

# **Building Stone Quarry Project**

**Block No. 29, Re-survey No. 120/10 at Manickal  
Village, Nedumangad Taluk, Thiruvananthapuram  
District**

Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020

**Half Yearly Compliance Report (HYCR)  
for the Period April 2023 to September 2023**

Project Proponent

**adani**

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

**November 2023**

Ref: AVPPL/MoEF/2023-24/2711

Date: 21<sup>st</sup> November 2023

To,  
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  
[rosz.bng-mefcc@gov.in](mailto:rosz.bng-mefcc@gov.in)

**Subject:** Submission of **Half Yearly Compliance Report (HYCR)** to Conditions of Environmental Clearance (EC) for the Period April 2023 to September 2023 - Reg.

**Reference:** EC for Building Stone Quarry in Block No. 29, Re-Survey No. 120/10 at Manickal Village, Nedumangad Taluk, Thiruvananthapuram District, Kerala; by M/s. Adani Vizhinjam Port Pvt. Ltd. vide **No. 1416/EC1/2019/SEIAA dated 27.02.2020**

Dear Sir/Madam,

This is with reference to the Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA issued on 27<sup>th</sup> February 2020 (vide reference cited) by the State Environmental Impact Assessment Authority (SEIAA), Kerala for the building stone quarry project in Block No. 29, Re-Survey No.120/10 in Manickal Village, Nedumangad Taluk, Thiruvananthapuram District, Kerala; of M/s. Adani Vizhinjam Port Pvt. Ltd. (AVPPL).

The Half Yearly EC Compliance Report (HYCR) of the conditions stipulated in the cited reference for the period from **April 2023 to September 2023** is enclosed herewith for record and reference. You are requested to kindly acknowledge receipt of the same.

Thanking You.

Yours Sincerely,



Rajesh Jha  
MD & CEO – Authorized Signatory




Enclosed: As mentioned above

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


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CIN: U61200GJ2015PTC083954

Registered Office:  
Adani Corporate House, Shantigram, Near Vaishno Devi Circle, S. G. Highway, Khodiyar, Ahmedabad-382421

	<b>Adani Vizhinjam Port Private Limited (AVPPL)</b>	<b>From: April 2023 To: September 2023</b>
<b>Building Stone Quarry Project in Block No. 29, Re-survey No. 120/10 at Manickal Village, Nedumangad Taluk, Thiruvananthapuram District</b>		

<b>Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023</b>		
<b>S. No.</b>	<b>Conditions</b>	<b>Compliance Status as on September 30, 2023</b>
<b>Specific Conditions</b>		
1	The Proponent shall follow the directions given by the District Collector, Thiruvananthapuram vide his NOC No. 137/127325/18 dated 13.07.2018. The copy of the NOC may also be enclosed with the EC.	<p><b>Complied</b> Adani Vizhinjam Port Pvt. Ltd. (AVPPL) will follow the directions given by the District Collector; Thiruvananthapuram vide NoC No. B7-127329/18 dated 13.07.2018. Copy of the NoC was submitted along with Half Yearly Compliance Report (HYCR) for the period October 2021 to March 2022.</p> <p>The NoC was further renewed on the same terms and conditions vide NoC No. B7-127329/18 dated 04.01.2020 (Copy of the renewed NoC was submitted along with HYCR for the period October 2021 to March 2022).</p>
2	Activities relating to Corporate Environmental Responsibility amounting to Rs. 1.64 lakhs shall be carried out leading to protection and promotion of environment including waste management in the project district as per OM FNo.22-65/2017-IA-III dt.01.05.2018 of MoEF& CC as directed by Director, Directorate of Environment & Climate Change and supervised by District Collector.	<p><b>Complied</b> Till 30.09.2023, an amount of Rs. 2.15 Lakhs have been spent on Corporate Environment Responsibility (CER) Activities. Despite having exhausted the agreed-upon funds for CER activities, AVPPL remains committed to environmental responsibility and has exceeded the required expenditure of Rs. 1.64 Lakhs as stated in the EC Letter.</p>
3	The proponent shall carry out quarrying as per the approved Mining Plan and the proponent should strictly follow the Kerala Minor Mineral Concession Rules 2015 and amendments thereby.	<p><b>Being Complied</b> AVPPL commenced operation on 23.03.2022. AVPPL will carry out quarrying as per the Approved Mining Plan (submitted along with HYCR for the period October 2021 to March 2022) and will strictly follow the Kerala Minor Mineral Concession Rules (KMMCR), 2015 and amendments.</p> <p>During the compliance period (April 2023 to September 2023), a total of 0.434 Lakh Tons of building stones have been extracted and a total</p>

	<b>Adani Vizhinjam Port Private Limited (AVPPL)</b>	<b>From: April 2023 To: September 2023</b>
<b>Building Stone Quarry Project in Block No. 29, Re-survey No. 120/10 at Manickal Village, Nedumangal Taluk, Thiruvananthapuram District</b>		


<p align="center"><b>Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023</b></p>
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S. No.	Conditions	Compliance Status as on September 30, 2023
		cumulative quantity of 1.153 Lakh Tons of building stones have been extracted from inception of mining on 23.03.2022 till 30.09.2023.
4	In the wake of occurrence of large scale landslides in the state, as per the information provided by the Department of Mining & Geology, it is directed to use only NONEL (Non Electrical) technology for blasting to reduce the vibration of the ground, which is one of the causative factors that triggers landslides, formation of cracks in the surrounding buildings and disturbance to human and wildlife.	<b>Complied</b> Mining is being conducted using Non-Electric Detonator (NONEL) method of Blasting only to minimize the air blast, fly rock and ground vibration. The Ignition will be the Non-Conventional and Eco-Friendly method by NONEL.
5	As per the directions contained in the OM F.No. 22-34/2018-IA.III dated 16th January 2020 issued by MoEF &CC, in obedience to the directions of the Honourable Supreme Court the Project Proponent shall, undertake re-grassing the mining area and any other area which may have been disturbed due to his mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc. The compliance of this direction shall be included in the half yearly compliance report which will be monitored by SEAC at regular intervals.	<b>Will be Complied</b> AVPPL shall undertake plantation as per Progressive Mine Closure Plan, which is included in the Approved Mining Plan (submitted along with HYCR for the period October 2021 to March 2022) as per KMMCR, 2015. AVPPL shall also undertake re-grassing in any other area which may have been disturbed due to mining activities to restore the land to a condition fit for growth of suitable flora.
<b>General Conditions</b>		
1	A separate environmental management and monitoring cell with qualified personnel	<b>Complied</b> An Environmental Management and Monitoring Cell (EMMC) with qualified personnel has been




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S. No.	Conditions	Compliance Status as on September 30, 2023
	should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.	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 Organizational Structure for EMMC was submitted along with HYCR for the period October 2021 to March 2022. EMMC meetings are being held regularly to monitor the environmental issues at the quarry.
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.	<p><b>Complied</b> AVPPL has planted avenue trees of local species at suitable locations like buffer zones, etc. for greenbelt development.</p>  <p style="text-align: center;"><b>Avenue Plantation</b></p> <p>At Mine Closure stage, the working pit shall be developed for water storage surrounded with local bio diversified vegetation. A total of 0.2922 Ha safety barrier area shall be used for development of greenbelt.</p>

**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023**

S. No.	Conditions	Compliance Status as on September 30, 2023
3	Sprinklers shall be installed and used in the project site to contain dust emissions.	<p><b>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>  <p style="text-align: center;"><b>Water Sprinkling</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 Approved Mining Plan (submitted along with HYCR for the period October 2021 to March 2022). 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>Complied</b></p> <p>Stacking of materials is not being carried out as all the produced materials are used for Breakwater Construction at Vizhinjam Seaport and are being transported directly to the Port site and not stacked at the quarry site.</p>
6	Corporate Environment Responsibility agreed upon by the proponent should be implemented.	<p><b>Being Complied</b></p> <p>Till 30.09.2023, an amount of Rs. 2.15 Lakhs has been spent on Corporate Environment Responsibility (CER) Activities with expense heads under specific activities leading to protection and promotion of environment in line</p>

	<b>Adani Vizhinjam Port Private Limited (AVPPL)</b>	<b>From: April 2023 To: September 2023</b>
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**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023**

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		<p>with Ministry of Environment and Forests &amp; Climate Change (MoEF&amp;CC) Office Memorandum (OM) F.No.22-65/2017-IA.III dated 01.05.2018. Despite having exhausted the agreed-upon funds for CER activities, AVPPL remains committed to environmental responsibility and has exceeded the required expenditure of Rs. 1.64 Lakhs as stated in the EC Letter.</p> <p>During the compliance period, AVPPL had distributed around 150 Onam Kits as a part of CER initiative to BPL families surrounding the project area amounting to expenditure of Rs. 0.66 Lakhs. The Onam Kit (which included various groceries and provisions) were sourced from VIZ Mart (an initiative supported by Adani foundation) and the same were distributed on 24.08.2023.</p> <div style="text-align: center;">  <p><b>Distribution of Onam Kits</b></p> </div>
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 0.8 km from the quarry project site to Pirappancode Road (which is connected to Main Central (MC) Road – State Highway (SH)-1) for movement of vehicles to reduce the air pollution.</p>




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		 <p style="text-align: center;"><b>Tarred Road Developed by AVPPL</b></p> <p>Loaded trucks start from the quarry site and move through the road developed by AVPPL (0.8 km) and reaches the Pirappancode Road and traverses along Thembamoodu - Pirappancode State highway for 0.7 km and reaches MC road. From there trucks travel along MC road for only about 1 km to reach Thaikod junction. Thereafter, the trucks use the Thaikod - Kazhakootom Road to come to Vetturoad junction and from there it travels along NH 66 to Vizhinjam Port Project site.</p> <p>As suggested by SEIAA vide letter 1416/EC1/2019/SEIAA dated 02.03.2023 (copy of the letter was submitted along with HYCR for the period October 2021 to March 2022), AVPPL engaged Ultra Tech Environmental Consultancy</p>





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S. No.	Conditions	Compliance Status as on September 30, 2023
		& Laboratory to conduct a carrying capacity study and prepare a traffic management plan; a copy of the report is given as <b>Annexure 1</b> .
9	Overburden materials should be managed within the site and used for reclamation of mine pit as per mine closure plan / specific conditions	<b>Complied</b> As such, the quarry had been mined earlier by another party and since this is already an open mine, there was minimal topsoil or overburden available in the quarry; all the produced materials are being used for Breakwater Construction at Vizhinjam Port and there would be no generation of waste.
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.	<b>Complied</b> As per the Approved Mining Plan (submitted along with HYCR for the period October 2021 to March 2022) 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.
11	Ground level should be fixed in individual cases separately	<b>Being Complied</b> For every bench, ground level is fixed in MSL as individual cases separately. Surface plan with MSL levels is provided in the Approved Mining Plan (submitted along with HYCR for the period October 2021 to March 2022).
12	No mining operations should be carried out at places having a slope greater than 45.	<b>Complied</b> No mining operations are being carried out at places having a slope greater than a 45 degrees angle.
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	<b>Not Applicable</b> There is no crusher adjacent to the quarry as there will be no crushing and screening within the lease area.
14	The workers on the site should be provided with the required	<b>Complied</b> All employees are provided with relevant


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	protective equipment such as ear muffs, helmet, etc.	<p>Personal Protective Equipment (PPEs) like Helmets, Shoes, Fluorescent Reflective Jackets, etc.</p>  <p style="text-align: center;"><b>Workers 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 at the top level during the compliance period. However, earthen garland drainage/garland canals have been developed in the lower slopes along periphery of mining area to channelize storm water. The water from garland drain is diverted to an earthen silt settling tanks before releasing clarified water to the natural water course.</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	<p><b>Complied</b></p> <p>The transportation of minerals in trucks is being undertaken covered with tarpaulin cover.</p> <p>Since this is an existing quarry which was already mined earlier, the quarry is in open condition. There was no clearing of land for the project and no trees have been cut down as there are no trees inside the lease area.</p>

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S. No.	Conditions	Compliance Status as on September 30, 2023
	issuance of EC so as to ensure the promptness in, planting.	 <p align="center"><b>Truck with Tarpaulin Cover</b></p>
17	Explosives should be stored in magazines in isolated place specified and approved by Explosives Department	<p><b>Complied</b></p> <p>AVPPL constructed a 500 Kgs portable explosives magazine at an area called Chappath; which is 45 km away from the quarry location. AVPPL are transporting the explosives and detonators from Chappath to Manickal 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 E/SE/KL/22/331 (E121778) dated 13.09.2021 (Copy was submitted along with HYCR for the period October 2022 to March 2023).</li> <li>• Explosives van-1 (KL01CP2414) license E/SE/KL/25/99 (E135886) dated 22.09.2021 (Copy was submitted along with HYCR for the period October 2022 to March 2023).</li> <li>• Explosives van-2 (KL01CP2472) license E/SE/KL/25/99(E135883) dated 22.09.2021 (Copy was submitted along with HYCR for the period October 2022 to March 2023).</li> </ul>
18	A minimum buffer distance of 100m from the boundary of the quarry to the nearest dwelling unit or other structures, not	<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</p>

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S. No.	Conditions	Compliance Status as on September 30, 2023
	<p>being any facility for mining shall be provided.</p>	<p>operations at or to any points within 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 (submitted along with HYCR for the period October 2021 to March 2022) that as per Rule 40 1(i) of the KMMC Rules, the lessee is permitted to carry out mining at 50 m from the residential houses.</p> <p>As per the map prepared by the village officer, the nearest house is 57.7 m from the boundary of the quarry.</p>
19	<p>50 m buffer distance should be maintained from forest boundaries.</p>	<p><b>Not Applicable</b> There are no forests or forest lands in the vicinity of the project site.</p>
20	<p>Consent from Kerala State Pollution Control Board under Water and Air Act(s) should be obtained before initiating mining activity.</p>	<p><b>Complied</b> CTO has been obtained from Kerala State Pollution Control Board (KSPCB) vide Consent No. vide Consent No.: PCB/TVM-DO/ICO/NDD/QRY/29/2020 dated 16.03.2020 valid up to 26.02.2025 (A copy of the same was submitted along with Letter No. AVPPL/MOEF/2020-21/1127 dated 13.05.2020 (submitted along with HYCR for the period October 2021 to March 2022).</p>
21	<p>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>	<p><b>Complied</b> 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>Approved Mining Plan by District Geologist, Thiruvananthapuram vide Letter No. 362/DOT/ML/18 dated 24.07.2019 (Copy was</li> </ul>



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		<p>submitted along with HYCR for the period October 2021 to March 2022).</p> <ul style="list-style-type: none"> <li>• No Objection Certificate (NoC) from Thiruvananthapuram District Collector vide Letter No. B7-127329/18 dated 13.07.2018 for Govt. land (Copy was submitted along with HYCR for the period October 2021 to March 2022).</li> <li>• The NoC was further renewed on the same terms and conditions vide NoC No. B7-127329/18 dated 04.01.2020 (Copy was submitted along with HYCR for the period October 2021 to March 2022).</li> <li>• Directorate of Mining and Geology, Govt. of Kerala, Thiruvananthapuram has issued a Letter of Intent (LOI) vide No. 5219/M3/2019 dated 07.06.2019. Copy was submitted along with Half Yearly Compliance Report for the period October 2021 to March 2022.</li> <li>• CTO has been obtained from Kerala State Pollution Control Board (KSPCB) vide Consent No.: PCB/TVM-DO/ICO/NDD/QRY/29/2020 dated 16.03.2020 valid up to 26.02.2025. A copy of the same was submitted along with HYCR for the period October 2019 to March 2020).</li> <li>• Purchase and Use of Explosives Approval from Petroleum &amp; Explosives Safety Organization (PESO), Ernakulam vide Letter No. E/SE/KL/22/129(E95316) dated 18.02.2022. (submitted along with HYCR for the period October 2021 to March 2022)</li> <li>• Dangerous and Offensive Trade (D&amp;O) License (Deemed as granted vide judgment dated 13.01.2021 in WP(C). No. 274 of 2021 (submitted along with HYCR for the period October 2021 to March 2022)</li> <li>• Lease Order from DMG vide Letter No. 7671/M3/2021 dated 22.01.2022 and Lease Execution from Additional Director of Mining and Geology vide Pro. Order No. 428/2021-</li> </ul>

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		<p>22/5219/M3/2019/DMG dated 22.01.2022 (submitted along with HYCR for the period October 2021 to March 2022)</p> <ul style="list-style-type: none"> <li>• Quarrying Lease Registration Agreement in Form H at Thiruvananthapuram Registrar Office dated 28.01.2022 (submitted along with HYCR for the period October 2021 to March 2022)</li> <li>• Explosives magazine license E/SE/KL/22/331 (E121778) dated 13.09.2021 (Copy was submitted along with HYCR for the period October 2022 to March 2023).</li> <li>• Explosives van-1 (KL01CP2414) license E/SE/KL/25/99 (E135886) dated 22.09.2021 (Copy was submitted along with HYCR for the period October 2022 to March 2023).</li> <li>• Explosives van-2 (KL01CP2472) license E/SE/KL/25/99(E135883) dated 22.09.2021 (Copy was submitted along with HYCR for the period October 2022 to March 2023).</li> </ul>
22	<p>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>Noted</b>
23	<p>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</p>	<b>Noted</b>

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	Environment (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.	
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 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	<b>Complied</b> EC for the project was issued on 27.02.2020. Details of the EC were advertised in the local newspapers published on 01.03.2020 (A copy of the same was submitted along with HYCR for the period October 2019 to March 2020). The signed EC was submitted to SEIAA vide AVPPL/SEIAA/2019-20/1083 dated 04.03.2020 (A copy of the same was submitted along with Letter No. AVPPL/MOEF/2020-21/1127 dated 13.05.2020 (submitted along with HYCR for the period October 2021 to March 2022)).  A 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> . The copy of EC is also uploaded to the company website: <a href="http://www.adaniports.com/Downloads">www.adaniports.com/Downloads</a> .

