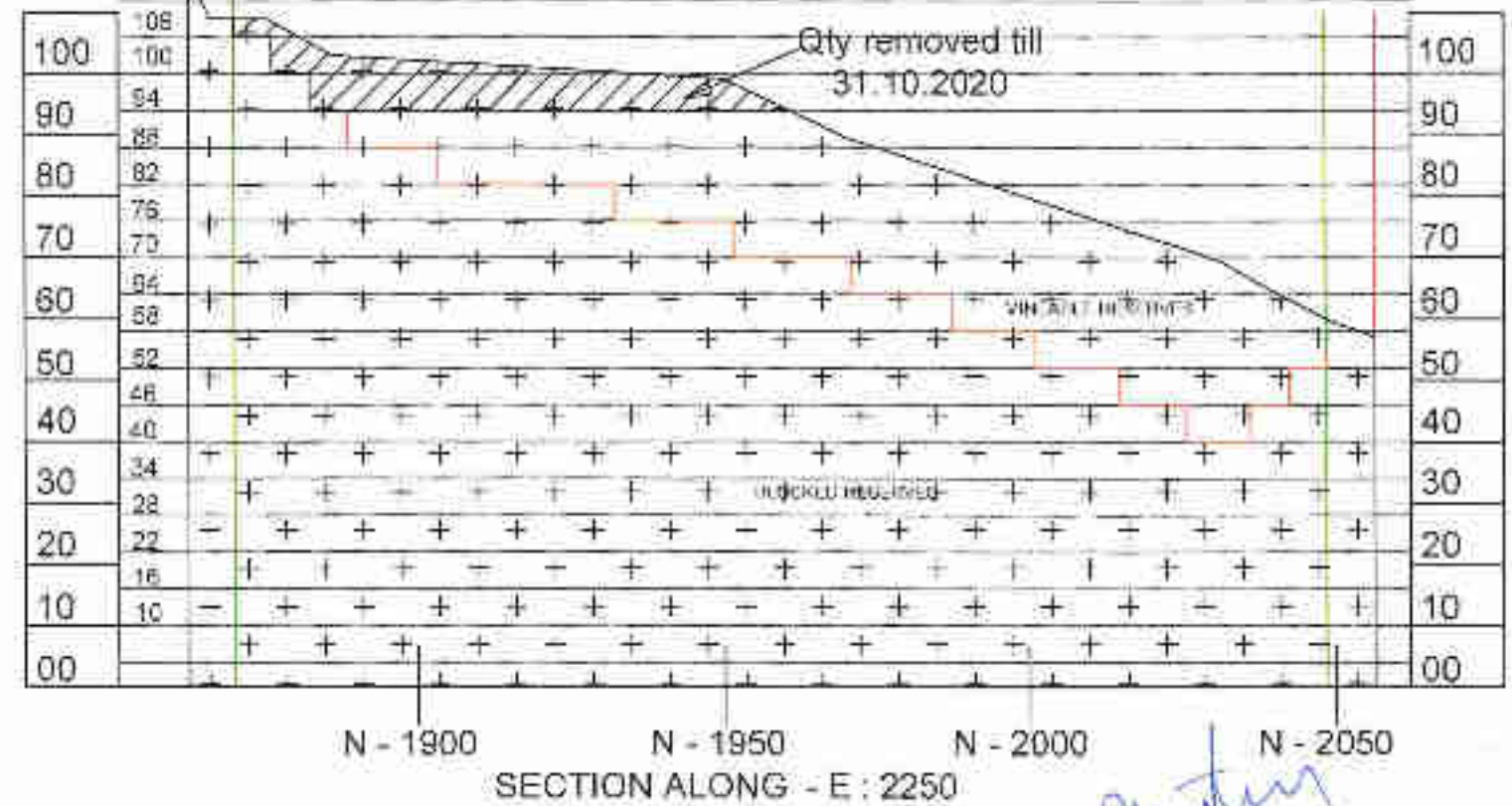
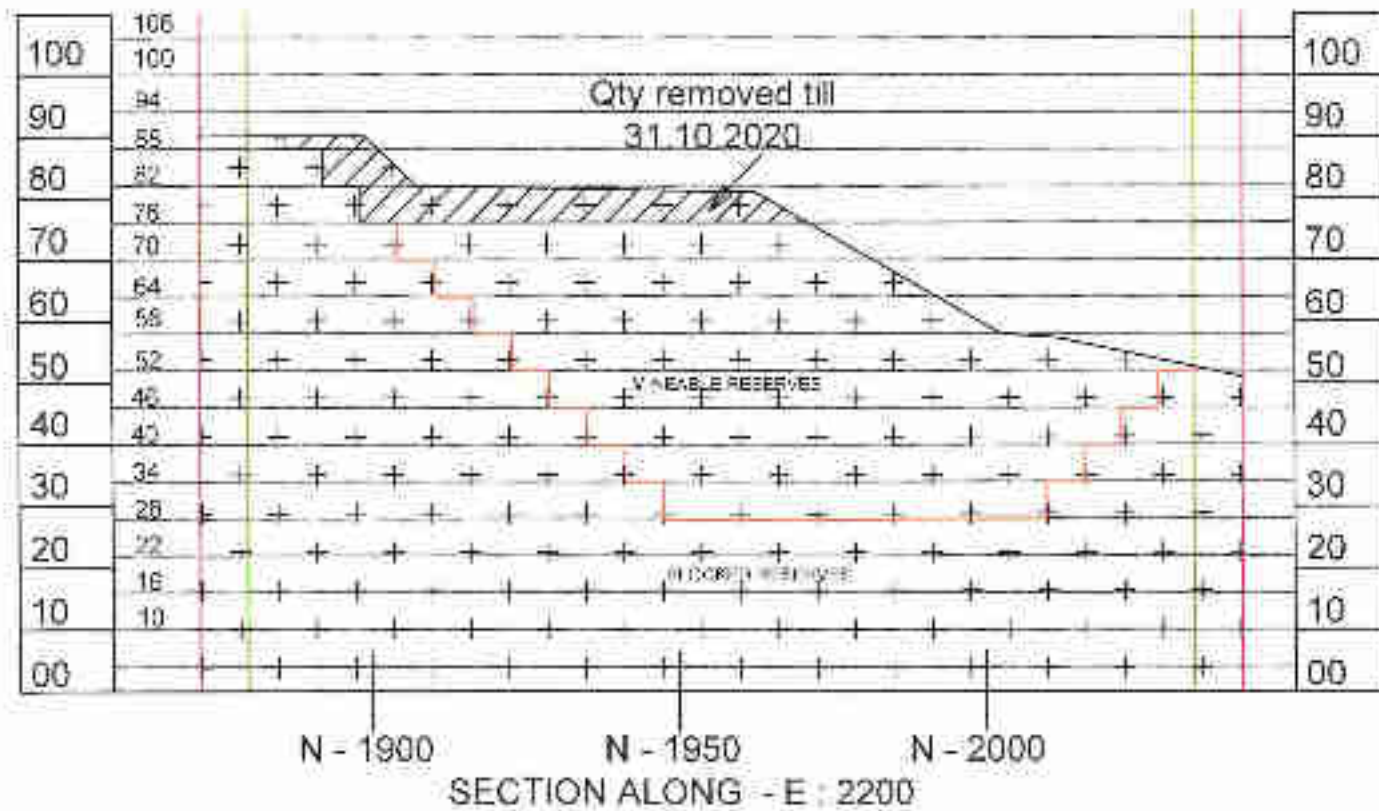


PLATE NO. 8.



GEOLOGY INDEX	
	BUILDING STONE
	MINABLE RESERVES
	BLOCKED RESERVES

ADANI VIZHINJAM PORT PVT. LTD. 2nd Floor, Vipanghika Tower, Thycaud, Thiruvananthapuram - 685 014, Kerala	
<b>GEOLOGICAL CROSS SECTION BUILDING STONE QUARRY</b> Situated at Sy. No. 655/2, Nagaroor Village (Kadavil), Chirayinkeezhu Taluk, Thiruvananthapuram Dist, Kerala State.	
Updated as on - 01-07-2020	Scale 1 : 1200
EXTENT : 3.8830 Ha	



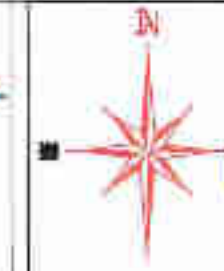
KANTHARAJ K.  
RDP/GOA/130/2000/A



GPS READINGS OF BOUNDARY PILARS		
BOUNDARY PILAR	LATITUDE	LONGITUDE
BP - 1	8°43'45.98"N	76°50'15.26"E
BP - 2	8°43'48.12"N	76°50'17.27"E
BP - 3	8°43'51.74"N	76°50'21.24"E
BP - 4	8°43'44.83"N	76°50'23.24"E
BP - 5	8°43'42.88"N	76°50'15.87"E

Ra Sy NO:	N O C AREA	BUFFER AREA	MINING AREA	LEASE AREA
555/2	4.0965 Ha.	0.5803 Ha.	3.0827 Ha.	3.6630 Ha.

TBM-50.981RL  
Rock Mark  
P3



LEGEND	
	PROPOSED LEASE AREA
	SAFETY BUFFER ZONE 7.5 MTS
	CONTOUR LINE
	QUARRY WORKINGS
	DISSEMINATED ROAD

### REFERENCE

PRODUCTION	
20 - 21	
21 - 22	
22 - 23	
23 - 24	
PLANTATION	
20 - 21	
21 - 22	
22 - 23	
EXISTING	

This is to certify that the plan is correct and updated as on 01-07-2020

MINE MANAGER

MINE SURVEYOR

MINE OWNER

PAJAN VELU KUMAR  
FIRST CLASS MINE MANAGER  
CERT. No.: 1395  
VALID FROM 03-05-2020

SRINATH SHARMA  
CERT. No.: 517  
VALID FROM 26-04-1999

RAJESH KUMAR JHA  
C.E.O

ADANI VIZHINJAM PORT PVT. LTD.  
2nd Floor, Vipanchika Tower, Thycaud,  
Thiruvananthapuram - 695 014, Kerala

### PRODUCTION PLAN BUILDING STONE QUARRY

Situated at Sy. No. 555/2, Nagamoor Village (Kadavla),  
Chirayinkeezhu Taluk, Thiruvananthapuram Dist,  
Kerala State.

Date of Survey 01-07-2020

Scale 1 : 1000

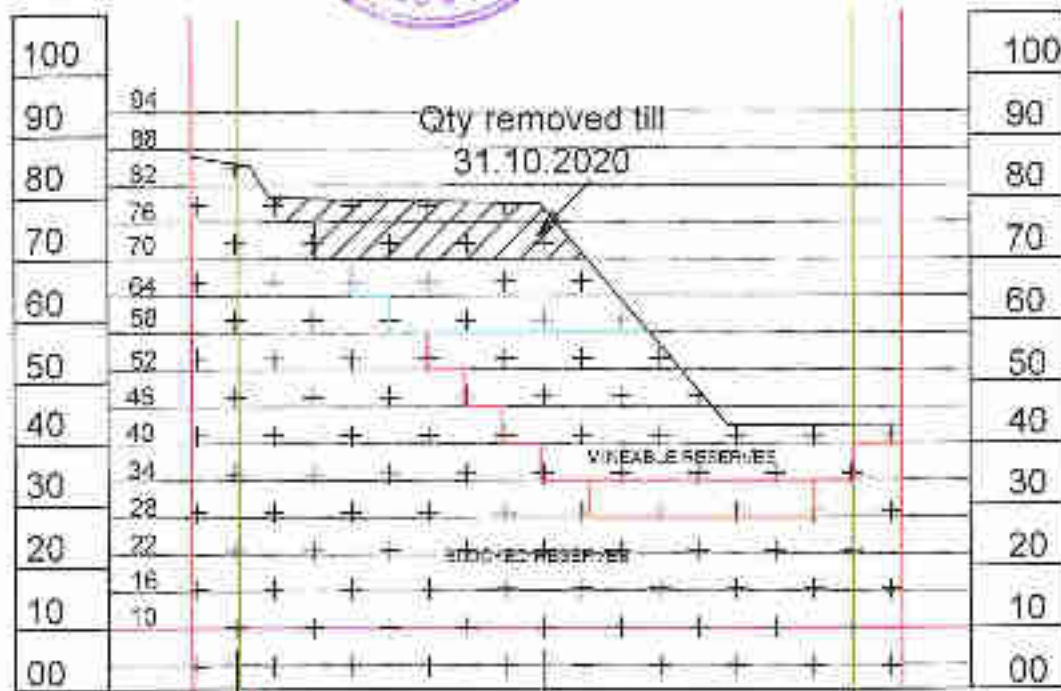
EXTENT : 3.6630 Ha

*Kantharaj K.*  
KANTHARAJ K.  
RGP/GOA/130/2000/A

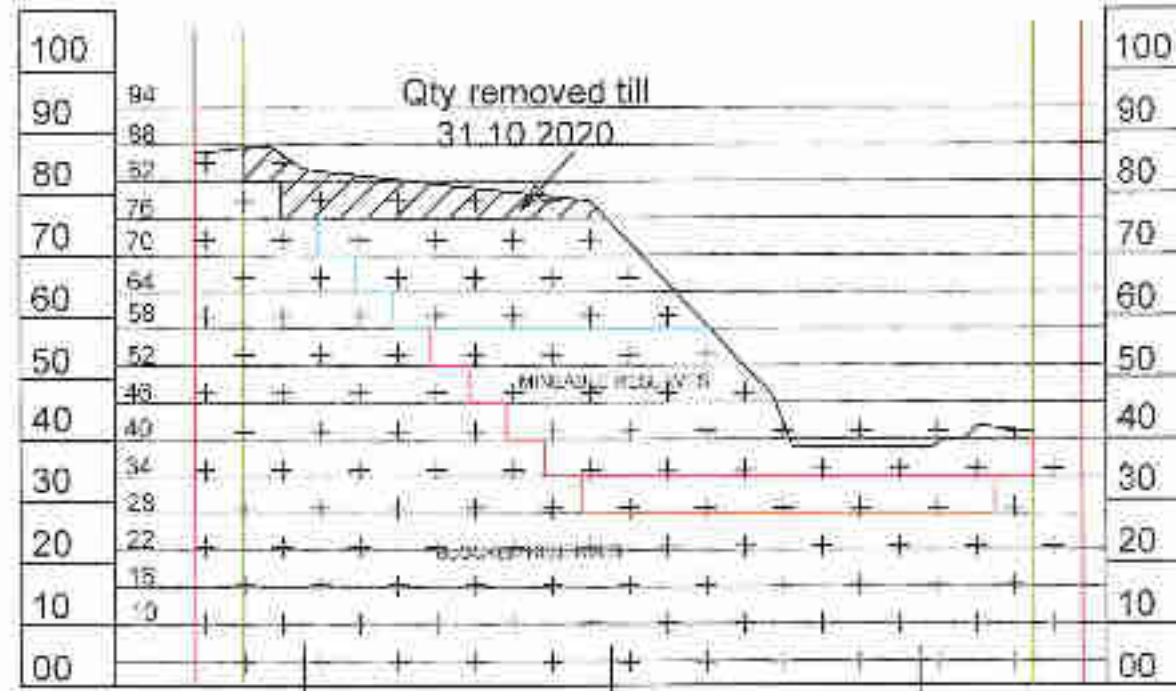




PLATE NO. 10.