	<b>Adani Vizhinjam Port Private Limited (AVPPL)</b>	<b>From: April 2023 To: September 2023</b>
<b>Building Stone Quarry Project in Block No. 29, Re-survey No. 120/10 at Manickal Village, Nedumangad Taluk, Thiruvananthapuram District</b>		


**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023**

S. No.	Conditions	Compliance Status as on September 30, 2023
	the office of this Authority as confirmation.	
26	The Environmental Clearance shall be put on the website of the company by the proponent.	<b>Complied</b> The copy of EC is uploaded to the company website: <a href="http://www.adaniports.com/Downloads">www.adaniports.com/Downloads</a> . Screenshot of the same was submitted along with Letter No. AVPPL/MOEF/2020-21/1127 dated 13.05.2020 (submitted along with HYCR for the period October 2021 to March 2022).
27	Proponent shall submit half yearly reports in soft copy and SEIAA will upload it on the website.	<b>Complied</b> 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 & Climate Change (MoEF&CC) dated 26.11.2018, wherein submission of HYCRs by email/soft copy is declared acceptable, soft copy of HYCR for the period April 2022 to September 2022 has been submitted vide email dated 26.05.2023 (a copy of the email is enclosed as <b>Annexure 2</b> ).
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	<b>Complied</b> The details of EC have been displayed at the site next to the entrance of the quarry, visible to the public.




**EC Details Displayed on Board at Site**



	<b>Adani Vizhinjam Port Private Limited (AVPPL)</b>	<b>From: April 2023 To: September 2023</b>
<b>Building Stone Quarry Project in Block No. 29, Re-survey No. 120/10 at Manickal Village, Nedumangad Taluk, Thiruvananthapuram District</b>		


**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023**

S. No.	Conditions	Compliance Status as on September 30, 2023
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 stating that all the conditions stipulated in the EC shall be scrupulously followed was submitted to SEIAA vide SEIAA vide AVPPL/SEIAA/2019-20/1083 dated 04.03.2020. A copy of the affidavit was submitted along with Letter No. AVPPL/MOEF/2020-21/1127 dated 13.05.2020 (submitted along with HYCR for the period October 2021 to March 2022).
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</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 safeguard measures to protect the first order streams, if any, originating from the mine lease shall be taken.	<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.
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	<b>Being Complied</b> As such, the quarry had been mined earlier by another party and since this is already an open mine, there was no topsoil or overburden available in the quarry; all the produced materials are being used for Breakwater Construction at Vizhinjam Port.

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**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023**

S. No.	Conditions	Compliance Status as on September 30, 2023
	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.	<b>Being Complied</b> The mining operators have developed an earthen siltation pond at the bottom of the quarry area to prevent run-off of water and flow of sediments. The water collected will be utilized for greenbelt development, etc. The drains will be regularly desilted particularly after monsoon.
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.

	Adani Vizhinjam Port Private Limited (AVPPL)	From: April 2023 To: September 2023
Building Stone Quarry Project in Block No. 29, Re-survey No. 120/10 at Manickal Village, Nedumangad Taluk, Thiruvananthapuram District		

**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023**


S. No.	Conditions	Compliance Status as on September 30, 2023				
		Parameter	Unit	Max	Min	Perm. Limit
		PM <sub>10</sub>	µg/m <sup>3</sup>	47.5	38.6	100
		PM <sub>2.5</sub>	µg/m <sup>3</sup>	24.2	19.2	60
		SO <sub>2</sub>	µg/m <sup>3</sup>	4.27	BDL	80
		NO <sub>2</sub>	µg/m <sup>3</sup>	4.74	4.18	80
		*BDL: Below Detectable Limit				
		The Ambient Air Quality Monitoring Report is enclosed as <b>Annexure 3</b> . All the monitored parameters were found within the prescribed limits.				
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	<p><b>Being Complied</b> AVPPL has developed a tar road of around 0.8 km from the quarry project site to Pirappanacode Road (which is connected to MC Road) for movement of vehicles; thereby reducing the dust pollution.</p> <p>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.</p>				
36	Measures should be taken for control of noise levels below 85 dBA in the work environment.	<p><b>Being Complied</b> The following measures are being taken for the control of noise levels:</p> <ul style="list-style-type: none"> <li>• Drilling: Captive silencers are being used in drilling equipment.</li> <li>• Blasting: AVPPL uses the NONEL method - bottom initiation to reduce the noise of blasting.</li> <li>• Machinery &amp; Tippers: It is ensured that equipment is 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 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>				

Building Stone Quarry Project in Block No. 29, Re-survey No. 120/10 at Manickal Village, Nedumangad Taluk, Thiruvananthapuram District

**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023**


S. No.	Conditions	Compliance Status as on September 30, 2023																														
		<p>Ambient Noise is being monitored by NABL and MoEF&amp;CC accredited laboratory; M/s. Standards Environmental &amp; Analytical Laboratories 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>Perm. Limit</th> <th>L<sub>eq</sub> Night time</th> <th>Perm. Limit</th> </tr> </thead> <tbody> <tr> <td>Project Site</td> <td>49.4</td> <td>75.0</td> <td>39.4</td> <td>70.0</td> </tr> <tr> <td>St. Johns Hospital, Manikkal</td> <td>50.0</td> <td>50.0</td> <td>41.8</td> <td>40.0</td> </tr> <tr> <td>Govt. L P School, Perumala</td> <td>49.7</td> <td>50.0</td> <td>41.2</td> <td>40.0</td> </tr> <tr> <td>Kovilvila Sree Mahavishnu Temple</td> <td>51.3</td> <td>50.0</td> <td>42.5</td> <td>40.0</td> </tr> <tr> <td>Operators Rest Room</td> <td>51.7</td> <td>75.0</td> <td>42.8</td> <td>70.0</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 4</b>.</p>	Location	L <sub>eq</sub> Day time	Perm. Limit	L <sub>eq</sub> Night time	Perm. Limit	Project Site	49.4	75.0	39.4	70.0	St. Johns Hospital, Manikkal	50.0	50.0	41.8	40.0	Govt. L P School, Perumala	49.7	50.0	41.2	40.0	Kovilvila Sree Mahavishnu Temple	51.3	50.0	42.5	40.0	Operators Rest Room	51.7	75.0	42.8	70.0
Location	L <sub>eq</sub> Day time	Perm. Limit	L <sub>eq</sub> Night time	Perm. Limit																												
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Operators Rest Room	51.7	75.0	42.8	70.0																												
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	<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 (submitted along with HYCR for the period October 2021 to March 2022) that an Escrow Account must be opened by AVPPL. All deposits must be made into this account and all payments have to be routed through this account for the construction of the port. This</p>																														



	<b>Adani Vizhinjam Port Private Limited (AVPPL)</b>	<b>From: April 2023 To: September 2023</b>
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**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023**

S. No.	Conditions	Compliance Status as on September 30, 2023
	Assessment Authority (SEIAA) office.	<p>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. 1.64 Lakhs earmarked for CER and funds earmarked for environmental protection measures will be kept as a balance in the current Escrow Account.</p> <p>Till 30.09.2023, an amount of Rs. 2.15 Lakhs has been spent on Corporate Environment Responsibility (CER) Activities. Despite having exhausted the agreed-upon funds for CER activities, AVPPL remains committed to environmental responsibility and has exceeded the required expenditure of Rs. 1.64 Lakhs as stated in the EC Letter.</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>Noted</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 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.	<p><b>Noted</b></p>
40	Concealing the factual data or submission of false/fabricated	<p><b>Noted</b></p>


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<p align="center"><b>Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023</b></p>
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S. No.	Conditions	Compliance Status as on September 30, 2023
	<p>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.</p>	
41	<p>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>Noted</b>
42	<p>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.</p>	<b>Noted</b>
43	<p>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.</p>	<b>Noted</b>
44	<p>The mining operation shall be restricted to above ground water table and it should not intersect ground water table</p>	<p><b>Complied</b> Mining operations will be restricted to workings at a higher level at the quarry and will not touch the ground water table. The mine is located at a higher elevation on a hill and the water table in the mine is much below the general surface. However, a few perched aquifers have been observed at about 130 m from the boundary of the mine. Here the observed water level to be about 10 m below the surface. The expected</p>



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**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023**

S. No.	Conditions	Compliance Status as on September 30, 2023
		deepest mining operation during this mining period shall be about 66 m above MSL; which will be much above the ground water table. No ground water is expected to be encountered during mining.
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>Being Complied</b></p> <p>It is ensured that all vehicles used for transportation have valid Pollution Under Control (PuC) certificate from authorized centers.</p> <div style="text-align: right;">  </div> <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 nallahs flowing in and around the mine lease area shall	<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>

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**Half Yearly Compliance Report (HYCR) on Conditions Stipulated in Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 for the Period April 2023 to September 2023**

S. No.	Conditions	Compliance Status as on September 30, 2023
	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	<p><b>Complied</b></p> <p>Occupational health surveillance programs of the workers are undertaken periodically to observe any contractions due to exposure to dust and take corrective measures. Statutory norms are being followed during mining to ensure the proper health and safety of workers. All the health and safety aspects as per the requirement and standards of the DGMS are being followed to ensure the health and safety of all persons employed at the mine.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">FORM 'O' (Refer rules 29 - F (a) and 29 - L)</p> <p style="text-align: center;">REPORT OF MEDICAL EXAMINATION UNDER RULE 29 - B (To be issued in triplicate)</p> <p>Certificate No. _____</p> <p>Certified that Shri <u>Kochumon Chacko</u> employed as <u>Driller</u> in <u>Manickal</u> mine. For D. No. has examined for an initial/periodical medical examination. He appears to be <u>38</u> years of age. The findings of the examining authority are given in the attached sheet. It is considered that Shri <u>Kochumon chacko</u></p> <p>a) <input checked="" type="checkbox"/> Is medically fit for employment in mines.  b) <input type="checkbox"/> Is suffering from _____ and is medically unfit for  i. Any employment in mines; or  ii. Any employment below ground; or  iii. Any employment or work _____</p> <p>c) <input type="checkbox"/> Is suffering from _____ and should get this disability cured / controlled and should be again examined within a period of _____ months. He will appear for re-examination with the result of test of _____ and the opinion of _____ he may be permitted / not permitted to carry on his duties during this period.</p> <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;">   <u>09/10/2023</u>  Place: MEDICAL OFFICE, V.C. CHC KATTARILANGARA </div> <div style="text-align: right;"> <p>Signature of the examining authority</p> <p><u>09/10/2023</u>  <b>DR. JUSTIN JOSE, S.J</b>  SENIOR CIVIL SURGEON  REG. NO. 2414  MEDICAL OFFICER, V.C. CHC KATTARILANGARA</p> <p>Signature in block letters</p>  </div> </div> </div>

**Medical Examination Report (Form O)**

**Enclosures:**

Annexure Number	Details of Annexure
Annexure 1:	Traffic Management Plan
Annexure 2:	Email Submission of HYCR for the period October 2022 to March 2023
Annexure 3:	Ambient Air Quality Monitoring Report
Annexure 4:	Noise Monitoring Report

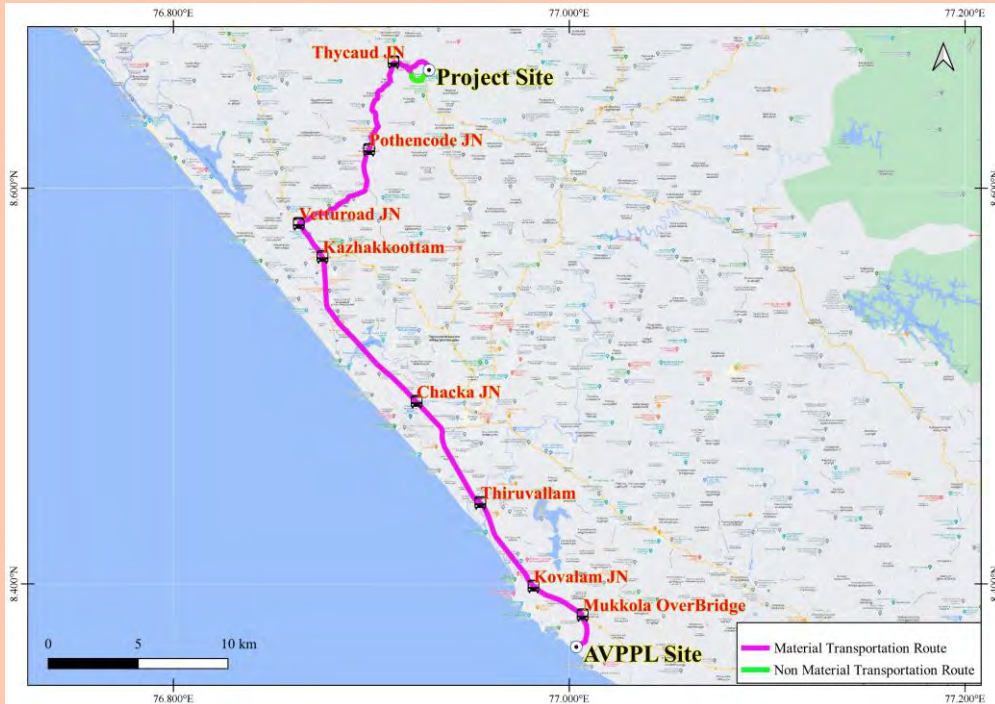


**Annexure 1:**  
**Traffic Management Plan**

# Traffic Management Plan

Granite Building Stone Quarry of M/s. Adani Vizhinjam Port Private Limited

Block. No.29, Re-Survey No. 120/10, Manickal Village, Nedumangad Taluk, Thiruvananthapuram District



Project Proponent

M/s. Adani Vizhinjam Port Private Limited

adani

Prepared by

ULTRA TECH

ENVIRONMENTAL CONSULTANCY AND LABORATORY

A QCI-NABET Accredited Environmental Consulting Organization

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Certificate No.: NABET/EIA/2023/RA 0194 Valid till June 06, 2023

Report Number: UT/KOCHI/TMP/2023/012

Field Study Period: April 2023

Report Released by: Ms Ananthitha A

In the capacity of: General Manager, ULTRA TECH Kochi

Signature:

April 2023



*Traffic Management Plan for Granite Building Stone Quarry of M/s. Adani Vizhinjam Port Private Limited, over an extent of 1.1081 Ha. (2.7381 Acres) at Block. No.29, Re-Survey No. 120/10, Manickal Village, Nedumangad Taluk, Thiruvananthapuram District*

Traffic Management Plan



**Document Details**

<i>Document Title</i>	:	<i>Traffic Management Plan for Granite Building Stone Quarry of M/s. Adani Vizhinjam Port Private Limited, over an extent of 1.1081 Ha. (2.7381 Acres) at Block. No.29, Re-Survey No. 120/10, Manickal Village, Nedumangad Taluk, Thiruvananthapuram District</i>
<i>Document Subtitle</i>	:	<i>Traffic Management Plan</i>
<i>Report No.</i>	:	<i>UT/KOCHI/TMP/2023/012</i>
<i>Date</i>	:	<i>30.05.2023</i>
<i>Version</i>	:	<i>R0</i>
<i>Author</i>	:	<i>ULTRA TECH Environmental Consultancy &amp; Laboratory</i>
<i>Client Name</i>	:	<i>M/s. Adani Vizhinjam Port Private Limited</i>

**Document History**

<i>Version</i>	<i>Revision</i>	<i>Author</i>	<i>Reviewed by</i>	<i>Date</i>
<i>Draft</i>	<i>R0</i>	<i>Ms. Ananthitha A Ms Haritha V Mohanan Ms Ambily U S Ms Farsana Nazrin V B</i>	<i>Ms. Anjali Singam</i>	<i>25.04.2023</i>
<i>Draft 1</i>	<i>R1</i>	<i>Ms. Ananthitha A Ms Ambily U S</i>	<i>Ms. Anjali Singam</i>	<i>09.05.2023</i>
<i>Draft 2</i>	<i>R2</i>	<i>Ms. Ananthitha A Ms Ambily U S</i>	<i>Ms. Anjali Singam</i>	<i>22.05.2023</i>
<i>Final</i>	<i>R0</i>	<i>Ms. Ananthitha A Ms Ambily U S</i>	<i>Ms. Anjali Singam</i>	<i>30.05.2023</i>



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## List of Abbreviations

Abbreviation	Description
AVPPL	: Adani Vizhinjam Port Private Limited
DMG	: Department of Mining and Geology
HMV	: Heavy Motor Vehicles
IRC	: Indian Road Congress
KSEB	: Kerala State Electricity Board
LMV	: Light Motor Vehicles
LoS	: Level of Service
MP	: Mining Plan
SEAC	: State Expert Appraisal Committee
SLs	: Survey Locations
TMP	: Traffic Management Plan

## Executive Summary

- M/s. Adani Vizhinjam Port Private Limited (AVPPL) obtained Environmental Clearance (EC) for its Granite Building Stone Quarry project over an extent of 1.1081 Ha. (2.7381 Acres) at Block No.29, Re-Survey No. 120/10, Manickal Village, Nedumangad Taluk, Thiruvananthapuram District in February 2020 (EC number 1416/EC1/2019/SEIAA dated 27.02.2020). This EC was for a production of 70, 230 TPA (max) and is valid till 26.02.2025.
- However, AVPPL intends to seek modification in the EC in terms of increasing the production capacity to compensate for the time lost for construction activities due to the local agitations against the Port project, and to meet the timelines stipulated by the Kerala State Government to make the port operational by August 2023. In this regard, the Mining Plan has been revised and approved on 29.8.2022.
- It is proposed to increase the production capacity of 2023-24 and 2024-25 as given in Table 1, as per the approved revised Mining Plan.