SECTION ALONG - E : 2100



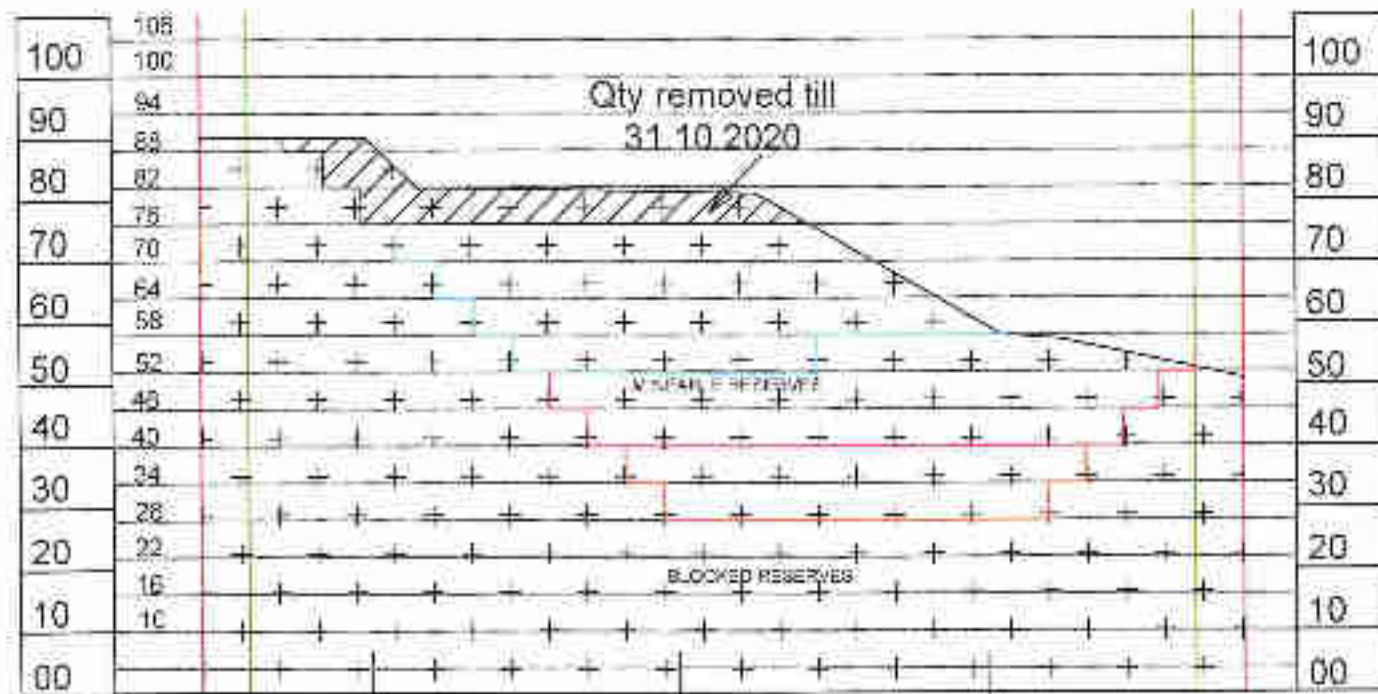
SECTION ALONG - E : 2150

REFERENCE	
PRODUCTION	GEOLOGY INDEX
20 - 21	BUILDING STONE
21 - 22	MINABLE RESERVES
22 - 23	BLOCKED RESERVES
23 - 24	

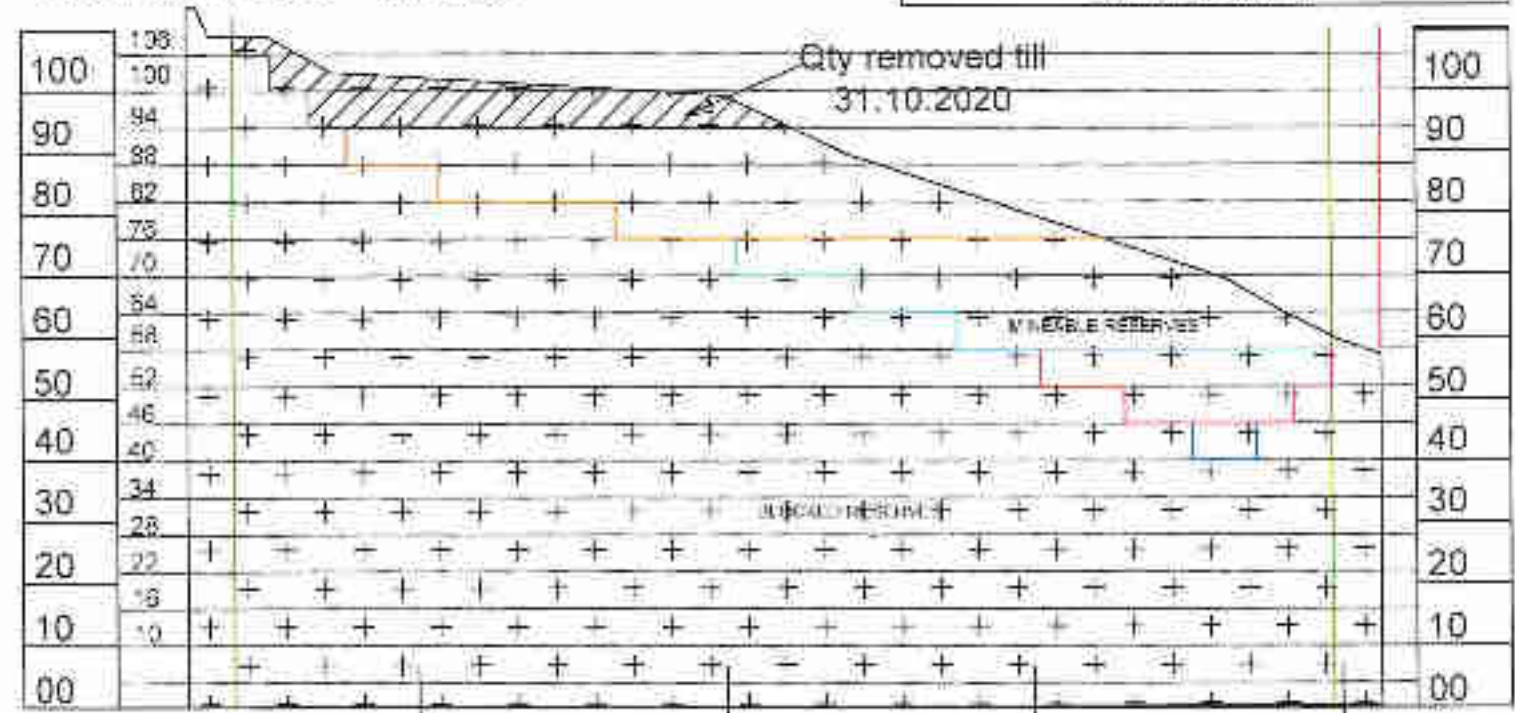
ADANI VIZHINJAM PORT PVT. LTD.  
2nd Floor, Vignanchika Tower, Trivandrum,  
Thiruvananthapuram - 695 014, Kerala

PRODUCTION CROSS SECTION  
BUILDING STONE QUARRY  
Situated at Sy. No. 506/2, Nagamoor Village (Kadavilla),  
Chayinkkuzhal Taluk, Thiruvananthapuram Dist.  
Kerala State

Updated as on 01-07-2020 Scale 1:1200  
EXTENT : 1.5630 Ha



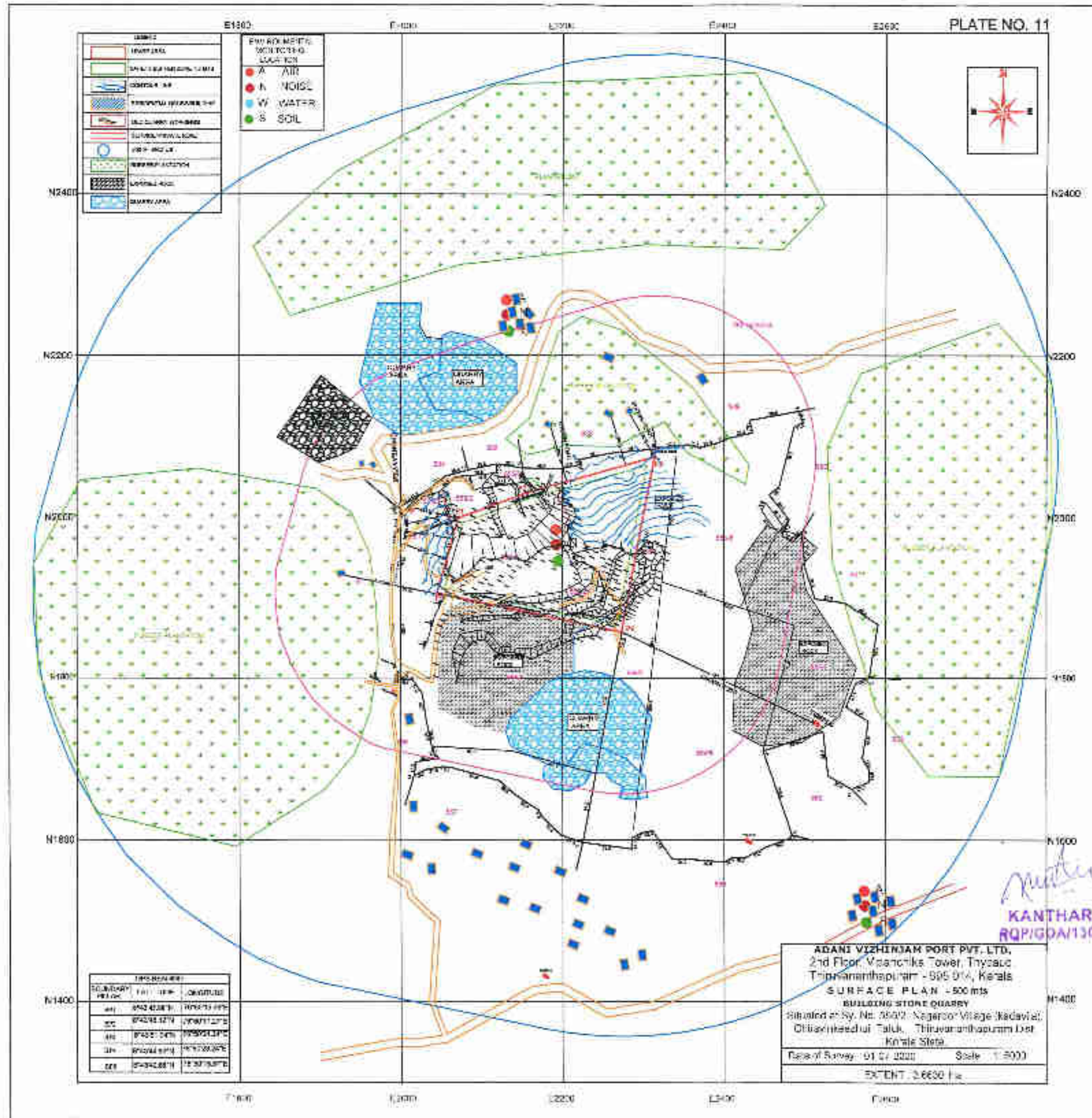
SECTION ALONG - E : 2200



SECTION ALONG - E : 2250

*Kantharaj K.*  
KANTHARAJ K.  
RQP/GOA/130/2000/A



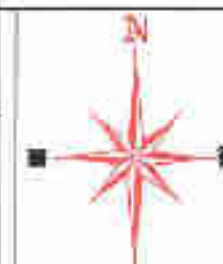




GPS READINGS OF BOUNDARY PILLARS		
BOUNDARY PILLAR	LATITUDE	LONGITUDE
BP - 1	8°43'45.08"N	76°50'13.26"E
BP - 2	8°43'48.12"N	76°50'17.27"E
BP - 3	8°43'51.74"N	76°50'11.24"E
BP - 4	8°43'44.83"N	76°50'23.24"E
BP - 5	8°43'42.88"N	76°50'15.87"E

Re Sy NO:	N O C AREA	BUFFER AREA	MINING AREA	LEASE AREA
555/2	4.0965 Ha.	0.5803 Ha.	3.0827 Ha.	3.6630 Ha.

TBM-50.981RL  
Rock Mark  
P3



LEGEND	
	PROPOSED LEASE AREA
	SAFETY BUFFER ZONE 75 MTS
	CONTOUR LINE
	QUARRY BOUNDARY
	SERVICE PRIVATE ROAD



RAIN WATER HARVESTING / WATER POND

*Kantharaj K.*  
KANTHARAJ K.  
RQP/GOA/130/2000/12

PLANTATION	
20 - 21	
21 - 22	
22 - 23	
EXISTING	

### REFERENCE

PRODUCTION	
FIRST BLOCK OF FIVE YEARS 19 - 20 TO 23 - 24	
SECOND BLOCK OF FIVE YEARS 24 - 25 TO 28 - 29	

This is to certify that the plan is correct and updated as on 01-07-2020

MINE MANAGER

MINE SURVEYOR

MINE OWNER

PALANIVELU KUMAR  
FIRST CLASS MINE MANAGER  
CERT. NO.: 1395  
VALID FROM 03-05-2000

SRINATH SHARMA  
CERT. NO.: 517  
VALID FROM 26-04-1999

RAJESH KUMAR JHA  
C.E.O.

ADANI VIZHINJAM PORT PVT. LTD.  
2nd Floor, Vipanchika Tower, Thycaud,  
Thiruvananthapuram - 695 014, Kerala

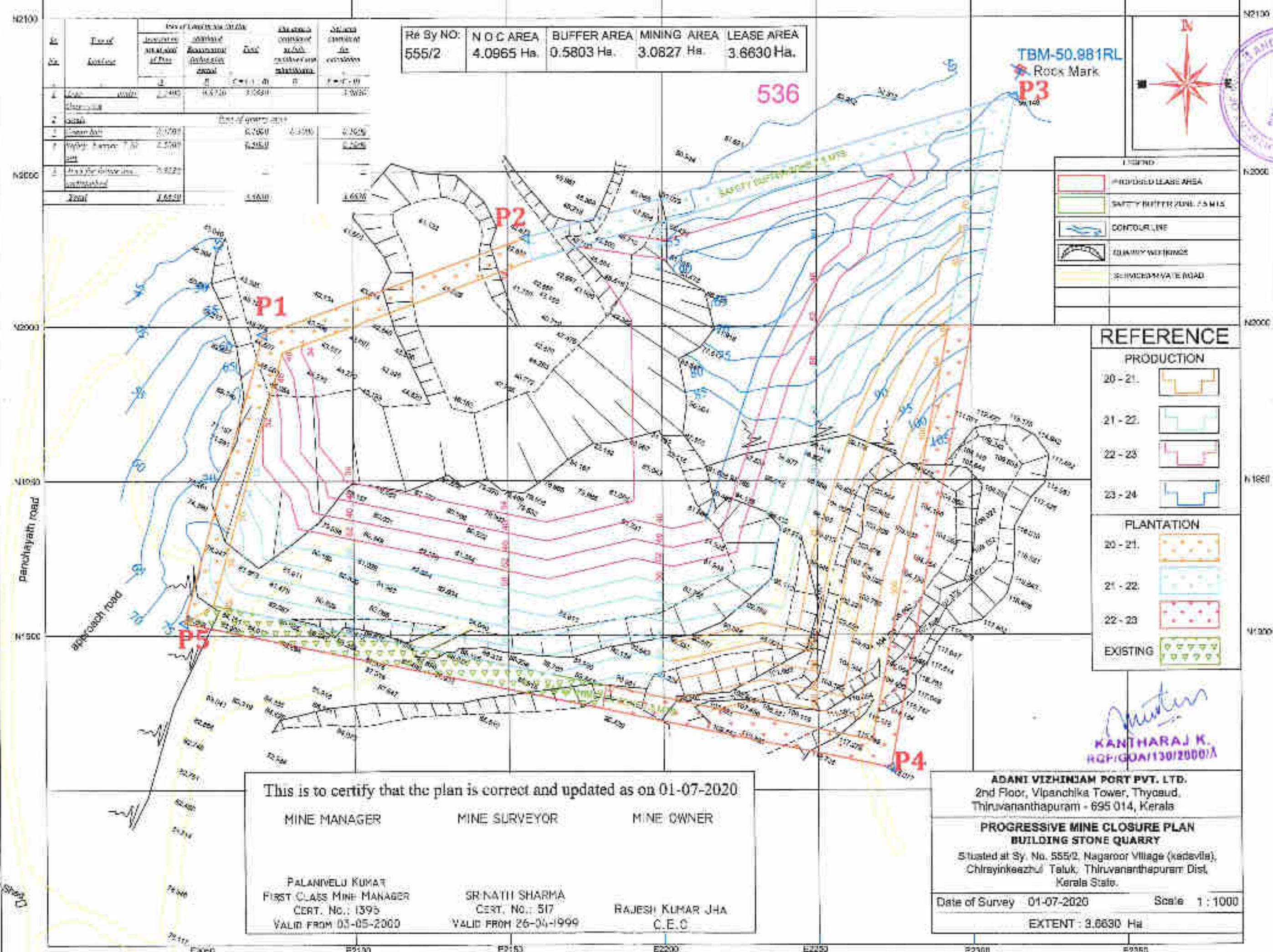
### CONCEPTUAL / POST MINE LAND USE PLAN BUILDING STONE QUARRY

Situated at Sy. No. 555/2, Nagaroor Village (Kadavila),  
Chirayinkeezhi Taluk, Thiruvananthapuram Dist,  
Kerala State.

Date of Survey 01-07-2020 Scale 1:1000

EXTENT : 3.6630 Ha.





Sl. No.	Type of Land Use	Area of Land Use (Ha)			Total Area (Ha)
		Proposed	Existing	Net	
1	Quarry	2.400	0.5803	1.8197	4.0003
2	Forest	0.000	0.000	0.000	0.000
3	Other	0.000	0.000	0.000	0.000
4	Water	0.000	0.000	0.000	0.000
5	Settlement	0.000	0.000	0.000	0.000
6	Barren Land	0.000	0.000	0.000	0.000
7	Other	0.000	0.000	0.000	0.000
8	Unclassified	0.000	0.000	0.000	0.000
9	Other	0.000	0.000	0.000	0.000
10	Other	0.000	0.000	0.000	0.000
11	Other	0.000	0.000	0.000	0.000
12	Other	0.000	0.000	0.000	0.000
13	Other	0.000	0.000	0.000	0.000
14	Other	0.000	0.000	0.000	0.000
15	Other	0.000	0.000	0.000	0.000
16	Other	0.000	0.000	0.000	0.000
17	Other	0.000	0.000	0.000	0.000
18	Other	0.000	0.000	0.000	0.000
19	Other	0.000	0.000	0.000	0.000
20	Other	0.000	0.000	0.000	0.000
21	Other	0.000	0.000	0.000	0.000
22	Other	0.000	0.000	0.000	0.000
23	Other	0.000	0.000	0.000	0.000
24	Other	0.000	0.000	0.000	0.000
25	Other	0.000	0.000	0.000	0.000
26	Other	0.000	0.000	0.000	0.000
27	Other	0.000	0.000	0.000	0.000
28	Other	0.000	0.000	0.000	0.000
29	Other	0.000	0.000	0.000	0.000
30	Other	0.000	0.000	0.000	0.000
31	Other	0.000	0.000	0.000	0.000
32	Other	0.000	0.000	0.000	0.000
33	Other	0.000	0.000	0.000	0.000
34	Other	0.000	0.000	0.000	0.000
35	Other	0.000	0.000	0.000	0.000
36	Other	0.000	0.000	0.000	0.000
37	Other	0.000	0.000	0.000	0.000
38	Other	0.000	0.000	0.000	0.000
39	Other	0.000	0.000	0.000	0.000
40	Other	0.000	0.000	0.000	0.000
41	Other	0.000	0.000	0.000	0.000
42	Other	0.000	0.000	0.000	0.000
43	Other	0.000	0.000	0.000	0.000
44	Other	0.000	0.000	0.000	0.000
45	Other	0.000	0.000	0.000	0.000
46	Other	0.000	0.000	0.000	0.000
47	Other	0.000	0.000	0.000	0.000
48	Other	0.000	0.000	0.000	0.000
49	Other	0.000	0.000	0.000	0.000
50	Other	0.000	0.000	0.000	0.000
51	Other	0.000	0.000	0.000	0.000
52	Other	0.000	0.000	0.000	0.000
53	Other	0.000	0.000	0.000	0.000
54	Other	0.000	0.000	0.000	0.000
55	Other	0.000	0.000	0.000	0.000
56	Other	0.000	0.000	0.000	0.000
57	Other	0.000	0.000	0.000	0.000
58	Other	0.000	0.000	0.000	0.000
59	Other	0.000	0.000	0.000	0.000
60	Other	0.000	0.000	0.000	0.000
61	Other	0.000	0.000	0.000	0.000
62	Other	0.000	0.000	0.000	0.000
63	Other	0.000	0.000	0.000	0.000
64	Other	0.000	0.000	0.000	0.000
65	Other	0.000	0.000	0.000	0.000
66	Other	0.000	0.000	0.000	0.000
67	Other	0.000	0.000	0.000	0.000
68	Other	0.000	0.000	0.000	0.000
69	Other	0.000	0.000	0.000	0.000
70	Other	0.000	0.000	0.000	0.000
71	Other	0.000	0.000	0.000	0.000
72	Other	0.000	0.000	0.000	0.000
73	Other	0.000	0.000	0.000	0.000
74	Other	0.000	0.000	0.000	0.000
75	Other	0.000	0.000	0.000	0.000
76	Other	0.000	0.000	0.000	0.000
77	Other	0.000	0.000	0.000	0.000
78	Other	0.000	0.000	0.000	0.000
79	Other	0.000	0.000	0.000	0.000
80	Other	0.000	0.000	0.000	0.000
81	Other	0.000	0.000	0.000	0.000
82	Other	0.000	0.000	0.000	0.000
83	Other	0.000	0.000	0.000	0.000
84	Other	0.000	0.000	0.000	0.000
85	Other	0.000	0.000	0.000	0.000
86	Other	0.000	0.000	0.000	0.000
87	Other	0.000	0.000	0.000	0.000
88	Other	0.000	0.000	0.000	0.000
89	Other	0.000	0.000	0.000	0.000
90	Other	0.000	0.000	0.000	0.000
91	Other	0.000	0.000	0.000	0.000
92	Other	0.000	0.000	0.000	0.000
93	Other	0.000	0.000	0.000	0.000
94	Other	0.000	0.000	0.000	0.000
95	Other	0.000	0.000	0.000	0.000
96	Other	0.000	0.000	0.000	0.000
97	Other	0.000	0.000	0.000	0.000
98	Other	0.000	0.000	0.000	0.000
99	Other	0.000	0.000	0.000	0.000
100	Other	0.000	0.000	0.000	0.000

Re By NO:	N O C AREA	BUFFER AREA	MINING AREA	LEASE AREA
555/2	4.0965 Ha.	0.5803 Ha.	3.0827 Ha.	3.6630 Ha.



LEGEND
[Red outline] PROPOSED LEASE AREA
[Green outline] SAFETY BUFFER ZONE 7.5 MTS
[Blue line] CONTOUR LINE
[Black line] QUARRY WORKINGS
[Yellow line] SCHISMATE ROAD

REFERENCE

PRODUCTION	
20 - 21	[Pattern]
21 - 22	[Pattern]
22 - 23	[Pattern]
23 - 24	[Pattern]
PLANTATION	
20 - 21	[Pattern]
21 - 22	[Pattern]
22 - 23	[Pattern]
EXISTING	[Pattern]

This is to certify that the plan is correct and updated as on 01-07-2020

MINE MANAGER	MINE SURVEYOR	MINE OWNER
PALANIVELU KUMAR FIRST CLASS MINE MANAGER CERT. NO.: 1395 VALID FROM 03-05-2000	SR NATH SHARMA CERT. NO.: 517 VALID FROM 26-04-1999	RAJESH KUMAR JHA C.E.O

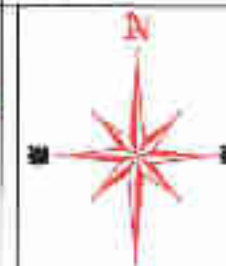
ADANI VIZHINJAM PORT PVT. LTD. 2nd Floor, Vipanchika Tower, Thycaud, Thiruvananthapuram - 695 014, Kerala	
PROGRESSIVE MINE CLOSURE PLAN BUILDING STONE QUARRY Situated at Sy. No. 555/2, Nagaroor Village (Kadavila), Chirayinkeezhu Taluk, Thiruvananthapuram Dist, Kerala State.	
Date of Survey 01-07-2020	Scale 1:1000
EXTENT - 3.6630 Ha	

*Kantharaj K.*  
KANTHARAJ K.  
RGP/GOA/130/2000/A



GPS READINGS OF BOUNDARY PILLARS		
BOUNDARY PILLAR	LATITUDE	LONGITUDE
BP - 1	8°43'45.98"N	76°50'13.26"E
BP - 2	8°43'48.12"N	76°50'17.27"E
BP - 3	8°43'51.74"N	76°50'21.24"E
BP - 4	8°43'44.83"N	76°50'23.24"E
BP - 5	8°43'42.88"N	76°50'13.87"E

Re Sy NO:	N.O.C AREA	BUFFER AREA	MINING AREA	LEASE AREA
555/2	4.0965 Ha.	0.5803 Ha.	3.0827 Ha.	3.6630 Ha.



LEGEND	
	PROPOSED LEASE AREA
	SAFETY BUFFER ZONE 7.5 MTS
	CONTOUR LINE
	QUARRY WORKING
	SERVICE PRIVATE ROAD



*Kantharaj K.*  
KANTHARAJ K.  
ASST. COMMISSIONER

This is to certify that the plan is correct and updated as on 01-07-2020

MINE MANAGER

MINE SURVEYOR

MINE OWNER

PALANIVELU KUMAR  
FIRST CLASS MINE MANAGER  
CERT. No. 1395  
VALID FROM 03-05-2000

SRINATH SHARMA  
CERT. No. 57  
VALID FROM 26-04-1999

RAJESH KUMAR JHA  
C.E.O

ADANI VIZHINJAM PORT PVT. LTD.  
2nd Floor, Vipanchika Tower, Thycaud,  
Thiruvananthapuram - 695 014, Kerala

**RAIN WATER HARVEST / DRAINAGE PLAN  
BUILDING STONE QUARRY**

Situated at Sy. No. 555/2, Nagaroor Village (Kadavila),  
Chirayinkeezhu Taluk, Thiruvananthapuram Dist,  
Kerala State.

Date of Survey 01-07-2020

Scale 1 : 1000

EXTENT : 3.6630 Ha



## **Annexure 3: Explosives Magazine and Van Licenses**



**GOVERNMENT OF INDIA**  
**MINISTRY OF COMMERCE & INDUSTRY**  
**PETROLEUM AND EXPLOSIVES SAFETY ORGANISATION (PESO)**  
*(Formerly Department of Explosives)*  
 Kendra Shivan, Block C-2, 3rd Floor  
 CSEZ PO Kakkulam Dist. Neyyattalam, Thrissur 682032  
 Tel: 2427286 Fax: 2427276  
 Email: dyccoccriskultur@explosives.gov.in

No: E/SE/KL/22/331(E121778)

Date: 11/05/2021

To,  
 Shri RAJESH KUMAR JHA,  
 C.E.O. M/s Adani Vinayagam Port Pvt. Ltd. Floor No.2, Vinayakula Tower, Thiruvananthapuram  
 Town/Village - Kattukal  
 Dist. THIRUVANANTHAPURAM, State, Kerala, Pincode-695003

Subject: Permission for Use of Explosives from magazine at Survey No:117/15-1-2,117/13,117/14, Village/Town, Kattukal, Neyyattinkara, Dist. THIRUVANANTHAPURAM, State Kerala Licence No: E/SE/KL/22/331(E121778) granted in Form 1.1-3 of Explosives Rules, 2008 -Endorsement regarding

Sir(s),

**Conditions:**

CONFIRMATION REGARDING QUARRYING OPERATIONS AS PER LETTER OF MINING LEASE ORDER NO.4902021/10126/M32020/0003 DATED 29/12/2020 FROM THE FROM THE DIRECTOR OF MINING & GEOLOGY, THIRUVANANTHAPURAM AND AFTER RECEIPT OF ENVIRONMENTAL CLEARANCE FROM SELAA VIDE NO. 1205BC220118NEIAA Dated 16/11/2020 AT Survey Block no. 37, Re survey No: 88562, of Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District IS ACKNOWLEDGED HERewith. PLEASE NOTE THAT THE USE OF EXPLOSIVES IN THE QUARRIES SHALL BE AS PER THE DIRECTION OF DMS, BANGALORE AS REQUIRED UNDER MINES ACT 1952 AND METALLIFEROUS MINES REGULATIONS 1961.

Reference memo No.: PNF/KL/22/331(E121778) Dated 30/08/2021 from Dy. Chief Controller of Explosives, Ernakulam and inspection of the subject premises by an officer of this organization on 03/08/2021.

The subject licence No. E/SE/KL/22/331(E121778) valid upto 31st March 2026 duly endorsed as required under Rule 107(1) of the Explosives Rules 2008 is forwarded herewith.

For further renewal of licence, please submit following documents so as to reach this office on or before 31/03/2026.

- Application in Form RP-1 duly filled in and signed.
- Licence fees renewable for one to five years, to be submitted online through e-payment facility available on online application portal under the Explosives Rules, 2008.
- Original licence with approved plan.
- In this connection, please also refer to Rule 111 of Explosives Rules, 2008.

• Indent for purchase of explosives shall be placed in RE-11 with the supplier and copy of the same shall be sent to this office. (Not applicable for Geotax store licence)

• Please submit quarterly returns of explosives in RE-7 at the end of every quarter so as to reach this office by 10th of the succeeding quarter. (Not applicable for Geotax store licence)

• All blasting operations shall be carried out by a competent person holding a valid shot firer's permit granted under above rules. However, blasting operations in mines coming under the purview of the Mines Act 1952, the blaster shall have qualifications prescribed in the regulations framed under the said Act.

Yours faithfully,

Dr. R. Venugopal

Deputy Chief Controller of Explosives

Ernakulam

Deputy Chief Controller of Explosives

Ernakulam

Copy Forwarded to:

1. District Magistrate, THIRUVANANTHAPURAM, Kerala with reference to his No: No: DCTVM-2988/2019 Dated: 26/07/2021

Deputy Chief Controller of Explosives  
 Ernakulam

(For more information regarding online fees and other details, please visit our web site <http://explosives.gov.in>)

**Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.**



भारत सरकार | Government of India

व्यापार 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

केन्द्रीय भवन, ब्लॉक सी-2, तीसरी मंजिल | Kendriya Bhavan, Block C-2, 3rd Floor

CSIR पी ओ कन्नूनाटु कोच्चि | CSIR PO Kankunadu Dist. Ernakulam Ernakulam 682037

फोन (Phone): - 2427786 फैक्स (Fax): - 2427276

संख्या (No.): E/SE/KL/22/331(E121778)

दिनांक (Date): 13/09/2021

### ज्ञापन | Memorandum

**विषय:** Survey No.117/15-1-2,117/13,117/14, ग्राम Kottukal, Neyyattinkara, जिला THIRUVANANTHAPURAM, राज्य Kerala में मैसर्स Shri RAJESH KUMAR JHA द्वारा विस्फोटक के मैगजीन में उपयोग के लिए कब्जा हेतु विस्फोटक नियम, 2008 के अंतर्गत I.E-3 में जारी अनुज्ञप्ति सं E/SE/KL/22/331(E121778) - अनुज्ञप्ति जारी करने के संदर्भ में।

**Subject:** Possession for Use of Explosives in a magazine situated at Survey No.: 117/15-1-2,117/13,117/14, Kottukal, Neyyattinkara, Dist. THIRUVANANTHAPURAM, State, Kerala of Shri RAJESH KUMAR JHA Licence No : E/SE/KL/22/331(E121778) granted in Form I.E-3 of Explosives Rules, 2008 - Issue of Licence regarding

मैसर्स Shri RAJESH KUMAR JHA, CEO, M/s.Adani Vizhinjam Port Pvt. Ltd, Floor No.2, Vipanchika Tower,Thycaud, Kottukal, Dist. THIRUVANANTHAPURAM, State, Kerala को दिनांक 31 मार्च 2026 को समाप्त समावर्ती के लिए जारी Survey No.117/15-1-2,117/13,117/14, Kottukal, Neyyattinkara, THIRUVANANTHAPURAM, Kerala स्थित मैगजीन में कब्जा हेतु विस्फोटक नियम, 2008 के नियम 107(3) के अंतर्गत आवश्यक है, तो अनुज्ञप्ति की मूल प्रति प्रेषित करें और जिला राजस्व अधिकारी, District Magistrate, THIRUVANANTHAPURAM, Kerala को सूचित करते हुए अनुज्ञप्ति सीने अनुज्ञापित करने को अनुरोध करें और अनुज्ञप्ति की एक प्रति कार्यालय रिकार्ड हेतु रखें। तथ्यादि, यदि वे अनुज्ञप्ति प्रेषित नहीं करने का निर्णय लेते हैं तो तुरंत कारण बताते हुए अनुज्ञप्ति या तीन महीने के भीतर इस कार्यालय को लौटा दें।

Two copies of Licence No.: E/SE/KL/22/331(E121778) granted to Shri RAJESH KUMAR JHA, CEO, M/s.Adani Vizhinjam Port Pvt. Ltd, Floor No.2, Vipanchika Tower,Thycaud, Kottukal, Dist. THIRUVANANTHAPURAM, State, Kerala for the period ending 31<sup>st</sup> March 2026 in Possession for Use Explosives from their magazine situated at Survey No.:117/15-1-2,117/13,117/14, Kottukal, Neyyattinkara, THIRUVANANTHAPURAM, Kerala are forwarded herewith to this office with the request that if he is satisfied that all the conditions prescribed in the Licence have been complied with, the original copy of the same may be endorsed as required under rule 107(3) of the Explosives Rules, 2008 and forwarded to the licensee directly with an intimation to the District Magistrate, THIRUVANANTHAPURAM, Kerala and this office, retaining the other copy of the licence for his office record. However, if he decides not to endorse the licence, he should immediately return the same to this office together with a statement of his reasons for not endorsing the licence, not later than three months.

(आर.वेणुगोपाल | Dr. R.Venugopal)

उप मुख्य विस्फोटक नियंत्रक | Deputy Chief Controller of Explosives

Ernakulam

Deputy Chief Controller of Explosives

संवाग | To,

इस कार्यालय

this office

प्रतिलिपि प्रेषित | Copy Forwarded to:

1. Shri RAJESH KUMAR JHA, CEO, M/s.Adani Vizhinjam Port Pvt. Ltd, Floor No.2, Vipanchika Tower,Thycaud, Kottukal - 685003, Dist. THIRUVANANTHAPURAM, State, Kerala

उनके दिनांक 10/09/2021 के आवेदन के संदर्भ में। With reference to their application dated 10/09/2021.

प्रबलक संगठन के अधिकारी द्वारा मैगजीन का निरीक्षण तथा विस्फोटक नियम, 2008 के नियम 107(3) के अंतर्गत अनुज्ञप्ति विधिवत प्रेषित नहीं हो जाती, मैगजीन उपयोग में नहीं लाया जाए। अनुज्ञप्ति के आगामी नवीकरण हेतु कृपया निम्नलिखित दस्तावेज दिनांक 31/03/2026 से पहले इस कार्यालय को भेजे जाए।

- प्रारूप आर्द-1 में विहित पूर्ण एवं हस्ताक्षरित आवेदन।
- एक से पाँच वर्ष के अनुज्ञप्ति शुल्क का, विस्फोटक नियम, 2008 के तहत ऑनलाइन आवेदन पोर्टल पर उपलब्ध ई-भुक्तान सुविधा के माध्यम से लाइसेंस शुल्क ऑनलाइन जमा किया जाना है।
- I.E-3 में मूल अनुज्ञप्ति।
- कृपया इस संबंध में विस्फोटक नियम, 2008 के नियम 112 का भी संदर्भ ग्रहण करें।

The magazine shall not be taken into use unless inspected by an officer of this organisation and licence duly endorsed under Rule 107(3) of Explosives Rules 2008. For further renewal of licence, please submit the following documents so as to reach this office on or before 31/03/2026.

- Application in Form RE-1 duly filled in and signed.
- Licence fees renewable for one to five years, to be submitted online through e-payment facility available on online application portal



under the Explosives Rules, 2008.

Original licence in Form LE-3.