**Table 1: Production Plan for the period 2023-2025**

Production Plan in MT as per:	Year		Total for the period 2023-2025
	2023-24	2024-25	
Old approved Mining Plan (dated 24.07.2019)	60,127.5	50,122	1, 10,249.5
Revised approved Mining Plan (dated 29.08.2022)	2,44,181	23,062	2,67,243.0

- There will be a subsequent increase in the number of trucks, as the production increases. The trucks used for transportation of the quarried stones from the quarry project site to AVPPL are of 20 MT capacity. The maximum production of 2,44,181.0 MT is proposed in the year 2023-24. The number of working days will be around 250/year and traffic movement is expected for 10 hours in all working days. Thus, the number of loaded trucks expected from the said quarry, due to the revised production is 5 trucks/hour. Considering the empty trucks, this will be equivalent to 10 trucks/hour, i.e., 1 truck in every 6 minutes.
- Therefore, AVPPL has decided to conduct a carrying capacity assessment for the existing roads and to prepare a Traffic Management Plan (TMP) for this project site.
- AVPPL has entrusted M/s ULTRA TECH Environmental Consultancy and Laboratory, a NABET accredited EIA consulting organization for preparing the TMP.
- ULTRA TECH has prepared this TMP based on reconnaissance survey, stakeholder consultations, collection & analysis of existing traffic data.
- The routes being used for the transportation of the quarried material from the said quarry to AVPPL site at Vizhinjam was shared by AVPPL.
- Two SLs are chosen for traffic data collection, considering the type of road, its present traffic conditions, and estimated increase in traffic due to the increase in the production of the quarry. One study location was 1.1 km from the quarry site, along the Pirappancode- Mulamukk road

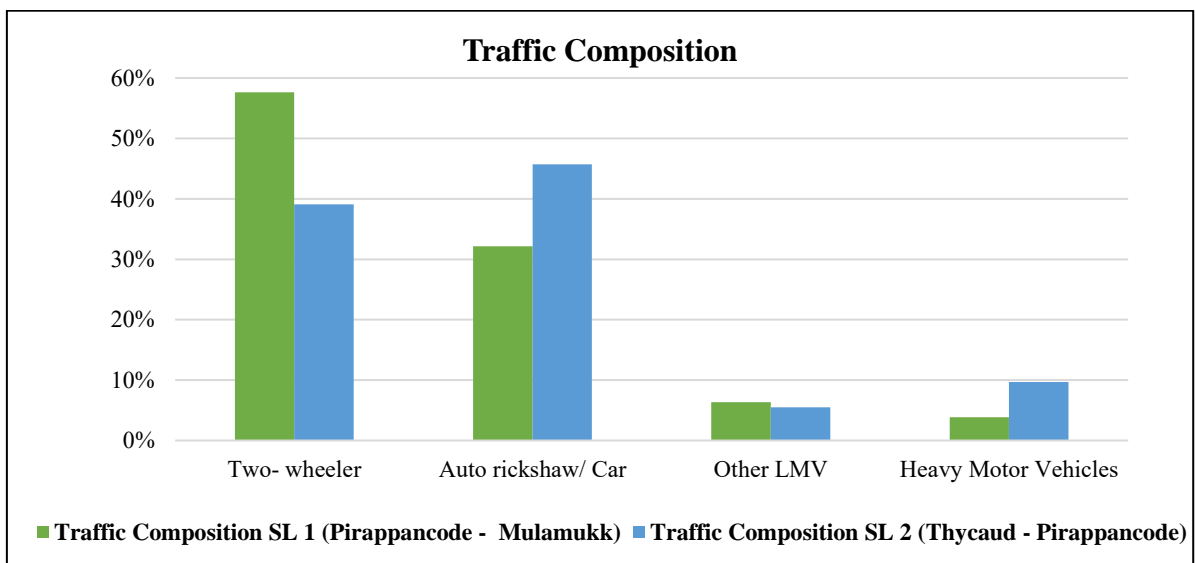
(carriageway width of 7.00 m). The other study location is a stretch between Thycaud-Pirappancode in State Highway -1 (Main Central Road i.e., MC Road), at 2.8 km from the quarry. The carriageway width at this location is 8.00 m.

- Reconnaissance survey and field data collection were done on two consecutive days 12.04.2023 and 13.04.2023. It is not required to conduct the traffic survey on a Sundays, as the quarry is not operational on Sundays and Public Holidays. The traffic management measures proposed should cater to the traffic to and from Manickal Quarry to Vizhinjam Port, on all days of operation.
- It was observed during the reconnaissance survey that, the quarry access road stretch from Kuthirakulam Junction to Manickal Quarry of about 0.7-1.00 km, has been widened and strengthened, tarred, and maintained in good condition by AVPPL (shown in Figure 1). This road is being used only for material transport.



**Figure 1: Material Transport Road Widened by AVPPL**

- The traffic studies revealed that, the traffic composition at Thycaud-Pirappancode road is dominated by autorickshaws and passenger cars (more than 45%) whereas the traffic composition at Pirappancode-Mulamukk road is dominated by two wheelers (more than 50%). The heavy vehicle (trucks and buses) constitutes less than 10 % of the traffic composition of the Thycaud-Pirappancode road whereas, it is less than 5% for Pirappancode-Mulamukk road. The graph of traffic composition at SLs is shown in Figure 2.



**Figure 2: Traffic Flow Composition**

- The increase in PCU due to the proposed increase in production is 39 trucks/day. The hours of transport operations being 9 hours, the proposed increase in PCU is 4.33 trucks/hour or 13 PCU/hour.
- An increase of 13 PCU/hour is insignificant to cause any changes to the existing LoS of Thycaud-Pirappancode road.
- The LoS in Thycaud-Pirappancode road is poor from 08.00 am to 10.00 am and from 03.00 pm to 05.00 pm. Therefore, it is advisable that, the trucks shall not commute during these heavy rush hours. Due to the school time restrictions already being followed, truck movements from Manickal Quarry are stopped from 08.30 am to 10.00 am and 03.30 pm to 05.00 pm. Therefore, no further restrictions are required for the scheduling of trucks from Manickal Quarry.
- The TMP prepared for Manickal Quarry includes the identification of the traffic management measures, the budget estimation for the implementation of traffic management measures and the roles and responsibilities to be performed by the various officials/stakeholders involved.
- Four traffic management measures are suggested based on the traffic studies, which are:
  - ❖ Installation of traffic mirrors at three junctions. Two mirrors are proposed at Pirappancode junction and one mirror each at Mulamukk and Kuthirakulam Junctions.
  - ❖ Erection of signboards are proposed at 8 locations, and
  - ❖ Establishment of speed breaker at Kuthirakulam Junction are proposed.
- The budget estimated for installation of these traffic management measures is approximately Rs 1,20,000/-.
- The important recommendations from the carrying capacity study and TMP are the following.
  - Time of truck movements to and from Manickal Quarry shall be between 6.00 am and 6.00 pm, as agreed upon with Manickal Gramapanchayat and the truck movements should stop between the school timings (8.30 am to 10.00 am and 3.30 pm to 5.00 pm).
  - Recording of the number of truck movements, hourly, daily, monthly (and annually) shall be done. It shall be ensured that, the number of trucks leaving the site is not exceeding the limit in any day.
  - Regular maintenance of the material transport road, especially the road from Manickal Quarry to Mulamukk junction shall be done.
  - A Traffic Warden shall be deployed at Mulamukk junction, in addition to the Traffic Warden at Kuthirakulam and Pirappancode Junction.
  - Trainings and awareness sessions shall be given to the truck drivers and local population.
- Vizhinjam Port being one of the high priority and prestigious projects of the Government of Kerala, measures to meet the timelines need to be followed. Increasing the production plan at Manickal Quarry is thus inevitable. The proposed increase in production and the corresponding increase in the number of trucks for transportation will not cause any hinderance to the existing traffic flow, if adequate measures as suggested in the TMP are scrupulously followed.

## **1. Introduction**

### **1.1. Overview**

This Traffic Management Plan (TMP) has been prepared for Granite Building Stone quarry of M/s. Adani Vizhinjam Port Private Limited (AVPPL), over an extent of 1.1081 Ha. (2.7381 Acres) at Block. No.29, Re-Survey No. 120/10, Manickal Village, Nedumangad Taluk, Thiruvananthapuram District. The stones mined from this quarry (hereafter referred to as Manickal Quarry) are transported to Vizhinjam Port and utilized for breakwater construction.

### **1.2. Kickoff meeting for TMP preparation**

Kickoff meeting was conducted with the following members of the Environment Management Cell (EMC) of AVPPL to understand the existing scenario and the objectives of the traffic management plan for Manickal Quarry.

- Mr Hebin C (Manager, Environment AVPPL)
- Mr Jesse Benjamin Fullonton (Assistant Manager, Environment AVPPL)

Vizhinjam is a major infrastructure project of Government of Kerala (GoK) being developed by AVPPL under PPP mode. All the construction works including that of the breakwater is now being undertaken with the ambitious target set by GoK. An increased quantity of rock supply is an important imperative for meeting the target. AVPPL proposed to increase the production capacity of Manickal Quarry to meet the timeline set by the State Government of Kerala for making the Vizhinjam Port operational in 2023 itself. The State Expert Appraisal Committee (SEAC), Kerala has instructed AVPPL to conduct a carrying capacity study and prepare a traffic management plan to cater to the increased production. While ensuring the construction targets, AVPPL is also committed in ensuring mitigation measures for every foreseeable impact due to the mining activity at Manickal quarry site.

The details of existing and proposed production, the haulage routes, etc. were explained by the EMC of AVPPL during the kickoff meeting. It is understood that the EMC has not, so far, received any complaints regarding the truck movement from Manickal Quarry or any transport related issues. GPS tracking is installed in all trucks used for transporting materials to Vizhinjam Port.

### **1.3. Objectives of the Traffic Management Plan**

This Traffic Management Plan (TMP) aims at the following:

- Conduct a comprehensive study of existing traffic situation, traffic intensity, available infrastructure etc and understanding the carrying capacity and level of service.
- Assess the changes in the level of service, when the production from Manickal Quarry increases as per the revised Mining Plan
- Identify if any rectification measures or interventions are required to ease the traffic flow.
- Ensure through adequate recommendations that, the truck movements from Manickal Quarry does not cause any inconveniences to the local population as well as other road users.



#### 1.4. Existing and Proposed Production Plan

The total mineable reserves at Manickal Quarry is 2,90,005 MT and the life of mine is estimated to be 6 years for a production plan of 70230 TPA (max), as per the approved Mining Plan dated 24.7.2019. To meet the timelines stipulated by the Kerala State Government to make the port operational by August 2023, AVPPL intends to increase the production in the year 2023-24. The Mining Plan has been revised and approved by Department of Mining and Geology (DMG) on 29.8.2022. The production plan as per the old and revised Mining Plans and the actual extraction are depicted in Table 1.1.

**Table 1.1: Production plan of the Manickal Quarry**

Production Plan in MT as per:	Year						Total production (MT)
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	
Approved Mining Plan dated 24.07.2019	50,125.5	70,230	60,127.5	50,122	50,400	9,000	<b>2,90,005</b>
Extracted	8,000	63,900					<b>71,900</b>
Revised approved Mining Plan dated 29.08.2022	-	-	2,44,181	23,062	-	-	<b>2,67,243.0</b>

Since it is April 2023 now, the production of 2,44,181 MT in the year 2023-24 implies that this increased production will be carried out in a span of 250 days, from the date of obtaining the approval of the amended Environment Clearance (EC). The number of trucks required for transportation depends on the days of operations as well as the operating hours in a day.

#### 1.5. Operating Hours

The operating hours of Manickal Quarry are depicted in in Table 1.2. There is no production or transportation from the quarry on Sundays and Public Holidays. The average number of days of production and transportation is 250 days/year.

**Table 1.2: Operating hours of the quarry**

Activity	Day	Time	Total hours/day
Loading of quarried aggregates into trucks	Monday to Saturday	6.00 am to 6.00 pm	12.00
	Sunday and Public Holidays	None	None
Dispatch of trucks from the quarry	Monday to Saturday	6.00 am to 8.30 am 10 am to 3.30 pm 5.00 pm to 6.00 pm	9.00
	Sunday and Public Holidays	None	None

**1.6. Number of trips required for Quarry Product Transport**

The number of trips required for transporting the quarried material is calculated from the maximum annual production and the capacity of each truck. The maximum production expected as per the revised mining plan is 2,44,181 MT. This will be transported in a span of 250 days, resulting in an average transportation of 977 MT/day. The capacity of trucks used for transportation is 20 MT. Therefore, the number of trips required for transportation of quarried material, per day will be 48.83 trips/day. The number of hours of operation is 9.0 hours. Thus, the number of laden trips per hour will be 5.42 trips/hour or 6 trips/ hour. The number of trucks required per day is calculated based on the to and fro travel time from Manickal Quarry to Vizhinjam Port. The average travel time on to and fro is about 3.00 hours for one truck. Thus for 9 hours of operation, each truck will be able to complete 3 trips. Therefore, number of trucks required per day for carrying out roughly 51 trips/day will be 17 trucks. The brief of the number of trips and trucks for the proposed production of 2,44,181 MT in a period of 250 days is given in Table 1.3.