In this connection, please also refer to Rule 112 of Explosives Rules 2008.

2. District Magistrate, THIRUVANANTHAPURAM, Kerala with reference to his No: DCTVM-3985/2019 Dated: 26/07/2021 अनुमोदित प्लान तथा अन्य दस्तावेजों के साथ अनुज्ञप्ति की एक प्रती आम्के कार्यालय रिकार्ड हेतु भेजी जा रही है।

A copy of licence along with approved plan and other enclosures are forwarded for his office record.

अनुरोध है कि विस्फोटक नियम, 2008 के नियम 21(2) के प्रावधानों के अनुसार कारखाना / भेगजीन साइट में तैनात सुरक्षा गार्ड : व्यवस्था का आकलन किया जाए।

He is requested to assess the security guards/arrangements provided at the factory/magazine site as required under Rule 21(2) of Explosives Rules, 2008.

3. Superintendent of Police, THIRUVANANTHAPURAM, Kerala

अनुमोदित प्लान तथा अन्य दस्तावेजों के साथ अनुज्ञप्ति की एक प्रती आम्के कार्यालय रिकार्ड हेतु भेजी जा रही है।

A copy of licence along with approved plan and other enclosures are forwarded for his office record.

एम मुख्या विस्फोटक नियंत्रक Deputy Chief Controller of Explosives  
Ernakulam

(आधिक जानकारी ले। आवेदन की स्थिति, शुल्क आदि के लिए हमारी वेबसाइट <http://peso.gov.in> देखें।)

(For more information regarding status, fees and other details please visit our website <http://peso.gov.in>.)

**Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.**

# अनुज्ञप्ति प्ररूप एल. ई.-3 | LICENCE FORM EE-3

(विस्फोटक नियम, 2008 की अनुसूची 4 के भाग 1 के अनुच्छेद 3(क) से (घ) देखिए।)

(See article 3(a) to (d) of Part 1 of Schedule IV of Explosives Rules, 2008)

(ग) उपयोग के लिए एक समय पर वर्ग 1, 2, 3, 4, 5 या वर्ग 7 के विस्फोटक या किसी मैगजीन में वर्ग 6 के विस्फोटक रखने के लिए अनुज्ञप्ति

Licence to possess : (c) for use, explosives of class 1, 2, 3, 4, 5, 6 or 7 in a magazine

अनुज्ञप्ति सं. (Licence No.) : E/SE/KL/22/331(E121778)

वार्षिक फीस रूपए (Annual Fee Rs): 2400/-

D.C.E., Ennakulam  
उ. नृ. वि. नि. मनाकुलम



1. Licence is hereby granted to

Shri RAJESH KUMAR JHA (अधिभोगी / Occupier : Shri RAJESH KUMAR JHA), CEO, M/s. Adani Vizhinjam Port Pvt. Ltd. Floor No.2, Vipanchilm Tower, Thycaud, Town/Village - Kottical, District-THIRUVANANTHAPURAM, State-Kerala, Pincode - 695003

को अनुज्ञप्ति अनुदत्त की जाती है।

2. अनुज्ञप्तिधारी की प्रास्थिति | Status of licensee : Company

3. अनुज्ञप्ति निम्नलिखित प्रयोजनों के लिए विधिमान्य है।

Licence is valid only for the following purpose.

possess for use of Nitrate Mixture, Electric Delay

Detonators, Non Electric (Nonel) detonators, - के उपयोग के लिए

4. अनुज्ञप्ति विस्फोटकों के निम्नलिखित किस्मों, प्रकार और मात्रा के लिए विधिमान्य है।

Licence is valid for the following kinds and quantity of explosives: -- (क) (a)

क्र. सं.	नाम और विवरण	वर्ग और प्रभाग	उप-प्रभाग	मात्रा किसी एक समय में
Sr. No.	Name and Description	Class & Division	Sub-division	Quantity at any one time
1.	Nitrate Mixture	2, 0	0	500 Kg.
2.	Electric Delay Detonators	6, 3	0	10000 Nos.
3.	Non Electric (Nonel) detonators	6, 3	0	10000 Nos.

(ख) किसी एक कैलेंडर मास में खरीदे जाने वाले विस्फोटक की मात्रा [अनुच्छेद 3(ख) और (ग) के अधीन अनुज्ञप्ति के लिए]

(b) Quantity of explosives to be purchased in a calendar month [applicable for licence under article 3 (b) and (c)] : 5 times as above.

5. निम्नलिखित रेखाचित्र (रेखाचित्रों) से अनुज्ञप्त परिसर की पुष्टि होती है।

रेखाचित्र क्र. (Drawing No.) E/SE/KL/22/331 : (E121778)

दिनांक (Dated) 13/09/2021

The licensed premises shall conform to the following drawing (s) :

6. अनुज्ञप्ति परिसर निम्नलिखित पते पर स्थित है। The licensed premises are situated at following address:

Survey No. 117/15-1-2, 117/13, 117/14, ग्राम (Town/Village) पोलिस थाना (Police Station) : Thiruvananthapuram

जिला (District) THIRUVANANTHAPURAM राज्य (State) Kerala पिनकोड (Pincode) 695521

दूरभाष (Phone) 7752011111 ई. मेल (E-Mail) rajesh.jha@adani.com फैक्स (Fax)

7. अनुज्ञप्ति परिसर में निम्नलिखित सुविधाएं अंतर्विष्ट हैं।

The licensed premises consist of following facilities.

Two B type magazines fabricated by M/s. Industrial Explosives Pvt.Ltd. Nagpur

8. अनुज्ञप्ति समय - समय पर यथासंशोधित विस्फोटक अधिनियम, 1884 और उनके अधीन विरचित विस्फोटक नियम, 2004 के उपबंधों, शर्तों और अतिरिक्त शर्तों और निम्नलिखित उपबंधों के अधीन रहते हुए अनुदत्त की जाती है।

The licence is granted subject to the provision of Explosives Act 1884 as amended from time to time and the Explosives Rules, 2008 framed there under and the conditions, additional conditions and the following Annexures.

1. उपर्युक्त क्रम सं. 5 में यथा कथित रेखाचित्र (स्थान, सन्निर्माण संबंधी और अन्य विवरण दर्शित करते हुए)।

Drawings (showing site, constructional and other details) as stated in serial No. 5 above.

2. अनुज्ञप्ति प्राधिकारी द्वारा हस्ताक्षरित इस अनुज्ञप्ति की शर्तों और अतिरिक्त शर्तों।

Conditions and Additional Conditions of this licence signed by the licensing authority.

3. दूरी प्ररूप DE-2 Distance Form DE-2.

9. यह अनुज्ञप्ति तारीख 31 मार्च 2026 तक विधिमान्य रहेगी। This licence shall remain valid till 31st day of March 2026.

यह अनुज्ञप्ति, अधिनियम या उसके अधीन विरचित नियमों या अनुसूची V के भाग 4 के प्रति निर्दिष्ट सेट-VII के अधीन तथा उपबंधित इस अनुज्ञप्ति की शर्तों का अधिक्रमण करने या यदि अनुज्ञप्त परिसर योजना या उससे संलग्न उपबंध में दर्शित विवरण के अनुरूप नहीं पाए जाने पर निलंबित या प्रतिसंहत की जा सकती है, जहां वह लागू हो।



This licence is liable to be suspended or revoked for any violation of the Act or Rules framed there under or the conditions of this licence as set forth under Set VIII, wherever applicable, referred to in Part 4 of Schedule V or if the licensed premises are not found conforming to the description shown in the plans and Annexure attached hereto.

तारीख | The Date - 13/09/2021

उप मुख्य विस्फोटक नियंत्रक | Dy. Chief Controller of Explosives Ernakulam

नवीनीकरण के प्रमाणिक के लिए स्थान  
Space for Endorsement of Renewal

  
उप मुख्य विस्फोटक नियंत्रक  
Deputy Chief Controller of Explosives  
एरनाकुलम Ernakulam

नवीकरण की तारीख Date of Renewal	समाप्ति की तारीख Date of Expiry	अनुज्ञापन प्राधिकारी के हस्ताक्षर और स्टाम्प Signature of licensing authority and stamp
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**कानूनी चेतावनी :** विस्फोटकों को गलत ढंग से चलाने या उनका दुरुपयोग विधि के अधीन गंभीर दांडिक अपराध होगा।  
**Statutory Warning :** Mishandling and misuse of explosives shall constitute serious criminal offence under the law.

**Note :-** This is system generated document does not require physical signature. Applicant may take printout for their records.





मैगजीन में वर्ग 1, 2, 3, 4, 5, 6, और 7 के विस्फोटकों को बिक्री या प्रयोग हेतु रखने के लिए प्रत्येक एतर्ही 3 (अनुच्छेद 3 (ख) से (ग)) में मुख्य विस्फोटक नियंत्रक या विस्फोटक नियंत्रक द्वारा प्रदान किए जाने वाले अनुमति सं. ESE/KL/22/331 (E121778) की शर्तें निम्नलिखित हैं।  
The following are the conditions of licence number ESE/KL/22/331 (E121778) to possess for sale or use, explosives of Class 1, 2, 3, 4, 5, 6 and 7 in a magazine in Form I.E-3 (articles 3(b) to (c)) granted by Chief Controller of Explosives or Controller of Explosives.

- परिस्तर में किसी भी साग विस्फोटकों की मात्रा अनुज्ञापन बोध-सामर्थ्य से अधिक नहीं होगी।  
The quantity of explosives in the premises at any one time shall not exceed the licensable capacity.
- विस्फोटकों के भंडारण के लिए प्रयुक्त होने वाली मैगजीन अनुसूची III और अनुज्ञापन के समावृद्ध में विनिर्दिष्ट सुरक्षा दूरी बनाए रखनी होगी।  
The magazine used for storage of explosives shall maintain safety distances specified in Schedule III and measure to the license.
- मैगजीन का प्रयोग उन्हीं सभी विस्फोटकों के, जो इस अनुमति में विनिर्दिष्ट हैं, रखे जाने के लिए और ऐसे रखे जाने से संबंध आधान 4 बीखर या उपकरणों के रखे जाने के लिए ही किया जाएगा; अन्यथा नहीं।  
The magazine shall be used only for keeping all explosives specified in this licence and of receptacles for, or tools or implements for work connected with the keeping of such explosives.
- पैकजों की खोलने का काम और विस्फोटकों को तोलने तथा पैक करने का कार्य मैगजीन में नहीं किया जाएगा।  
The opening of packages and the weighing and packing of explosives shall not be carried on in the magazine.
- दो या दो से अधिक वर्णन के विस्फोटकों को, जिन्हें मैगजीन में रखे जाने की अनुज्ञा दी जा सकती है, मैगजीन में तभी रखे जायेंगे जब उनमें से प्रत्येक को, ऐसे पदार्थ या स्वरूप का कोई मध्यवर्ती विभाजक लगाकर या उनके बीच ऐसा मध्यवर्ती स्थान छोड़कर, परस्पर वृत्त का दिया जाए कि किसी मूल से विस्फोटक में लगे वाली साग या होने वाला विस्फोट किसी अन्य वर्णन के विस्फोटक तक न पहुंच सके। परंतु (ग) 2 (नाइट्रेट मिश्रण), वर्ग 3 (नाइट्रो कंपाउंड) के विभिन्न विस्फोटक, वर्ग 6 प्रभाग प्रभाग के अंतर्गत आने वाले सुरक्षा पल्लो और वर्ग 6 प्रभाग 2 के अंतर्गत आने वाले विस्फोटक प्रत्येक परीक्षा, जिनमें कोई खुला लोहा या इस्पात नहीं है, एक दूसरे के साथ बिना किसी मध्यवर्ती विभाजक या स्थान के रखे जा सकते हैं।  
(घ) वर्ग 6 प्रभाग 3 के अंतर्गत आने वाले विस्फोटक प्रत्येक अलग रखे जायेंगे।  
(च) वर्ग 1 के अंतर्गत आने वाले चार्ज का अलग रखा जाएगा।  
Two or more description of explosives which may be permitted to be kept in the magazine shall be kept only if they are separated from each other by an intervening partition of such substance or character, or by such intervening space, as will effectively prevent explosion or fire in the one communicating with the other; Provided that—  
(d) the various explosives of Class 2 (nitrate-mixture), Class 3 (nitro-compound), safety fuses belonging to Class 6 Division 1 and detonating fuses belonging to Class 6 Division 2 as do not contain any exposed iron or steel, may be kept with each other without any intervening partition or space;  
(e) Detonators belonging to Class 6 Division 3 shall be kept separately.  
(f) Gun powder belonging to Class 1 shall be kept separately.
- वर्ग 3 (नाइट्रो कंपाउंड) के विस्फोटकों को, उनके विनिर्माण की तारीख से एक वर्ष बीत जाने के पश्चात् सिवाय अनुज्ञापन अधिकारी की विशेष मंजूरी के मैगजीन में नहीं रखा जाएगा।  
Explosives of Class 3 (nitro compound) shall not be kept in the magazine after the expiration of one year from the date of their manufacture except with the special sanction of licensing authority.
- वर्ग 3 (नाइट्रो कंपाउंड) के विस्फोटकों को, उनके विनिर्माण की तारीख से एक वर्ष बीत जाने के पश्चात् मैगजीन में तभी रखा जाएगा जब कि किसी विस्फोटक नियंत्रक ने इसके लिए विशेष मंजूरी दे दी हो।  
(a) जब ऐसी मंजूरी दे दी गई हो तो प्रत्येक निरीक्षण पर किसी विस्फोटक नियंत्रक से ऐसा लिखित प्रमाणपत्र अभिप्राय कर लिया जाए जिसमें दी गई मंजूरी के अंतर्गत आने वाली अवधि दर्शित की गई हो और ऐसे प्रमाणपत्र के अनुमतिधारी अपने पास रखेगा और मांग की जाने पर प्रस्तुत करेगा।  
(b) जब कोई विस्फोटक मानक शुद्धता का न रह जाने के कारण या दूषणकारण या नाइट्रो ग्लायसरीन या द्रव नाइट्रो कंपाउंड के मिश्रित होने के चिह्न प्रकट होने के कारण मैगजीन में भण्डारित किए जाने के उपयुक्त नहीं रह जाता है तो अनुमतिधारी अपने ही व्यय पर ऐसे विस्फोटक के निपटारे के लिए ऐसे निदेशों का अनुपालन करेगा जो मुख्य नियंत्रक या विस्फोटक नियंत्रक जारी करें।  
Explosives of Class 3 (nitro compound) shall not be kept in the magazine after the expiration of one year from the date of their manufacture except with the special sanction of the Controller of Explosives.  
(i) When such sanction has been given, a written certificate showing the period covered by the sanction shall be obtained from the Controller of Explosives at each inspection, and shall be kept by the licensee and produced on demand.  
(ii) When an explosive owing to its being no longer of standard purity or owing to signs of liquefaction or of mixed nitro-glycerin or liquid nitro-glycerin or liquid nitro compound is no longer fit for storage in the magazine or store house the licensee shall comply, at his own expense, with such directions as to its disposal as the Chief Controller or Controller of Explosives may issue.
- मैगजीन के भीतरी भाग या चरमों लगी देंगे, शेल्फ और उसकी फिटिंग का इस प्रकार सन्निर्माण किया जाएगा या उन्हें इस प्रकार अंतरित या अद्वितीय किया जाएगा कि विस्फोटक का किसी लोहे या इस्पात के साथ स्पर्श रोक जा सके। भीतर ही भाग में लगी देंगे, शेल्फ और फिटिंग दृढ़ साबुट से मुक्त एवं साफ रखे जायेंगे तथा ऐसे विस्फोटक, जो जल से खतरनाक रूप में प्रभावित हो सकते हैं, इस बावत सावधानी बरती जाएगी कि वहां कोई जल भीबूद न रहे। परंतु किसी लोहे या इस्पात के खुले होने के विरुद्ध सावधानी से संबंधित इस शर्त का वह भाग ऐसे किसी भवन में बांधेकर नहीं होगा जिसमें वर्ग 6 (लोहा बरकूद) के प्रभाग के विस्फोटक से भिन्न कोई विस्फोटक रखा गया है।  
The interior of the magazine and the benches, shelves and fittings therein shall be so constructed or so lined or covered as to prevent the exposure of any iron or steel contact with the explosives. Such interior, benches, shelves and fittings shall so far as is reasonably practicable, be kept free from grit and shall otherwise be clean; and in the case of any explosives liable to be dangerously affected by water, due precautions shall be taken to exclude water therefrom.  
Provided that so much of this condition as relates to precautions against the exposure of any iron or steel shall not be obligatory in a building in which no explosive other than explosive of the 1st Division 6th (Ammonium) Class is kept.
- यदि तद्विषय चालक का परीक्षण विस्फोटक नियंत्रक करता है तो अनुमतिधारी ऐसे परीक्षण के लिए विहित फीस का सदान करेगा यदि परीक्षण असमाधानकारी साबित होता है तो उसने ही फीस अनुमतिधारी द्वारा पथलती प्रत्येक परीक्षण के लिए जब तक दी जाती रहेगी जब तक कि परीक्षण अधिकारी तद्विषय चालक को समाधानप्रद घोषित नहीं कर देता।  
परंतु किसी एक परीक्षण के लिए दस फीस किसी एक दिन के दौरान किसी चालक के किए गए सभी परीक्षणों के लिए प्रभार होगा।  
परंतु यह और कि यदि दो या अधिक तद्विषय चालक एक ही मैगजीन से संबंध है तो ऐसे सभी चालकों के परीक्षण के लिए फीस ऐसी किसी भी अधिक नहीं होगी जो किसी एक तद्विषय चालक के परीक्षण के लिए हर स्थिति में विहित की गई है।  
If the lighting conductor is tested by the Controller of Explosives, the licensee shall pay the fees prescribed for test. In the event of the test proving unsatisfactory, the same fees shall be payable by the licensee for each subsequent test until the lighting conductor is



passed by the testing officer as satisfactory;

Provided that the fee payable for a single test shall be charged for all tests made on a conductor during any one day;

Provided further that where two or more lighting conductors are attached to one and the same magazine, the fee for the testing of all such conductors shall not exceed the fee prescribed in this condition for testing a single lightning conductor.