*Table 1.3: Number of trips/day for maximum production*

S No	Item	Existing for 2023-24	Revised Details
1.	Production for a period of 1 year (250 working days)	60,127.5 MT	2,44,181 MT
2.	Production per day	240.5 MT	977 MT
3.	Number of trips per day, for 20 MT trucks	12	51
4.	Number of laden trips/hours, for 9 hours transportation	2	6

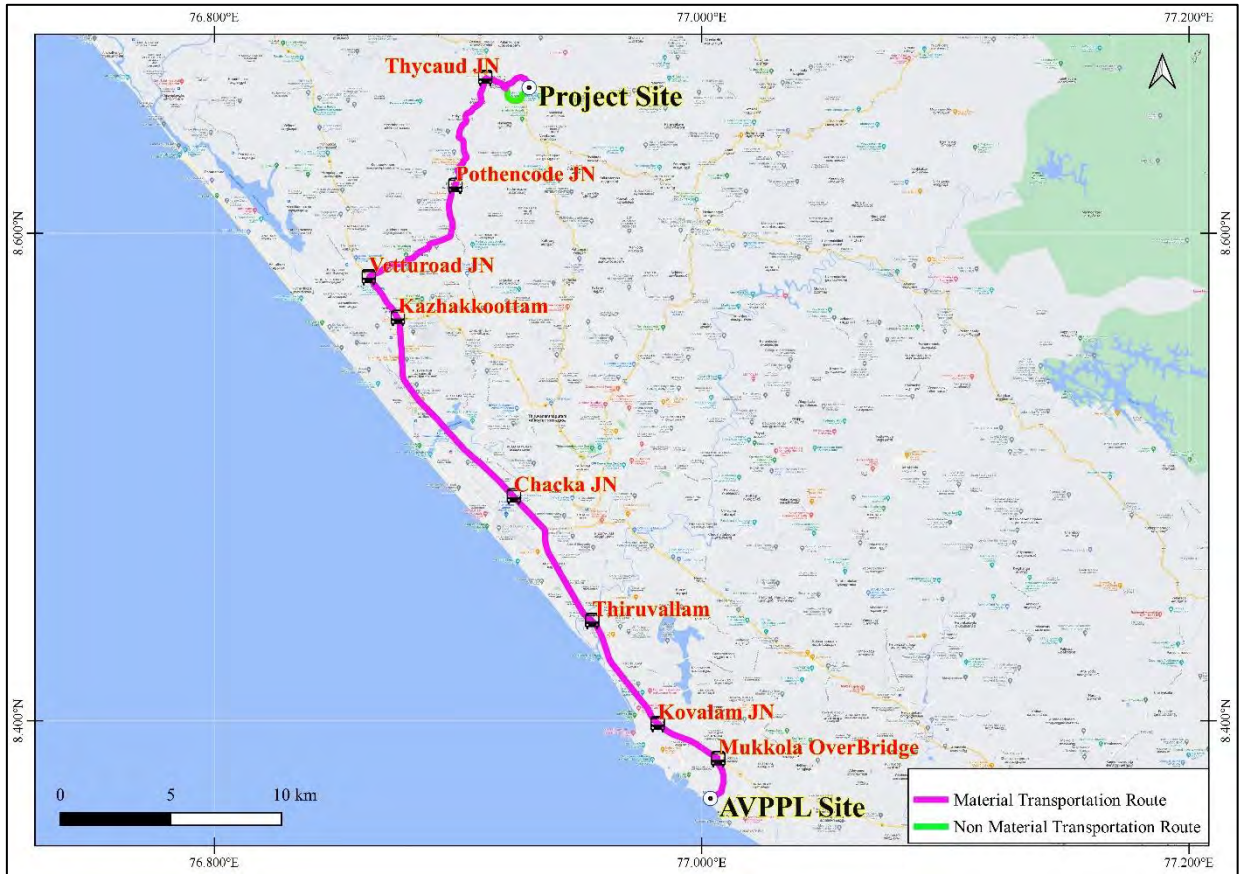
An average of 51 laden truck movements and 51 empty truck movements are estimated to be plying to and fro, between Manickal Quarry and Vizhinjam Port for the increased production.

**1.7. Contractor for transportation of quarried aggregates from Manickal Quarry**

The transportation of quarried material from Manickal Quarry to Vizhinjam Port is outsourced by AVPPL to M/s Isdec India Private Limited for a period of 1 year from 15.03.2022 to 31.03.2024. The Contract agreement covers the mandatory requirements of drivers of the trucks. In addition, safety trainings are given to all truck drivers, once in two months and during special events such as ‘road safety week’.

**1.8. Haulage Route and Destination**

The route followed for the transportation of material from Manickal Quarry to Vizhinjam Port, as detailed by the EMC of Manickal Quarry is depicted in Figure 1.1.



**Figure 1.1: Route of transportation from Manickal Quarry to Vizhinjam Port**

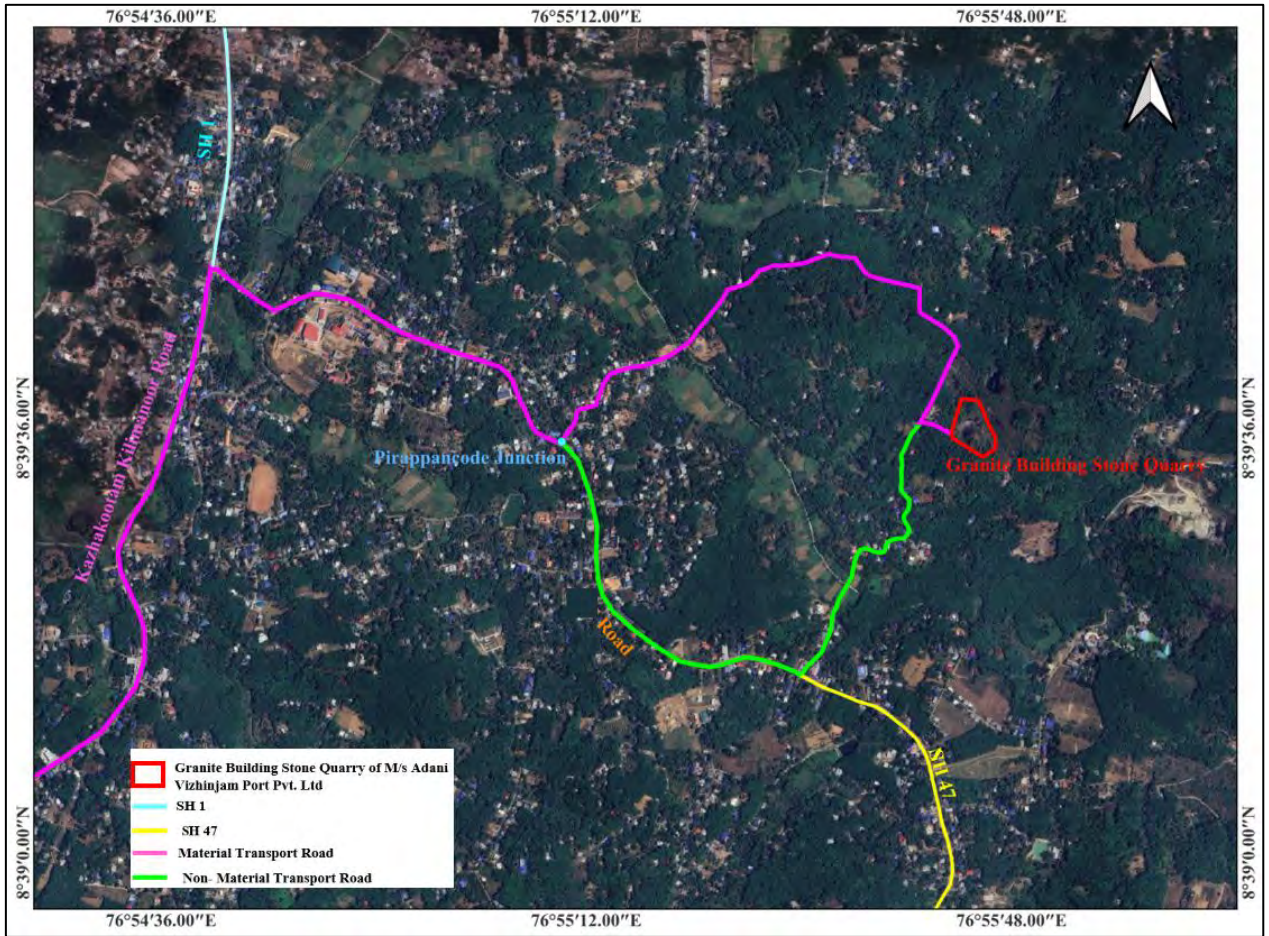
- The route follows the Main Central Road (MC Road, ie, SH-1) from Pirappancode Junction to Thycaud Junction for 1.1 km.
- From Thycaud Junction, it follows the National Highway Bypass road (Kazhakuttam-Thycaud Road) till it reaches the Vetturoad Junction.
- From the Vetturoad Junction, it follows the National Highway (NH-66) till it reaches the Mukkola Overbridge.
- From Mukkola, it follows the Poovar- Vizhinjam Road and reaches the Vizhinjam Port

### 1.9. Product Transport Routes from Manickal Quarry

Manickal Quarry is located approximately 1.5 km East of Pirappancode Junction, as shown in Figure 1.2. The routes being utilized for material transport and the movement of workforce (non-material transport) are depicted in Figure 1.2.

The material transport route originates from the quarry access road and follows the northward road (Mulamukk-Vadhyarukonam-Thumbara road) and meets the Mulamukk Junction. From there, it follows the Kuthirakulam road connecting Pirappancode- Thembamoodu road, which meets SH- 1 (Main Central road). The non- material transport route originates from the quarry access road and follows the southwards road and joins the Main Central (MC) road.



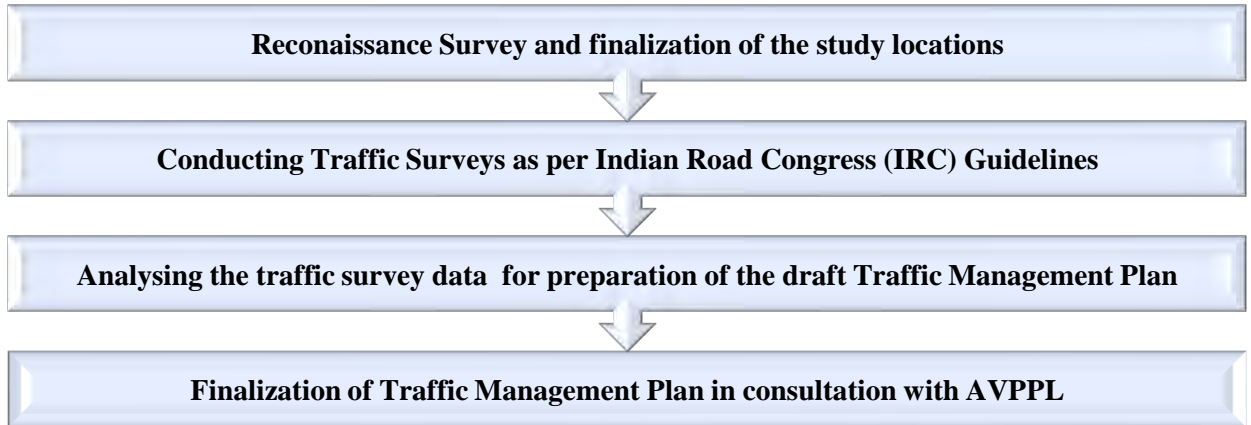


**Figure 1.2: Connectivity to the Manickal Quarry**

The approach and methodology formulated for preparation of the TMP for Manickal Quarry is presented in the next section.

## 2. Approach and Methodology

The approach and methodology formulated for preparation of the TMP for Manickal Quarry is presented in Figure 2.1.



**Figure 2.1: Approach and Methodology for preparation of TMP**

Conducting the reconnaissance survey, ground truth verification and stakeholder consultations are critical for identifying the traffic survey locations. Indian Road Congress (IRC) guidelines are followed for Traffic Volume Count Surveys.

### 2.1. IRC Guidelines for Traffic Volume Count Survey

The following guidelines as per IRC: SP: 19-2001 and IRC:09 -1972 are followed for conducting the traffic surveys.

- The survey locations should be where, the traffic is travelling at a constant speed, at least 100.00 m away from a change of speed limit
- The sites where vehicles are accelerating or decelerating due to sharp bends, steep inclines, traffic signals, near junctions, near pedestrian crossings or on-street parked vehicles are to be avoided.

### 2.2. Day and Time for Traffic Volume Count Survey

Traffic volumes on a rush hour of Monday morning and Friday evening shows exceptionally high volumes and is normally not used in analysis. Therefore, traffic volume counts are usually conducted on Tuesday, Wednesday, or Thursday.

- The reconnaissance survey is conducted on Wednesday (12.04.2023) and the Traffic Volume Count Survey is done on Thursday (13.04.2023)
- It is not required to conduct the traffic surveys on Sundays and Public Holidays as, Manickal Quarry is not operational on these days.
- The traffic survey is to be carried out from 6.00 am to 6.00 pm, as the transporting operations in the quarry follows this schedule.



### 2.3. Reconnaissance Survey and Ground Truth Verification

The reconnaissance survey started with the consultations with the Mines Manager Mr Suraj Kamat, Mines Supervisor Mr Saleem, Assistant Mines Supervisor Mr Purushothaman, Mr Sreenath S P Senior Associate Environment of M/s AVPPL and the truck drivers of M/s Isdec India Private Limited. The photographs of consultation with AVPPL is shown in Figure 2.2.



**Figure 2.2: Consultations with AVPPL**

The Mines Manager and the Mines Supervisor mentioned about the measures already undertaken for smooth flow of traffic from Manickal Quarry, such as widening of the access road and deployment of traffic wardens at 2 locations. They informed that, empty trucks that reach the quarry in the night, wait at the parking location and the loading of trucks start before 6.00 am so that, trucks start leaving the quarry site from 6.00 am onwards. They informed that, all necessary arrangements including adequate additional parking space for trucks will be provided before increasing the production as per the revised Mining Plan.

The truck drivers explained about the precautions they take while driving such as following the speed restrictions, as per the signboards, not driving the trucks during the school time (from 8.30 am to 10.00 am and 3.30 pm to 5.00 pm). The site photographs are given in Figure 2.3.



**Figure 2.3: Site Photographs**

The access roads to Manickal Quarry are depicted in Figure 2.4. It was observed that, the access road has been widened by concreting on either side, to enable better movement of the trucks.



**Figure 2.4: Access road to Manickal Quarry**

The material and non-material transport routes are depicted in Figure 2.5. The non-material transport road was however, not maintained adequately by the local panchayath.



Material transport route

Non-material transport route

**Figure 2.5: Material transport and non-material transport routes**

All the trucks used for transportation to Vizhinjam Port has the label ‘Vizhinjam Port’ and are covered with tarpaulin when laden, as depicted in Figure 2.6.



Truck with “Vizhinjam Port” label



Covered trucks

**Figure 2.6: Trucks for material transport**

Identification of the traffic survey location is the most vital step in studying the carrying capacity and level of service of the existing roads. SLs were selected according to IRC: SP: 19- 2001 and IRC: 09- 1972, about 100.00 m away from speed limit change of traffic. The study locations were away from sharp bends, steep inclines, signals, junctions, pedestrian crossings etc.

**2.4. Junctions along the Material Transport Route**

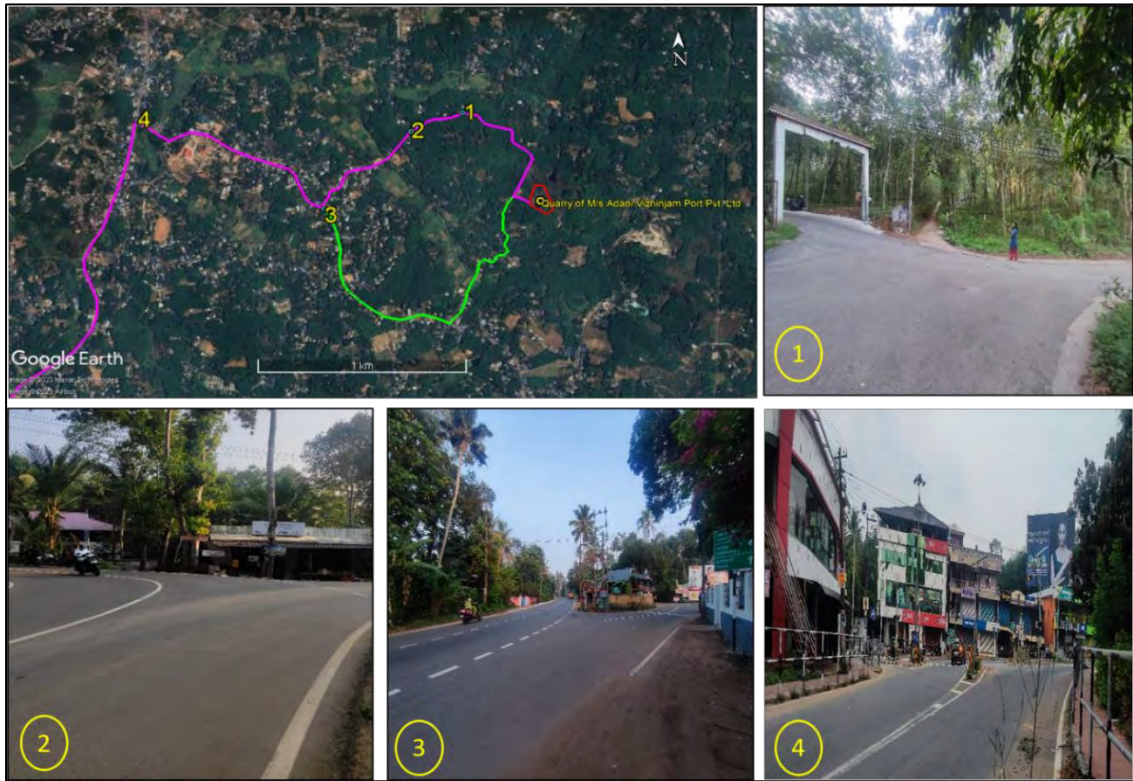
The objective of the TMP is to address any traffic congestion expected from the proposed increase in production from Manickal Quarry, as per the revised Mining Plan. The focus is on MC Road and the smaller quarry access roads, as from Vetturoad Junction onwards, the material transport route follows the NH bypass of carriage way width of ‘4 lanes. It is observed from the reconnaissance survey that there four ‘2 lane’ junctions along the material transport road of Manickal Quarry till it reaches the NH bypass road (Kazhakkootam-Thycaud Road), which are Kuthirakulam, Mulamukk, Pirappancode and Thycaud junctions. AVPPL has deployed traffic wardens at Kuthirakulam and Pirappancode junctions. The geo-coordinates of the junctions are given in Table 2.1 and shown in Figure 2.7.