10. तपयुक्त तथा लेव रहित कार्यकरण वस्ती, अनुपयुक्त वस्ती के प्रयोग वस्तु तथा तलाशी लेकर या अगम्य अथवा ऐसे किन्हीं साधनों द्वारा इस बांधो सम्मत्क उपबंध किया जाएगा कि फैक्ट्री परिसर में अग्नि, विपराजित अथवा ऐसी कोई वस्तुएं या पदार्थ, जिससे विस्फोट हो सकता है या आग लग सकती हो, किन्तु इस शर्त के कारण ऐसी संरचना, स्थिति या व्यवस्था में किसी कृत्रिम वस्ती का प्रवेश वसित नहीं है जिससे आग लगने या विस्फोट होने का खतरा न हो।

परंतु इस शर्त का वह भाग, जो लोहे या दृढ़ता के उपकरणों को लागू होता है, ऐसे किसी भाग के संरक्षण में बाध कर नहीं होगा जिससे थोड़ा कोई विस्फोटक नहीं रखा गया है।

Due provisions shall be made, by the use of suitable working clothes without pockets, suitable shoes and by searching or otherwise or by such means, for preventing the introduction into danger area of the factory premises of fire, Lucifer matches or any substance or article likely to cause explosion or fire, but this condition shall not prevent the introduction of an artificial light of such construction, position or character as not to cause any danger of fire or explosion.

Provided that so much of this condition as applies to the exclusion of iron or steel, shall not be obligatory in a building in which no explosive other than an explosive of the 1st Division of the 5th (Ammunition) Class is kept.

11. अनुज्ञापिका प्रारूप अ. र. ई.-3 और आर. ई.-4 या आर. ई.-5, जैसी स्थिति हो, में सभी विस्फोटकों का अभिलेख और लेखा रखेगा और विस्फोटक नियम, 2008 के अधीन प्राधिकृत किसी भी अधिकारी के समक्ष उसके द्वारा देना करने की मांग की जाने पर स्टॉक पुस्तक और अभिलेख प्रस्तुत करेगा। स्टॉक पुस्तक विहित प्रारूपों में पूरा संख्यांकित होगी।

The licensee shall keep records and accounts of all explosives in Forms RE-3 and RE-4 or RE-5, as the case may be, and exhibit the stock books and records to any of the officers authorised under the Explosives Rules, 2008 whenever such officer may call upon him to do so. The stock books in the prescribed form shall be page numbered.

12. परिसरों में कोई परिवर्तन या तबदीली अनुज्ञापन प्राधिकारी के पूर्वानुमति बिना नहीं की जाएगी और अनुज्ञापिका ऐसी किसी शर्त का अनुपालन करेगा जो इस निमित्त अनुज्ञापन प्राधिकारी विनियुक्त करे।

No changes or alterations shall be carried out to the premises without prior approval of the licensing authority and the licensee shall comply with any condition that may be specified by the licensing authority in this behalf.

13. मैगजीन सभी समयों पर अच्छी मरमात की स्थिति में बनाई रखी जाएगी (या अच्छी हालत में बनाई रखी जाएगी) यदि किसी कारणवश किसी विस्फोटक के भण्डारण के लिए मैगजीन अनुपयुक्त हो जाती है तो अनुज्ञापिका इस बात की सूचना अनुज्ञापन प्राधिकारी को तुरंत देगा।

Magazine shall at all times be kept in state of good repair (or maintained in good condition). The licensee shall report to licensing authority forthwith, if the magazine becomes unfit for storage of any explosives for any reason whatsoever.

मैगजीन का अनुज्ञापिका इन नियमों के नियम 24 के उप-नियम 3 के अनुसार त्रैमासिक विवरण प्रस्तुत करेगा।

The licensee of the magazine shall submit quarterly returns as per sub-rules (3) and (4) of rule 24 of these rules.

14. यदि सुरक्षा दूरी का कोई अधिकमन होता है तो उसकी सूचना अनुज्ञापन प्राधिकारी को आवश्यक सलाह और कार्यवाही के लिए तुरंत दी जाएगी।

Any encroachment of the safety distance shall be immediately communicated to the licensing authority for necessary advice and action.

15. यदि कोई विस्फोटक गिनह हुआ अथवा अनुपयोगी जाया जाता है तो उसकी सूचना अनुज्ञापन प्राधिकारी को, सशह प्राप्त करने के लिए, तुरंत दी जाएगी।

The licensing authority shall be immediately informed for advice if any explosive is found deteriorated or unserviceable.

16. विस्फोटकों के पैकेटों के बड़े इस प्रकार लगाए जाएंगे कि कम से कम एक व्यक्ति भण्डार किए गए सभी पैकेटों की हालत की जांच करने और प्रत्येक पैकेट की विनिर्दिष्ट विशेषताओं की पढ़ने के लिए उनके बीच से होकर आ जा सके।

The explosive packages shall be stacked in such a way as to allow movement of at least one person to check the condition of all packages stored and to read the manufacture particulars of each package.

सहित चालकों की भूमि के लिए प्रतिरोध चक्रसंभव न्यूनतम होगा और किसी भी दशा में 10 सेंटीमीटर से अधिक नहीं होगा।

The resistance of the lightning conductor to earth shall be as low as possible and in no case be more than 10 ohms.

17. मैगजीन के चारों ओर 15 मीटर की दूरी के अंतर्गत कोई खुल बरस या झड़ी या जलनशील सामग्री नहीं रहने दी जाएगी।

A distance of 15 meters surrounding the magazine or store house shall be kept clear of dried grass or brush or flammable materials.

18. विस्फोटकों के प्रत्येक पैकेट की, जब उसी मैगजीन के भीतर रखा जा रहा हो, ठीक दशा जानने के लिए परीक्षा की जाएगी।

Every package of explosive at the time of bringing inside the magazine shall be examined for its sound condition.

19. किसी मैगजीन भंडारण में किसी एक समय में चार व्यक्तियों से अधिक को नहीं रहने दिया जाएगा।

Not more than 4 persons shall be allowed inside the magazine or store house at any one time.

20. विस्फोटकों के खाली पैकेटों को शीघ्रतः शीघ्र वहां से हटा दिया जाएगा और नष्ट कर दिया जाएगा।

Empty packages of the explosives shall be removed at the earliest and destroyed.

21. अनुज्ञापिका और कर्मचारी को परिसर के भीतर आवागमन के दौरान की जाने वाली प्रक्रियाओं से अवगत होना चाहिए।

The licensee and the employee shall be conversant with procedure to be taken during the emergency within the premises.

22. निरीक्षण या नमूना अधिकारी को सभी युक्तियुक्त सामग्री पर अनुज्ञापन परिसर में अवग्रह रूप से पहुंचने दिया जाएगा और यह सुनिश्चित करने के लिए कि अधिनियम और इन नियमों के उद्देश्यों और सुरक्षा स्थितियों को सम्मत्तः अनुपालन किया जा रहा है, अधिकारी को प्रत्येक सुनिश्चिता प्रदान की जाएगी।

Free access to the licensed premises shall be given at all reasonable times to any inspecting or sampling officer and every facility shall be afforded to the officer for ascertaining that the provisions of the Act and these rules and the safety conditions are duly observed.

23. यदि अनुज्ञापन प्राधिकारी या विस्फोटक निष्पन्न अनुज्ञापिका को अनुज्ञापन परिसरों या मशीनरी, टूल या उपकरण में ऐसी कोई मरनात या परिवर्तन या परिवर्तन करने या सिफारिशों को लागू करने को शिष्टित रूप में सूचित करता है जो परिसर के अंदर या बाहर या व्यक्तियों की सुरक्षा के लिए आवश्यक है, अनुज्ञापिका सिफारिशों को निष्पदित करेगा और विनिर्दिष्ट अवधि के भीतर अनुपालन रिपोर्ट ऐसे प्राधिकारी को देगा।

If the licensing authority or a Controller of Explosives informs in writing, the holder of the licence to execute any repairs or to make any additions or alterations to the licensed premises or machinery, tools or apparatus or carry out recommendations, which are in the opinion of such authority may pose unacceptable risk and so necessary for the safety of either on-site or off-site of the premises or persons, the holder of the licence shall execute the recommendations and report compliance within the period specified by such authority.

24. अनुज्ञापिका मैगजीन में रहने और बिक्री के लिए प्राधिकृत विस्फोटक सूची में उल्लिखित अनुज्ञापन फैक्ट्री या कंपनी से प्राधिकृत विस्फोटक आतिशबाजी या सुरक्षा पदार्थ खरीदेगा।

The licensee shall purchase authorised explosives, fireworks or safety fire as mentioned in the list authorised explosives from a licensed factory or company for possession and sale from the magazine.

25. निम्न से अधिक शर्तों के स्तर प्रदर्शित करने वाले आतिशबाजियों पटाखों की बिक्री और रखने के लिए -

(क) जो फटने की जगह से चार मीटर की दूरी पर है, 125 सी.बी. (ए.) या 145 डी.बी. (सी.) के, प्रतिबंधित होंगे;

(ख) शृंखला (जुड़े हुए पटाखे) को गठन करने वाले व्यक्तिगत पटाखों के लिए उपर्युक्त उल्लिखित सीमा 5 लॉग 10 (एन) डी.बी. (सी.) के प्रतिबंधित होंगे।

The possession and sale of fire-crackers constituting outer level exceeding

a) 125 dB(A) or 145 dB(C) at 4 metres distance from the point of burning shall be prohibited;

b) For individual fire-cracker constituting the series (joined fire-crackers), the above mentioned limit be reduced by  $5 \log_{10} (N)$  dB, where N = number of crackers joined together.

26. ताल या विस्फोट द्वारा दुर्घटना या नुकसान पटाखों की कमी या नोचों, हर्षत पत्रों के पुलिस थाने और अनुज्ञापन अधिकारी और अनुज्ञापन अधिकारी के स्थानीय कार्यालय को रिपोर्ट की जाएगी।

Accidents by fire or explosion and losses, shortage or theft of explosives shall be immediately reported in the nearest police station and the licensing authority and local office of the licensing authority.

#### अतिरिक्त शर्तें / Additional Conditions :

1. अनुज्ञापनकारी विदेशी मूल के आतिशबाजी को ना प्रदर्शित करेगा, ना रखेगा और ना ही उसकी बिक्री करेगा। The licensee shall not exhibit, possess and sell fireworks of foreign origin.

प्रमुख, विस्फोटक नियंत्रण  
For Dy. Chief Controller of Explosives  
एरणकुलम | Ernakulam

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प्रमुख, विस्फोटक नियंत्रण  
Dy. Chief Controller of Explosives  
एरणकुलम | Ernakulam



**Form DE-3**  
(See rule 113 of the Explosives Rules, 2008)  
(Distance Permit to be obtained by the licensee)

Safety distances required to be kept clear around magazine for high explosives or fire works or factory license number E/SE/KL/32/331(E171778) in form DE-3 granted to Shri RAJESH KUTTYVAR IHA, CEO, M/s.Adani Vizhinjam Port Pvt. Ltd. Floor No.2, Vipanchika Tower,Thyiruvananthapuram, Kerala-695521.

Type of Structure(s)		Safety distance in meters	
<b>Inside Safety Distances(ISD)</b>		<b>M</b>	<b>1/3 M</b>
1	Room or Workshop used in Connection with the Magazine	19	25
2	Any other Explosives Magazine or store House or Factory of the Applicant		
3	Magazine Office		
<b>Middle Safety Distances(MSD)</b>			
4	Magazine Keeper's or Chowkidar's Dwelling house		
5	Roadway including Municipal and Private Highways		
6	Canal (in canal use) or other navigable water		
7	Dock or Pier or Jetty		
8	Public Highway or Public Road		30
9	Private Road which is PRINCIPAL means of access to a Temple, Mosque, Church, Gurudwara or other places of worship, Hospital, College, School or Factory		
10	River Embankment or Sea Embankment or Public Well		
11	Reservoir or bounded watercourse		
12	Windmill or Solar panel for Power Generation		
<b>Outside Safety Distances(OSD)</b>			
13	Dwelling House		
14	Govt. and Public Building		
15	Temple, Mosque, Church or Gurudwara or other Places of Worship		
16	Shops, Market place, Public recreation and Sports Ground, College, School, Hospital, Theatre, 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, Spill, gas, or other inflammable or hazardous substances		
19	Building or Works used for Storage and Manufacture of Explosives or of articles which contain Explosives		95
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 Potentially works		
<b>Overhead Electric lines</b>			
27	Electric Power over head Transmission Lines above 110KV		90
28	Electric Power over head Transmission Lines upto 110KV		15

The Date: 13/06/2021

  
For Dy- Chief Controller of Explosives  
Tamil Nadu

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Digitally signed by Dy- Chief Controller of Explosives  
Tamil Nadu



GOVERNMENT OF INDIA  
MINISTRY OF COMMERCE & INDUSTRY  
PETROLEUM AND EXPLOSIVES SAFETY ORGANISATION (PENSO)  
(Formerly Department of Explosives)  
Kendriya Bhawan, Block C-2, 3rd Floor  
CSEZ, PO Kankulam Dist. Ernakulam - 682037  
Tele: 2427286 Fax: 2427276  
Email: dycc@erakulam.explosives.gov.in

No: E/SE/KL/25/99(E135886)

Dated: 22/09/2021

To,  
AGS ALANKKUDAM PORT PVT LTD.,  
3rd Floor, Arpinwall House, Kankulamam, Thiruvananthapuram  
Terni Village - Thiruvananthapuram  
Dist. THIRUVANANTHAPURAM State, Kerala, Pincode-695017

Subject: Road Van for the carriage of Explosives - Registration No KL01CP2414 Licence No: E/SE/KL/25/99(E135886) granted in Form LE-7 under Explosives Rules, 2008 - Endorsement regarding -Renewment of Licence.

Sir(s),

Reference memo No: E/SE/KL/25/99(E135886) Dated 22/09/2021 from Dy. Chief Controller of Explosives, Ernakulam and inspection of the subject premises by an officer of this organisation on 03/09/2021.

The subject licence No: E/SE/KL/25/99(E135886) valid upto 31 st March 2026 duly endorsed is forwarded herewith.

For further renewal of licence, please submit following documents so as to reach this office on or before 31/03/2026:-

- Application in Form RE-1 duly filled in and signed;
- Licence fees renewable for use to five years, to be submitted online through e-payment facility available on online application portal under the Explosives Rules, 2008.
- Original licence with approved plan
- In this connection, please also refer to Rule 112 of Explosives Rules, 2008.

Please follow following instructions strictly:

1. The records of explosives transported by the licensed Roadvan shall be maintained in the proforma RE-6 under Part 5 of schedule V of Explosives Rules 2008.
2. Please ensure that persons whose antecedents verified by the local Police shall only be employed with the licensed explosive roadvan/compressor mounted truck as drivers or assistants. List of such drivers and assistants along with the personal particulars shall be made available to the local police in advance. The re-verification of such staff shall also be made at least once in a year in compliance to Rule 61(3) of Explosives Rules 2008.
3. Please note that during transportation of explosives, the Roadvan shall always be attended to by two armed guards. If the consignment of explosives is likely to pass through sensitive area notified by Ministry of Home Affairs, it should be escorted by armed Police escort / guard provided by District Police Administration as required in Rule 47(7) of Explosives Rules 2008.

Yours faithfully,

(Dr. R.V. Sengopal)  
Deputy Chief Controller of Explosives  
Ernakulam

Copy Forwarded to:

1. District Magistrate, THIRUVANANTHAPURAM, Kerala with reference to his No: E/NT/TV M/NA/1(N/6) Dated: 24/07/2021.

Deputy Chief Controller of Explosives  
Ernakulam

(The main file is to be retained in the file and other copies, please send me via email to dycc@erakulam.explosives.gov.in)

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**GOVERNMENT OF INDIA**  
**MINISTRY OF COMMERCE & INDUSTRY**  
**PETROLEUM AND EXPLOSIVES SAFETY ORGANISATION (PESO)**  
*(Formerly Department of Explosives)*  
 Kendriya Bhavan, Block C-2, 3rd Floor  
 CSFZ PO Kakkanaad Dist. Ernakulam Ernakulam 682037  
 Tele: 2427286 Fax: 2427276

No. E/SE/KL/25/99(E135886)

Dated: 22/09/2021

**MEMORANDUM**

**Subject: Road Van for the carriage of Explosives - Registration No KL01CP2414 of MSADANI VIZHINJAM PORT PVT LTD., 3rd Floor, Aspinwall House, Kuruvashanor, Thiruvananthapuram, Dist. THIRUVANANTHAPURAM, State, Kerala - Grant of Licence.**

Two copies of Licence No. E/SE/KL/25/99(E135886) granted to MSADANI VIZHINJAM PORT PVT LTD., Survey No. 117/15-1, 117/15-2, 117/14, 117/13, Kottur Veli, THIRUVANANTHAPURAM, Kerala for the period ending 31st March 31/03/2023 to transport Explosives by Road Van between SE NO. 117/15-1, 117/15-2, 117/14, 117/13, KOTTUR Veli, NEELAKKARA (TK), THIRUVANANTHAPURAM DT. TO KADAMILLAI STONE QUARRY AT ST NO. 355/2, NEELAKKARA are forwarded herewith to this office, with the request that if he is satisfied that all the conditions prescribed in the licence have been complied with, the original copy of the same be endorsed and forwarded to the licensee directly with an intimation to the District Magistrate, THIRUVANANTHAPURAM, Kerala and this office, retaining the other copy of the licence for his office record. If, however, he decides not to endorse the licence he shall immediately return the same to this office together with a statement of his reasons for not endorsing the licence, not later than three months.

(Dr. R. Venugopal)  
 Deputy Chief Controller of Explosives

To,  
 this office

Copy Forwarded to:

1. MSADANI VIZHINJAM PORT PVT LTD., 3rd Floor, Aspinwall House, Kuruvashanor, Thiruvananthapuram, Dist. THIRUVANANTHAPURAM, State, Kerala - 695003 with reference to their application dated 22/09/2021.  
 The vehicle shall not be taken into use unless inspected by an officer and licensee duly endorsed under Rule 107(1) of Explosives Rules 2008.

The records of explosives transported by the licensed Roadvan shall be maintained in the perfoms RP-5 under Part B of schedule V of Explosives Rules 2008.

Please ensure that persons who are antecedents verified by the local Police only shall be employed with the licensed explosives roadvan/transporter/mounted truck as drivers or cleaners. List of such drivers and cleaners along with the personal particulars shall be made available to the local police on demand. The re-verification of such staff shall also be made at least once in a year in compliance to Rule 65 (3) of Explosives Rules 2008.

For further renewal please submit the following documents to us in reach this office on or before 31/03/2026.

- a. Application in RS-1 duly filled in and signed.
- a. License fees renewable for one in five years, to be submitted online through e-payment facility available on online application portal under the Explosives Rules, 2008.
- a. Original licence with approved plan.
- a. In this connection, please also refer to Rule 117 of Explosives Rules 2008.

2. Superintendent of Police, THIRUVANANTHAPURAM, Kerala  
 A copy of Licence along with approved plan is enclosed for his office report.

Deputy Chief Controller of Explosives  
 Ernakulam

(For more information regarding rules, fees and other details, please visit our web site <http://peso.gov.in>)

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अनुज्ञापि प्रारूप एलई-7 | LICENCE FORM LE-7  
(विस्फोटक नियम 2008 की अनुसूची 4 के भाग 1 का अनुच्छेद 7 देखें)  
(See article no 7 of Part 1 of Schedule IV of Explosives Rules, 2008)

अनुज्ञापि : सड़क वैन में विस्फोटकों के परिवहन के लिए  
Licence to : transport explosives in a road van

अनुज्ञापि संख्या / Licence No.: E/NR/KC/25/99(E135886)  
वार्षिक वार्षिक शुल्क / Annual Fee Rs.: 2500/-

अनुज्ञापि प्रमाणित  
LICENCE ENDORSED

D G C E. Emakulam  
2. मु. वि. प्र. एम.कुलम



- अनुज्ञापि एतद्वारा जारी की जाती है  
Licence is hereby granted to: **M/s. ADANI VIZHINJAM PORT PVT LTD., (Occupier : Rajesh Kumar Jha)**  
3rd Floor, Aspinwall House, Kuruvankunam, Thiruvananthapuram,  
District-THIRUVANANTHAPURAM, State-Kerala, Pincode-695003.
- अनुज्ञापिधारी की प्रकृति / Status of licensee : Company
- सड़क वैन की विशेषताएँ / Particulars of the road van:

पंजीकरण संख्या / Registration No	KL01CF2414
वाहन का मेक एवं मॉडल / Make and model of vehicle	TATA 5PC 407 EX/31 HT BS IV
लदान सहित वजन / Lifting weight	2950 Kgs)
लदान सहित अधिकतम वजन / Maximum laden weight	6250 Kgs)
परिवहन के लिए अनुज्ञापि विस्फोटकों की अधिकतम मात्रा Maximum quantity of explosives permitted for transport	3300 Kgs)
इंजन संख्या / Engine No.	45PCR1HEPY621445
चैसिस संख्या / Chassis No.	MAT505243KSE10649
अन्य फिटिंग्स का विवरण / Description of Other Fittings	
वाहन के लिए अनुमति विस्फोटकों की मात्रा / Quantity of Explosives permitted to carry	3300 Kgs)

- अनुज्ञापि परिसर निम्नलिखित आरेख (आरेखों) के अनुरूप होना चाहिए / The licensed premises shall conform to the following drawing(s):  
आरेख संख्या / Drawing No.: E/SE/KC/25/99(E135886) दिनांक / dated : 22/09/2021
- समय समय पर यथा संशोधित विस्फोटक अधिनियम, 1884 और उसके अधीन बनाए गए विस्फोटक नियम, 2008 के उपबन्धों और शर्तों एवं निम्नलिखित अनुज्ञापि के अधीन अनुज्ञापि प्रदान की जाती है।  
The licence is granted subject to the provision of Explosives Act 1884 as amended from time to time and the Explosives Rules, 2008 framed thereunder and the conditions and the following annexures—  
(क) उपर्युक्त क्रम संख्या 4 में प्रमाणित सड़क वैन का आरेखण / (a) Drawings of the road van as stated in serial no.4 above.  
(ख) अनुज्ञापि प्राधिकारी द्वारा हस्ताक्षरित शर्तें / (b) Conditions signed by the licensing authority.
- यह अनुज्ञापि तारीख 31 मार्च 2026 तक वैध रहेगी / This licence shall remain valid till 31st day of March 2026

यह अनुज्ञापि, अधिनियम या उसके अधीन विहित नियमों या इस अनुज्ञापि की शर्तों के उल्लंघन, अनुसूची 5 के भाग 1 में संदर्भित, जहाँ भी लागू हो, या यदि अनुज्ञापि परिसर आरेखण या उससे संलग्न उपबन्धों में दर्शाए गए विवरण के अनुरूप नहीं पाए जाने पर निलंबित या प्रतिबंधित की जा सकती है।

This licence is liable to be suspended or revoked for any violation of the Act or rules framed there under or the conditions of this licence as set forth under Conditions, wherever applicable, referred to in Part 4 of Schedule V or if the licensed premises are not found conforming to the description shown in the plans and annexure attached hereto.

दिनांक / Date: 22/09/2021

उप मुख्य विस्फोटक नियंत्रक (Dy. Chief Controller of Explosives)  
एम.कुलम / Emakulam

अनुज्ञापि के नवीनीकरण हेतु प्रमाण / Endorsement for renewal of licence:

नवीनीकरण की तिथि  
Date of Renewal

वैधता समाप्ति की तिथि  
Date of Expiry

अनुज्ञापि प्राधिकारी का हस्ताक्षर  
Signature of licensing authority

Deputy Chief Controller of Explosives

वैधानिक चेतावनी : विस्फोटकों का जापरवाही से प्रयोग या दुरुपयोग, विधि के अधीन गंभीर दण्डित अपराध होगा।

Statutory Warning : Mishandling and misuse of explosives shall constitute serious criminal offence under the law.

**Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.**



सड़क वैन में विस्फोटकों के परिवहन के लिए प्रारूप एन.ई.-7 में विस्फोटक नियंत्रक द्वारा प्रदान किए जानेवाले अनुज्ञापि संख्या F/SF/KL/25/99(E135886) की शर्तें निम्नलिखित हैं।

The following are the conditions of licence number F/SF/KL/25/99(E135886) to transport explosives in a road van in Form LE-7 granted by Controller of Explosives.

1. यह अनुज्ञापि किसी अन्य सड़क वैन को अंतरणीय नहीं है।  
This licence is not transferable to any other explosives van.
2. मान, उसकी बाँटी और अन्य हिस्सों में कोई भी परिवर्तन, अनुज्ञापन प्राधिकारी के अनुमोदन के बिना नहीं किया जाना चाहिए।  
No alterations should be made to the vehicle, its body and other fittings without approval from the licensing authority.
3. यह अनुज्ञापि या उसकी प्रमाणित प्रतियाँ हमेशा वैन में रखी जाएँगी एवं निरीक्षण अधिकारी के मांगे जाने पर उन्हें प्रस्तुत किया जाएगा।  
This licence or its authenticated copy shall at all times be kept in the van and produced on demand by an inspecting officer.
4. सड़क वैन का, विस्फोटकों के परिवहन के लिए जब तक प्रयोग नहीं किया जाएगा जब तक कि वह ठीक हालत में नहीं है और विस्फोटक नियम 2008 का अनुपालन नहीं करता है।  
The road van shall not be used for transport of explosives unless it is in a fit condition and complies with the Explosives Rules, 2008.
5. सड़क वैन का प्रयोग, इस अनुज्ञापि द्वारा प्राधिकृत लोगों से भिन्न किसी सामान्यी के लिए तक तब नहीं किया जाएगा जब तक कि अनुज्ञापन प्राधिकारी द्वारा इसकी लिखित अनुमति न दी गई हो।  
The road van shall not be used for transport of any material other than that authorised by this licence, unless permitted by licensing authority in writing.
6. सड़क वैन में धूम्रपान नहीं किया जाएगा न उसमें जलियाँ या कुर्चों पर प्रज्वलित या कोई ऐसे वस्तु जिससे आग लग सकती हो, की अनुमति दी जाएगी।  
No smoking and no fire or artificial light or any article capable of sparking fire shall be allowed on the explosives van.
7. वैन का प्रयोग यात्रियों के वहन के लिए नहीं किया जाएगा।  
The vehicle shall not be used for carrying passenger.
8. जिस समय सड़क वैन पर विस्फोटकों की लोडिंग या उन्लोडिंग या परिवहन किया जा रहा हो, उस समय सड़क वैन ऐसे किसी महान व्यक्ति के अन्तर्गत होनी चाहिए जिसके विस्फोटकों की धरा-उतार करने का अनुमति है और उनसे पूर्णतः परिचित है। जहाँ प्राप्त अनुज्ञापिधारी द्वारा न बताया जा रहा हो वहाँ एक ऐसा दस्तावेज, जिस पर अनुज्ञापिधारी के हस्ताक्षर हों और उन व्यक्तियों का नाम दर्ज हो जिन्हें वैन को लोडिंग के लिए प्राधिकृत किया गया हो, वैन के साथ ले जाया जाएगा और किसी निरीक्षण अधिकारी द्वारा मांगे जाने पर उसे प्रेषित किया जाएगा।  
Road van, while explosives are being loaded or unloaded or transported, shall always be under the charge of competent person who shall be experienced in handling of explosives and fully conversant therewith. Where the vehicle is not driven by the licence holder, a document signed by the licensee naming persons authorised to drive and accompany the vehicle shall be carried in the van and produced on demand to an inspecting officer.
9. सड़क वैन में किसी भी विस्फोटक का परिवहन तब तक नहीं किया जाएगा जब तक कि वे विस्फोटक नियमों के अनुसार या मुख्य विस्फोटक नियंत्रक द्वारा निर्दिष्ट रीति में पैक न कर दिए गए हों।  
No explosives unless they are packed in accordance with the Explosives Rules or in a manner specified by the Chief Controller shall be transported in the explosives van.
10. किसी अन्य विस्फोटकों के साथ विस्फोटकों का परिवहन नहीं किया जाएगा।  
Explosives shall not be transported with any other explosives.
11. यदि सड़क वैन में कोई दूर दूर तक हो जाती है या उसमें आग लग जाती है या विस्फोट हो जाता है अथवा सड़क वैन अपने किसी से अवर्धित हो जाती है तो ऐसी दूर दूर तक, दुर्घटना, अग्नि या विस्फोट की दूरी रिपोर्ट के साथ इस वैन की जानकारी अनुज्ञापन प्राधिकारी को तुरन्त दी जाएगी। यदि ऐसी दुर्घटना, अग्नि या विस्फोट में किसी व्यक्ति की मृत्यु हो जाती है या किसी व्यक्ति या सम्पत्ति का नशीब भविष्य की मृत्यु हो तो उसकी रिपोर्ट निकटतम पुलिस स्टेशन को तुरन्त दी जाएगी।  
Any breakdown, accident, fire or explosion occurring in or involving the van, shall be immediately reported to the licensing authority together with a full report of such breakdown, accident, fire or explosion. If such accident, fire or explosion is attended with loss of human life or serious injury to person or property, a report shall also be made immediately to the nearest Police Station.
12. विस्फोटकों को वैन में लोडिंग के अनुज्ञापन परिसर में ही लोड किया जाएगा और उन्लोडिंग के अनुज्ञापन परिसर पर ही वैन से उतारा जाएगा।  
The explosives shall be loaded into the van only at the licensed premises of consignor and unloaded from the van at the licensed premises of the consignee.
13. अनुज्ञापिधारी, परिवहन किए जाने वाले विस्फोटकों का लेखाजोखा प्रारूप एन.ई.-6 में रखेगा और निरीक्षण अधिकारी द्वारा मांगे जाने पर प्रस्तुत करेगा।  
The licensee shall maintain account of explosives transported in Form RE-6 and present the same on demand by an inspecting officer.
14. अनुज्ञापिधारी और कम्पानी परिसर के भीतर आपात के दौरान की जाने वाली प्रक्रिया से अवगत होंगे।  
The licensee and the company shall be conversant with procedure to be taken during the emergency within the premises.
15. किसी निरीक्षण करने या तन्नाम लेने वाले अधिकारी को सभी सुविधाएँ सम्पूर्ण पर अनुज्ञापन परिसर में अथवा पहुँच प्रदान की जाएगी और यह अभिनिश्चित करने के लिए कि अभिनिश्चित और इन नियमों के उपबन्धों तक सुरक्षा सम्बन्धी शर्तों का सम्पूर्ण रूप से पालन किया जाता है, उस अधिकारी को प्रत्येक सुविधा उपलब्ध कराई जाएगी।  
Free access shall be given at all reasonable times to any inspecting or sampling officer and every facility shall be afforded to the officer to ascertain that the provisions of the Act or these rules and these conditions are duly observed.
16. यदि अनुज्ञापन प्राधिकारी या विस्फोटक नियंत्रक लिखित में अनुज्ञापिधारी को ऐसी संस्तुतियों को क्रियान्वित करने के लिए, जो ऐसे प्राधिकारी को तब से असाध्य के लिए उत्पन्न कर सकता है और स्थल पर मास्थित से बाहर व्यक्तियों की सुरक्षा के लिए आवश्यक है, सुविधा करता है तो अनुज्ञापिधारी उन संस्तुतियों को पेश/प्रस्तुत करेगा और ऐसे प्राधिकारी द्वारा निर्दिष्ट अवधि के भीतर अनुज्ञापन को रिपोर्ट देगा।  
If the licensing authority or a Controller of Explosives informs in writing, the holder of the licence to carry out recommendations, which are in the opinion of such authority may pose unacceptable risk and so necessary for the safety of either on-site or off-site persons, the holder of the licence shall execute the recommendations and report compliance within the period specified by such authority.
17. अग्नि या विस्फोटक के कारण होने वाली दुर्घटना और विस्फोटकों की हानि, कमी या चोरी के बारे में निकटतम पुलिस स्टेशन और अनुज्ञापन प्राधिकारी तथा अनुज्ञापन प्राधिकारी के स्थानीय कार्यालय को तुरन्त रिपोर्ट दी जाएगी।  
Accidents by fire or explosion and losses, shortage or theft of explosives shall be immediately reported to the nearest police station and the licensing authority and local office of the licensing authority.

यहाँ उप मुख्य विस्फोटक नियंत्रक  
For Dy. Chief Controller of Explosives  
एरमाकुलम | Ernakulam

**Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.**



GOVERNMENT OF INDIA  
MINISTRY OF COMMERCE & INDUSTRY  
PETROLEUM AND EXPLOSIVES SAFETY ORGANISATION (PESO)  
(Formerly Department of Explosives)  
Kandiyu Block, Block C-2, 3rd Floor  
CSCT PO Kakkandil, Ernakulam Ernakulam 682037  
Tale: 2427286 Fax: 2427274  
Email: dyc@ernakulam.explosives.gov.in

No E/SK/KL/25/98(E135883)

Dated: 22/09/2021

To:  
M/S. ADANI TRANSPORT PVT LTD.,  
3rd Floor, Azhivall House, Kuravankulam, Thiruvananthapuram  
Poonkolli - Thiruvananthapuram  
Dist. THIRUVANANTHAPURAM, State, Kerala, Pincode-695003

Subject: Road Van for the carriage of Explosives - Registration No KL01CP2472 Licence No: E/SK/KL/25/98(E135883) granted in Form (A)-7 under Explosives Rules, 2008 - Endorsement regarding - Endorsement of Licence.

Sirs,

Reference memo No: E/SK/KL/25/98(E135883) Dated 22/09/2021 from Dy. Chief Controller of Explosives, Ernakulam and inspection of the subject premises by an officer of this organisation on 05/09/2021.

The subject licence No. E/SK/KL/25/98(E135883) valid upto 31st March 2026 duly endorsed is forwarded herewith.