**Table 2.1: Details of location of 2 lane junctions along the material transport road**

S. No	2-way 2 lane Junctions	Coordinates	
		Latitude	Longitude
1.	Kuthirakulam Junction	8°39'50.68"N	76°55'32.54"E
		76°55'32.54"E	8°39'47.63"N
2.	Mulamukk Junction	8°39'47.63"N	76°55'24.07"E
		76°55'24.07"E	8°39'34.29"N
3.	Pirappancode- MC Road junction (Both sides)	8°39'34.29"N	76°55'10.54"E
		76°55'10.54"E	



4.	Thycaud Junction	Latitude	8°39'49.68"N
		Longitude	76°54'40.44"E



**Figure 2.7: Location of junctions**

**2.5. Traffic Survey Locations**

Two survey locations are identified as depicted in Figure 2.8 and Table 2.2.



**Figure 2.8: Traffic Volume Count Locations**



**Table 2.2: Details of Traffic Volume Count Locations**

Traffic Survey Locations		Geo Co-ordinates	Remarks
SL 1		<p>8°39'16.68"N 76°55'31.65"E</p>	<p>Straight stretch of road between Mulamukk Junction and Pirappancode Junction</p>
SL 2		<p>8°39'46.71"N 76°54'44.02"E</p>	<p>Straight stretch of road between Pirappancode Junction and Thycadud Junction</p>

**2.6. Consultations with nearby residents other road users**

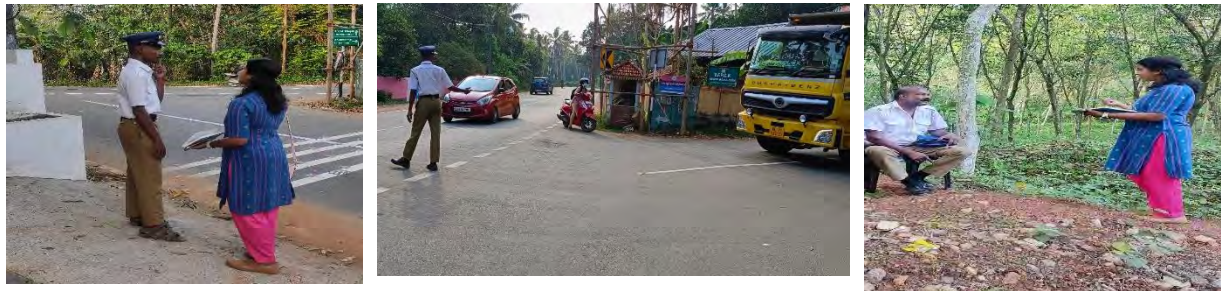
Consultations were done with local people near the two selected Traffic Survey Locations as depicted in Figure 2.9. The concerns raised by local people include the erection of signboards on all relevant locations, widening of MC road by the relevant Government authorities.



**Figure 2.9: Consultations with nearby residents and road users**

**2.7. Consultations with Traffic Wardens deployed by AVPPL**

Consultations were done with the Traffic Wardens deployed by AVPPL as depicted in Figure 2.10. Mr Sujin is appointed as the Traffic Warden at Pirappancode Junction and Mr Muraleedharan Nair at Kuthirakulam Junction.



**Traffic Warden at Pirappancode Junction**

**Traffic Warden at Kuthirakulam Junction**

**Figure 2.10: Consultations with the Traffic Wardens deployed by AVPPL**

The Traffic Wardens manually regulate the truck movements to and from Vizhanjam Port and Manickal Quarry. The details of the field studies are mentioned in the next section.



### 3. Field Studies

#### 3.1. Method of Data Collection

Manual counting was adopted for Traffic Volume Count Survey. It is of paramount importance that traffic on road is counted and classified by direction of traffic flow and hence one team each was deployed on either side of the road. Each team counted the Traffic Volumes along one direction of flow.

Manual counting of vehicles passing a point at a specific interval of every 1 hour was done from 6 am to 6 pm to identify the hourly pattern of traffic flow characteristics. The composition of traffic includes two wheelers (cycle / motor cycle), passenger cars and three wheelers (goods & passenger autos), light motor vehicles (van/mini tempo) and heavy motor vehicles such as lorries, buses, trucks, etc. The hourly flow pattern of the study area was captured using traffic counting forms.

The traffic study was conducted on 13.04.2023. 12 hours counts were considered from 6 am to 6 pm. Photographs of traffic survey is shown in Figure 3.1.



*From Thycaud Junction to Pirappancode Junction*



*From Pirappancode Junction to Thycaud Junction*



*From Pirappancode to Mulamukk*



*From Mulamukk to Pirappancode*

**Figure 3.1: Photographs of Traffic Survey**

#### 3.2. Data Collected during Traffic Surveys

The traffic survey data collected for the study are given in Table 3.1, Table 3.2, Table 3.3 and Table 3.4.



**Traffic Management Plan for Granite Building Stone Quarry of M/s. Adani Vizhinjam Port Private Limited, over an extent of 1.1081 Ha. (2.7381 Acres) at Block. No.29, Re-Survey No. 120/10, Manickal Village, Nedumangad Taluk, Thiruvananthapuram District**

**Table 3.1: Traffic Survey Data – SL 1 (Pirappancode to Mulamukk)**

Assessment Location: SL 1			Direction of Traffic Flow: Pirappancode to Mulamukk		
Date: 13 <sup>th</sup> April 2023			Time: 06:00 AM - 06:00 PM		
<b>TRAFFIC VOLUME COUNT FORM</b>					
S. No.	Time (AM-PM)	Two-Wheeler	Auto-rickshaw / Car	Other Light Motor Vehicles (LMV)	Heavy Motor Vehicles (HMV)
1.	06:00 AM-07:00 AM	5	2	1	0
2.	07:00 AM-08:00 AM	70	21	5	5
3.	08:00 AM-09:00 AM	90	36	7	1
4.	09:00 AM-10:00 AM	75	22	5	6
5.	10:00 AM-11:00 AM	48	36	10	13
6.	11:00 AM-12:00 PM	44	41	6	2
7.	12:00 PM-01:00 PM	37	31	8	4
8.	01:00 PM-02:00 PM	52	39	11	6
9.	02:00 PM-03:00 PM	53	28	6	9
10.	03:00 PM-04:00 PM	34	29	1	2
11.	04:00 PM-05:00 PM	105	66	10	2
12.	05:00 PM-06:00 PM	35	33	17	0
<b>Total</b>		<b>648</b>	<b>384</b>	<b>87</b>	<b>50</b>





**Traffic Management Plan for Granite Building Stone Quarry of M/s. Adani Vizhinjam Port Private Limited, over an extent of 1.1081 Ha. (2.7381 Acres) at Block. No.29, Re-Survey No. 120/10, Manickal Village, Nedumangad Taluk, Thiruvananthapuram District**

**Table 3.2: Traffic Survey Data – SL 1 (Mulamukk to Pirappancode)**

Assessment Location: SL 1		Direction of Traffic Flow: Mulamukk to Pirappancode Junction			
Date: 13 <sup>th</sup> April 2023		Time: 06:00 AM – 06:00 PM			
<b>TRAFFIC VOLUME COUNT FORM</b>					
S. No.	Time (AM-PM)	Two-Wheeler	Auto-rickshaw / Car	Other Light Motor Vehicles (LMV)	Heavy Motor Vehicles (HMV)
1.	06:00 AM-07:00 AM	10	3	0	2
2.	07:00 AM-08:00 AM	140	30	8	7
3.	08:00 AM-09:00 AM	210	153	4	5
4.	09:00 AM-10:00 AM	130	64	3	2
5.	10:00 AM-11:00 AM	101	43	5	4
6.	11:00 AM-12:00 PM	62	35	9	9
7.	12:00 PM-01:00 PM	52	25	10	2
8.	01:00 PM-02:00 PM	37	21	9	6
9.	02:00 PM-03:00 PM	48	36	7	3
10.	03:00 PM-04:00 PM	39	27	5	4
11.	04:00 PM-05:00 PM	78	40	15	9
12.	05:00 PM-06:00 PM	28	23	13	3
<b>Total</b>		<b>935</b>	<b>500</b>	<b>88</b>	<b>56</b>





**Traffic Management Plan for Granite Building Stone Quarry of M/s. Adani Vizhinjam Port Private Limited, over an extent of 1.1081 Ha. (2.7381 Acres) at Block. No.29, Re-Survey No. 120/10, Manickal Village, Nedumangad Taluk, Thiruvananthapuram District**

**Table 3.3: Traffic Survey Data – SL 2 (Thycaud Junction to Pirappancode)**

Assessment Location: SL 2 (MC Road)		Direction of Traffic Flow: Thycaud Junction to Pirappancode Junction			
Date: 13 <sup>th</sup> April 2023		Time: 06:00 AM - 06:00 PM			
<b><u>TRAFFIC VOLUME COUNT FORM</u></b>					
S. No.	Time (AM-PM)	Two-Wheeler	Auto-rickshaw / Car	Other Light Motor Vehicles (LMV)	Heavy Motor Vehicles (HMV)
1.	06:00 AM-07:00 AM	85	70	3	31
2.	07:00 AM-08:00 AM	315	240	25	49
3.	08:00 AM-09:00 AM	490	380	25	47
4.	09:00 AM-10:00 AM	395	370	39	50
5.	10:00 AM-11:00 AM	253	310	17	42
6.	11:00 AM-12:00 PM	261	200	25	40
7.	12:00 PM-01:00 PM	220	215	38	40
8.	01:00 PM-02:00 PM	256	279	39	49
9.	02:00 PM-03:00 PM	192	276	34	38
10.	03:00 PM-04:00 PM	90	307	26	45
11.	04:00 PM-05:00 PM	292	285	28	40
12.	05:00 PM-06:00 PM	88	120	25	44
<b>Total</b>		<b>2937</b>	<b>3052</b>	<b>324</b>	<b>515</b>





**Traffic Management Plan for Granite Building Stone Quarry of M/s. Adani Vizhinjam Port Private Limited, over an extent of 1.1081 Ha. (2.7381 Acres) at Block. No.29, Re-Survey No. 120/10, Manickal Village, Nedumangad Taluk, Thiruvananthapuram District**

**Table 3.4: Traffic Survey Data – SL 2 (Pirappancode to Thycaud Junction)**

Assessment Location: SL 2 (MC Road) Junction		Direction of Traffic Flow: Pirappancode to Thycaud			
Date: 13 <sup>th</sup> April 2023		Time: 06:00 AM - 06:00 PM			
<b>TRAFFIC VOLUME COUNT FORM</b>					
S. No.	Time (AM-PM)	Two-Wheeler	Auto-rickshaw / Car	Other Light Motor Vehicles (LMV)	Heavy Motor Vehicles (HMV)
1.	06:00 AM-07:00 AM	98	110	11	16
2.	07:00 AM-08:00 AM	175	260	21	48
3.	08:00 AM-09:00 AM	270	290	24	50
4.	09:00 AM-10:00 AM	206	250	20	40
5.	10:00 AM-11:00 AM	185	200	30	47
6.	11:00 AM-12:00 PM	216	263	27	55
7.	12:00 PM-01:00 PM	220	240	32	69
8.	01:00 PM-02:00 PM	240	235	20	40
9.	02:00 PM-03:00 PM	275	200	45	50
10.	03:00 PM-04:00 PM	241	299	65	91
11.	04:00 PM-05:00 PM	173	279	50	103
12.	05:00 PM-06:00 PM	120	220	65	103
<b>Total</b>		<b>2419</b>	<b>2846</b>	<b>410</b>	<b>712</b>





### 3.3. Traffic Flow Composition

The traffic composition at SL 1 shows high percentage in the flow of two- wheelers when compared to the flow in SL 2. The flow of auto rickshaws and cars are comparably high in Thycaud junction. For heavy motor vehicles, the flow rate is high in SL 2 when compared to SL 1. The composition of traffic at two assessment locations are given in Figure 3.2 and Figure 3.3.

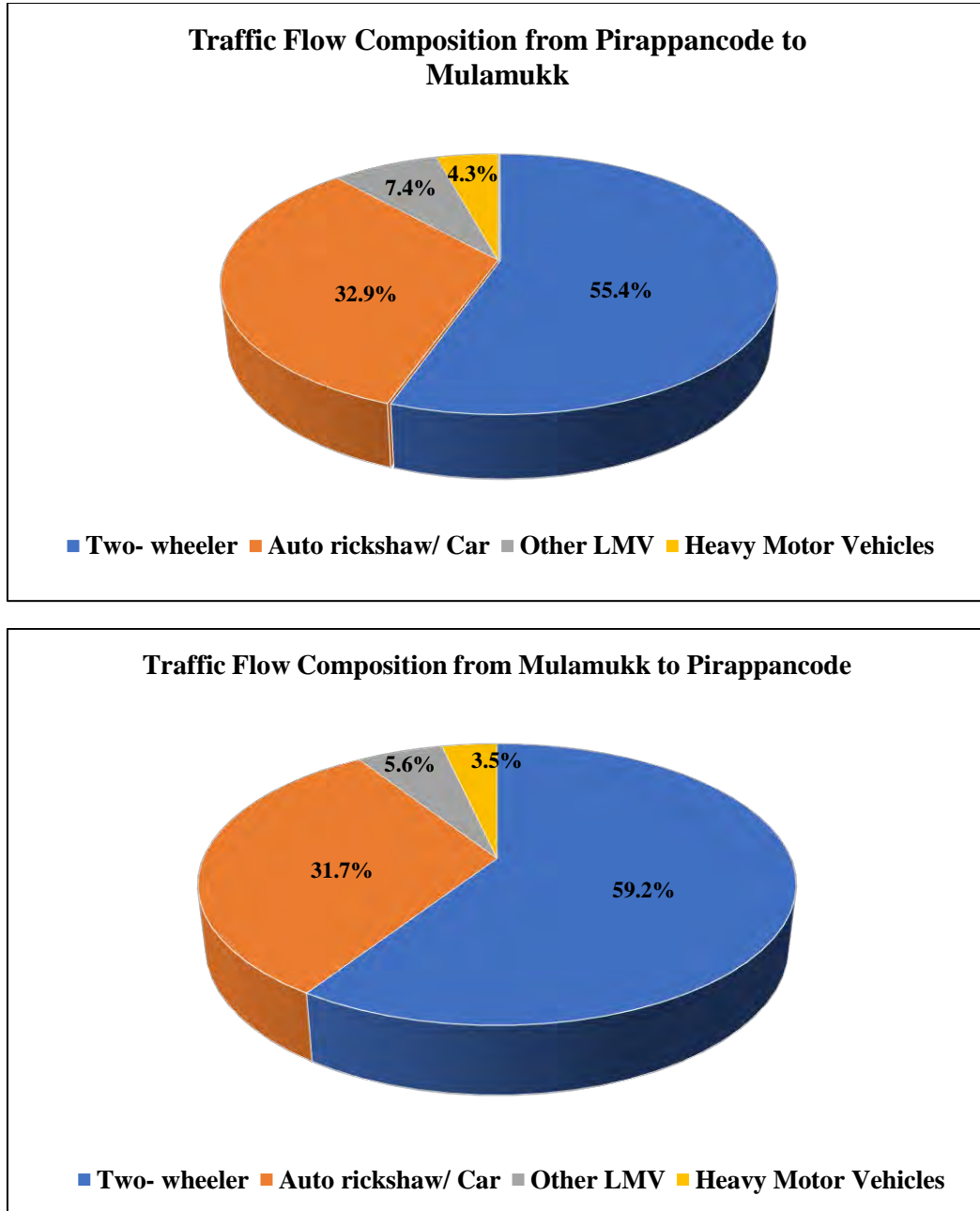
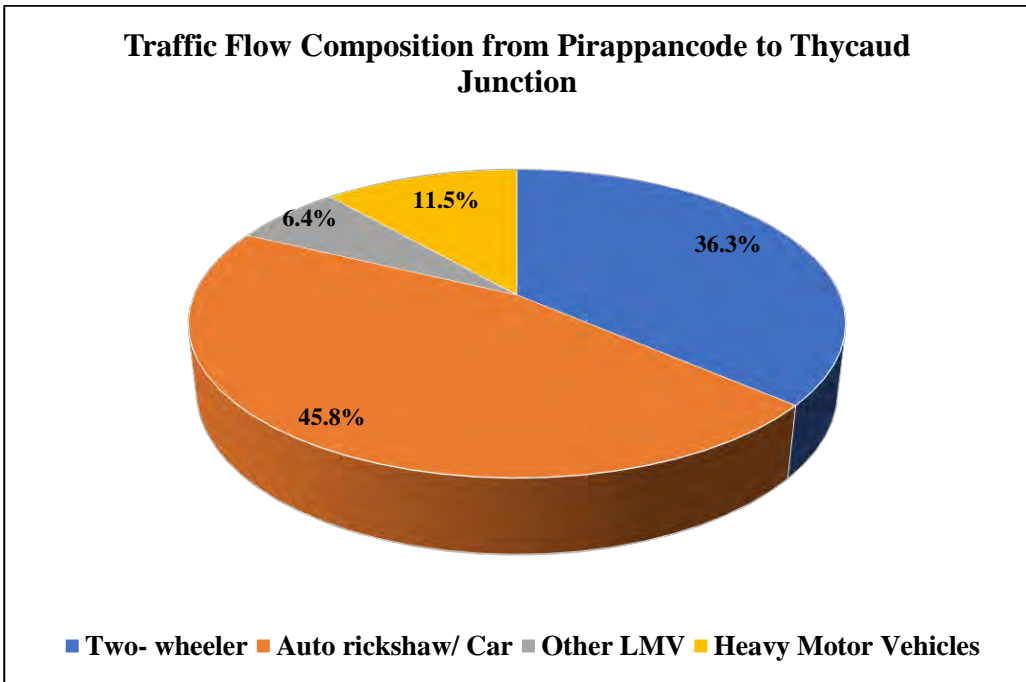
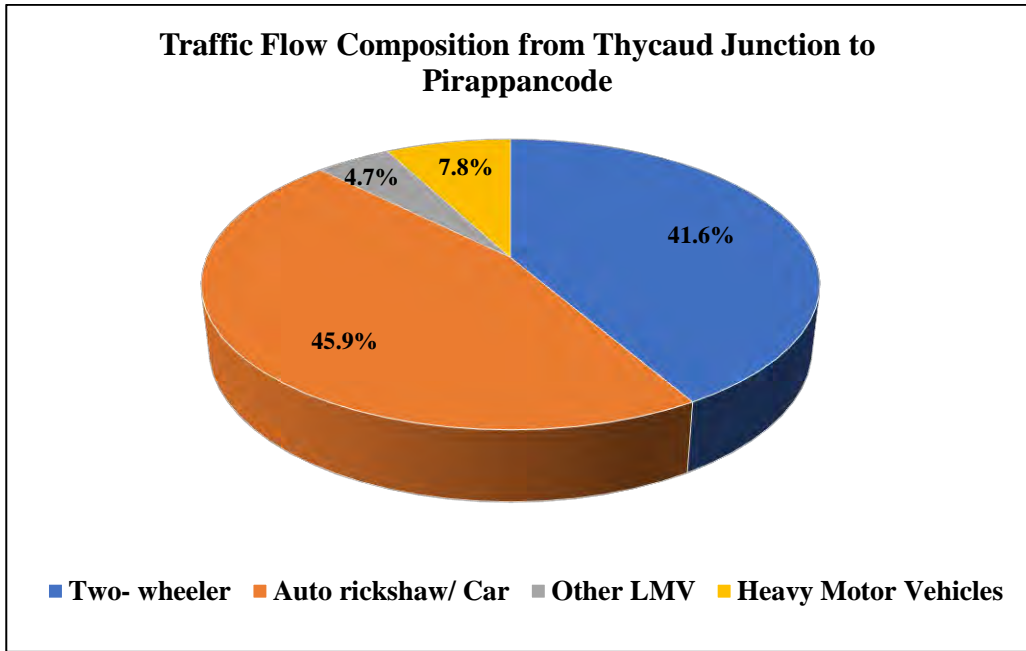


Figure 3.2: Traffic Flow composition at SL 1



**Figure 3.3: Traffic Flow Composition at SL 2**

**3.4. Analysis of Traffic Data**

The traffic in this study area is highly heterogeneous in nature. When the traffic is composed of a number of types of vehicles, it is a common practice to convert the flow into equivalent passenger car unit (PCUs), by certain equivalency factors. The flow is then expressed as PCUs per hour or PCU’s per day. The conversion factors for various types of vehicles as per IRC:64-1990 are given in Table 3.5.

**Table 3.5: PCU Values for Different Types of Vehicles**

Sl. No.	Mode	PCU Value
1.	Cycle	0.5
2.	Scooter	0.5
3.	Auto rickshaw	1.0
4.	Car/Van	1.0
5.	Other LMV (Mini Lorry/Tempo)	1.5
6.	Bus (Passenger)	3
7.	Lorry/Truck/Luxury Bus	3
8.	Other HMV (Cranes/ JCB/Tractor)	4.5

The hourly traffic patterns for both directions of MC road after applying the conversion factors for PCU are depicted in Table 3.6.

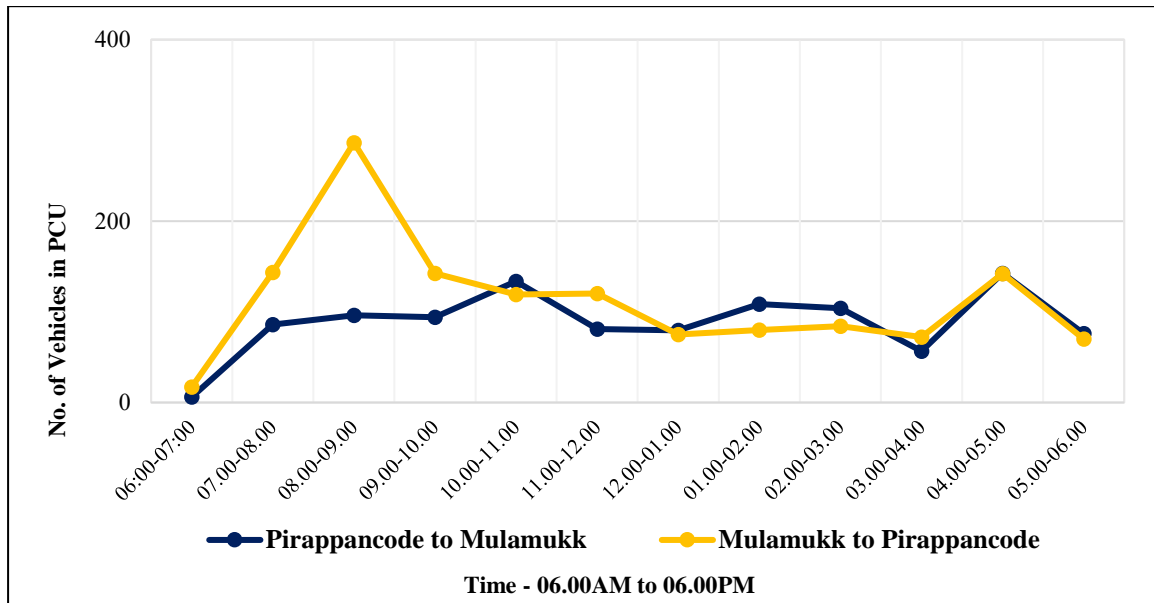
**Table 3.6: Hourly Traffic Pattern in PCU at Survey Locations**

Sl. No	Time (06.00 AM to 06.00 AM)	PCU/hour- SL 1		PCU/hour- SL2	
		Pirappancode to Mulamukk	Mulamukk to Pirappancode	Thycaud Junction to Pirappancode	Pirappancode to Thycaud Junction
1.	06:00 AM-07:00 AM	6	17	256.5	247.5
2.	07:00 AM-08:00 AM	86	143.5	655.5	595
3.	08:00 AM-09:00 AM	96	286.5	874	686
4.	09:00 AM-10:00 AM	94	142.5	851	563
5.	10:00 AM-11:00 AM	133.5	119	651	596
6.	11:00 AM-12:00 PM	81	120	548	659
7.	12:00 PM-01:00 PM	79.5	75	562	708.5
8.	01:00 PM-02:00 PM	108.5	80	686	565
9.	02:00 PM-03:00 PM	104	84	594	630
10.	03:00 PM-04:00 PM	56.5	72	593.5	926.5
11.	04:00 PM-05:00 PM	142.5	142	653	904
12.	05:00 PM-06:00 PM	76	70	399.5	841

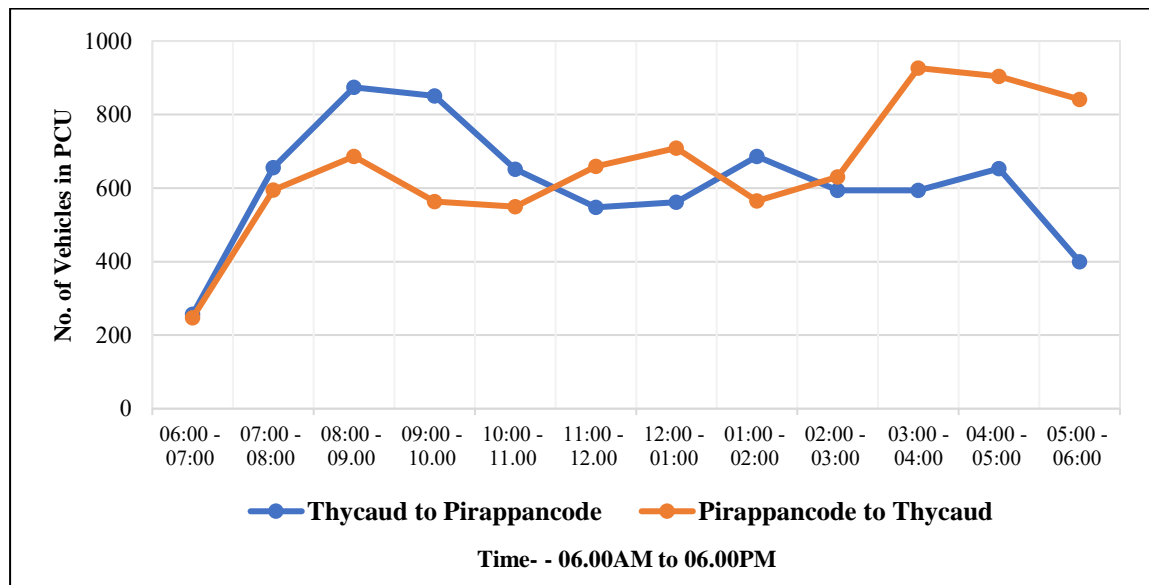
The hourly pattern of traffic at survey locations are,

- Pirappancode to Mulamukk: reaches morning peak around 10:00 am to 11:00 am and evening peak around 04:00 pm to 05:00 pm.
- Mulamukk to Pirappancode: reaches morning peak around 08:00 am to 09:00 am and evening peak around 04:00 pm to 05:00 pm.
- Thycaud Junction to Pirappancode: reaches morning peak around 08:00 am to 09:00 am and evening peak around 04:00 pm to 05:00 pm.
- Pirappancode to Thycaud Junction: reaches morning peak around 08:00 am to 09:00 pm and evening peak around 03:00 pm to 05:00 pm.

The pictorial representation of the hourly patterns of SL 1 (Pirappancode- Mulamukk road) traffic flow is depicted in Figure 3.4 and Figure 3.5.



**Figure 3.4: Hourly Pattern of Traffic at SL 1 (Pirappancode – Mulamukk)**



**Figure 3.5: Hourly Pattern of Traffic at SL 2 (Thycaud Junction – Pirappancode)**

### 3.5. Level of Service (LOS)

Level of Service is a qualitative measure describing operational conditions within a traffic stream and it describes these conditions in terms of factors such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, convenience and safety. Six LOS are recognized in IRC:64-1990. These are designated from A to F, with LOS-A representing the best operating condition (free flow) and LOS-F, the worst (forced/break down flow). The characteristics of traffic flow for each of these LOS are depicted in Table 3.7.

**Table 3.7: Characteristics of the various Level of Service in Indian Roads as per IRC**

Level of Service (LOS)	Characteristics	Existing Traffic/Design Service Volume
A (Excellent)	Represents a condition of free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is high. The general level of comfort and convenience provided to the road users is excellent	0.0 to 0.2
B (Very Good)	Represents a zone of stable flow, with the drivers still having reasonable freedom to select their desired speed and maneuver within the traffic stream. Level of comfort and convenience provided is somewhat less than LOS-A, because the presence of other vehicles in the traffic stream begins to affect individual behavior	0.2 to 0.4
C (Good)	This also is a zone of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interaction with others in the traffic stream. The selection of speed is now affected by the presence of others and maneuvering within the traffic stream requires substantial vigilance on the part of the users. The general level of comfort and convenience declines noticeably at this level	0.4 to 0.6
D (Fair)	Represents the limit of stable flow with conditions approaching close to unstable flow. Due to high density, the drivers are severely restricted in their freedom to select desired speed and maneuver within the traffic stream. The general level of comfort and convenience is poor. Small increases in traffic flow will usually cause operational problems at this level.	0.6 to 0.8
E (Poor)	Represents operating conditions when traffic volumes are at or close to the capacity level. The speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult and is generally accomplished by forcing a vehicle to give way to accommodate such maneuvers. Comfort and convenience are extremely poor and driver frustration is generally high. Operations at this level are usually unstable because small increases in flow or minor disturbances within the traffic stream will cause break downs.	0.8 to 1.0
F (Very Poor)	Represents zone of forced or break down flow. This condition occurs when the amount of traffic approaching a point exceeds the amount which can pass it. Queues form behind such	>1.0



Level of Service (LOS)	Characteristics	Existing Traffic/Design Service Volume
	locations. Operations within the queue are characterized by stop and go waves which are extremely unstable. Vehicles may progress at a reasonable speed for several hundred meters and may then be required to stop in a cyclic fashion. Due to high volumes, break down occurs and long queues and delays result.	

### 3.6. Recommended Design Service Volumes

Normally LOS C is adopted for design of roads. Capacity of roads is also a function of the roadside fringe conditions such as parking, extent of commercial activities, frontage access etc. The fringe conditions considered in IRC:106-1990 are given in Table 3.8.

**Table 3.8: Fringe Conditions for Roads as per IRC**

Road Category	Description
Arterial	No frontage access, no standing vehicles, very little cross traffic.
Sub Arterial	Frontage development, side roads, bus stops, no standing vehicles, waiting restrictions
Collectors	Free frontage access, parked vehicles, bus stops, no waiting restrictions

Design Service Volumes for different categories of roads corresponding to above referred fringe conditions are given in Table 3.9.

**Table 3.9: Design Service Volumes for Different Categories of Roads**

Sl. No	Type of carriage way	Total Design Service Volumes for different categories of roads		
		Arterial	Sub arterial	Collector
1.	2 lane one way	2400	1900	1400
2.	2 lane two way	1500	1200	900
3.	3 lane one way	3600	2900	2200
4.	4 lane undivided two way	3000	2400	1800
5.	4 lane divided two way	3600	2900	-
6.	6 lane undivided two way	4800	3800	-
7.	6 lane divided two way	5400	4300	-
8.	8 lane divided two way	7200	-	-

### 3.7. Level of Service of Pirappancode-Mulamukk road (SL1)

Since the Thycaud-Pirappancode road is two-lane two-way Arterial Road, the Design Volume Capacity is 1500 PCU/hr. The Design Volume Capacity of Pirappancode-Mulamukk road is taken as 900 PCU/hour. The Level of Service for this road is determined based on the PCU Values given in Table 3.5.

The LoS for the hourly pattern in roads taken for traffic assessment for 13th April 2023 is depicted in Table 3.10.

**Table 3.10: Levels of Service in study area**

Time	PCU/hour at SL 1	Existing Traffic/ Design Volume	Level of Service at SL1	PCU/hour at SL 2	Existing Traffic/ Design Volume	Level of Service at SL2
06:00-07:00	23	0.0	A	504	0.3	B
07:00-08:00	229.5	0.3	B	1250.5	0.8	D
08:00-09:00	382.5	0.4	B	1560	1.0	E
09:00-10:00	236.5	0.3	B	1414	0.9	E
10:00-11:00	252.5	0.3	B	1247	0.8	D
11:00-12:00	201	0.2	A	1207	0.8	D
12:00-01:00	154.5	0.2	A	1270.5	0.8	D
01:00-02:00	188.5	0.2	A	1251	0.8	D
02:00-03:00	188	0.2	A	1224	0.8	D
03:00-04:00	128.5	0.1	A	1520	1.0	E
04:00-05:00	284.5	0.3	B	1557	1.0	E
05:00-06:00	146	0.2	A	1240.5	0.8	D

### 3.8. Level of Service of Thycaud-Pirappancode Road (SL2)

It can be noted that, the LoS remains ‘Excellent’ and ‘Very Good’ for the studied stretch of Thycaud-Mulamukk road. On the other hand, for the stretch between Thycaud and Pirappancode, the LoS is very good only from 06.00 am to 07.00 am. The LoS of of this stretch remains at ‘Fair’ for most of the hours during the day. However, from 08.00 am to 10.00 am and from 03.00 pm to 05.00 pm, the LoS of this stretch is ‘Poor’ and these are peak traffic hours as per the survey.