For further renewal of licence, please submit following documents to us in reach this office come before 31/03/2026:

- Application in Form RE-7 duly filled in and signed.
- Licence fee renewable for up to five years, to be submitted online through e-payment facility available on online application portal under the Explosives Rules, 2008.
- Original licence with approved van.
- In this connection, please also refer to Rule 112 of Explosives Rules, 2008.

Please follow following instructions strictly:

- The records of explosives transported by the licensed Roadvan shall be maintained in the penforms RE-8 under Part 5 of schedule V of Explosives Rules 2008.
- Please ensure that persons whose antecedents verified by the local Police shall only be employed with the licensed explosives roadvan/compressor mounted truck as drivers or cleaners. List of such drivers and cleaners alongwith the personal particulars shall be made available to the local police in advance. The re-verification of such staff shall also be made at least once in a year in compliance to Rule 61(5) of Explosives Rules 2008.
- Please note that during transportation of explosives, the Roadvan shall always be attended to by two armed guards. If the transportation of explosives is likely to pass through sensitive areas notified by Ministry of Home Affairs, it should be escorted by armed Police escort - guard provided by District Police Administration as required in Rule 67(7) of Explosives Rules 2008.

Yours faithfully,

(Dr. R. Venagopal)  
Deputy Chief Controller of Explosives  
Ernakulam

Deputy Chief Controller of Explosives  
Ernakulam

Copy Forwarded to:

- District Magistrate, THIRUVANANTHAPURAM, Kerala with reference to his Not No: E-KL/TVM/NA/1(NR) Dated: 26/07/2021.

Deputy Chief Controller of Explosives  
Ernakulam

(For more information regarding such Transport document please refer to website of Explosives.gov.in)

**Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.**



**Annexure 4: SEIAA letter No.  
1200/EC2/2018/SEIAA dated  
31.08.2021**

31/08/21

## **State Environment Impact Assessment Authority (SEIAA) Kerala**

**KSRTC Bus Terminal, 4th floor, Thampanoor, Thiruvananthapuram - 695 001**

**Ph: +91471-2334262 (Off) +91471-2334265 (Fax)**

**e-mail: [seacseiaakerala@gmail.com](mailto:seacseiaakerala@gmail.com)**

**web: [www.seiaakerala.org](http://www.seiaakerala.org)**

**No. 1200/EC2/2018/SEIAA**

**Date: 31.08.2021**

**From**

The Administrator  
State Environment Impact Assessment Authority  
Thiruvananthapuram

**To**

1. Shri.K.Krishna Panicker, Expert Member, SEAC  
Athira, KRWA 113  
Kavalloor Lane, Vattiyoorkavu, Thiruvananthapuram – 695 013
2. The District Geologist, Thiruvananthapuram
3. Mr.Palanivelu Kumar, M/s Adani Vizhinjam Port Pvt.Ltd,  
2<sup>nd</sup> Floor, Vipanchika Tower,  
Thycaud, Thiruvananthapuram- 695014
4. Mr.Rajesh Jha, CEO, M/s Adani Vizhinjam Port Pvt.Ltd,  
2<sup>nd</sup> Floor, Vipanchika Tower,  
Thycaud, Thiruvananthapuram- 695014

**Sir,**

**Sub:-SEIAA –Monitoring functioning of quarry of M/s Adani Vizhinjam Port Pvt Ltd-  
Field inspection intimation- reg.**

**Ref:1, Decision of 105<sup>th</sup> SEIAA meeting**

**2. Order No. 1200/EC2/2018/SEIAA dated 31.03.2021**

Vide references above, a Monitoring Team was constituted, under the leadership of Shri.K.Krishna Panicker, Expert Member, SEAC for monitoring functioning of quarry of

M/s Adani Vizhinjam Port Pvt Ltd will be conducting the inspection on 2<sup>nd</sup> September 2021 at 11 am. The project proponent is requested to be present during the inspection and provide necessary logistic support for the same.

Yours faithfully,

Sd/-

ANIL P. ANTONY  
Administrator, SEIAA

Approved for issue



Section officer



**Annexure 5: Minutes of Meeting of  
112<sup>th</sup> SEIAA**

**MINUTES OF THE 112<sup>th</sup> MEETING OF THE STATE LEVEL  
ENVIRONMENT IMPACT ASSESSMENT AUTHORITY (SEIAA)  
KERALA, HELD ON 14<sup>th</sup>, 15<sup>th</sup> & 16<sup>th</sup> September 2021 THROUGH VIDEO  
CONFERENCING.**

**Present:**

- 1. Dr.H.Nagesh Prabhu IFS (Retd), Chairman, SEIAA, Kerala**
- 2. Dr.V.Venu IAS  
Member Secretary, SEIAA**
- 3. Dr.Jayachandran.K, Member, SEIAA**

The meeting commenced at 11 AM. After a preliminary discussion on all the Agenda items, Authority decided the following before the Agenda items are taken up for a detailed discussion:

1. Authority decided to give extension of EC periods from respective dates of expiry of ECs for a period corresponding to that portion of their EC periods coming between 01.04.2020 to 31.03.2021 as per MoEF&CC S.O. 221 (E) dated 18.01.2021. It was also decided to upload this information in the website of SEIAA, for the benefit of Project Proponents and District Geologists.
2. In few cases of application for revalidation of EC period, though SEAC has recommended for suspension of EC period for 6 months, to attend the violations noticed during field inspection, considering the special circumstances of repeated floods and Covid pandemic in the state, Authority decided to give an one time opportunity in such cases, excluding the exceptional cases, to attend the observations made by SEAC within 6 months with certain specific conditions.

Followed by this, Agenda items were taken up for detailed discussion.

- 1) Functioning of the said quarry may be stopped with immediate effect
- 2) Mining & Geology Department and Revenue Department may be requested to ensure compliance of the order no B7-2372/2012 dated 17-04-2013 of the District Collector, Thiruvananthapuram (Copy enclosed).
- 3) Revenue Department may be requested to take a final decision on encroachment of puramboke/govt. land by the quarry owner before allowing further mining in the area.
- 4) Aerial distances to nearby houses have to be measured and the threat due to explosions should be assessed by the Mining & Geology Department considering the slope of the hill.

**Decision of Authority:**

1. Request District Collector to issue a stop memo with immediate effect as recommended by SEAC.
2. SEIAA Secretariat to take action on point no 2, 3, and 4 listed above.
3. The decision on functioning of the quarry will be decided after getting satisfactory replies from respective authorities on issues raised above and after a field inspection by SEAC.

**Item No.112.15**

**Monitoring functioning of quarry of M/s Adani Vizhinjam Port Pvt. Ltd- Field inspection report –reg (File No.1200/EC2/2018/SEIAA)**

Authority noted the observations and recommendation Monitoring committee on the functioning of the quarry by M/s Adani Vizhinjam Port Pvt. Ltd. and decided the following:

1. To forward the observations and recommendation of monitoring committee to the Project Proponent with a direction to attend all the observations within 4 months otherwise EC given will be cancelled and action will be taken for violation EC conditions.
2. Monitoring committee led by SEAC member shall conduct a field inspection after 4 months to verify the compliance status and report to SEIAA for appropriate action.



**3. Inform the decision of SEIAA to project Proponent and SEAC for necessary follow up action.**

**Item No.112.16**      **O.A No. 155/2020 filed by Mr. Vijeesh Kumar against M/s Covenant stones Pvt. Ltd before the Hon'ble NGT (File No. 1422/EC1/2019/SEIAA)**

Mr.Raghunath Kunju Krishnan, M/s Covenant stones Pvt. Ltd, Site Office, Katta, Cheeranikara P.O., Vembayam, Trivandrum, Pin-695615, has been granted Environmental Clearance for the proposed quarry project in Sy.No.29/2, 29/3 & 30/4 of Thekkada Village & Survey Nos., 470,472/4/1, 474/1, 474/1-1, ½, 472/5, 472/6,469/4/3/4, 469/4/3/3, 469/4/2, 469/4/1/1, 469/4/1/2, 469/4/1/3 & 469/4 of Manickal village, Nedumangad Taluk, Thiruvananthapuram District, Kerala vide Order No. 237/SEIAA/KL/885/2013 dated. 27.11.2014 for a period of 5 years from 27.11.2014 for an area of 8.9637 hectares and production capacity for dimension stone is 30,000 CuM& building stone is 2,85, 000 tonnes/annum. This is case involving misrepresentation of facts, manipulation of records and alleged violation of EC conditions.

Authority noted the decisions and actions taken in 99<sup>th</sup>, 100<sup>th</sup>, 103<sup>rd</sup> and 104<sup>th</sup> meeting of SEIAA and 104<sup>th</sup>, 110<sup>th</sup>, and 111<sup>th</sup> meetings of SEAC held on different dates. Now there is a request from police department to handover the relevant files for investigation and a case also filed in NGT for violation of EC conditions.

**Authority noted the above developments and decided the following:**

- 1. Ascertain the latest position of case in NGT and take steps to defend the case through standing Counsel.**
- 2. As requested by police department hand over the photo copies of relevant files to an authorized police officer on acknowledgement.**

**Item No. 112.17**      **Seeking alternate name for the existing Environmental Clearance Holders, M/s Crescent Granite Products in Lakkidi Perur-1 Village, Ottappalam Taluk, Palakkad District (File No. 1649/EC1/2020/SEIAA)**

**Annexure 6: Email Submission of HYCR  
for the period October 2020 to March  
2021**

## Jesse Benjamin Fullonton

---

**From:** Rajesh Kumar Jha  
**Sent:** Monday, 24 May, 2021 12:53 PM  
**To:** rosz.bng-mefcc@gov.in; rosz.bng-mef@nic.in  
**Cc:** seiaa kerala; Shalin Shah; Harsh Yadav; Hebin Chenthamarakshan; Jesse Benjamin Fullonton  
**Subject:** EC No. 1200/EC2/2018/SEIAA dated 01.03.2019 - Half Yearly Compliance Report (HYCR) - Oct 2020 to Mar 2021 - Kadavilla-1 - Reg.  
**Attachments:** EC No.1200\_EC2\_2018\_SEIAA dated 01.03.2019-HYCR-Oct20-Mar20.pdf

Dear Sir/Madam,

This has reference to the Environmental Clearance (EC) Order **No. 1200/EC2/2018/SEIAA issued on 3<sup>rd</sup> March 2019** issued by State Environmental Impact Assessment Authority (SEIAA), Kerala to Adani Vizhinjam Port Private Limited (AVPPL) for our **Building Stone Quarry Project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District.**

The Half Yearly Compliance Report (HYCR) of the conditions stipulated in the EC for the period **October 2020 to March 2021** is attached; for record and reference please.

You are requested to kindly acknowledge the receipt of the same.

Thanks & Regards,

**Rajesh Jha**  
MD & CEO  
**Adani Vizhinjam Port Pvt. Ltd.**

2<sup>nd</sup> Floor, Vipanchika Tower, PO-Thycaud, Trivandrum- 6950 14, Kerala, India  
Direct Line: 0471 277 2116 | [www.adani.com](http://www.adani.com)

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## **Annexure 7: AAQM Report**

## TEST REPORT

ULR No: TC540221000004900F	Date: 11-10-2021	Page 1 of 2
----------------------------	------------------	-------------

CUSTOMER DETAILS	
Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 30-09-2021

SAMPLE DETAILS			
Product Category	Atmospheric Pollution	Sample Code	EN21100009
Sample Name	Ambient Air	Sample Received on	04-10-2021
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	04-10-2021
Sampled by	Lab Authorized Sampler	Test Completed on	07-10-2021

DETAILS OF SAMPLING			
Sampling Location	Near Operators Rest Room - North Side	Date of Sampling	30-09-2021
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	72 %
Latitude	N 08° 43'47.9"	Longitude	E 76° 50'12.6"

SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

TEST RESULTS- CHEMICAL PARAMETERS					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
1	Particulate matter (PM <sub>10</sub> )	IS 5182 Part 23: 2006 RA 2017	µg/m <sup>3</sup>	44.1	100 (Max)
2	Particulate matter (PM <sub>2.5</sub> )	EPA 40 CFR Part 50 Appendix - L	µg/m <sup>3</sup>	21.4	60.0 (Max)

  
Rija Joseph  
Technical Manager  
Checked by:



  
Lajja P.N.  
Laboratory Head  
Authorized Signatory

The results are related only to the samples submitted for analysis and this test report shall not be reproduced except in full, without the written approval of the laboratory.

Standard S Environmental & Analytical Laboratories

Accreditation & Approval: NABL accredited Testing Laboratory as per ISO/IEC 17025:2017

Vide Certificate No. TC - 5402 & "A" Grade Laboratory approved by KSPCB.

K.J. Towers, Peshamatt, Udyogamandal P.O., Ernakulam-683 501, Tel: 0404-7546660, 93-07-2724 02, 90 74 34 14 43

Web: www.sealabs.in, E-mail: sealabs@gmail.com

## TEST REPORT

ULR No: TC540221000004900F	Date: 11-10-2021	Page 2 of 2
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TEST RESULTS- CHEMICAL PARAMETERS					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
3	Sulphur dioxide (SO <sub>2</sub> )	IS 5182 Part 2: 2001 RA 2017	µg/m <sup>3</sup>	< 2.00	80.0 (Max)
4	Nitrogen dioxide (NO <sub>2</sub> )	IS 5182 Part 6: 2006 RA 2017	µg/m <sup>3</sup>	< 2.00	80.0 (Max)

Remarks: The Air sample complies with National Ambient Air Quality Standards with respect to above parameters tested.

\*\*\*End of Report\*\*\*

# Standards

  
**Rija Joseph**  
 Technical Manager  
 Checked by:



  
**Lajja P.N.**  
 Laboratory Head  
 Authorized Signatory

The results are related only to the samples submitted for analysis and this test report shall not be reproduced except in full, without the written approval of the Laboratory.

**Standard S Environmental & Analytical Laboratories**

Accreditation & Approval: NABL accredited Testing Laboratory as per ISO/IEC 17025:2017

Vide Certificate No. TC - 5402 & "A" Grade Laboratory approved by KSPCB.

K.J. Towers, Peshawar, Hyderabad-683 501, Tel: 0404-7546660, 93-07 27 24 02, 90 74 34 14 43  
 Web: www.sealabs.in, E-mail: sealabs@gmail.com



## TEST REPORT

ULR No: TC540221000004899F	Date: 11-10-2021	Page 1 of 2
----------------------------	------------------	-------------

CUSTOMER DETAILS	
Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 30-09-2021

SAMPLE DETAILS			
Product Category	Atmospheric Pollution	Sample Code	EN21100008
Sample Name	Ambient Air	Sample Received on	04-10-2021
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	04-10-2021
Sampled by	Lab Authorized Sampler	Test Completed on	07-10-2021

DETAILS OF SAMPLING			
Sampling Location	Project Site	Date of Sampling	30-09-2021
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	72 %
Latitude	N 08° 43'42.4"	Longitude	E 76° 50'16.6"

SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

TEST RESULTS- CHEMICAL PARAMETERS					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
1	Particulate matter (PM <sub>10</sub> )	IS 5182 Part 23: 2006 RA 2017	µg/m <sup>3</sup>	49.5	100 (Max)
2	Particulate matter (PM <sub>2.5</sub> )	EPA 40 CFR Part 50 Appendix - L	µg/m <sup>3</sup>	22.7	60.0 (Max)

  
**Rija Joseph**  
 Technical Manager  
 Checked by:



  
**Lajja P.N.**  
 Laboratory Head  
 Authorized Signatory

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Web: www.sealabs.in, E-mail: sealabs@gmail.com

## TEST REPORT

ULR No: TC540221000004899F	Date: 11-10-2021	Page 2 of 2
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TEST RESULTS- CHEMICAL PARAMETERS					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
3	Sulphur dioxide (SO <sub>2</sub> )	IS 5182 Part 2: 2001 RA 2017	µg/m <sup>3</sup>	< 2.00	80.0 (Max)
4	Nitrogen dioxide (NO <sub>2</sub> )	IS 5182 Part 6: 2006 RA 2017	µg/m <sup>3</sup>	< 2.00	80.0 (Max)

Remarks: The Air sample complies with National Ambient Air Quality Standards with respect to above parameters tested.

\*\*\*End of Report\*\*\*

# Standards

  
**Rija Joseph**  
 Technical Manager  
 Checked by:



  
**Lalji P.N.**  
 Laboratory Head  
 Authorized Signatory

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 Web: www.sealabs.in, E-mail: sealabs@gmail.com

## TEST REPORT

ULR No: TC540221000004902F	Date: 11-10-2021	Page 1 of 2
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CUSTOMER DETAILS	
Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 30-09-2021

SAMPLE DETAILS			
Product Category	Atmospheric Pollution	Sample Code	EN21100011
Sample Name	Ambient Air	Sample Received on	04-10-2021
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	04-10-2021
Sampled by	Lab Authorized Sampler	Test Completed on	07-10-2021

DETAILS OF SAMPLING			
Sampling Location	St: Joseph of Cluny Public School - South side	Date of Sampling	30-09-2021
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	73 %
Latitude	N 08° 43'35.1"	Longitude	E 76° 50'48.4"

SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

TEST RESULTS- CHEMICAL PARAMETERS					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
1	Particulate matter (PM <sub>10</sub> )	IS 5182 Part 23: 2006 RA 2017	µg/m <sup>3</sup>	41.7	100 (Max)
2	Particulate matter (PM <sub>2.5</sub> )	EPA 40 CFR Part 50 Appendix - L	µg/m <sup>3</sup>	19.4	60.0 (Max)

  
**Rija Joseph**  
Technical Manager  
Checked by:



  
**Lajja P.N.**  
Laboratory Head  
Authorized Signatory

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## TEST REPORT

ULR No: TC540221000004902F	Date: 11-10-2021	Page 2 of 2
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TEST RESULTS- CHEMICAL PARAMETERS					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
3	Sulphur dioxide (SO <sub>2</sub> )	IS 5182 Part 2: 2001 RA 2017	µg/m <sup>3</sup>	< 2.00	80.0 (Max)
4	Nitrogen dioxide (NO <sub>2</sub> )	IS 5182 Part 6: 2006 RA 2017	µg/m <sup>3</sup>	< 2.00	80.0 (Max)

Remarks: The Air sample complies with National Ambient Air Quality Standards with respect to above parameters tested.

\*\*\*End of Report\*\*\*

# Standards

  
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 Technical Manager  
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## TEST REPORT

ULR No: TC540221000004901F	Date: 11-10-2021	Page 1 of 2
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CUSTOMER DETAILS	
Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 30-09-2021

SAMPLE DETAILS			
Product Category	Atmospheric Pollution	Sample Code	EN21100010
Sample Name	Ambient Air	Sample Received on	04-10-2021
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	04-10-2021
Sampled by	Lab Authorized Sampler	Test Completed on	07-10-2021

DETAILS OF SAMPLING			
Sampling Location	Vanchiyoor UP School West Side	Date of Sampling	30-09-2021
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	73 %
Latitude	N 08° 43'17.3"	Longitude	E 76° 50'08.1"

SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

TEST RESULTS- CHEMICAL PARAMETERS					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
1	Particulate matter (PM <sub>10</sub> )	IS 5182 Part 23: 2006 RA 2017	µg/m <sup>3</sup>	45.9	100 (Max)
2	Particulate matter (PM <sub>2.5</sub> )	EPA 40 CFR Part 50 Appendix - L	µg/m <sup>3</sup>	22.8	60.0 (Max)

  
**Rija Joseph**  
Technical Manager  
Checked by:



  
**Lajja P.N.**  
Laboratory Head  
Authorized Signatory

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## TEST REPORT

ULR No: TC540221000004901F	Date: 11-10-2021	Page 2 of 2
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TEST RESULTS- CHEMICAL PARAMETERS					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
3	Sulphur dioxide (SO <sub>2</sub> )	IS 5182 Part 2: 2001 RA 2017	µg/m <sup>3</sup>	< 2.00	80.0 (Max)
4	Nitrogen dioxide (NO <sub>2</sub> )	IS 5182 Part 6: 2006 RA 2017	µg/m <sup>3</sup>	< 2.00	80.0 (Max)

Remarks: The Air sample complies with National Ambient Air Quality Standards with respect to above parameters tested.

\*\*\*End of Report\*\*\*

# Standards

  
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 Technical Manager  
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## TEST REPORT

ULR No:TC540221000004903F	Date: 11-10-2021	Page 1 of 2
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CUSTOMER DETAILS	
Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 30-09-2021

SAMPLE DETAILS			
Product Category	Atmospheric Pollution	Sample Code	EN21100012
Sample Name	Ambient Air	Sample Received on	04-10-2021
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	04-10-2021
Sampled by	Lab Authorized Sampler	Test Completed on	07-10-2021

DETAILS OF SAMPLING			
Sampling Location	Viswanadhapuram Shiva Temple East Side	Date of Sampling	19.03.2021
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	66%
Latitude	N 08° 44'09.7"	Longitude	E 76° 50'18.4"

SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

TEST RESULTS- CHEMICAL PARAMETERS					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
1	Particulate matter (PM <sub>10</sub> )	IS 5182 Part 23: 2006 RA 2017	µg/m <sup>3</sup>	40.9	100 (Max)
2	Particulate matter (PM <sub>2.5</sub> )	EPA 40 CFR Part 50 Appendix - L	µg/m <sup>3</sup>	20.8	60.0 (Max)

  
**Rija Joseph**  
 Technical Manager  
 Checked by:



  
**Lajja P.N.**  
 Laboratory Head  
 Authorized Signatory

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## TEST REPORT

ULR No:TC540221000004903F	Date: 11-10-2021	Page 2 of 2
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TEST RESULTS- CHEMICAL PARAMETERS					
Sl. No.	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARDS
3	Sulphur dioxide (SO <sub>2</sub> )	IS 5182 Part 2: 2001 RA 2017	µg/m <sup>3</sup>	< 2.00	80.0 (Max)
4	Nitrogen dioxide (NO <sub>2</sub> )	IS 5182 Part 6: 2006 RA 2017	µg/m <sup>3</sup>	< 2.00	80.0 (Max)

Remarks: The Air sample complies with National Ambient Air Quality Standards with respect to above parameters tested.

\*\*\*End of Report\*\*\*

# Standards

  
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 Technical Manager  
 Checked by:



  
**Lajja P.N.**  
 Laboratory Head  
 Authorized Signatory

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## **Annexure 8: Noise Monitoring Report**



## TEST REPORT

ULR No:TC540221000004905F	Date: 11-10-2021	Page 1 of 2
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CUSTOMER DETAILS	
Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 30-09-2021

DETAILS OF MONITORING			
Product Category	Atmospheric Pollution	Sample Code	EN21100014
Sample Name	Ambient Noise	Monitoring Commenced on	30-09-2021/ 06:00
Monitoring Location	Near Operators Rest Room North Side	Monitoring Completed on	01-10-2021/ 06:00
Test Method	IS 9989:1981 RA:2008	Monitored by	Lab Authorized Sampler
Latitude	N 08° 43'47.9"	Longitude	E 76° 50'12.5"

SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

MONITORING RESULTS - Leq					
TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	34.0	14:00	45.5	22:00	32.9
07:00	36.4	15:00	45.9	23:00	31.7
08:00	40.3	16:00	46.9	24:00	34.0
09:00	43.4	17:00	47.3	01:00	34.7
10:00	45.5	18:00	42.4	02:00	34.3
11:00	48.3	19:00	39.2	03:00	35.0
12:00	45.9	20:00	35.7	04:00	34.0
13:00	45.2	21:00	35.3	05:00	35.6

  
**Riya Joseph**  
Technical Manager  
Checked by:



  
**Lajja P.N.**  
Laboratory Head  
Authorized Signatory

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## TEST REPORT

ULR No:TC540221000004905F	Date: 11-10-2021	Page 2 of 2
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TEST RESULTS- CHEMICALPARAMETERS				
Sl. No.	PARAMETERS	UNIT	RESULT	NAAQ STANDARDS (RESIDENTIAL AREA)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	44.0	55 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	34.5	45 dB (A)

Remarks: The Noise level Monitoring complies with the Noise Pollution(Regulation and Control) Rules, 2000.

\*\*\*End of Report\*\*\*

# Standards

  
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 Technical Manager  
 Checked by:



  
**Lajja P.N.**  
 Laboratory Head  
 Authorized Signatory

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## TEST REPORT

ULR No:TC540221000004904F	Date: 11-10-2021	Page 1 of 2
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CUSTOMER DETAILS	
Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt: 30-09-2021

DETAILS OF MONITORING			
Product Category	Atmospheric Pollution	Sample Code	EN21100013
Sample Name	Ambient Noise	Monitoring Commenced on	30-09-2021/ 06:00
Monitoring Location	Project Site	Monitoring Completed on	01-10-2021/ 06:00
Test Method	IS 9989:1981 RA:2008	Monitored by	Lab Authorized Sampler
Latitude	N 08° 43'41.5"	Longitude	E 76° 50'16.9"

SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

MONITORING RESULTS - Leq					
TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	34.9	14:00	46.8	22:00	33.8
07:00	37.4	15:00	47.1	23:00	32.0
08:00	41.4	16:00	48.2	24:00	34.3
09:00	44.6	17:00	48.6	01:00	35.0
10:00	46.8	18:00	43.5	02:00	34.7
11:00	49.7	19:00	40.3	03:00	35.3
12:00	47.1	20:00	36.7	04:00	34.3
13:00	46.4	21:00	36.3	05:00	36.0

  
**Riya Joseph**  
Technical Manager  
Checked by:



  
**Lalji P.N.**  
Laboratory Head  
Authorized Signatory

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### TEST REPORT

ULR No:TC540221000004904F	Date: 11-10-2021	Page 2 of 2
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TEST RESULTS- CHEMICALPARAMETERS				
Sl. No.	PARAMETERS	UNIT	RESULT	NAAQ STANDARDS (RESIDENTIAL AREA)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	45.2	55 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	34.8	45 dB (A)

Remarks:The Noise level Monitoring complies with the Noise Pollution(Regulation and Control) Rules, 2000.

\*\*\*End of Report\*\*\*

# Standards

  
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 Technical Manager  
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**Lajja P.N.**  
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## TEST REPORT

ULR No:TC540221000004907F	Date: 11-10-2021	Page 1 of 2
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CUSTOMER DETAILS	
Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 30-09-2021

DETAILS OF MONITORING			
Product Category	Atmospheric Pollution	Sample Code	EN21100016
Sample Name	Ambient Noise	Monitoring Commenced on	30-09-2021/ 06:00
Monitoring Location	St Joseph Colony Public School	Monitoring Completed on	01-10-2021/ 06:00
Test Method	IS 9989:1981 RA:2008	Monitored by	Lab Authorized Sampler
Latitude	N 08° 43'35.1"	Longitude	E 76° 50'48.4"

SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

MONITORING RESULTS - Leq					
TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	33.7	14:00	45.1	22:00	32.6
07:00	36.1	15:00	45.5	23:00	32.2
08:00	39.9	16:00	46.5	24:00	34.5
09:00	43.0	17:00	46.8	01:00	35.2
10:00	45.1	18:00	42.0	02:00	34.9
11:00	47.9	19:00	38.9	03:00	35.5
12:00	45.5	20:00	35.4	04:00	34.5
13:00	44.8	21:00	35.0	05:00	36.2

  
**Riya Joseph**  
 Technical Manager  
 Checked by:



  
**Lajja P.N.**  
 Laboratory Head  
 Authorized Signatory

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### TEST REPORT

ULR No:TC540221000004907F	Date: 11-10-2021	Page 2 of 2
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TEST RESULTS- CHEMICALPARAMETERS				
Sl. No.	PARAMETERS	UNIT	RESULT	NAAQ STANDARDS (RESIDENTIAL AREA)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	43.6	55 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	34.9	45 dB (A)

Remarks: The Noise level Monitoring complies with the Noise Pollution(Regulation and Control) Rules, 2000.

\*\*\*End of Report\*\*\*

# Standards

  
**Rija Joseph**  
 Technical Manager  
 Checked by:



  
**Lalji P.N.**  
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 Authorized Signatory

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## TEST REPORT

ULR No:TC540221000004906F	Date: 11-10-2021	Page 1 of 2
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CUSTOMER DETAILS	
Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 30-09-2021

DETAILS OF MONITORING			
Product Category	Atmospheric Pollution	Sample Code	EN21100015
Sample Name	Ambient Noise	Monitoring Commenced on	30-09-2021/ 06:00
Monitoring Location	Vanchiyoor UP School West Side	Monitoring Completed on	01-10-2021/ 06:00
Test Method	IS 9989:1981 RA:2008	Monitored by	Lab Authorized Sampler
Latitude	N 08° 43'16.5"	Longitude	E 76° 50'11.1"

SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

MONITORING RESULTS - Leq					
TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	33.5	14:00	44.9	22:00	32.4
07:00	35.9	15:00	45.2	23:00	32.8
08:00	39.7	16:00	46.2	24:00	35.2
09:00	42.8	17:00	46.6	01:00	35.8
10:00	44.9	18:00	41.7	02:00	35.5
11:00	47.6	19:00	38.6	03:00	36.2
12:00	45.2	20:00	35.2	04:00	35.2
13:00	44.5	21:00	34.8	05:00	36.8

  
**Riya Joseph**  
Technical Manager  
Checked by:



  
**Lajja P.N.**  
Laboratory Head  
Authorized Signatory

The results are related only to the samples submitted for analysis and this test report shall not be reproduced except in full, without the written approval of the Laboratory.

**StandardS Environmental & Analytical Laboratories**

Accreditation & Approval: NABL accredited Testing Laboratory as per ISO/IEC 17025:2017

Vide Certificate No. TC - 5402 & "A" Grade Laboratory approved by KSPCB.

K.J. Towers, Peshamatti, Udyogamandal P.O., Ernakulam-683 501, Tel: 0404-7546660, 93-07-2724 02, 90 74 34 14 43

Web: www.sealabs.in, E-mail: sealabs@gmail.com

### TEST REPORT

ULR No:TC540221000004906F	Date: 11-10-2021	Page 2 of 2
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TEST RESULTS- CHEMICALPARAMETERS				
Sl. No.	PARAMETERS	UNIT	RESULT	NAAQ STANDARDS (RESIDENTIAL AREA)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	43.3	55 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	35.5	45 dB (A)

Remarks: The Noise level Monitoring complies with the Noise Pollution(Regulation and Control) Rules, 2000.

\*\*\*End of Report\*\*\*

# Standards

  
**Rija Joseph**  
Technical Manager  
Checked by:  
**Lalji P.N.**  
Laboratory Head  
Authorized Signatory

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## TEST REPORT

ULR No:TC540221000004908F	Date: 11-10-2021	Page 1 of 2
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CUSTOMER DETAILS	
Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Nagaroor, Chirayinkeezhu, Thiruvananthapuram District.
Customer Reference	Test Request dt : 30-09-2021

DETAILS OF MONITORING			
Product Category	Atmospheric Pollution	Sample Code	EN21030359
Sample Name	Ambient Noise	Monitoring Commenced on	30-09-2021/ 06:00
Monitoring Location	Viswanadhapuram Shiva Temple - East Side	Monitoring Completed on	01-10-2021/ 06:00
Test Method	IS 9989:1981 RA:2008	Monitored by	Lab Authorized Sampler
Latitude	N 08° 44'09.7"	Longitude	E 76° 50'18.4"

SAMPLING SITE DETAILS			
Re - Survey No	555/2, Block No.37		
Village	Nagaroor	Taluk	Chirayinkeezhu
District	Thiruvananthapuram	State	Kerala

MONITORING RESULTS - Leq					
TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	32.7	14:00	43.8	22:00	31.7
07:00	35.0	15:00	44.1	23:00	31.3
08:00	38.8	16:00	45.2	24:00	33.6
09:00	41.8	17:00	45.5	01:00	34.2
10:00	43.8	18:00	40.8	02:00	33.9
11:00	46.5	19:00	37.7	03:00	34.6
12:00	44.1	20:00	34.4	04:00	33.6
13:00	43.5	21:00	34.0	05:00	35.2

  
**Rija Joseph**  
Technical Manager  
Checked by:



  
**Lajja P.N.**  
Laboratory Head  
Authorized Signatory

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### TEST REPORT

ULR No:TC540221000004908F	Date: 11-10-2021	Page 2 of 2
---------------------------	------------------	-------------

TEST RESULTS- CHEMICALPARAMETERS				
Sl. No.	PARAMETERS	UNIT	RESULT	NAAQ STANDARDS (RESIDENTIAL AREA)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	42.3	55 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	34.1	45 dB (A)

Remarks: The Noise level Monitoring complies with the Noise Pollution(Regulation and Control) Rules, 2000.

\*\*\*End of Report\*\*\*

# Standards

  
**Rija Joseph**  
 Technical Manager  
 Checked by:



  
**Lalji P.N.**  
 Laboratory Head  
 Authorized Signatory

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## **Annexure 9: CER and EMP Expenditure Statements**

	Adani Vizhinjam Port Private Limited (AVPPL)	From: April 2021 To: September 2021
Building Stone Quarry Project in Survey No. 555/2 at Nagaroor Village, Chirayinkeezhu Taluk, Thiruvananthapuram District		

## Annexure 9

### Expenditure Statement for CER and EMP for the FY 2021-2022:

S. No.	CER Activity	Expenditure (Rs. Lakhs)
<b>Total FY 2020-2021</b>		<b>8.05</b>
1.	Water Supply to Local Community	2.31
2.	Onam Kit (Groceries & Provisions) Distribution to BPL Families	2.05
3.	COVID-19 beds and Antigen Kits	1.77
4.	Medical Expenses to Sathyaseelan M. and Chellama	0.075
<b>Total FY 2021-2022 (Till Date)</b>		<b>6.205</b>
<b>Cumulative Total till date</b>		<b>14.255</b>

S. No.	EMP Expenditure	Expenditure (Rs. Lakhs)
<b>Total FY 2019-2020</b>		<b>4.95</b>
<b>Total FY 2020-2021</b>		<b>7.34</b>
1.	Water Sprinkling	4.17
2.	Greenbelt Development/Sapling Plantation	0.04
3.	Environmental Monitoring	0.40
<b>Total FY 2021-2022 (Till Date)</b>		<b>4.61</b>
<b>Cumulative Total till date</b>		<b>16.90</b>



**Half Yearly Compliance Report (HYCR)  
April 2021 to September 2021**

**Building Stone Quarry Project: Survey No. 555/2 at Nagaroor Village,  
Chirayinkeezhu Taluk, Thiruvananthapuram District**



**Adani Vizhinjam Port Private Ltd. (AVPPL)**