### 3.9. Changes in Level of Service due to increased production

- The increase in PCU due to the proposed increase in production is 39 trucks/day. The hours of transport operations being 9 hours, the proposed increase in PCU for truck per hour is 4.33 trucks/hour or 13 PCU/hour.
- An increase of 13 PCU/hour is insignificant to cause any changes to the existing LoS of Thycaud-Pirappancode road.
- The LoS in Thycaud-Pirappancode road is poor from 08.00 am to 10.00 am and from 03.00 pm to 05.00 pm. Therefore, it is advisable that, the trucks shall not commute during these heavy rush hours. Due to the school time restrictions already being followed, truck movements from Manickal Quarry are stopped from 08.30 am to 10.00 am and 03.30 pm to 05.00 pm. Therefore, no further restrictions are required for the scheduling of trucks from Manickal Quarry.

## 4. Traffic Management Plan

Improving the traffic infrastructure is critical to ensure that, smooth flow of vehicles can be maintained. To improve the traffic infrastructure, the following four traffic management measures are proposed.

- Traffic Mirrors
- Signboards
- Speed breaker and
- Streetlight

The budget for the provision of this additional infrastructure for traffic management is given in Table 4.3.

### 4.1. Traffic mirrors

Traffic mirrors are used for drivers to have a better view on other vehicles, especially on a junction. A total of 4 traffic convex mirrors were suggested at three locations along the material transport road from the quarry. The location details of the suggested traffic mirrors are given in Table 4.1 and Figure 4.1.



**Figure 4.1: Locations of suggested traffic mirrors**

**Table 4.1: Details of suggested traffic mirrors**

S. No	Proposed Location	Coordinates	
		Latitude	8°39'34"N
1.	Pirappancode- MC Road junction (Both sides)	Longitude	76°55'10"E
	Mulamukk Junction	Latitude	8°39'47"N

S. No	Proposed Location	Coordinates	
2.		Longitude	76°55'24"E
3.	Kuthirakulam Junction	Latitude	8°39'50"N
		Longitude	76°55'32"E

#### 4.2. Sign boards

Sign boards are suggested at different locations along the access road (material transport road) of the quarry. The sign boards include 2 T- Junction boards for Kuthirakulam and Mulamukk Junctions and a Y- Junction board for Pirappancode junction. Speed limit sign board is needed on the Pirappancode-Thembamood road. Sign board showing narrow road is required for the access roads from Mulamukk to quarry passing Kuthirakulam junction; and adequate stop signs are also needed.

#### 4.3. Speed breaker

A speed breaker/ controller is a hump surface across roadways to reduce the speed of the vehicles. Provision of speed breaker at Kuthirakulam junction is required since the road from the quarry to the junction is in a steep manner. The details of location for suggested speed breaker is given in Table 4.2 and Figure 4.2.

**Table 4.2: Details of location of speed breaker**

S. No	Proposed Location	Coordinates	
1.	Kuthirakulam Junction	Latitude	8°39'50"N
		Longitude	76°55'32"E



**Figure 4.2: Location of suggested speed breaker**



#### 4.4. Streetlights

The access road is already provided with streetlights at different locations. But adequate maintenance should be done by Kerala State Electricity Board (KSEB) as and when needed so that transportation can be done without any hindrance.

#### 4.5. Budget for Traffic Management Measures

The budget estimated for traffic management measures is given in Table 4.3.

**Table 4.3: Budget for traffic management measures**

S. No.	Items	No. of Locations	Total cost (including labour cost) in INR
1.	Traffic mirror <ul style="list-style-type: none"> <li>• convex mirror-24 inch- 4 Nos.</li> <li>• metal stand- 4 Nos.</li> <li>• cement platform</li> </ul>	4	45,000
2.	Sign boards <ul style="list-style-type: none"> <li>• T-Junction- 2 Nos.</li> <li>• Y- Junction- 1 Nos.</li> <li>• Speed limits- 1 Nos.</li> <li>• Road narrow- 2 Nos.</li> <li>• Stop sign- 2 Nos.</li> </ul>	8	60,000
3.	Speed breaker	1	15,000
<b>Total</b>			<b>1,20,000</b>

#### 4.6. Roles and Responsibilities for Implementation of TMP

The implementation of the TMP is to be ensured through the Environment Monitoring Cell (EMC) of Manickal Quarry (AVPPL), Quarry Supervisor, Mines Manager, Traffic wardens and Truck Drivers. The roles and responsibilities of respective personnel are given in Table 4.4.

**Table 4.4: Roles and Responsibilities for Implementation of TMP**

S No	Roles	Responsibilities
1.	Environment Management Cell (EMC)	<ul style="list-style-type: none"> <li>➤ Ensure adequate resources are available to implement the TMP and making the budget provisions for implementation of the traffic management measures.</li> <li>➤ Regular review of the TMP and providing rectification measures whenever required.</li> <li>➤ Planning and undertaking meetings with local representatives of Manickal Panchayat to ensure that, the local representatives and local population are sensitized about the requirement of the increased</li> </ul>

S No	Roles	Responsibilities
		<p>production and the increased truck movement to meet the timeline stipulated by the State Government.</p> <ul style="list-style-type: none"> <li>➤ Address the complaints received from the any road users or government authorities with respect to trucks from the quarry.</li> </ul>
2.	Quarry Supervisor	<ul style="list-style-type: none"> <li>➤ Ensure that the production is as per the approved Mining Plan.</li> <li>➤ Ensure that, adequate parking facility can be provided at the site, when the production increases and the trucks waiting for loading are parked without hindering the movement of the laden trucks.</li> <li>➤ Shall keep accurate records of all laden truck movements to and from site (hourly, daily, weekly, monthly and annually)</li> <li>➤ Ensure compliance with the TMP.</li> <li>➤ Ensure operations of truck movement are from 06.00 am to 06.00 pm as agreed with Manickal Grama Panchayath.</li> <li>➤ Ensure that, there is a delay of approximately 10 minutes between each truck leaving Manickal Quarry.</li> <li>➤ Ensure that, not more than 54 trucks are leaving the project site per day.</li> <li>➤ Regular maintenance of material transport route with immediate rectification when road is damaged.</li> </ul>
3.	Traffic Warden	<ul style="list-style-type: none"> <li>➤ Ensure trucks movements do not hamper the other vehicle movements/pedestrian movement on the junctions where the Traffic Wardens are deployed</li> <li>➤ Time to time communication with the Quarry Supervisor and other Traffic Wardens to know the arrival of trucks.</li> </ul>
4.	Contractor for transportation	<ul style="list-style-type: none"> <li>➤ Contact number of Quarry Supervisor shall be prominently displayed on the trucks so that, local people or any road users can raise complaints.</li> <li>➤ Ensure that code of conduct is issued to truck drivers.</li> <li>➤ Ensuring that truck drivers are given induction trainings and refresher trainings at regular intervals.</li> </ul>
5.	Truck Drivers	<ul style="list-style-type: none"> <li>➤ Follow any instructions provided by Quarry Supervisor.</li> </ul>

S No	Roles	Responsibilities
		<ul style="list-style-type: none"><li>➤ Follow the speed restrictions as per the stipulated regulations.</li><li>➤ There shall be no overtaking of any vehicles by the trucks, unless in emergency situations.</li><li>➤ No unnecessary honking at any location, to reduce the nuisance to the local inhabitants from noise.</li></ul>

## 5. Recommendations

### 5.1. Time of operations and scheduling of trucks

- The hours of operations of truck movement as agreed upon with Manickal Grama Panchayat is from 6.00 am to 6.00 pm. There should not be any truck movement during the school hours (08.30 am to 10.00 am and 03.30 pm to 05.00 pm). This shall be scrupulously followed.
- When the production capacity is increased, about 51 trips are required per day. There shall be a time delay of 10 minutes between each truck leaving Manickal Quarry, to ensure that, not more than 1 truck is entering the road at one go.
- Records of all laden truck movements to and from site (hourly, daily, weekly, monthly, and annually) shall be maintained.
- The number of trips per day shall not exceed, 54 trips.

### 5.2. Regular Maintenance of Material Transport Route

- The material transport route from Manickal Quarry till Kuthirakulam Junction shall be maintained at regular intervals. If there are any cracks or formation of potholes, it shall be immediately rectified.

### 5.3. Traffic Management Measures

- The following traffic management measures suggested in the TMP shall be implemented at the earliest.
  - Traffic Mirrors at 4 locations
  - Road Signs at 8 locations
  - Speed breaker at 1 location
- Proper maintenance of streetlights is needed to avoid obstacles while using roads.
- Ensure that the GPS provided in each truck are functioning properly for efficient tracking of truck movements.

### 5.4. Traffic Warden at Mulamukk Junction

- A Traffic Warden shall be deployed at Mulamukk Junction as well. The Traffic Warden shall inform the truck movement at Mulamukk Junction to the Traffic Wardens at Kuthirakulam and Pirappancode, for regulating the traffic.

### 5.5. Trainings and Awareness to Truck Drivers

- The Contractor for transportation of quarried material shall ensure that, a code of conduct is issued to its truck drivers to ensure satisfactory driver behavior and ensure community expectations are met. The truck drivers should be given induction training in which the project specific requirements such as locations of schools where speed regulations are to be followed shall be informed. In addition, regular refresher trainings shall be given to the truck drivers.
- There shall be no overtaking of any vehicles by the trucks, unless in emergency situations.



### **5.6. Traffic Safety Awareness to local population and community engagement**

- Community engagement is crucial for ensuring that, the traffic management plan is scrupulously followed.
- The contact number of the Quarry Supervisor should be prominently displayed on the trucks, so that, in case of any complaint, the local people or any road users can raise complaints instantly enabling AVPPL to initiate urgent action.
- Local representatives shall be selected and sensitized on the expected increase in the truck movement due to the increased production plan, to meet the timelines stipulated by Kerala State Government.
- Awareness sessions shall be held in schools, especially Government L P School Pirappancode about road safety measures.
- Sponsoring of initiatives such as ‘Public Transport Day’ so that, the State Government and Public focus on improving the Public Transport Infrastructure, which can reduce the heavy dependence on passenger cars, which can in turn, decongest the existing road infrastructure. Decongestion of the roads will make sure that, the truck movements for projects of national importance are not frowned upon, neither by the regulatory authorities, nor by the public.

## **Annexure 2:**

**Email Submission of HYCR for the  
period October 2022 to March 2023**

**From:** [Jesse Benjamin Fullonton](mailto:Jesse.Benjamin.Fullonton)  
**To:** [Jesse Benjamin Fullonton](mailto:Jesse.Benjamin.Fullonton)  
**Subject:** FW: EC No. 1416/EC1/2019/SEIAA dated 27.02.2020 - HYCR - Oct 2022 to Mar 2023 - Manickal - Reg.  
**Date:** Monday, November 20, 2023 3:48:20 PM

---

**From:** Rajesh Kumar Jha <Rajesh.Jha@adani.com>  
**Sent:** Friday, May 26, 2023 5:46 PM  
**To:** rosz.bng-mefcc@gov.in  
**Cc:** seacseiaakerala@gmail.com; Hebin Chenthamarakshan <Hebin.C@adani.com>; Jesse Benjamin Fullonton <jesse.fullonton@adani.com>; Palanivelu Kumar <Palanivelu.Kumar@adani.com>; Environment Avppl <envir.avppl@adani.com>  
**Subject:** EC No. 1416/EC1/2019/SEIAA dated 27.02.2020 - HYCR - Oct 2022 to Mar 2023 - Manickal - Reg.

Dear Sir/Madam,

This is with reference to the Environmental Clearance (EC) Order No. 1416/EC1/2019/SEIAA dated 27.02.2020 issued by State Environment Impact Assessment Authority (SEIAA), Kerala to Adani Vizhinjam Port Private Limited (AVPPL) for our Granite Building Stone Quarry Project in Block No.29, Re-Survey No.120/10 in Manickal Village, Nedumangad Taluk, Thiruvananthapuram District, Kerala.

The Half Yearly Compliance Report (HYCR) of the conditions stipulated in the EC for the period October 2022 to March 2023 is attached vide reference AVPPL/MoEF/2023-24/2437 dated 24.05.2023; 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.

**Annexure 3:**  
**Ambient Air Quality Monitoring Report**



**TEST REPORT****ULR No: TC121912300002287F**

LRI No.: SEAAL23100453A

Date: 10-10-2023

Page 1 of 1

**CUSTOMER DETAILS**

Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Manickal, Nedumangad, Thiruvananthapuram District.
Customer Reference	Test Request date: 29-09-2023

**SAMPLE DETAILS**

Product Category	Atmospheric Pollution	Sample Code	EN23100015
Sample Name	Ambient Air	Sample Received on	01-10-2023
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	02-10-2023
Sampled by	Lab Authorized Sampler	Test Completed on	09-10-2023

**DETAILS OF SAMPLING**

Sampling Location	Project Site	Date of Sampling	29-09-2023
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	65 %
Latitude	8° 39'35.19" N	Longitude	76° 55'42.78" E

**INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS**

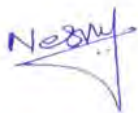
Re - Survey No	120/10, Block No.29		
Village	Manickal	Taluk	Nedumangad
District	Thiruvananthapuram	State	Kerala

**TEST RESULTS-CHEMICAL DISCIPLINE**

SL NO	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARD
1	Particulate matter, PM <sub>10</sub>	IS 5182 (Part 23): 2006	µg/m <sup>3</sup>	47.5	100 (Max)
2	Particulate matter, PM <sub>2.5</sub>	IS 5182 (Part 24): 2019	µg/m <sup>3</sup>	24.2	60.0 (Max)
3	Sulphur dioxide as SO <sub>2</sub>	IS 5182 (Part 2): 2001	µg/m <sup>3</sup>	4.18	80.0 (Max)
4	Oxides of Nitrogen as NO <sub>2</sub>	IS 5182 (Part 6): 2006	µg/m <sup>3</sup>	4.52	80.0 (Max)

Remarks:

\*\*\*End of Report\*\*\*



**Nesny A.K.**  
Chemist  
Checked by




**Laju P.N.**  
Laboratory Head  
Authorized Signatory

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Accreditation & Approval: NABL accredited Testing Laboratory as per ISO/IEC 17025:2017  
vide Certificate No. TC - 12191 & "A" Grade Laboratory approved by KSPCB.

'Standards' Bldg. No: 338/A,B,C,D,E (Behind BPCL Petrol Pump), Edayar, Muppathadam P.O., Ernakulam Dist.- 683 110.  
Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com

## TEST REPORT

ULR No.: TC1219123000002288F

LRI No.: SEAAL23100454A

Date: 10-10-2023

Page 1 of 1

### CUSTOMER DETAILS

Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Manickal, Nedumangad, Thiruvananthapuram District.		
Customer Reference	Test Request date: 29-09-2023		

### SAMPLE DETAILS

Product Category	Atmospheric Pollution	Sample Code	EN23100016
Sample Name	Ambient Air	Sample Received on	01-10-2023
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	02-10-2023
Sampled by	Lab Authorized Sampler	Test Completed on	09-10-2023

### DETAILS OF SAMPLING

Sampling Location	St. John's Hospital, Manickal, (1.4 km away from Project Site)	Date of Sampling	29-09-2023
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	65 %
Latitude	8° 39'45.82" N	Longitude	76° 54'53.35" E

### INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS

Re - Survey No	120/10, Block No.29		
Village	Manickal	Taluk	Nedumangad
District	Thiruvananthapuram	State	Kerala

### TEST RESULTS-CHEMICAL DISCIPLINE

SL NO	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARD
1	Particulate matter, PM <sub>10</sub>	IS 5182 (Part 23): 2006	µg/m <sup>3</sup>	43.8	100 (Max)
2	Particulate matter, PM <sub>2.5</sub>	IS 5182 (Part 24): 2019	µg/m <sup>3</sup>	21.7	60.0 (Max)
3	Sulphur dioxide as SO <sub>2</sub>	IS 5182 (Part 2): 2001	µg/m <sup>3</sup>	4.21	80.0 (Max)
4	Oxides of Nitrogen as NO <sub>2</sub>	IS 5182 (Part 6): 2006	µg/m <sup>3</sup>	4.74	80.0 (Max)

Remarks:

\*\*\*End of Report\*\*\*



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Chemist  
Checked by




**Laju P.N.**  
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Authorized Signatory

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com

**TEST REPORT**

ULR No: TC1219123000002289F

LRI No.: SEAAL23100455A

Date: 10-10-2023

Page 1 of 1

**CUSTOMER DETAILS**

Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Manickal, Nedumangad, Thiruvananthapuram District.
Customer Reference	Test Request date: 29-09-2023

**SAMPLE DETAILS**

Product Category	Atmospheric Pollution	Sample Code	EN23100017
Sample Name	Ambient Air	Sample Received on	01-10-2023
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	02-10-2023
Sampled by	Lab Authorized Sampler	Test Completed on	09-10-2023

**DETAILS OF SAMPLING**

Sampling Location	Govt.L P School, Perumala, (3.36 km away from Project Site)	Date of Sampling	29-09-2023
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	65 %
Latitude	8° 40'48.59" N	Longitude	76° 55'55.74" E

**INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS**

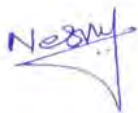
Re - Survey No	120/10, Block No.29		
Village	Manickal	Taluk	Nedumangad
District	Thiruvananthapuram	State	Kerala

**TEST RESULTS-CHEMICAL DISCIPLINE**

SL NO	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARD
1	Particulate matter, PM <sub>10</sub>	IS 5182 (Part 23): 2006	µg/m <sup>3</sup>	44.4	100 (Max)
2	Particulate matter, PM <sub>2.5</sub>	IS 5182 (Part 24): 2019	µg/m <sup>3</sup>	21.8	60.0 (Max)
3	Sulphur dioxide as SO <sub>2</sub>	IS 5182 (Part 2): 2001	µg/m <sup>3</sup>	4.27	80.0 (Max)
4	Oxides of Nitrogen as NO <sub>2</sub>	IS 5182 (Part 6): 2006	µg/m <sup>3</sup>	4.61	80.0 (Max)

Remarks:

\*\*\*End of Report\*\*\*



**Nesny A.K.**  
Chemist  
Checked by




**Laju P.N.**  
Laboratory Head  
Authorized Signatory

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com

**TEST REPORT**

ULR No: TC121912300002290F

LRI No.: SEAAL23100456A

Date: 10-10-2023

Page 1 of 1

**CUSTOMER DETAILS**

Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Manickal, Nedumangad, Thiruvananthapuram District.
Customer Reference	Test Request date: 29-09-2023

**SAMPLE DETAILS**

Product Category	Atmospheric Pollution	Sample Code	EN23100018
Sample Name	Ambient Air	Sample Received on	01-10-2023
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	02-10-2023
Sampled by	Lab Authorized Sampler	Test Completed on	09-10-2023

**DETAILS OF SAMPLING**

Sampling Location	Kovilvila Sree Mahavishnu Temple (2.34 km away from Project Site)	Date of Sampling	29-09-2023
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	65 %
Latitude	8° 39'41.44" N	Longitude	76° 56'36.67" E

**INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS**

Re - Survey No	120/10, Block No.29		
Village	Manickal	Taluk	Nedumangad
District	Thiruvananthapuram	State	Kerala

**TEST RESULTS-CHEMICAL DISCIPLINE**

SL NO	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARD
1	Particulate matter, PM <sub>10</sub>	IS 5182 (Part 23): 2006	µg/m <sup>3</sup>	38.6	100 (Max)
2	Particulate matter, PM <sub>2.5</sub>	IS 5182 (Part 24): 2019	µg/m <sup>3</sup>	19.2	60.0 (Max)
3	Sulphur dioxide as SO <sub>2</sub>	IS 5182 (Part 2): 2001	µg/m <sup>3</sup>	BDL (LOD 4.00)	80.0 (Max)
4	Oxides of Nitrogen as NO <sub>2</sub>	IS 5182 (Part 6): 2006	µg/m <sup>3</sup>	4.39	80.0 (Max)

Remarks:

\*\*\*End of Report\*\*\*



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Chemist  
Checked by




**Laju P.N.**  
Laboratory Head  
Authorized Signatory

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com



## TEST REPORT

ULR No: TC121912300002291F

LRI No.: SEAAL23100457A

Date: 10-10-2023

Page 1 of 1

### CUSTOMER DETAILS

Customer Name & Address	M/s Adani Vizhinjam Port Pvt Ltd Manickal, Nedumangad, Thiruvananthapuram District.		
Customer Reference	Test Request date: 29-09-2023		

### SAMPLE DETAILS

Product Category	Atmospheric Pollution	Sample Code	EN23100019
Sample Name	Ambient Air	Sample Received on	01-10-2023
Sample Conditions at Receipt	Fit for Analysis	Test Commenced on	02-10-2023
Sampled by	Lab Authorized Sampler	Test Completed on	09-10-2023

### DETAILS OF SAMPLING

Sampling Location	Operators Rest Room (0.47 km away from Project Site)	Date of Sampling	29-09-2023
Sampling Procedure	SEAAL/ENL/GEN/SOP/02	Humidity	65 %
Latitude	8° 39'35.78" N	Longitude	76° 55'40.344" E

### INFORMATION PROVIDED BY CUSTOMER - SAMPLING SITE DETAILS

Re - Survey No	120/10, Block No.29		
Village	Manickal	Taluk	Nedumangad
District	Thiruvananthapuram	State	Kerala

### TEST RESULTS-CHEMICAL DISCIPLINE

SL NO	PARAMETERS	TEST METHOD	UNIT	RESULT	NAAQ STANDARD
1	Particulate matter, PM <sub>10</sub>	IS 5182 (Part 23): 2006	µg/m <sup>3</sup>	42.9	100 (Max)
2	Particulate matter, PM <sub>2.5</sub>	IS 5182 (Part 24): 2019	µg/m <sup>3</sup>	20.4	60.0 (Max)
3	Sulphur dioxide as SO <sub>2</sub>	IS 5182 (Part 2): 2001	µg/m <sup>3</sup>	BDL (LOD 4.00)	80.0 (Max)
4	Oxides of Nitrogen as NO <sub>2</sub>	IS 5182 (Part 6): 2006	µg/m <sup>3</sup>	4.18	80.0 (Max)

Remarks:

\*\*\*End of Report\*\*\*

**Nesny A.K.**  
Chemist  
Checked by



**Laju P.N.**  
Laboratory Head  
Authorized Signatory

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com



**Annexure 4:**  
**Noise Monitoring Report**

**TEST REPORT**

ULR No: TC121912300002292F

LRI No.: SEAAL23100458A

Date: 10-10-2023

Page 1 of 2

**CUSTOMER DETAILS**

Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Manickal, Nedumangad, Thiruvananthapuram District
Customer Reference	Test Request date: 29-09-2023

**DETAILS OF MONITORING**

Product Category	Atmospheric Pollution	Sample Code	EN23100020
Sample Name	Ambient Noise	Monitoring Commenced on	29-09-2023
Test Method	IS 9989:1981	Monitoring Completed on	30-09-2023
Monitoring Location	Project Site	Monitored by	Lab Authorized Sampler
Latitude	8° 39'35.34" N	Longitude	76° 55'42.93" E

**SAMPLING SITE DETAILS**

Survey No.	120/10, Block No.29		
Village	Manickal	Taluk	Nedumangad
District	Thiruvananthapuram	State	Kerala

**MONITORING RESULTS - Leq**

TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	38.0	14:00	51.0	22:00	36.8
07:00	40.8	15:00	51.4	23:00	36.7
08:00	45.1	16:00	52.5	24:00	39.3
09:00	48.6	17:00	52.9	01:00	40.1
10:00	51.0	18:00	47.4	02:00	39.7
11:00	54.1	19:00	43.9	03:00	40.4
12:00	51.4	20:00	40.0	04:00	39.3
13:00	50.6	21:00	39.5	05:00	41.2



**Nesny A.K.**  
Chemist  
Checked by




**Laiju P.N.**  
Laboratory Head  
Authorized Signatory

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com

## TEST REPORT

ULR No: TC121912300002292F

LRI No.: SEAAL23100458A

Date: 10-10-2023

Page 2 of 2

### TEST RESULTS- CHEMICAL DISCIPLINE

Sl. No.	PARAMETERS	UNIT	RESULT	Limit as per Noise Pollution (Regulation and Control) Rules, 2000 (Industrial Area)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	49.4	75 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	39.7	70 dB (A)

Remarks:

\*\*\*End of Report\*\*\*

# Standards



**Nesny A.K.**  
Chemist  
Checked by



**Laiju P.N.**  
Laboratory Head  
Authorized Signatory

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com

## TEST REPORT

ULR No: TC121912300002293F

LRI No.: SEAAL23100459A

Date: 10-10-2023

Page 1 of 2

### CUSTOMER DETAILS

Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Manickal, Nedumangad, Thiruvananthapuram District
Customer Reference	Test Request date: 29-09-2023

### DETAILS OF MONITORING

Product Category	Atmospheric Pollution	Sample Code	EN23100021
Sample Name	Ambient Noise	Monitoring Commenced on	29-09-2023
Test Method	IS 9989:1981	Monitoring Completed on	30-09-2023
Monitoring Location	St. John's Hospital, Manikkal, (1.4 km away from Project Site)	Monitored by	Lab Authorized Sampler
Latitude	8° 39'45.80" N	Longitude	76° 54'53.46" E

### SAMPLING SITE DETAILS

Survey No.	120/10, Block No.29		
Village	Manickal	Taluk	Nedumangad
District	Thiruvananthapuram	State	Kerala

### MONITORING RESULTS - Leq

TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	37.0	14:00	49.5	22:00	35.8
07:00	39.6	15:00	49.9	23:00	36.3
08:00	43.8	16:00	51.1	24:00	38.9
09:00	47.2	17:00	51.4	01:00	39.6
10:00	49.5	18:00	46.1	02:00	39.3
11:00	52.6	19:00	42.7	03:00	40.0
12:00	49.9	20:00	38.9	04:00	38.9
13:00	49.1	21:00	38.4	05:00	40.8



**Nesny A.K.**  
Chemist  
Checked by




**Laiju P.N.**  
Laboratory Head  
Authorized Signatory

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com

## TEST REPORT

ULR No: TC121912300002293F

LRI No.: SEAAL23100459A

Date: 10-10-2023

Page 2 of 2

### TEST RESULTS- CHEMICAL DISCIPLINE

Sl. No.	PARAMETERS	UNIT	RESULT	Limit as per Noise Pollution (Regulation and Control) Rules, 2000 (Safe Zone Area)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	50.0	50 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	41.8	45 dB (A)

Remarks:

\*\*\*End of Report\*\*\*

# Standards



**Nesny A.K.**  
Chemist  
Checked by



**Laiju P.N.**  
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Authorized Signatory

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Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com



## TEST REPORT

ULR No: TC1219123000002294F

LRI No.: SEAAL23100460A

Date: 10-10-2023

Page 1 of 2

### CUSTOMER DETAILS

Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Manickal, Nedumangad, Thiruvananthapuram District
Customer Reference	Test Request date: 29-09-2023

### DETAILS OF MONITORING


Product Category	Atmospheric Pollution	Sample Code	EN23100022
Sample Name	Ambient Noise	Monitoring Commenced on	29-09-2023
Test Method	IS 9989:1981	Monitoring Completed on	30-09-2023
Monitoring Location	Govt.L P School, Perumala, (3.36 km away from Project Site)	Monitored by	Lab Authorized Sampler
Latitude	8° 40'48.588" N	Longitude	76° 55'55.88" E

### SAMPLING SITE DETAILS

Survey No.	120/10, Block No.29		
Village	Manickal	Taluk	Nedumangad
District	Thiruvananthapuram	State	Kerala

### MONITORING RESULTS - Leq

TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	36.3	14:00	48.6	22:00	35.2
07:00	38.9	15:00	49.0	23:00	36.5
08:00	43.0	16:00	50.1	24:00	39.1
09:00	46.4	17:00	50.5	01:00	39.9
10:00	48.6	18:00	45.3	02:00	39.5
11:00	51.6	19:00	41.9	03:00	40.2
12:00	49.0	20:00	38.1	04:00	39.1
13:00	48.2	21:00	37.7	05:00	41.0



**Nesny A.K.**  
Chemist  
Checked by



**Laju P.N.**  
Laboratory Head  
Authorized Signatory

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### Standards Environmental & Analytical Laboratories

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'Standards' Bldg. No: 338/A,B,C,D,E (Behind BPCL Petrol Pump), Edayar, Muppathadam P.O., Ernakulam Dist.- 683 110  
Tel. 0484-2546660, 93872 72402, 90743 41443, Web: www.sealabs.in, E-mail: seaalab@gmail.com

## TEST REPORT

ULR No: TC1219123000002294F

LRI No.: SEAAL23100460A

Date: 10-10-2023

Page 2 of 2

### TEST RESULTS- CHEMICAL DISCIPLINE

Sl. No.	PARAMETERS	UNIT	RESULT	Limit as per Noise Pollution (Regulation and Control) Rules, 2000 (Safe Zone Area)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	49.7	50 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	41.2	40 dB (A)

Remarks:

\*\*\*End of Report\*\*\*

# Standards



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Chemist  
Checked by



**Laiju P.N.**  
Laboratory Head  
Authorized Signatory

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## TEST REPORT

ULR No.: TC1219123000002295F

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Date: 10-10-2023

Page 1 of 2

### CUSTOMER DETAILS

Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Manickal, Nedumangad, Thiruvananthapuram District
Customer Reference	Test Request date: 29-09-2023

### DETAILS OF MONITORING

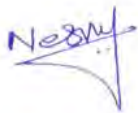
Product Category	Atmospheric Pollution	Sample Code	EN23100023
Sample Name	Ambient Noise	Monitoring Commenced on	29-09-2023
Test Method	IS 9989:1981	Monitoring Completed on	30-09-2023
Monitoring Location	Kovilvila Sree Mahavishnu Temple(2.34 km away from Project Site)	Monitored by	Lab Authorized Sampler
Latitude	8° 40'48.588" N	Longitude	76° 55'55.88" E

### SAMPLING SITE DETAILS

Survey No.	120/10, Block No.29		
Village	Manickal	Taluk	Nedumangad
District	Thiruvananthapuram	State	Kerala

### MONITORING RESULTS - Leq

TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	36.0	14:00	48.2	22:00	34.9
07:00	38.6	15:00	48.6	23:00	36.8
08:00	42.7	16:00	49.7	24:00	39.4
09:00	46.0	17:00	50.1	01:00	40.2
10:00	48.2	18:00	44.9	02:00	39.8
11:00	51.2	19:00	41.6	03:00	40.6
12:00	48.6	20:00	37.8	04:00	39.4
13:00	47.9	21:00	37.4	05:00	41.3



**Nesny A.K.**  
Chemist  
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## TEST REPORT

ULR No: TC1219123000002295F

LRI No.: SEAAL23100461A

Date: 10-10-2023

Page 2 of 2

### TEST RESULTS- CHEMICAL DISCIPLINE

Sl. No.	PARAMETERS	UNIT	RESULT	Limit as per Noise Pollution (Regulation and Control) Rules, 2000 (Safe Zone Area)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	51.3	50 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	42.5	40 dB (A)

Remarks:

\*\*\*End of Report\*\*\*

# Standards



**Nesny A.K.**  
Chemist  
Checked by



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## TEST REPORT

ULR No: TC1219123000002296F

LRI No.: SEAAL23100462A

Date: 10-10-2023

Page 1 of 2

### CUSTOMER DETAILS

Customer Name & Address	<b>M/s Adani Vizhinjam Port Pvt Ltd</b> Manickal, Nedumangad, Thiruvananthapuram District
Customer Reference	Test Request date: 29-09-2023

### DETAILS OF MONITORING

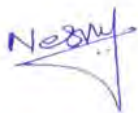
Product Category	Atmospheric Pollution	Sample Code	EN23100024
Sample Name	Ambient Noise	Monitoring Commenced on	29-09-2023
Test Method	IS 9989:1981	Monitoring Completed on	30-09-2023
Monitoring Location	Operators Rest Room (0.47 km away from Project Site)	Monitored by	Lab Authorized Sampler
Latitude	8° 40'48.588" N	Longitude	76° 55'55.88" E

### SAMPLING SITE DETAILS

Survey No.	120/10, Block No.29		
Village	Manickal	Taluk	Nedumangad
District	Thiruvananthapuram	State	Kerala

### MONITORING RESULTS - Leq

TIME	RESULTS dB(A)	TIME	RESULTS dB(A)	TIME	RESULTS dB(A)
06:00	39.7	14:00	53.2	22:00	38.4
07:00	42.5	15:00	53.6	23:00	39.5
08:00	47.0	16:00	54.8	24:00	42.3
09:00	50.7	17:00	55.2	01:00	43.1
10:00	53.2	18:00	49.5	02:00	42.7
11:00	56.4	19:00	45.8	03:00	43.5
12:00	53.6	20:00	41.7	04:00	42.3
13:00	52.8	21:00	41.2	05:00	44.4



**Nesny A.K.**  
Chemist  
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## TEST REPORT

ULR No: TC1219123000002296F

LRI No.: SEAAL23100462A

Date: 10-10-2023

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### TEST RESULTS- CHEMICAL DISCIPLINE

Sl. No.	PARAMETERS	UNIT	RESULT	Limit as per Noise Pollution (Regulation and Control) Rules, 2000 (Industrial Area)
1	Ambient Sound Level (Leq) Day Time (06:00 to 22:00)	dB(A)	51.7	75 dB (A)
2	Ambient Sound Level (Leq) Night Time (22:00 to 06:00)	dB(A)	42.8	70 dB (A)

Remarks:

\*\*\*End of Report\*\*\*

# Standards



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**Half Yearly Compliance Report (HYCR)  
April 2023 to September 2023**

**Building Stone Quarry Project in Block No. 29, Re-survey No. 120/10 at  
Manickal Village, Nedumangad Taluk, Thiruvananthapuram District**



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